

JUST A LOT OF HOT AIR?
A close look at the Climate Change Convention

1	INTRODUCTION	
	What do we know about global warming?	
	Greenhouse gases	
	Who is responsible?	
	Counting the cost	
2	THE CLIMATE CHANGE CONVENTION	
	Who is for, who is against?	
	The Kyoto Protocol	
	Action in developing countries	
	Equity – bottom line or wishful thinking?	
3	THE SIXTH CONFERENCE OF PARTIES (COP 6)	
	1. The Flexibility mechanisms	
	? Emissions trading	
	? Joint Implementation	
	? Clean Development Mechanism	
	2. Forests and land use	
	3. Compliance and enforcement	
	4. The US position in the negotiations	
4	MAKING THE ENERGY SHIFT	
	Lighting up the world: electricity	
	Moving on: transport	
	Making the change: energy taxes	
5	THE NEXT STEPS	
	Glossary	

INTRODUCTION

The next few weeks could be crucial to the future of the Earth. The world's governments are meeting in the Hague from 13-24 November 2000 to try and agree how to stop global warming. This meeting, COP6, or the Sixth Conference of Parties to the Climate Change Convention, is the latest in a series following the agreements made at Kyoto in 1997 (the Kyoto Protocol). After years of discussion, the industrialised countries of the world are almost at the point of agreeing specific targets and actions for reducing their greenhouse gas emissions.

Most people – though not all – agree that greenhouse gases are one of the major factors contributing to climate change. While the industrialised world is the biggest polluter, it is the developing* world that is currently most at risk. Global warming may affect water supplies and reduce food production in the tropics and sub-tropics, putting an additional 50 million people at risk of hunger by 2100. Rising sea levels caused by climate change threaten 10 million people living in low-lying areas in countries like Bangladesh, the Maldives, Egypt and China.

And yet in 1996, one US citizen was responsible for producing as much greenhouse gas as 19 Indians, 30 Pakistanis, or 269 Nepalese.

There are major disagreements that need to be resolved at the meeting in the Hague. The poorer world argues that the biggest polluters must be the first to take action. But in countries like the US, governments are reluctant to take measures that might be unpopular with voters or with corporations.

There is no certainty that these differences will be resolved at the meeting. Even if they are, it will only be the first, small step towards stabilising the global temperature. Some people feel that even if the meeting succeeds, it will make little difference to the catastrophic course the world seems set on; others are more optimistic, feeling that once this step is taken, the rest will become easier.

** The words "developed" or "industrialised" for the rich world and "developing" for the poor one have been used throughout, while acknowledging that they are not adequate ways of dividing or describing the world in which we live.*

What do we know about global warming?

Fact: The world is heating up – fast. Temperatures are rising more quickly than they have done for 10,000 years.

Fact: The 1990s were the warmest decade on record, and 1998 was the hottest year.

Fact: The earth's average surface temperature has warmed between 0.3 and 0.6 degrees Celsius in the last 100 years. It may rise by two degrees in the next 100 years, if we go on producing greenhouse gases at the present rate.

Fact: Sea levels have risen by between 10-25 centimetres in 100 years, as polar ice caps have melted. They are projected to rise another 50 centimetres by 2100.¹

Fact: There have been unpredictable and extreme weather patterns – freak weather disasters such as Hurricane Mitch that hit Central America in 1998; the devastating

storm “Lothar” that swept through Europe in December 1999; and the floods in Mozambique in early 2000.

Most people accept that global warming is a major problem. The Intergovernmental Panel on Climate Change says that “In themselves [the signs of climate change] are not proof of global warming, but the accumulation and frequency of them is”.²

It also seems clear that the changes we are seeing in the weather are caused – at least in part – by the gases our industries and transport systems pour into the atmosphere. There are sceptics, including a number of scientists, who argue that the extreme weather events we are witnessing probably have causes other than global warming. The present variations, they say, are no greater than those which have occurred from time to time during the past millennium and more – for instance, the increase and severity of hurricanes in the eastern US is a regular natural cycle, just as drought also occurs in cycles. Periods of cold – “Ice-Ages” and “mini Ice-Ages” – occur as a matter of course. The most recent mini Ice Age was from the thirteenth to the nineteenth centuries, when the River Thames in London froze, half the populations of Sweden and Norway may have starved to death, and snow blanketed parts of Ethiopia.³

Most scientists, however, agree that “the balance of evidence suggests a discernible human influence on the global climate”.⁴ They argue that we cannot afford to wait for absolute proof. They find the evidence sufficiently convincing and argue for the ‘precautionary principle’ – that is, if there is a strong risk of something bad occurring, we should take action to prevent it, even if we are not completely certain it will ever happen.

Greenhouse gases

The so-called “greenhouse gases” are mainly carbon dioxide, methane and nitrous oxide. Carbon dioxide is the most important, forming 80% of industrialised world’s greenhouse gas emissions in 1990. It is principally produced by the combustion of oil, coal and gas.

After over 200 years of industrialisation powered by these carbon-based fossil fuels, large quantities of gases have been released faster than natural processes can remove them from the atmosphere. As a result, concentrations of carbon dioxide have risen by almost one third – more and faster than at any time in recorded history. The cutting down of forests that absorb carbon dioxide has added to the problem. Carbon dioxide forms a tiny proportion of the atmosphere – only 0.028 % at pre-industrial levels and 0.036% now – but it is critical for maintaining the temperature in which life flourishes. Released into the atmosphere, carbon dioxide remains there for around 100 years. This causes the atmosphere to retain more of the infrared heat radiated from the earth’s surface, thus leading to a gradual rise in global temperature. Other greenhouse gases are smaller in volume than carbon dioxide but more potent. The amount of methane, released mainly by agriculture, has more than doubled.⁵ Methane remains in the atmosphere for twelve years.

Who is responsible?

In 1990 the quarter of the world's population living in the developed world contributed about three quarters of the world's carbon dioxide emissions and well over half of total global greenhouse gas emissions. The US alone produces almost a quarter of the total world emissions of greenhouse gases, with one of the highest per capita emissions rates of carbon dioxide.⁶

Per capita differences are even starker. According to the Centre for Science and Environment, Delhi, the greenhouse gas emissions of one US citizen in 1996 were equal to those of 19 Indians, 30 Pakistanis, 19 Sri Lankans, 107 Bangladeshis, 134 Bhutanese or 269 Nepalese.⁷ Per capita emissions in the European Union (EU) and Japan are about half the levels of the United States and Australia.

Total emissions by developing countries are expected to catch up with those of the developed countries within the next four decades, according to the IPCC. But on a per capita basis, some 20% of the world's population will still be responsible for half of its greenhouse gas emissions.⁸

Counting the cost

And yet it is people in developing countries who will suffer most from climate change. Poverty makes people more vulnerable to natural changes as they don't have the resources – whether at country or individual level – to deal with changes and adapt to natural disasters.

For example, rising sea levels threaten 10 million people living in island states and in low-lying deltas in countries like Bangladesh, Egypt and China. Most of the endangered areas are in south and south-east Asia, and include 30 of the world's largest cities. Global warming may affect water supplies and reduce food production in the tropics and subtropics, putting an additional 50 million people at risk of hunger by 2100. It may also damage non-tropical forests; lead to loss of species; and perhaps spread tropical diseases further north.

For industrialised countries, the costs of living in a world with twice pre-industrial levels of carbon dioxide in the atmosphere are estimated at between 1% and 3% of Gross Domestic Product (GDP). For developing countries, the estimates range from 2-9% of GDP.⁹

A view from Bangladesh

Bangladesh will suffer more from climate change than almost anywhere else in the world. 20-30 million people are likely to be affected, while the country's own emissions of greenhouse gases are less than 0.1% of the global total. The likely impacts can't be predicted exactly – though some of Bangladesh's scientists have become world-respected experts on the subject of vulnerability to climate change – but they include:

- ✍ increased drought
- ✍ increased floods from rainfall and snowmelt
- ✍ sea level rise, causing salinisation of coastal crop lands, coastal erosion, and damage to coastal mangrove forests
- ✍ impacts on fisheries, as seawater temperatures and conditions change
- ✍ cyclones becoming more severe and perhaps more frequent.

To prepare itself for these changes, Bangladesh must develop crops that will tolerate drought and salinity, strengthen its disaster management capability, and include climate change impacts in all its natural resources and infrastructure development planning. Dr Saleemul Huq, Executive Director of the Bangladesh Centre for Advanced Studies, has proposed that a Climate Change Impact Assessment should be added to the Environmental Impact Assessment already required for major new development projects.

The international community has a moral obligation to assist Bangladesh in adapting to climate change, says Dr Huq, “as the problem... is not of our own making, but is clearly caused by others.” Until now, adaptation to climate change has received a lot less attention in international discussions than reducing emissions – but it will certainly be needed, as levels of greenhouse gases will continue to grow for the next few decades even if the Kyoto Protocol is successful.

As well as giving high priority to these domestic responses, Dr Huq argues that the Bangladesh government should take a more active role in the international climate change negotiations, to persuade other countries to reduce their emissions. This requires acting independently instead of lining up with the majority of developing countries, as Bangladesh usually does in international fora, because many countries have very different interests, including neighbouring India with its large national stocks of coal.¹⁰

THE CLIMATE CHANGE CONVENTION

Organised scientific observation of climate change began as far back as 1957, International Geophysical Year, and the First World Climate Conference took place in 1979. The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 to provide an authoritative assessment of the state of scientific knowledge on global warming. It published its First Assessment Report in 1990; this gave strong enough evidence for the Second World Climate Conference in that year to lay out the principles for a Convention.

The United Nations Framework Convention on Climate Change (UNFCCC) was signed by 154 countries at the 1992 Earth Summit in Rio. The US was one of the first to sign. By mid-2000 the Convention had been ratified by 182 countries.

