



postnote

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CLIMATE CHANGE POLICY UPDATE

The Kyoto Protocol aims to reduce emissions of 'greenhouse gases', the main sources of human-induced climate change. International negotiations resume in Bonn on 19th July 2001 to define the rules for implementing the Protocol. However, recent statements from the US Administration have heightened doubts over the prospects for agreement at Bonn.

This briefing summarises the latest scientific assessment of climate change, the issues to be resolved in Bonn, and the implications for future policy.

Scientific assessment

Previous POSTnotes¹ have described the work of the Intergovernmental Panel on Climate Change (IPCC). Building on its 1995 assessment, the IPCC published its latest findings (www.ipcc.ch) in July 2001, covering:

- scientific aspects of the climate and climate change
- vulnerability to, and impacts of climate change
- mitigating climate change

The science of climate change

The key findings in each of the three areas are highlighted in the boxes opposite and on page 2. In summary, there is now stronger evidence that the climate has changed over the last 50 years. The IPCC states that most of the observed changes can be attributed to human activities. In particular, the burning of fossil fuels (coal, oil and natural gas) and deforestation.

Computer models of the climate have improved significantly over the last five years, and now IPCC has greater faith in the projections of climate change into the future. Despite the increased levels of confidence in the data and the projections, gaps in information and understanding remain.

IPCC assessment of the science of climate change

- During the 20th century, the world warmed by about 0.6°C and global average sea level rose by 0.1-0.2m. In the Northern Hemisphere, the increase in temperature has probably been the largest of any century in the last 1000 years.
- The concentration of carbon dioxide (CO₂) in the atmosphere has increased 31% since 1750. IPCC suggests that it is now the highest for over 400,000 years, and possibly for the past 20 million years. Also, the rate at which this concentration has increased is unprecedented during the past 20,000 years.
- Mathematical models of the climate have improved since 1995, with more sophisticated understanding of climate processes. These models are now better able to simulate how the climate has changed in the past. As such, there is now greater confidence in the scientific basis for the models and there is stronger evidence of human causes to most of the observed concentration and temperature changes.
- Projections of future greenhouse gas emissions indicate that global average temperature and sea level will continue to rise for the rest of the 21st century.

To reduce uncertainties and improve projections of future climate change, IPCC has suggested further research on:

- understanding of climate change processes
- the detection of human-induced climate change from within a naturally variable climate
- the attribution of climate change to human activities.

IPCC examined a range of scenarios related to patterns of economic development and activities to curb greenhouse gas emissions. Across the range of all scenarios, it found that the global average temperature is expected to continue to rise by between 1.4 and 5.6 °C by 2100.

Impacts of climate change

Effects of a changing climate have already been observed. Examples include: shrinking glaciers, thawing permafrost, later freezing and earlier break-up of ice, lengthening growing seasons, poleward migration of some animals and plant populations, earlier flowering of trees, earlier emergence of insects and earlier bird egg-laying. Floods and droughts have become more frequent, affecting communities and economies.

However, IPCC points out that such systems are also affected by short-term weather variations, and by demographic and land-use changes, making it difficult to identify the relative impact of climate change. Furthermore, it is not possible to link single events such as a severe storm or flood directly with global climate change.

If climate change continues at the anticipated rate, there may be a mixture of adverse and beneficial effects. Among the adverse effects, many animal and plant species will find it difficult to adapt, and so IPCC concludes that some will be irreversibly damaged. Similarly, many human activities are sensitive to climate change, in particular, changes in climate extremes such as droughts, heat waves, floods and windstorms. Here, projections indicate that these will become more severe and more frequent, resulting in damage to property, possible loss of life, increased energy demand for cooling and decreased crop yields. Among the beneficial effects, there may be increased crop yields, fewer winter deaths and reduced demand for space heating. However, at present neither the risks nor benefits are well quantified.

Overall, IPCC expects impacts to be inevitable, arising from an increasingly variable climate, a rapid rate of change, and alterations in both average and extreme conditions. Adapting to these changes would reduce (but not eliminate) risks but also enhance benefits.

Impacts of climate change

At least some of these significant changes would affect all parts of the world. In particular, IPCC expressed concern over the likely increases in the magnitude and severity of extreme weather events, such as rainfall, heatwaves, and windstorms.

A key issue arising is the extent to which developing countries are likely to be disproportionately affected by such changes. Climate change may well increase the disparity between developed and developing countries. IPCC argues that there is a direct link between a country's level of development and its ability to adapt to climate change. The least developed are, therefore, likely to be most vulnerable to the adverse effects. In contrast, developed countries could expect net economic gains where temperature rises remain low (within a few degrees). However, the IPCC states² that "*an increase in global mean temperature of up to a few degrees would produce a mixture of economic gains and losses in developed countries*" and also states³ that "*economic losses would result from larger temperature increases.*"

Mitigating climate change

To reduce these potential effects, IPCC points to a range of possible mitigation measures. Noting that burning fossil fuels dominates the emission of greenhouse gases, IPCC concludes that reducing emissions requires

Mitigating climate change

Mitigation of climate change is the deliberate intervention to reduce greenhouse gas emissions or to enhance their natural absorption in 'sinks' such as forests, grasslands and oceans (see POSTnote 147, October 2000).

Examining the broad range of mitigation options, IPCC found that known technologies could stabilise atmospheric CO₂ levels over the next 100 years or more, but "*a very significant reduction in world carbon emissions per unit of GDP from 1990 levels will be necessary.*" At present, it is not possible to define the ultimate target for stabilising the CO₂ concentration, but research is continuing. IPCC thus suggests that a precautionary approach is needed, recognising the long-term and complex nature of climate change, and seeking the best near-term course of action.

Technological progress towards reducing greenhouse gas emissions has been made since the last assessment and IPCC reports that that this progress has been faster than anticipated in 1995. Although there is also significant potential for mitigation through the enhancement of carbon sinks, this is not necessarily a permanent solution (see box on page 3). However, at the very least, it may allow time for other options to be developed.

countries to adopt different choices of energy technology. However, it points out that there are many technical and non-technical barriers to reducing emissions, and so suggested a flexible approach. In particular, IPCC concludes that a mix of policies should be developed; tied into objectives not specifically related to climate and co-ordinated between sectors and countries.

Overall, IPCC concludes that four key elements are necessary for successful mitigation:

- taking actions earlier rather than later
- implementing a portfolio of options
- stimulating technology development
- reducing scientific uncertainty.

International policy debate

The Hague conference

The sixth conference of the parties (COP6) to the UN Framework Convention on Climate Change (FCCC) began in The Hague in November 2000. The meeting aimed to set the rules for implementing the Kyoto Protocol, but did not succeed⁴. It was subsequently resolved to resume COP6 in Bonn from the 19-27th July 2001⁵. POSTnote 147 outlined the key issues, and these still remain important (summarised in the box on page 3).

Recent developments in the US

Since COP6 was suspended, the US Administration has withdrawn support for the Kyoto Protocol. It argues that the Protocol is an expensive way to reduce emissions that could send the US economy into recession.

In May 2001, the US National Energy Policy Development Group⁶ set out a new energy policy that sees growth in energy supply as essential. It supports growth of conventional supplies (i.e. oil, coal and natural gas), but also supports further renewable and nuclear energy sources, and greater energy efficiency.

Sticking-points at COP6

Use of carbon sinks. This proved one of the most contentious issues at COP6. Here, the US wanted to be able to offset its emissions against the absorption of carbon in biological sinks – e.g. from changes in agriculture, and in existing forests and grasslands. The EU opposed this, arguing that scientific understanding of carbon sinks was not sufficiently advanced to ensure the success of this strategy. The EU was also concerned about how carbon sinks could be abused (e.g. by cutting down and then replanting forests or claiming credit for avoiding deforestation).

Flexible mechanisms. The Kyoto Protocol allows for the use of so-called ‘flexible mechanisms’ (such as emissions trading, and carrying out emission reduction projects in other countries) to supplement action taken within a country to curb emissions. The EU argued that these should be limited and ‘supplemental’ to domestic action, based on the principle of ‘putting one’s own house in order’ before seeking extensive offsets elsewhere. However, the US (and others e.g. Japan) argued for more extensive use of offsets.

Developing country issues. The Protocol includes provisions for the transfer of technology to developing countries; building capacity for tackling climate change; and funds for adapting to climate change. Progress on these topics was made at The Hague, but the details remain unresolved.