STEPS TOWARDS ACTION ON CLIMATE CHANGE		
Event	Date and place	Principal achievements
Intergovernmental Panel on Climate Change (IPCC) - First report	1990	Broad international scientific consensus that human actions are influencing the climate
UN Framework Convention on Climate Change	1992, Rio de Janeiro, Brazil. (Entered into force 1994)	Committed the global community to stabilising the level of greenhouse gases in the atmosphere Recognised the primary responsibility of industrialised countries, and the differentiated responsibilities of developing countries
IPCC - Second report	1995	Confirmed human influence on climate Stated that risk from climate change is severe enough to justify preventive actions (Governments which have signed the Convention have to accept the findings of the IPCC).
Conference of Parties (COP) 1	1995, Berlin, Germany	Established budget, secretariat and institutional mechanisms Established pilot phase of "Activities Implemented Jointly" to reduce greenhouse gas emissions Agreed timetable for setting specific reduction targets for industrialised countries
Conference of Parties (COP) 2	1996, Geneva, Switzerland	Endorsed IPCC2 and COP1 agreements US announced its commitment to binding targets "medium-term", with "flexibility, in implementation measures" OPEC dropped its opposition to action
Conference of Parties (COP) 3	1997, Kyoto, Japan	Agreed the Kyoto Protocol, with targets for industrialised country greenhouse gas reductions
Conference of Parties (COP) 4	1998, Buenos Aires, Argentina	Agreed a "Plan of Action" for following up on the Kyoto Protocol, including processes for stimulating technology transfer
Conference of Parties (COP) 5	1999, Bonn, Germany	Further progress on implementing the Kyoto Protocol

Conference of Parties (COP) 6	2000, The Hague, The Netherlands	<i>See main body of text</i>
IPCC - Third report	Due 2000/2001	
“Rio plus Ten” Earth Summit	2002	Many people hope the Kyoto Protocol will be ratified and will enter into force by this the time.
Negotiations begin for a second round of emissions reductions	2005	This is the target date to start negotiations for the second period of the Kyoto Protocol
Agreed cuts in greenhouse gases	2008-2012	This is the period in which emissions cuts agreed in the Kyoto Protocol have to be achieved and measured

The UNFCCC is a ‘framework convention’ laying out broad principles, norms and goals and the institutional mechanisms for taking negotiations forward (the most important of which is the annual Conference of Parties or COP). It does not make specific and binding commitments: these are made in the Kyoto Protocol to the Convention and any other protocols which may be agreed subsequently. The objective of the Convention is the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [human-induced] interference with the climate system”.¹¹

The Convention set out some ruling principles, including:

- ✍ the “common but differentiated responsibilities and respective capabilities” of countries. This relates to countries’ different levels of emissions and different capacities to take action. It makes it clear that the developed world, as the main culprit, should be taking the lead in cutting emissions.
- ✍ the “specific needs and special circumstances of developing country parties, especially those that are particularly vulnerable to the adverse effects of climate change” (for example, island states);
- ✍ the precautionary principle which allows actions to be taken in the “absence of full scientific certainty”;
- ✍ the “right” to promote sustainable development;
- ✍ “Measures to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.”

The Convention lists some intentions, including:

- ✍ developing and reporting on national inventories of greenhouse gas emission sources and “sinks” (such as forests, which absorb carbon dioxide);
- ✍ developing and reporting on national and regional programmes to mitigate and to adapt to climate change;
- ✍ promoting and cooperating in the “development, application and diffusion, including transfer, of technologies, practices and processes”, and in the “adaptation to the impacts of climate change”;
- ✍ that the developed countries should aim for emissions levels of greenhouse gases in 2000 no higher than 1990 levels.

Article 4 also says that the developed countries “shall provide new and additional financial resources to meet the agreed full costs incurred by developing countries” to meet their obligations under the Convention. The Global Environmental Facility, jointly managed by the World Bank and the UN Development and Environment Programmes (UNDP and UNEP), was appointed to manage this.

Who is for, who is against?

Since the 1980s the EU has been pressing for stronger action on climate change. One factor is the fairly high level of environmental awareness of its citizens, another is that most European countries are fossil fuel importers, so they have an economic incentive to reduce consumption. The US, on the other hand, with a culture and economy built on copious domestic supplies of oil and coal, fears the cost of reducing its greenhouse gas emissions. Though it led the establishment of the IPCC, it has hesitated or even obstructed other stages of progress towards accepting binding emissions reduction targets: in 1992, then President George Bush threatened not to attend the Earth Summit in Rio if the Convention included any binding commitments to stabilising greenhouse gases. In the end, a weak Convention was the price that had to be paid to bring in the US.

Other countries’ positions vary, depending largely on how they perceive the cost and difficulties for themselves of reducing their emissions and to what extent they feel themselves to be responsible for the greenhouse gas problem.

For example, Australia is a high per capita emitter, afraid of the costs of switching to lower emissions. Economies whose energy comes largely from hydropower – Norway, New Zealand, Switzerland – are low emitters of greenhouse gases and fear that the costs of further reductions will be high. Japan is ambivalent – already a highly efficient user of energy and without strong popular environmental pressure, it is cautious about its ability to make major emissions cuts, but on the other hand sees economic and political opportunities in a strong greenhouse gas regime.

The picture is equally complex for developing countries, which do not have a united position. The ‘Group of 77 plus China’ (which actually includes over 130 developing countries at present) only agree that the industrialised world must take responsibility for addressing climate change. There are three main groupings:

- ✍ The 42-member Alliance of Small Island States (AOSIS) will be directly affected by climate change and are pushing for tough action.
- ✍ The oil-producing countries (OPEC), afraid of seeing their oil revenues dwindle, argue for more research, and for emphasis on increasing absorption of carbon dioxide through forestry activities.
- ✍ The majority of the other developing countries are concerned to maintain their right to use their own natural resources, and insist that any commitments they make will be dependent on prior emissions cuts by the industrialised countries and financial resources from them.

The Kyoto Protocol

In 1997 at the Third Conference of the Parties (COP3) in Kyoto, Japan, developed countries agreed to specific targets for cutting their emissions of greenhouse gases. This agreement is known as the Kyoto Protocol to the Climate Change Convention. It had taken two and a half years of intense negotiations, with changes and compromises even at the last minute.

But it is still not clear whether the Protocol will be effective and force cuts in greenhouse gas emissions, or whether it is just empty words. The answer depends on decisions about what kinds of actions countries will take to make cuts, and perhaps on whether penalties are introduced against countries which fail to comply with their obligations. These questions will be the subject of intense and difficult negotiations at the COP6, in the Hague, the Netherlands, in November 2000. If agreement can be reached, the Protocol will soon be ready for ratification, and may enter into force by the time of the “Rio plus Ten” Earth Summit in 2002.

In the Kyoto Protocol, 38 industrialised countries plus the EU (listed in Annex 1 to the Convention, and sometimes referred to as “Annex 1 countries”) committed themselves to an overall reduction of emissions of six greenhouse gases to 5.2% below 1990 levels for the period 2008 - 2012. This was far less than the 15% cut for carbon dioxide, methane and nitrous oxide called for by the EU, but better than a US proposal to stabilise emissions and not cut them at all.

Commitments of individual countries vary: none for Russia, a reduction of 7% for the US and of 8% for the EU, distributed among the 15 EU countries. By 2005, they should have made “demonstrable progress”; although it has not been defined what this means. Sceptics were quick to point out that by 1997 most developed countries were nowhere near reducing their emissions to 1990 levels, as they had voluntarily said they would do in the Climate Change Convention.

“Top on the defaulters list were the US, Australia and Japan, with carbon emissions in 1996 that were 8.8%, 9.6% and 12.5% above 1990 levels respectively. In the US, the increase in emissions between 1990 and 1996 is more than the total combined annual emissions of Brazil and Indonesia, two of the largest developing countries.”¹²

Even if the promised cuts are achieved, they are only the beginning of what looks likely to be a difficult process. The Intergovernmental Panel on Climate Change stated in its 1990 report that a total reduction of 60% in the world’s annual emission of greenhouse gases is needed to stabilise the quantity in the atmosphere at a level a little higher than the present one. Since most industrialised countries during the current economic boom have been increasing their emissions, and developing countries expect to increase theirs as they develop, this is a massive task.

Equity – bottom line or wishful thinking?

Greenhouse gas emissions today overwhelmingly come from industrialised countries, which have also been responsible for their build up in the atmosphere during the 200 years of industrialisation. The imbalance in responsibility for emissions is the cause of many difficulties.

Countries that will be badly affected by climate change – such as the Maldives or Bangladesh, for example – have to prepare themselves for its impact (because even if the Kyoto Protocol is effective, some further warming is probably inevitable from the greenhouse gases already built up in the atmosphere). Will the developed countries help the badly affected poor ones to pay for the measures they must take to adapt? During the tortuous process of negotiating the Protocol and in the run-up to COP6, more attention has been focussed on how to reduce emissions (mitigation) than on ways of adapting and the costs of adaptation, despite the efforts of the Alliance of Small Island States to keep compensation issues on the agenda. Developing countries feel that industrialised countries have not yet done enough to help them. For example, the low-lying islands of Kiribati in the South Pacific face costs for building sea walls or planting mangroves to protect themselves from coastal erosion, but Kiribati's Climate Change Coordinator, Nakibae Teuatobo, says:

“Developed countries have not committed themselves to any actual projects... Kiribati reserves the right under international law to pursue compensation against any losses it might sustain... In the West, you spend millions of dollars a year protecting endangered species. Soon, we will be endangered too.”¹³

Most developing countries have firmly resisted making commitments to reduce or limit their emissions at present (though some have made them on a voluntary basis). They want to see evidence first that industrialised countries are serious about taking action. Only then, they say, could they make commitments, perhaps for the second phase of the Protocol, after 2012, for which discussions are supposed to begin in 2005. But the US is insisting that developing countries undertake actions now – otherwise, they say, the Protocol is unfair and they will not ratify it.

Politically the most difficult equity question to resolve is the fundamental one of how to decide what quantity of greenhouse gases each country will be allowed to produce in the long term. Commitments in the current phase of the Protocol are based on levels of actual emissions in 1990, but this is only an interim stage. What should be the basis for a second round of emissions cuts after 2012? And for deciding how much southern countries will be allowed to emit as they develop? Should the world's leaders be trying to stabilise emissions in more or less their present distribution pattern, with industrialised countries producing far more than developing countries? Or should they be trying to redistribute emission rights, so that every country is allowed to produce a similar amount – which would be much fairer, but much more difficult to achieve?

One formula proposed is to calculate “per capita rights”. This involves working out how much total emission of greenhouse gases the globe can sustainably support, and dividing that by the number of people in the world to find the quantity each person can be allowed to emit. This per capita right would then be used for setting national allocations. Opposing the idea, some industrialised countries argued for per capita or national entitlements to be based on historic and current levels of emissions.

The concept of equity was incorporated in the Buenos Aires Plan of Action agreed at the fourth Conference of Parties to the Kyoto Protocol, but no realistic means of achieving it have yet emerged. Equity has been “absent from the negotiations” so far, according to Bangladesh’s Saleemul Huq. Many Northern non-governmental organisations might be expected to support the idea of equity, but they are accused of pushing it aside, for “pragmatic” reasons – principally, because they know it would be a major obstacle to US ratification.

Equity can’t remain absent for much longer. Once the first phase of the Protocol is over a new round of reduction targets has to be discussed – if we are ever to reach the 60% reductions the IPCC say is needed. So total emissions allowances will have to be decided soon.

Another reason for urgency is the likely start of “carbon trading” and other forms of exchange of emissions rights such as the Clean Development Mechanism. For these to work as part of a system of global reductions, instead of simply adding to the emissions allowances of rich countries, they have to be worked out as part of a global total of allowed emissions. For a global total, an allowance has to be worked out for every country. Many developing countries are keen to participate in and benefit from trading, so they want to have an agreed allowance to sell. What sort of calculation should form the basis of this? Per capita equity is the most logical.

The Africa group spelled out the consensus in favour of per capita equity among most developing countries in a declaration in August 1997: “A globally agreed ceiling of greenhouse gas emissions can only be achieved by adopting the principle of per capita emissions rights that fully takes into account the reality of the population growth.”¹⁴

The Non-Aligned Movement agreed: “Emissions trading... can only commence after ...allocations of emissions entitlements on an equitable basis to all countries has been agreed upon by the Parties...”¹⁵

The idea of equal rights is the basis of the proposal for “Contraction and Convergence”, supported by several countries and some non-governmental organisations. This proposes that greenhouse gas emissions should be gradually reduced overall down to the required level, but with greater reductions by industrialised countries being matched by increased emissions by developing countries, until they converge at a sustainable level of use with all having equal rights. This idea is supported by India: “[There must be] targets and time-tables for equitable emissions reduction overall. This means devising and implementing a programme for convergence at equitable and sustainable ... values for consumption on a per capita basis globally.”¹⁶

The EU also supports the idea in principle: “a set of common principles will have to be based on... initial distribution of emissions rights according to the Kyoto targets... [with] progressive convergence towards an equitable distribution of emissions rights on a per capita basis by an agreed date in the next century [ie 21st]”¹⁷

If equity is taken as the goal, the cuts industrialised countries would have to make would be enormous – the US currently uses twelve times the allowable amount per capita, the UK nearly six. It is not realistic to expect that a shift in production and consumption patterns on such a scale could be achieved, voluntarily, in a short time. So the question for future meetings of the Convention may be, what is the best strategy for going forward? Accept cuts on the more modest scale suggested by Kyoto, for the moment, and try to negotiate an agreement on the principle in the future? Or refuse to make any commitments until the industrialised countries have accepted that they'll have to make such changes?

A view from India

“Although India initially reacted with a degree of hesitation, today it accepts that there is climate change, as a result partly of 100 years of data from the Indian Meteorological Department, which support global statistics showing temperature rises of half a degree in 100 years.

In 1991, 12 Asian countries - including China, Pakistan, Bangladesh, India and the Philippines - launched ALGAS (the Asian Low-Cost Greenhouse Gas Abatement Strategy) with funding from the World Bank, the United Nations Development Programme and the Asian Development Bank. In India, a high-level advisory committee on climate change has been set up under the Ministry of Environment and Forests. We are serious about this problem. India is looking at renewable energy; our wind energy programme is one of the largest in the world. The solar and thermal energy programmes are also very old and established. The National Physical Laboratory developed the solar cooker way back in the 1950s.

We also believe nuclear power is one of the ways forward. At the Indian Atomic Energy Commission, we think it is one of the major approaches we should take. After all, industrialised countries have kept nuclear energy as a viable option. ALGAS included the nuclear option, but it was not the most favoured because of the initial high costs involved.

There are other options: coal, for instance. How do we make coal consumption more efficient? Of the 12 Asian countries in ALGAS, India and China alone account for 60 -70% of carbon dioxide from coal use. Realistically, the consumption of coal will continue. In India, research institutes have developed various treatments for cleaning coal, but investment for commercial use is not there. If it was, we could switch to clean coal fairly quickly.

Despite all our efforts, our emissions are likely to grow from their present low level. By 2020 they will be increasing at the rate of 5% a year – more than the US which by then should only be increasing at the rate of 1%. But even so, by that time Asia, with 51% of the world's population, will account for only 12% of global greenhouse gas emissions. India's emissions will be 3%.

So population is not the only parameter. It is not even the most critical parameter. If the rate of population growth remains the same in India, we will have a population of about 1.5 billion by 2020. Even then, the projected consumption figure of 0.2 to 0.4 tons of carbon per capita is much lower than that in industrialised countries.

Population is a preconceived notion. There are other factors: take megacities. Their greenhouse gas emissions account for a large proportion of a country's total emissions. Or agriculture. In India, 70% of emissions come from agriculture and gases such as methane.

When it comes to the Kyoto Protocol, there are some worries. The US continues to have very high emission levels, and they are increasing. Why then is the pressure on the developing world?

The problem lies with the Clean Development Mechanism and with Joint Implementation as proposed by industrialised countries. For instance, India does not need foreign technological help in most areas. But where we do, as in the case of polluting automobiles, this help is not forthcoming. Industrialised countries do not help wherever there is the slightest chance of making some profit.

The Rio summit pledged help for developing countries, but this has not happened. One of the reasons for this is that their industries are privately owned. Also, the donor countries should not be able to choose the field in which they will assist. Instead, donor and receiving countries should agree on the priority area and type of technology. CDM should be attached to programmes that *we* want, for *our* development, so that it is mutually acceptable – things like clean coal technology, automobile emissions and adaptation strategies.

We need to find a point of convergence, where the per capita consumption of developed countries goes down, while that of developing countries' is allowed to go up.

But we cannot let emissions go up beyond a certain point, whether after 50 years or 100 years.

The effects of climate change after that point will not be sustainable. We all have to accept a

certain targets and stick to them. And in the end we need to set aside our differences and think of the globe.”

Interview by Dipankar de Sarkar with Dr. Ashesh P Mitra, former director of India’s National Physical Laboratory and scientific adviser on climate change to the government of India.

A right to pollute?

The equity question is, not surprisingly, an emotive one. Energy use is necessary for development, and as long as the world’s principal energy source is fossil fuels, energy use entails greenhouse gas emission. (At present, fossil fuel provides 75% of the world’s energy.) Many people in developing countries therefore feel that in pressing to keep greenhouse gas emissions low, the industrialised countries are trying to stifle the South’s development. Every country, they feel, has a “right to pollute” until it has achieved a certain level of development, just as the industrialised countries themselves did in their own earlier development. In the view of the Centre for Science and the Environment in Delhi, “International negotiations... have turned into a tug of war with rich countries unwilling to ‘compromise their lifestyles’, and poor countries unwilling to accept a premature cap on their right to basic development.”¹⁸

However, many environmentalists say that it is a mistake to view a “right to pollute” as essential for development. They say that developing countries should make early and planned investment in energy supplies that produce less greenhouse gas, leap-frogging the “dirty energy” stage that the industrialised world went through. A clean energy development path is available and feasible, and will very quickly prove cheaper, they say.

Social justice and sustainability

The aim of international environmental agreements is generally to support “sustainable development” – a concept based on an assumption that we can achieve environmental sustainability and at the same time increase social justice by distributing benefits more widely. As yet there is no empirical evidence for this assumption. Sustainable development has not yet occurred on a large enough scale. A review of the literature on the subject found that there are many different concepts of environmental sustainability, and not all of them are compatible with social justice goals. Policymakers may sometimes have to choose between conflicting objectives rather than always being able to meet both environmental and social justice goals. Professor Andrew Dobson, Department of Politics, Keele University, UK¹⁹

THE SIXTH CONFERENCE OF PARTIES (COP 6)

The Sixth Conference of Parties at the Hague on 13-24 November 2000 is very important. Some see it as make-or-break for the world's efforts to deal with climate change. A lot depends on what actions countries agree on to meet their target cuts in greenhouse gas emissions. Some observers say that if the rules are interpreted narrowly, the targets will be impossible to achieve, so the whole Protocol will collapse. Others point out that a more flexible interpretation would allow emissions of greenhouse gas emissions to actually increase, even while countries are boasting that they have fulfilled the Protocol commitments. Another major issue is whether economic sanctions, or some other form of penalty, will be allowed against countries which fail to fulfil their obligations. The disagreements are still enormous.

Underlying many of the tensions is the fact that the US is unlikely to ratify the Protocol if the rules are interpreted narrowly. Opinions among other countries are divided as what to do about this: one school of thought holds that because the US is the major emitter of greenhouse gases, the Protocol will be meaningless without US ratification, and compromises may be needed to make it acceptable to the US. Others feel that the compromises demanded by the US undermine the whole purpose and effectiveness of the Protocol. They believe that it can be ratified and enter into force without the US. The US will then be under pressure to join in later.

For the Protocol to enter into force, 55 countries, responsible for 55% of total carbon dioxide emissions, must ratify it. As long as Russia joins in, the numbers might add up without the US.

1. Flexibility mechanisms

One of the major issues for COP6 is the "flexibility mechanisms" – a range of different actions countries can take towards meeting their targets. They allow developed countries the option of achieving a proportion of their greenhouse gas emission reduction targets by investing in reductions in other countries instead of at home. The language of the Protocol on the flexibility mechanisms was vague and sometimes even ambiguous, and many details remain to be worked out about exactly how and to what degree they will be introduced.

The flexibility mechanisms are highly controversial. Supporters say they enable emissions cuts to be made in places where they will be most cost effective, keeping down the overall cost of the "energy shift" to less polluting forms of energy use. Critics are more pessimistic, saying that by allowing industrialised countries easier options in other countries, they will divert effort from the real goal of forcing high-emitting industrialised countries to reduce their emissions at home.

The EU holds the latter view, and wants to limit to 50% the proportion of a country's cuts that can be made through the flexibility mechanisms. The US, on the other hand, demands an unlimited right to use them, saying this is the only way it will be able to meet its targets. Most developing countries initially opposed the flexibility mechanisms, but their position has changed to support for the EU proposal for limited use.²⁰ But as Anil Agarwal, Director of the Delhi-based Centre for Science and the Environment, comments, "at current rates, emissions can be bought (from the

developing countries) for as low as \$3 to \$20 for each tonne of carbon. This when compared to what it would cost to do the same carbon reduction by taking measures at home, around \$125, is a real steal.²¹

Crucial for the success of the Protocol will be the procedures and structures for assessing and monitoring activities under the flexibility mechanisms. These will have to be completely transparent and accessible if all countries are to have confidence in them, but there are considerable disagreements still about how they should work.