Compliance. There is agreement that countries should be subject to both penalties and incentives for meeting emission reduction targets, and ensuring fair trading. The EU supported strong legally binding consequences for non-compliance, while some other developed countries disagreed (in particular Russia, Japan and Australia).

A US National Research Council (NRC) review of the science of climate change reported its findings to the White House in June 2001. The review stated that the NRC “*generally agrees with the assessment of human-induced climate change presented by the IPCC Working Group I scientific report*”, although it pointed out the levels of confidence and caveats attached⁷. In responding to the report, and again later at the EU-US summit in June, President Bush acknowledged the seriousness of climate change, but also pointed out its complexity and the lack of full scientific understanding. Essentially, the US views the Kyoto Protocol as fundamentally flawed, primarily because it feels that the targets are unrealistic, draconian (requiring the US to reduce its current emissions by 30%) and without any scientific basis. The two main US concerns are over the cost of the Protocol and the role of developing countries. These arguments are explored below with others’ views.

The cost of the Kyoto Protocol

- The US position

The Kyoto Protocol aims to reduce developed countries’ greenhouse gas emissions by 5.2% by 2008-2012 (from a 1990 base). The US view is that compliance would hit the US economy. It cites estimates indicating that meeting the targets would reduce US GDP by 1-2% by 2010 (a similar scale to the 1970s oil shocks). However, observers point to other estimates (including those by the IPCC) indicating the impact to the US economy might be considerably smaller – less than 0.6% of GDP, set against a projected 30% growth by 2010.

Similarly, divisions exist within the US business sector over the perceptions of the cost-effectiveness of climate change mitigation. Indeed, some point to commitments already made by some businesses (e.g. Ford Motor Company) and the growth of alliances between US states towards improving environmental performance.

- The EU position

The EU acknowledges that the Kyoto targets are modest, but sees them as the first steps towards much deeper cuts in emissions. Thus, the EU maintains that the Kyoto Protocol is ‘the only game in town’ and that it is essential to establish a legal framework with targets and timescales to reduce emissions. The EU wants the US to participate, and has expressed willingness to negotiate.

Fundamentally though, the EU disagrees with US arguments about the costs of mitigation and suggests that it is possible to improve what is known as ‘resource productivity’ (i.e. breaking the link between economic growth and the use of resources). In particular, the EU bases this view on its ability to compete internationally despite having higher energy costs than the US.

- The IPCC view

IPCC concluded that it is ‘notoriously difficult’ to estimate the costs and benefits of mitigation because there are many ways to undertake the analysis. As a result, estimates of costs and benefits are inevitably uncertain. For example, studies indicate that a tonne of carbon could be traded in an international market for anywhere between two and six hundred US dollars.

For any mitigation efforts, the economic costs and benefits are distributed unevenly between sectors, with the possibility of ‘spillover’ effects between countries. For example, the economies of oil-producing countries in the Middle East may be damaged, or industries may relocate to areas of the world with less stringent environmental policies (known as ‘carbon leakage’). The IPCC pointed out that different regions and nations have access to different technological, natural and financial resources. One region or country may, therefore, be able to reduce emissions at lower cost than another. Also, mitigation costs may be lower in future.

One area on which there is little disagreement is the availability of so-called ‘no-regrets’ options. These are activities not specifically related to climate change mitigation, whose benefits equal or exceed their costs to society. These exist where current systems are inefficient and already create costs to society. For example, existing inefficiencies in current energy production and use can cause fuel poverty and pollution.

Involving developing countries

The Kyoto Protocol does not require developing countries to take on legally binding emission reduction targets. But the US argues that participation by these countries will be necessary for successfully dealing with climate change. It points out for instance, that China is the second largest emitter of greenhouse gases (after the US

itself), yet China is exempted from any targets at this stage of the process. As such, the US believes that its economy would be compromised if it were to reduce emissions without developing countries taking on binding commitments at the same time.

However, the UN FCCC, agreed by the US in 1992 underpins the Kyoto Protocol. The FCCC sets out the principle of 'differentiated responsibilities' requiring developed countries to reduce greenhouse gas emissions before developing countries, recognising their historical roles in the climate change problem. Nevertheless, the FCCC requires developing countries to 'take steps' to limit emissions. Similarly, developing countries can take part in the Kyoto protocol through investment projects under the Clean Development Mechanism. Thus, all Parties to the FCCC recognise the need for developing countries to eventually adopt legally binding targets. Many thus interpret the US demand for developing countries' participation at this stage, as renegeing on the responsibilities it recognised in 1992.