There will also be clashes over whether activities such as forestry, which create “sinks” to absorb carbon dioxide, will be counted as offsetting emissions. Several countries including the US, Japan and Australia and some Latin American and African countries want forest-related activities to be counted, while others say that, again, this will detract from the effort to reduce emissions from fossil fuel use.

The Flexibility Mechanisms include:

1. **Emissions trading**: sometimes referred to as ‘carbon trading’. This allows developed countries and enterprises within countries to trade emissions allowances among themselves.
2. **Joint Implementation**, by which developed countries can invest in emissions-reducing activities in other *developed* countries, gaining Emission Reduction Units to help them meet their own emission reduction targets.
3. **The Clean Development Mechanism** by which developed countries can finance emissions-reducing projects in *developing* countries, gaining Certified Emission Reductions to help them meet their own emission reduction targets.

1. Emissions trading

The Protocol states that emissions trading is allowed, but must not be the major means by which countries meet their commitments. Actual reductions in greenhouse gas emissions at home are more important. Rules and guidelines, and systems for verification and accountability – crucial safeguards to make trading work and build credibility – are not defined in the Kyoto text.

For trading to take place, an emissions allowance has to be decided for each nation, or corporation, participating in the system. (Trading can be between industries, as well as between countries). This allowance is then a tradeable commodity. A corporation or nation that emits below its allowed amount can sell the surplus “allowance units” to another.

The system evolved to control emissions within countries – US sulphur dioxide emissions trading was a successful system, which brought emissions down more than required – but it is now widely accepted that international trading will form one of the measures for meeting national targets. Some predict that it will be a major market in the 21st century, especially once emissions allowances and commitments have been agreed for developing countries, so that they can join in the trade.

Enthusiasts for trading say it is a crucial element of climate change action. It brings in the private sector, they say, who are the leaders in innovation and investment. By creating a market, it will bring market pressures to work towards emissions reductions, making energy efficiency more profitable, attracting investment and stimulating innovation. Others argue that, on the contrary, trading will allow heavily polluting countries and industries to escape their obligations to reduce their emissions – it will be cheaper to buy additional permits than to change their industrial processes.

In advance of the Protocol coming into force, some countries and corporations are developing domestic trading programmes so that they will be ready to benefit when international trading takes off. The Nordic countries are the leaders here; Australia and New Zealand, US, Canada and the UK are following suit. There is also a “small but growing world of brokers who are trying to do well by spring boarding greenhouse gas emissions trading into a global standard business practice... multinational corporations, non-governmental organisations, multilateral institutions like UNCTAD and small entrepreneurs are working together to build what appears destined to be a major force in the increasingly interlinked world of finance, industry and the environment.”²²

The World Bank’s Prototype Carbon Fund, set up in 1999, is one example of this kind of activity. It aims to “learn by doing” emissions trading through piloting emissions-cutting projects for sustainable development in developing countries and distributing the credits earned among the donors to the Fund, that comprises five countries and 20 multinational corporations. Many of these emissions-trading pioneers see greenhouse gas restrictions as inevitable, whether or not the Protocol comes into force. Some predict that by 2010 there will be 50 billion tonnes of greenhouse gas emissions traded annually. This is 500 times the present level of trade, and a market worth up to \$500 billion. ²³

Australia’s forests

Australia is one country starting a carbon-trading system. Australia has plenty of land suitable for use as forestry plantations, so it includes the capacity of forests to sequester carbon in its emissions accounting, and in its emerging trading regime. In 1998, the New South Wales government corporation State Forest persuaded the state government to introduce legislation creating tradeable carbon rights. High-emitting electricity companies started buying “carbon rights” created by new certified State Forest plantations. State Forest expects to gain a quarter of its income from selling “sink” capacity, rather than timber harvest, within two years. A Japanese electricity company, Tokyo Electric Power Company (TEPCO) is also buying in. It plans to establish 40,000 hectares of plantation over the next decade. Land will be leased from rural landowners, and plantations managed by State Forest. The project is expected to sequester 200,000 tonnes of carbon annually, and if the Protocol comes into force TEPCO will offset the carbon against its own emissions.

Russia’s hot air

One issue to be resolved is that of “hot air” - the surplus emissions rights that the Russian federation and other ex-Soviet countries have because their industries

collapsed after the baseline year 1990. These surplus rights are equivalent to 5% to 10% of the total Annex 1 countries' reduction targets, so some fear that if Russia were allowed to sell them, it would seriously undermine global efforts at reduction. Others feel that because the sale would be a one-off event, it wouldn't impact on the effectiveness of the system in the longer term. Another disadvantage, however, may be that developing countries who do not have any "hot air" to sell (because they are not part of the Annex 1 system of allocations and commitments) resent the inflow of funds the "hot air" countries will earn.

2. Joint Implementation

Under Joint Implementation (JI) countries can earn emissions credits by investing in projects that reduce emissions or that absorb them (eg tree planting) in other developed (Annex 1) countries. Projects will often involve private investors, but must be sanctioned and monitored by the governments.

A trial phase of Joint Implementation (also known as "Activities Implemented Jointly" or AIJ) ran from 1995 – 2000, not limited to partnerships between developed countries. The US took up the challenge enthusiastically, to demonstrate the effectiveness of JI projects and promote its case for unlimited flexibility. To September 1999, the US programme had approved 36 projects – 7 in Costa Rica, 12 in other Latin American countries in the energy, waste, agriculture and forestry sectors. Some aspects of AIJ caused difficulties, and by 1997 the two found in the Protocol – JI for developed countries and the Clean Development Mechanism (CDM) for developing countries – had replaced the single concept. In this form, JI was a fairly uncontroversial article in the Protocol, and some countries started implementing it at once, on the assumption that once the Protocol is ratified, they will be able to claim emissions credits – Japan has a substantial programme of JI investments in Russia, for example.

3. The Clean Development Mechanism

The Clean Development Mechanism (CDM) is of great importance for developing countries, as it may be a source of new investment and new technology for them, but there are many uncertainties and disagreements to be discussed. The positive aspects of the CDM (which was first proposed, in a different form, by Brazil in 1997) are that it will attract private sector investment in emissions-reducing projects in developing countries. It will also increase their technical capacity to implement their own emissions controls at a later stage in the Kyoto process. The potential amount of CDM investments is estimated at between \$5 billion and \$10 billion a year.²⁴

CDM projects are intended to assist developing countries in achieving sustainable development. A study of how CDM potential matches the development priorities of three countries found that Brazil and China might gain support for urban air quality improvement, India for cleaner power generation and greater efficiency in cement, iron and steel production, China for rural electrification. Soil conservation, flood protection and employment are other potential benefits.²⁵

On the negative side, critics charge that the CDM will, like emissions trading and Joint Implementation, enable industrialised countries to avoid the more difficult task of reducing emissions at home, and so will do nothing to address climate change. And because the emissions credits will be gained by one country but not lost by another (the receiving countries do not have any agreed emissions levels or “assigned amounts”) it will increase the global total of allowed emissions, thus potentially undermining the whole purpose of the Protocol. Most developing countries initially opposed the CDM for these reasons. Another criticism is that industrialised countries will buy up all the cheapest ways of reducing emissions, so that when developing countries have to make reductions themselves later, only more expensive means will be left. If the criteria and processes are not strict, there will be other problems of sustainability and power – who really chooses which projects to support? Who will benefit?

The CDM was, and continues to be, extremely controversial. Many crucial aspects of its implementation remain to be discussed at COP6, including:

- ✍ Should a limit be set on what proportion of their targets industrialised countries can meet through CDM projects? The EU is arguing for this whereas the US wants unlimited flexibility.
- ✍ Should CDM investments be limited to a list of specific activities?
- ✍ One major question is whether nuclear energy investment should qualify – with some (including the US) arguing that it is an emissions-free type of energy production, whereas others (including the EU) say that nuclear projects should never be counted as “sustainable development”.
- ✍ Hydropower from dams is also in question – research by the World Commission on Dams (due to report in November) shows that large dams, especially in the tropics, may produce rotting vegetation which produces a large quantity of greenhouse gases. This challenges the conventional view that hydropower is “clean”.
- ✍ There is also dispute about conventional energy projects – cleaner coal-fired power stations, for instance. Some countries and non-governmental organisations propose that only renewable energy projects should be eligible.
- ✍ How can the Conference of Parties (the only ‘enforcing’ body for the Convention) verify that a project included in the CDM is really *additional* to what would have been done without the CDM, as required by the Protocol? (See box below on Chevron pipeline project).
- ✍ Non-governmental organisations are asking that mechanisms and guarantees should be established for public participation in approving, implementing and monitoring CDM projects.
- ✍ Should activities to increase the storage of carbon dioxide (such as tree planting) be included, or only projects to reduce emissions?

Additional value, or additional profit?

In August 2000, oil companies Chevron and Shell signed an agreement to build a 1,000 km off-shore pipeline to carry gas from petrol fields in Nigeria to Benin, Togo and Ghana, with the possibility of extending it to other countries later. The developmental and environmental benefits of the project are clear. It will carry gas to generators, industry and domestic users in the three countries – gas which at present

is wasted by being “flared” (burned) at the petrol field, and which is a major source of greenhouse gas emissions. The project has been hailed as potentially a “most important cooperative project”, by Ghana’s Minister for Mines and Energy, Fred Ohere-Kena.

Controversy arises because Chevron is proposing this as a CDM project. If it were accepted – and this depends on what eligibility criteria are agreed for the CDM – Chevron would gain credits for reducing or avoiding around 100 million tonnes of carbon dioxide emissions over 20 years. Chevron would be able to sell these credits in the “emissions trading” market, gaining extra profit for a project which was planned around five years ago and deemed commercially viable, long before the CDM idea was born.

People living around the oil fields, meanwhile, who have suffered the polluting effects of the fields and the flaring for years, will not be compensated.

Activists are arguing that the CDM must not be used simply to increase profits for companies, especially for fossil fuel companies, but should be strictly limited to non-fossil-fuel projects, which might not otherwise attract investment.²⁶

Local people not consulted

In Argentina, a provincial government signed an agreement with a German Foundation, in 1999, for a forest conservation project in the basin of Lakes Fontana and La Plata. The intention is that it will be eligible as a CDM project, and the carbon credits it earns will be shared between the partners. But now local people are protesting: they were not consulted in the design of the project, and they object to several elements of it, such as the harvesting of valuable trees and ecotourism. In August 2000, they announced that they were ready to chain themselves to trees and block roads to prevent any deforestation or logging.²⁷

2. Forests and land use

The role of forests and other land-use activities (such as agriculture) in the fight against global warming will be one of the most hotly contested items on the agenda at COP6.

Forests absorb carbon dioxide, and can also bring many other environmental benefits. In some people’s view they can form a significant part of the global fight to reduce total greenhouse gas emissions. Others argue that because 85% of greenhouse gas emissions come from fossil fuel use, absorption (“sequestration”) by forests can never make much difference, and is a distraction from the real task of reducing fossil fuel use. Besides, critics say, the absorption capacity of forests is very hard to measure and unpredictable.

Forests and land-use issues were only included in the Kyoto negotiations at a late stage, and then inconsistently, because of difficulties in agreeing how to include them. These difficulties include:

- ✍ scientific difficulty in assessing and verifying the actual emissions from various types of forest and land use;

- ✍ impermanence – forests don't last forever and are vulnerable to sudden disasters such as fires as well as to changes in the market values of land and timber;
- ✍ definitions – how exactly to define “forest” and “reforestation”;
- ✍ the danger (if forestry is included in the CDM) of encouraging new monoculture plantations, at the expense of people, old trees and biodiversity.

In the Protocol, most developed countries were not allowed to include carbon dioxide absorption by forestry and agriculture in their baseline figure of greenhouse gas emissions in 1990. Australia won itself an exception to this rule: land use is a significant producer of greenhouse gas emissions in Australia, so including it in the 1990 inventory raises Australia's baseline emissions total, thus also raising the total emissions allowed in the Protocol implementation period 2008-2012.

All countries, however, can set a certain amount of creation of new “sinks” against their emissions total for the target period 2008-2012. (In the jargon of the protocol these are referred to as “Land Use, Land Use Change and Forestry activities”– LULUCF). The Protocol specifies the activities that can be counted: “direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and deforestation, since 1990”.

However the Protocol also said that the scientific advisory body would consider adding other types of activity to the list of those to be counted – for instance, forest conservation or forest plantation management. This is one of the most controversial topics on the table for the Hague meeting. One of the problems is that there is no agreement on definitions and methods for calculating emissions from and absorption by different types of land use and forestry. The different systems proposed by the UN's Food and Agriculture Organisation and the IPCC, for instance, produce very different results.

The US is demanding that all forestry and land-use activities can be counted. The latest US inventory calculates that in 1990, 19% of US greenhouse gas emissions were offset by removals of carbon dioxide by forest and land-use activities within the US. Thus if the US were allowed to count all these activities towards its target, it would not have to reduce emissions from fossil fuels at all. The official US position is that this is the only way it could fulfil its commitments; opponents argue that this undermines the entire purpose of the Protocol and must not be allowed.

Japan's official position, after many debates between different branches of the government, is that because Japan doesn't have spare land for new forestry plantations, it should be allowed to count management of existing forests, including harvesting of plantations. Opponents charge that this, like the US proposal, is simply a way of avoiding cuts in emissions from fossil fuels.

The EC position is that no new activities – beyond the already agreed afforestation, reforestation and deforestation – should be allowed until there is more understanding of how to calculate and measure emissions and absorption.

Agriculture and greenhouse gases

Soil can be a carbon sink, if it is well managed and not too intensively cultivated. Minimal tillage contributes, and is being tried, for instance, with farmers in Iowa, US, as part of a Canada-based commercial emissions-trading scheme. But many observers believe that the difficulty and expense of measuring the carbon content of soil mean that it is not likely to be a cost-effective carbon store.

Agriculture makes a small contribution to carbon dioxide emissions. It also produces nearly half of human-induced emissions of methane (mostly from cattle) and of nitrous oxide (from fertiliser). Research is finding ways to reduce production of methane by modifying cattle feed and the digestive systems of cattle. For instance, the Washington DC-based Global Livestock Group has piloted improved cattle feed projects in India, Bangladesh, Nepal, Zimbabwe and Uganda.²⁸

Including forests in the Clean Development Mechanism

The debates about the role of forest “sinks” in meeting industrialised countries’ commitments are repeated on the question of whether forest “sinks” will be included in the list of activities eligible for the CDM. The Protocol did not specifically mention forests in relation to the CDM. Some people take this to mean that they should be excluded, others argue that they must be included, in line with their clearly stated eligibility as JI projects between developed countries.

Whether or not “sinks” will be included, and which types of activity, are major concerns for developing countries, which stand to gain investment in their forest sector.

Most Latin American countries, which have major forest resources, want forestry conservation and sustainable management activities as well as new plantations to be included in the CDM. They see it as a rich source of investment. Costa Rica, for example, has already offered industrialised countries many opportunities to invest in protecting its forests, during the experimental period of “Activities Implemented Jointly” over the past decade.

OPEC countries, not surprisingly, are keen that sinks can be counted, because this will allow developed countries to maintain higher levels of fossil fuel use. Malaysia and Indonesia, with their strong commercial forestry sectors, want management of commercial forests to be counted. Indonesia is also asking for preservation of National Parks to count.

The African countries’ position builds on the fact that the CDM will trigger a flow of investment, which should support sustainable development. They are demanding geographical equity – that CDM investment should be spread evenly, by a quota system, among developing countries. (During the experimental phase of Activities Implemented Jointly, only two out of around 100 projects were in Africa – though this may have been due to African countries’ initial lack of interest and lack of capacity to propose projects, rather than to any inbuilt marginalisation of Africa.) For African countries to be able to benefit from investment available through the CDM, the CDM criteria have to include activities that are relevant to Africa and match African

countries' development priorities. A study by the Senegal-based non-governmental organisation ENDA suggests that African development priorities include food and energy security, and the CDM could contribute to these if the criteria also allowed such activities as intensification of agriculture (which would reduce deforestation) or sustainable management of forests..²⁹

A dubious project

In Uganda, a Norwegian forestry company Tree Farms, through a local subsidiary Busoga Forestry Company Ltd, has started planting a 5,000 hectare plantation, mainly of pine and eucalyptus, in the Bukaleba Reserve area near Jinja on the shores of Lake Victoria. The project is part of a planned 80,000 - 100,000 hectares of forest activity in Uganda. Recent research by a Norwegian non-governmental organisation, NorWatch, has revealed some questionable aspects of the scheme.

- ✍ Some estimate that as many as 8,000 people will be evicted from 13 villages to make way for the Bukaleba scheme, and now if they want to cultivate food among the trees for the first few years, they have to pay rent.
- ✍ Under the CDM, the land is tied up to its use as a plantation indefinitely – limiting the government's options to use it for other purposes which might be more beneficial to the Ugandan people.
- ✍ This type of two-species plantation may not be effective as a carbon-store anyway, because of the lack of undergrowth, and it might result in reducing carbon-storage in surrounding natural forest and other areas.
- ✍ Under the CDM, the Norwegian government will gain emissions credits from carbon dioxide stored by this plantation. When the Ugandan government starts to make its own commitments, it will not be able to count this plantation in its own inventory of emissions.
- ✍ The company stands to profit from the “carbon trade” value of the plantation. Some estimates put the profit at about \$28 million after 25 years. The company has in fact made a deal to sell the credits by 2003 for \$9 million to another company involved in power generation in Norway. This future carbon credit purchase has formed part of the Norwegian government's controversial decision to allow the construction of a new gas power plant.
- ✍ In contrast, the company is leasing the land from the Ugandan government at a modest annual rent which, at its present rate, will amount to around \$300,000 over 25 years..³⁰

3. Compliance and enforcement

One of the questions on the table at COP6 is whether mechanisms should be put in place for enforcing compliance. The EU is proposing the introduction of economic sanctions for use against non-complying countries, but the group of industrialised countries known as the “umbrella group” – which includes the US, Australia, and Japan – has so far opposed this.

Verification

Reviewing and reporting on implementation are the main mechanisms for compliance in the Climate Change Convention. But reporting requires data, and it is in fact difficult to assess and verify greenhouse gas emissions, particularly for gases other than carbon dioxide, such as methane. This lack of verifiability is likely to undermine confidence and therefore the effectiveness of any agreement on reductions targets. Scientists need to look for proxy indicators – that is, visible changes which can tell us that another change has taken place which is important but invisible.

Owen Greene, Department of Peace Studies, University of Bradford, UK³¹

4. The US position in the negotiations

The US is a major producer of greenhouse gases, so its commitment to reduce these is needed to make a meaningful difference to global emissions levels, and to give the Protocol credibility, especially among developing countries.

US politicians insist that they can only ratify the Protocol if there is “meaningful participation by developing countries” (this is not specified – for instance, China’s success in increasing energy efficiency is not apparently enough). They are also insisting on unlimited use of flexibility mechanisms and the right to count the “sink” capacity of US forests.

Indeed, without use of the flexibility mechanisms it would be very hard for US to meet its commitments. With the economy booming, annual emissions are growing and it might require at least a 30% reduction in overall emissions levels to meet the target of 7% reduction below 1990 levels. The economy is heavily geared to fossil fuels, which produce 84% of its energy. More than half the country’s electricity is produced from coal.

So, to bring the US to ratify would require big concessions from other countries. Developing countries might have to commit themselves to future reductions, and others – notably the EU – would have to drop their proposal to limit the use of flexibility mechanisms in order to keep focus on immediate domestic reductions.

Political attitudes: walking to work

Different interest groups in the US have very different attitudes to climate change. The Senate in particular is strongly influenced by fossil fuel industries and so is opposed to action that might harm US economic interests. It has blocked attempts to take more progressive stands. However, according to a senior Presidential official, Congress is slowly moving towards acceptance that an energy policy is necessary – helped by the current high price of oil.³² Public opinion is sometimes seen as believing in climate change and in favour of action to prevent it, at other times cited as sceptical and totally opposed to reducing fossil fuel use.

Presidential candidate Al Gore played a key role in crafting the Protocol, and so he wants it to succeed. But the position of his Democratic Party is ambivalent – they believe that global warming is a reality and must be addressed, but fear hostility from public and business if too many changes are demanded of the US. All US policymakers are afraid of raising gasoline prices. Some critics believe the

administration's intention is actually to scupper the Protocol altogether – but some delegates deny this hotly, citing many government initiatives to start the emissions reduction process.