Implications for climate policy

Recent US statements have raised a number of questions about the future of climate change policies. Both the US and the EU have stated that they are committed to the FCCC, and to achieving its ultimate goal of stabilising the concentrations of greenhouse gases "*to avoid dangerous interference with the climate*". They agree on the importance of co-operating on climate-related research, but they disagree on the Kyoto Protocol and ratification.

Nevertheless, the US will participate at the resumed COP6 talks. The question arises, however, over whether agreement can be reached in Bonn, and whether lack of agreement would signal the death knell for the Kyoto Protocol. Parties to the Protocol are keen to reach agreement, and are hopeful of a successful outcome in Bonn. The US position may not be a barrier, as it is possible for the Kyoto Protocol to enter into force without the US. However, 55 countries (together representing 55% of developed countries' 1990 emissions) would need to ratify. This makes ratification by the EU, Russia and Japan essential. While, the EU is planning to do so, and Russia is likely to ratify (if agreement can be reached on emissions trading), ratification by Japan is less certain. However, it may be possible if greater use of the flexible mechanisms and carbon sinks are allowed.

Once the Kyoto Protocol enters into force emissions targets become legally binding. Similarly, the flexible mechanisms gain a legal footing, but non-ratifying countries will not be eligible to take part. Billions of dollars of property rights will be created, and US businesses may wish to participate in this potentially lucrative market. The US may, therefore, wish to participate later (e.g. as developing countries begin to take on binding targets).

Nevertheless, Parties would be unwilling to let any lack of an agreement in Bonn be seen as a total failure of the whole process, and would seek to continue negotiations

What future for the Kyoto Protocol?

Amending Kyoto - Countries could renegotiate their emission reduction targets, or allow greater use of the flexible mechanisms and carbon sinks to help meet the targets.

Unpicking Kyoto - The Kyoto Protocol covers many intertwined and complex issues. As such, reaching agreement may necessarily be difficult. The Protocol could be 'unpicked' – with different parts negotiated on parallel tracks, allowing for the basic elements to be agreed. For instance targets, compliance and flexible mechanisms might be agreed separately from developing country issues. Again, the Protocol's complexity may make this difficult.

Replacing Kyoto - A new Protocol could be negotiated which included developing countries taking on commitments regarding future emissions. Persuading developing countries to take action before developed countries had made substantial progress would be difficult.

Abandoning Kyoto - Individual countries or groups of countries could pursue their own mitigation policies, possibly co-ordinated (e.g. by the OECD).

at subsequent meetings, or through a continuous negotiating process. However, should talks break down, a number of scenarios for the future of the international negotiations can be envisaged (box above). Ultimately, a renegotiated international agreement may be possible, but many commentators point out that the Kyoto Protocol already enshrines the foundations for any feasible international agreement. Thus, they argue that any reconstructed treaty would end up looking much like the Kyoto Protocol⁸.

Overview

Despite US concerns over the Kyoto Protocol, it remains committed to attending the Bonn meeting. For the present, at least, the Kyoto Protocol remains the focus for international action on climate change. The resumption of the COP6 meeting in Bonn should help clarify countries' positions, and point the way for the future development of international climate policy.

Endnotes

- 1 POSTnotes 61 (1995), 100 (1997), 121 (1998) and 147 (2000).
- 2 with low confidence
- 3 with medium confidence
- 4 There are many theories put forward of why The Hague conference failed – e.g. see *International Affairs* 77 2(2001) 251-210.
- 5 A high level political statement is expected for the 22nd July, with the last week of the conference dedicated to drawing up a legal text.
- 6 A cabinet-level group, chaired by the Vice-President.
- 7 17 national science academies issued a statement on 17 May 2001 concluding, "*the balance of evidence demands effective steps now to avert damaging changes to the earth's climate.*"
- 8 Grubb, M. *et al* (2001). *Keeping Kyoto - a study of approaches to maintaining the Kyoto Protocol on climate change*. Climate Strategies - International Network for Climate Policy Analysis (www.climate-strategies.org).

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