The Republican Party, in a statement in the run-up to November's presidential election, appealed to climate change sceptics:

“[The] deliberations [of the Kyoto Conference] were not based on the best science; its proposed agreements would be ineffective and unfair inasmuch as they do not apply to the developing world... More research is needed to understand both the cause and the impact of global warming... A Republican president will work with businesses and with other nations to reduce harmful emissions through new technologies without compromising America's sovereignty or competitiveness without forcing Americans to walk to work”

Neutral science?

US politicians are probably not the only ones to use only those scientific findings that suit them, and in fact 'scientific advice' is not always as objective as is generally believed. According to a researcher in the UK, science is not neutral when it's directed at high-level international policy making. There's a tension between the clear messages policy-makers need to hear, and the plurality of opinion that is normal in a scientific understanding of the world. In addition, research funds are at stake.

In any case, it appears that science has less influence on policy decisions than political and economic factors. The linear policy model – that scientific advice leads to formulation of policy which is then implemented – is an over-simplified view of what actually happens.

Dr Sonja Boehmer-Christiansen, Department of Geography, University of Hull, UK

33

Industry and the costs of action

Coal, oil and motor industries have great power over politicians and public opinion. An industry lobby group, the Global Climate Coalition, spent \$13 million a year since its establishment in 1989 persuading people and politicians that the threat of climate change was exaggerated and fanning fears about the costs of taking action.³⁴ Between 1998 and 2000, however, most of the major oil companies withdrew from the Coalition, as they began to appreciate that they might benefit as much as lose from starting to act to reduce the world's dependence on fossil fuels.

The main weapon used by those who want no action on climate change is the argument that action will be very costly and will cripple the US economy. The debate has been heated, with different studies showing that action will cost a proportion of GDP ranging from 0.5% to over 4%. (The government's Department of Energy produces some of the highest, most alarmist figures). Critics have argued that studies producing the higher figures, though purportedly academic, are in fact seriously flawed. They exaggerate the real cost of compliance by assuming that no action would take place at all until a high-energy tax is introduced. They ignore all the possibilities opened up by new technologies, gradual introduction of efficiency standards, the removal of subsidies on fossil fuels, and even the effects of existing

Clean Air legislation.³⁵

One emotive argument used is that emissions-reduction actions will hit the poor harder than the rich. For example, a study was published on 5 July 2000 demonstrating that the Protocol would harm minority communities in the US by increasing fuel prices. At the press launch one of the organisations involved in the study admitted that it received funding from the coal industry.³⁶ The industry lobbies at policy level too – a pessimistic presentation on the costs of Kyoto compliance to the US economy, made recently to a European Commission conference, was sponsored by Exxon-Mobil, the oil company which has as yet hardly admitted the reality of climate change.³⁷

Many scientists and business people have consistently argued the opposite – that energy-saving action will actually benefit the economy, but cautious politicians have paid no heed.

There are signs that the politicians and the self-protecting industry lobbies are out of step with US public feeling on the issue. A recent public opinion poll for the World Wildlife Fund found that 73% of Americans – spread fairly evenly across the political spectrum – do believe global warming is a threat. 80% want the government to take action to reduce carbon dioxide emissions and 67% think they should do this regardless of what other countries do.³⁸

Taking the initiative

Secretary General of the World Energy Council, Gerald Doucet, thinks that so many things are happening on the ground in the US that it won't matter if the US does not ratify the Kyoto protocol:

“Many of the benefits of Kyoto have already been achieved, in that corporate and consumer thinking, strategies and investment trends are starting to change. Ratification isn't essential for the US: it's the action taking place behind the scenes that's important. A lot more is taking place here than the media imagines.”³⁹

At local and municipal government level, there are many initiatives to switch to less polluting forms of energy. The City of Oakland, California, has become the world's largest municipal purchaser of green power with a unanimous vote by the city council to have all municipal facilities powered solely by electricity from renewable sources. California already gets 9% of its energy from renewable sources other than hydro. Chicago city and government agencies have voted for a new plan to buy 20% of electricity from renewables from 2001 and require pollution reduction plans from all suppliers. Los Angeles Post Office has bought non-polluting electric-powered vans for mail delivery.⁴⁰

There are also initiatives at federal level: for instance, a Department of Energy plan to introduce energy efficiency standards for four key products – water heaters, clothes washing machines, air conditioning and fluorescent lighting. There is a presidential order that the federal government – the largest single energy consumer in the US – must slash greenhouse gas emissions to 30% below 1990 levels by 2010. And then there is a plan to raise wind energy from 0.1% to 5% of total US energy output by

2020.⁴¹

Some businesses are far ahead of the politicians, either believing that action on global warming will be profitable, or just accepting that it is inevitable and that the longer it is put off, the more costly it will be. Many are undertaking voluntary energy-efficiency actions – for instance, redesigning production processes and installing new equipment to cut energy use. They are joining together for research, advocacy and education in groups such as the government Environmental Protection Agency’s “Climate Wise” Program, the Climate Neutral Network, and the Business Environment Leadership Council of the non-governmental organisation the Pew Center.

Some are starting to lobby the government to speed up ratification of the Protocol. Many analysts believe that new technologies and energy efficiency measures are already showing that they are profitable, as prices fall and new market opportunities emerge domestically and abroad. Industry and government will adopt them increasingly, to such an extent that some optimists say the US could achieve its Kyoto targets even if it does not ratify the Protocol.⁴²

Farmers are coming round to supporting the Protocol too, as the development of profitable agricultural techniques that reduce methane emission, such as low-tillage, combine with the beginning of emissions trading to make emissions cutting look attractive.⁴³

Non-governmental organisations and citizen activists are confident that their activities are creating a shift in public, business and policy opinion in favour of action on climate change. A network of religious groups who own shares in Exxon-Mobil, for example, are using their power to demand change in the corporations’ position. In the words of one NGO activist, “US non-governmental organisations are working all out... Political opposition to the Protocol is still loud but it is brittle – a few events could cause the opposition’s ability to block ratification to crumble quite rapidly.”⁴⁴

MAKING THE ENERGY SHIFT

Climate change is, in theory, the perfect topic for an international environmental agreement. All countries are affected by, and contribute to, the build up of greenhouse gases, and should be willing to join in the effort to stop it. However, it is far from easy to agree what to do, and how to do it.

Before policy could be decided, understanding of the sources and causes of greenhouse gas emissions had to be improved; the costs and potentials of technologies for reducing them had to be extensively studied; scenarios had to be modelled based on different future trends.

The challenge is to use far less fossil fuel energy while increasing standards of living in developing countries and avoiding the sort of cuts in standards of living in developed countries that would produce public backlash and political impasse.

Total world energy consumption grew by 0.2% in 1999, compared with an average of 0.9% over the previous 10 years.⁴⁵ This was made up of a growth of 1.4% in OECD countries, whose economies were doing well, and an overall drop of 2.3% in developing countries, many of whose economies were in trouble. But several developing countries have shown that energy use and carbon dioxide emissions can fall even during periods of growth, and are doing far more than developed countries to reduce their emissions, even though they have not yet made any commitments to do so under the Climate Change Convention.

Alternative energy sources, including renewables, exist but haven't yet been taken up on a large enough scale to make much difference. Energy efficiency measures and new energy-reducing technologies, such as non-polluting cars, are also ways of reducing the dependency on fossil fuels. Mexico's National Commission for Energy Conservation has introduced efficiency standards for boilers, refrigerators, buildings, electric motors, and air conditioners. However there has been considerable political and civil society resistance in many countries to some of the possible alternatives – many people fear they will be costly, or ineffective.

Production and consumption must be shifted from their present heavy dependence on coal and oil to other energy sources. Is this possible? According to UNEP, the United Nations Environment Programme, “current and expected” technologies (alternative energies and energy efficiency technologies) could reduce global carbon dioxide emissions from fossil fuels from 6 billion tonnes in 1990 to 2 billion tonnes in 2100.⁴⁶

Cultural and social factors in adopting new technologies

A major element in reducing greenhouse gas emissions in many countries will be energy saving, including reducing the amount of energy used in buildings. (In the UK,

this is about half of the total energy used). Scientific research to identify energy-saving technologies is only part of the issue: getting the technologies adopted is a complex of cultural, social, institutional and commercial factors. A study of seven European countries found significant differences in the take-up of research, and recommended that, in devising strategies for energy-saving, policy-makers should recognise that it is a social process.

Dr Elizabeth Shove, Centre for Science and the Environment, Lancaster University, UK⁴⁷

A Chinese example

China is the world's second largest consumer of coal – one of the main sources of carbon dioxide emissions. But China has taken the most dramatic steps to curb growth in coal use. Subsidies for coal fell from 37% to 29% between 1984 and 1995, and petrol subsidies were slashed from 55% to 2% between 1990 and 1995. Between 1998 and 1999, clean air legislation and energy efficiency measures reduced China's coal consumption by 16.8% and its overall fuel use by 10.7%, even though the economy was growing by 7-8% at the time. (Over the same period coal use was increasing in the US and in Russia, and US overall energy use increased by 1.6%). At the end of 1995, a quarter of China's national energy was coming from renewable sources.

For many years the conventional energy sector has dismissed alternative energy sources as ineffective, small-scale and expensive, and pointed to high costs of switching from one to the other. This may be about to change: gradual growth of the alternative energy sector, technological developments, innovative investment, and environmental concern are coming together to give alternative energies the critical mass they need. *Tomorrow* magazine sees them as the next “new thing” to excite the stock markets.

“When capital starts underwriting change instead of resisting it, markets are born – and worlds transformed – overnight.”⁴⁸

Others however are less sanguine, pointing out that despite their expressed enthusiasm for new clean energy sources, major oil companies are still searching for new oil and gas sources – to such an extent that sceptics say the major companies' “green energy” programmes are nothing but a public relations exercise (“greenwash”). Bangladesh, the South China Sea and the Senkaku Islands between China and Japan are just some of the areas where companies and governments are vying for control of new oil and gas fields. If these and other fields prove to be as rich as the developers hope, and are opened up for exploitation, they will enable the world to continue its dependence on fossil fuels for many years to come.

Public support

Whatever agreements are reached internationally, implementation will depend on national and local governments, and their commitment and capacity will in turn depend to some extent on their populations' attitude to the issue.

Research in the early 1990s found a number of domestic factors influencing government policy on climate change. In some countries the public were not

interested, and it was only because of the Climate Change Convention that climate policy was on the government agenda at all. In others (such as Germany), where the public was concerned about energy conservation and renewable energy, climate policy was taken seriously.

In countries such as the US, a free market perspective, general hostility to environmental regulation, and doubts about the scientific case for global warming militated against any strong demand for a national climate policy.

Dr Wolfgang Rudig, Department of Government, University of Strathclyde, UK⁴⁹

Lighting up the world: electricity

Most of the world's electricity is produced using coal or other fossil fuels, making electricity, along with transport, the major culprit in creating greenhouse gases. But there are less polluting ways of producing electricity, and ways of using less electricity to produce the same amount of goods. Many factors are in a period of dramatic change at the moment: industry ownership and investment, technologies and materials, information technologies, the design of goods and processes, social and environmental concern, could all work together to produce a far cleaner and more efficiently electrified 21st century.

Ownership:

Many people think the recent privatisation of electricity supply in most countries is an opportunity for the industry to shift to a more sustainable pattern of energy production and use. They believe that the private companies, often smaller and more flexible than the old state-owned coal-powered electricity monopolies, will be much more willing to introduce new technologies. Others disagree, and argue that privatised companies will try to avoid the investment needed to make any changes.

Subsidies:

To give new companies and new technologies a fair chance to enter the growing energy market, governments are being pressed to end the huge subsidies and tax breaks that protect fossil fuel energy.

For instance, 14 developing countries, responsible for 25% of carbon dioxide emissions from industrial sources, slashed fossil fuel subsidies by 45% between 1990 and 1995, from \$60 billion to \$33 billion. Cutting subsidies has a big effect in promoting more efficient use of energy. Over the same period, OECD countries reduced subsidies by only 20.5%, from \$12.5 billion to \$9 billion.

At present, the US subsidises the fossil fuel industries to the tune of \$20 billion a year, while the total fossil fuel subsidy globally is calculated to be around \$300 billion. The OECD estimates that removing subsidies for fossil fuels in the EU and Japan alone would trigger efficiency measures that would reduce carbon dioxide emissions by 13% by 2005.⁵⁰ Governments could also level the playing field by requiring old companies to observe the same stringent environment standards as new ones.

Scale:

“Micropower” has become a new buzzword – the generation of electricity by small units, either feeding into a national grid or close to the point of use. Even domestic-scale units are on the horizon. Micropower can be efficient, clean and cheap.

Developing countries may be able to leapfrog to it, especially for serving poor and rural areas, where two billion people worldwide are not yet connected to electricity grids.

Renewable energy sources:

- ? Wind is the fastest-growing energy technology worldwide, with 22% growth in the period 1990-98: Germany has the most installed capacity, followed by the US, Denmark, India and Spain.
- ? Solar energy grew 15.9% in 1990-98. The price of solar cells is falling fast and will soon be level with the costs of rival energy sources. The oil company BP, for example, showed its confidence in the future of solar power in 1997 by making a significant investment. BP believes that by 2050, 50% of the world's energy will come from renewables. At present, Kenya probably has the largest unsubsidised solar capacity, with around 100,000 rural people using small solar panels charging car batteries for domestic uses.
- ? Hydrogen may well be the principal fuel of the future. Fuel cells – in which hydrogen combines with oxygen from the air to produce electricity – are just starting to be produced commercially. In some types of fuel cell, the only waste product is water.
- ? Biomass (fuel wood, charcoal, agricultural residues) accounted for 14% of world energy use in 1995. It is much more climate-friendly than fossil fuels, and the IPCC projects it should form 25- 46% of the total by 2100. Plantations can be grown specifically to power electricity generation, or waste products can be used. For example, in Spain, sludge residue from olive oil making powers a small generator producing electricity for four villages.⁵¹

Cleaner fossil fuels:

- ? In the US about 50% of electricity is generated by coal; less in Europe and more in India. Coal-powered generating plants using new technologies can be much less polluting and more efficient than old ones: according to UNEP the conversion efficiency of existing plants could be doubled. In countries with coal deposits – such as India and Russia – there is pressure from the coal industry to continue using coal. Environmentalists say that there is no such thing as “clean coal”, and its use should be phased out. A 1990 study in Karnataka, India, showed that a mix of efficiency savings and renewables would be cheaper and more productive than the state utility's plan to expand use of fossil fuel.
- ? Natural gas use is increasing. Electricity from gas turbines produces only one quarter as much carbon dioxide as from other fuels. But it is not renewable.

Nuclear power

Nuclear energy is controversial. Some people, including a few environmentalists, support it, saying it is a more environmentally-friendly option than coal, and less risky than is generally believed. The World Energy Council has supported a nuclear reactor in India as part of its greenhouse gas emissions reduction programme. But many non-governmental organisations and governments say nuclear power has no place in a safe and sustainable future. After some years in the doldrums, at least in industrialised countries, nuclear power consumption increased in 1999 by 3.8%, according to BP, led by a sharp increase in the US.⁵²

Environment and development

Most developing countries see electricity as vital for economic growth, and they may not at first be concerned that electricity is also often a key contributor to environmental problems. It is often assumed that environmental problems will automatically be solved as countries develop, but there is very little evidence that this really happens. In fact, it is only when an explicit demand arises that environmental problems are addressed. More research is needed to find out what factors tend to create such a demand.

Dr Peter Pearson, Centre for Environmental Technology, Imperial College, London⁵³

Moving on: Transport

Transport produces 21% of current carbon dioxide emissions and its share is growing rapidly. At present developing countries own only 10% of the world's cars, but this is likely to grow. There are 600 million cars on the world's roads now, and this is expected to increase five-fold – to 3 billion – by 2020. Aircraft numbers are expected to double by 2015, though at present air transport produces only 2% of global greenhouse gas emissions.⁵⁴ If no new technologies were introduced, transport's share of fossil fuel use would rise by between 35% and 130% by 2025.

Some non-fossil fuels are already in use for transport, such as ethanol from sugar cane in Brazil. Since 1976 use of ethanol (ethyl alcohol) made from sugar cane to power cars has replaced half the petrol that would otherwise have been used, and avoided 15% of Brazil's carbon dioxide emissions.

There is hot competition among alliances of major oil and car companies to develop new technologies – new materials, designs and fuels for cars – because the market potential is huge.

Hydrogen is probably the main fuel for 21st century transport. Toyota has plans to market a fuel cell powered car by 2002, and BMW unveiled a liquid hydrogen car in May 2000, which will go into mass production in 2010. Hydrogen-fuelled buses have been trialled in several countries – for instance in Oslo, Norway in 1999, through a collaboration of oil company Norsk Hydro, Daimler-Chrysler, and Canadian fuel-cell manufacturer Ballard. Mass production is due to start in 2005. But as yet the infrastructure does not exist for delivering hydrogen where it is needed – the hydrogen equivalent of petrol pumps.

Momentum of new technologies

Some out-and-out optimists believe that technological development is gathering such momentum that businesses will be able to solve the problems with minimal direction from governments. Technological visionaries Paul Hawken, Amory Lovins and L Hunter Lovins argue that with presently available technologies it is becoming more cost-effective for businesses to make changes in their designs, processes and products. If they made a number of common-sense changes, the global warming problem would almost disappear. Half the threat would disappear if energy were used

more efficiently, a quarter with improved management of forests and soils, most of the rest if other greenhouse gases (like CFCs) can easily be replaced.

“We believe that the world stands on the threshold of basic changes in the conditions of business. Companies that ignore the message of natural capitalism do so at their peril... Because of the resource productivity revolution, the actions and requirements needed to protect the climate are profitable for business right now, no matter how the science turns out and no matter who takes action first. Arguments that it would be too expensive and economically harmful to mitigate the rate of increase in greenhouse gases are upside down. It costs less to eliminate the threat to our global climate, not more... The menu of climate-protecting opportunities is so large that over time, they can overtake and even surpass the pace of economic growth.”⁵⁵

Persuading to change

Others, rather less optimistic, believe that leadership and actions by governments and others will be needed to make the shift from fossil fuels happen. It is not enough for the science and technology to exist. People as well as businesses have to be convinced of the benefits of adopting new technologies or new patterns of behaviour. Building confidence – between governments, and in the general public – is essential, and specific measures may be needed to inform and persuade key sectors to change their practices.

Public understanding

In democracies, implementation of conventions like the one on climate change depends in part on the public's willingness to embrace change. A study in two cities in Europe (in the UK and the Netherlands) found that this varies according to several factors:

- ? *people's belief in an ethical duty of care for others;*
- ? *the ability to exercise choice over their individual expenditure of time and money;*
- ? *their confidence that the actions taken will be effective;*
- ? *their conviction that environmental responsibilities are being assumed equally across all sectors of society.*

In the UK, change will be harder to effect because public attitudes are characterised by a profound mistrust of governments, companies and experts making claims about environmental issues.

Professor Jacquelin Burgess, Department of Geography, University College London, UK⁵⁶

Making the change: energy taxes

A tax on energy is one of the most widely discussed ways of achieving greenhouse gas emissions reduction targets. It should encourage industries and households to find ways of using less energy, and the revenue from the tax can be used to support development of alternative energy sources and energy-efficiency technologies.

Energy taxes are generally unpopular, however, and they are only just starting to be introduced. Industries protest that an energy tax will force them to raise prices and become uncompetitive.

- ? When the Netherlands government proposed a tax in 1996, Royal Dutch Shell and six other corporations wrote to the prime minister threatening to move investment out of the country. A compromise was finally agreed – a reduced tax rate for high energy users combined with energy efficiency agreements – and this has made Dutch industry one of the most energy-efficient in the world.
- ? The UK is about to introduce an energy tax, after industry forced the rate down: industrial energy prices will increase by 15-20%, and industries that enter binding energy-saving agreements will be exempted from 80% of the tax.
- ? In Germany, industry has won such big concessions that some environmentalists think the tax will have little impact on energy use.
- ? India introduced tax concessions for renewable energy equipment such as wind turbines.
- ? In the US, according to the influential environmental lobby group the Sierra Club, “any politician proposing new energy taxes right now...would be extremely brave. I could count on one hand the number who would publicly support an energy tax.”⁵⁷

How to make taxes effective

It is not yet clear how much a tax should raise the price of fuel, and how fast, to encourage the switch to less polluting fuels or greater efficiency. It is often assumed that a gradual and steady increase of tax must be the best way. However, research using economic modelling found that the most effective pattern would be a rapid rise in tax, followed by stabilisation or even reduction – because it will be the sudden rise at the start that induces technical innovations to reduce emissions.

Such taxes are only likely to be introduced if there is agreement among countries to do it together – no single country wants to increase its fuel prices and bear the costs of innovation on its own. Carbon taxing is not popular in most countries, so international agreement will be hard to reach.

Professor David Currie, London Business School, UK⁵⁸

Before introducing energy taxes, governments are bound to consider the impact on the competitiveness of their industries – and this can vary according to local circumstances, costs and the structure of the industry. For example, one study found that if an energy tax of 47% was introduced in Europe but not elsewhere in the world (and this is a lower rate than some have proposed), it would raise marginal costs so much that it would lead to the collapse of Europe’s basic chemicals industry.”

Professor Alistair Ulph, Department of Economics, University of Southampton, UK⁵⁹

THE NEXT STEPS

The process of negotiating the Climate Change Convention and the Kyoto Protocol has been long and arduous. But given the different interests of so many of the countries and groups involved, the novelty of trying to address such wide-ranging global problems, and the unfamiliarity of some of the solutions proposed – such as emissions trading – it is widely accepted that to have got as far as the process has is a significant achievement. According to analyst Michael Grubb of the UK's Royal Institute of International Affairs, "The Kyoto Protocol is an extraordinary and unprecedented achievement in international affairs."⁶⁰ There is now almost universal acceptance by governments of the need to take action, and commitment to doing so; a system for monitoring and reporting on greenhouse gases and actions to reduce them; and a system for constantly revising targets every five years.

But given the size of the problem, is this enough? Some countries and non-governmental organisations had wanted much more ambitious targets – for instance, the Alliance of Small Island States pushed for 20% reduction targets from industrialised countries. Obviously, in comparison with the 60% or 70% cuts recommended by the IPCC, the present less than 5% globally is very small.

According to Michel Grubb, even if the Protocol commitments are fulfilled to the letter, global emissions could actually be 31% *above* 1990 levels by the Protocol's commitment period of 2008-2012.⁶¹ This takes into account that baseline 1990 levels were higher than actual levels in 1997, and the possible inclusion of sinks in the CDM, and adds the likely growth in emissions from developing countries. The impact on global warming might be a small (4 -14%) reduction in the rate of temperature increase by 2100, and a sea level rise of just a few centimetres less than it would have been without any action.

So if the present phase of the Protocol were the end of the story, the outlook would be very bleak. But the optimists argue that the Protocol is a process: once started, confidence in the various processes and political commitment will develop, so the negotiations and commitments will become easier. Very important is the fact that the Protocol will – and has already – stimulated technological innovation and more positive attitudes to adopting new technologies, such as renewable energies. The inertia and resistance are starting to crumble, but how quickly this happens depends largely on how the flexibility mechanisms are interpreted. It is not yet clear whether the political will is really there, or whether, as some critics feel, the overriding aim of participants in "flexmex" discussions is simply to find ways of avoiding painful action. Environmentalists will be scrutinising the COP6 outcomes and subsequent implementation of commitments very carefully to hold governments to real and increasing commitments. And when the next round of negotiations begins in 2005, developing countries will only be prepared to make their own commitments if they see developed countries make some real progress now.

Glossary of technical terms

Annex 1 countries

38 industrialised countries plus the EU. Called Annex 1 because they are listed in Annex 1 of the Kyoto Protocol.

Conference of Parties (COPs)

The supreme body of a Convention. Has Regular meetings of representatives of all the countries that have signed a particular convention, to discuss and agree on issues of implementation, new scientific evidence, etc as well as to hear reports from one another on progress towards achieving commitments. This reporting to the COP is the principal means of enforcing most Conventions.

Convention

Signing a Convention

When a state representative signs a convention, this indicates that the country approves the convention in principle and intends to participate in the process of taking it forward and implementing it. **Ratifying a Convention**

The next stage of approval after signing – national parliament and government have approved the country's joining the convention, and have approved a specific text detailing principles, goals and mechanisms, and are prepared to amend national legislation and work to meet targets.

Carbon dioxide

The most important of the greenhouse gases.

Carbon trading see Emissions trading

CDM Clean Development Mechanisms

By which developed countries can gain CERs (Certified Emissions Reductions) to help them meet their emission reduction targets through financing projects in developing countries.

CER (Certified Emissions Reductions)

These go towards the targets that each developed country has to reduce their greenhouse gas emissions.

Emissions trading

Also known as 'carbon trading', this is the mechanism whereby developed countries can trade their allowances of emissions.

Flex mex

Flexibility mechanisms are the overall terms for all the ways by which developed countries can achieve a proportion of their greenhouse gas emissions reduction targets by investing in reductions in other countries instead of at home.

Framework Convention

An agreement that lays out the broad principles, norms and goals and the institutional mechanism for taking the negotiations forward, such as conferences of parties

Greenhouse gases

Mainly carbon dioxide, methane and nitrous oxide. See page x for more details.

Intergovernmental Panel on Climate Change

Set up in 1988 under the auspices of two United Nations organisations (UNEP and World Meteorological Organisation) to provide an authoritative assessment of the state of scientific knowledge on the phenomenon of global warming. Its reports, widely accepted by other scientists and governments, form the basis for the commitments of the UNFCCC and Kyoto Protocols.

JI/AIJ Joint Implementation/Activities Implemented Jointly

By which developed countries can gain Certified Emissions Reductions (CERs) to help them meet their emission reduction targets by investing in other developed countries.

Kyoto Protocol

The agreement made between governments on climate change in Kyoto Japan in 1997.

LULUCF - Land Use, Land Use Change and Forestry activities

Activities to increase carbon dioxide stores or “sinks”.

Methane

One of the greenhouse gases.

Nitrous oxide

One of the greenhouse gases.

Precautionary Principle

The right to take action to protect against some event, when it is likely – but not absolutely certain - that that event will take place.

Sinks

Activities such as forestry, which absorb carbon dioxide.

¹ Figures from the second report of the IPCC

² Dr Hermann Ott, acting head of the Climate Policy Division of the Wuppertal Institute in Germany, quoted in “EU called on to ratify Kyoto Protocol on Greenhouse Gases”, by Brian Kenety, InterPress Service, 22 March 2000

³ *New Scientist*, 2 Sept 2000, “Feel the Pulse”, Fred Pearce

⁴ 99.9% of the world’s qualified climate scientists agree that release of Greenhouse gases is cause for concern, according May/June 2000 to Hawken et al *Natural Capitalism*.

⁵ *The Kyoto Protocol: A Guide and Assessment*, Michael Grubb et al, Earthscan/Royal Institute of International Affairs, London, 1999

⁶ as above

⁷ *Green Politics*, eds Anil Agarwal et al, Centre for Science and Environment, New Delhi, 1999

⁸ as above

⁹ UNEP Information Unit for Conventions, Climate Change Information sheet 23

¹⁰ Information taken from “Minimising the impact of climate change”, Dr Saleemul Huq, *Daily Star*, Bangladesh, 25 June 1999; www.bcas.net

¹¹ UNFCCC, Article 2

¹² *Green Politics*, as note 7

¹³ *New Scientist*, 12 February 2000, “Turning back the tide”, Fred Pearce

¹⁴ Africa Group position at the negotiating session of the Ad Hoc Group of the Berlin Mandate, August 1997; cited in *Who owes who? Climate change, debt, equity and survival*, Christian Aid, UK, 1999

¹⁵ Heads of Government Statement in relation to Article 17 of the Kyoto Protocol, cited in *Who owes who?* as above

¹⁶ India’s statement at the First Conference of Parties, cited in *Who owes who?* as above

¹⁷ Resolution of European Parliament, quoted in *Who owes who?* as above

¹⁸ *Green Politics*, as note 7

¹⁹ ESRC Global Environmental Change programme: Professor Andrew Dobson, Keele University. Research carried out 1996–97; www.gecko.ac.uk

²⁰ Statement from the EU Executive, 19 Sept 2000

²¹ “Is the Kyoto Protocol a steal?”, Anil Agarwal, Centre for Science and Environment, New Delhi, India, electronic news bulletin, 17 March 2000

²² *Tomorrow*, May/June 2000, “The Sky’s the limit”, Carl Frankel

²³ as above

²⁴ UNCTAD, GHG Emissions Trading Project, press release, 9 September 2000

²⁵ World Resources Institute, “How much Sustainable Development can we expect from the CDM?” November 1999

-
- ²⁶ UN Integrated Regional Information Network, www.reliefweb.int/IRIN; and James Barnes, Friends of the Earth International
- ²⁷ Greenpeace International, August 2000
- ²⁸ *Tomorrow*, as note 22
- ²⁹ Information from ENDA, “The Clean Development Mechanism: what prospects for Africa?”, Dakar 1998; and personal communication from M Djimingue Nanasta, ENDA Energy programme.
- ³⁰ *The future in our hands*, April 2000, “CO2lonialism: Norwegian tree plantations, carbon credits and land conflicts in Uganda”, Harald Eraker, NorWatch, Norway
- ³¹ ESRC Global Environmental Change programme: Owen Greene, Dept of Peace Studies, University of Bradford, UK. Research carried out 1992-94
- ³² Roger Ballentine, Deputy Assistant to the President for Environmental Initiatives, in a speech to a meeting of US business and NGOs, 19 September 2000
- ³³ ESRC Global Environmental Change programme: Dr Sonja Boehmer-Christiansen, Department of Geography and Earth Resources, University of Hull, UK, studied the IPCC, how it perceived its tasks, the processes and organisational structures, and policy outcomes. Research carried out 1991-94
- ³⁴ *Green Politics*, as note 7
- ³⁵ Rob Bradley, Climate Network Europe; posted in Can-talk, the e-mail discussion list of the Climate Action Network, July 2000
- ³⁶ Ozone Action; Can-talk 5 July 2000
- ³⁷ as note 35
- ³⁸ WorldWide Fund for Nature, Press Release, 2 Aug 2000, Washington
- ³⁹ *Tomorrow*, July/August 2000, “Power to the People”, Stewart Boyle
- ⁴⁰ Information in this paragraph from various sources, posted in the Can-talk e-mail discussion list, July 2000
- ⁴¹ Mark Hambley, US special negotiator for climate change, in a speech to a conference at the Royal Institute of International Affairs, London, 20 June 2000; and *Tomorrow*, Jan/Feb 2000
- ⁴² See for instance *Natural Capitalism*, Paul Hawken et al, Earthscan, London 1999
- ⁴³ *Tomorrow*, as note 22
- ⁴⁴ David Hawkins, personal posting to Can-talk, 22 June 2000
- ⁴⁵ BP World Energy Review 1999; and World Resources Institute, *Climate Notes*, “Are Developing Countries already doing as much as Industrialised Countries to slow climate change?” Reid and Goldemberg, July 1997, Washington
- ⁴⁶ UNEP Information Unit for Conventions, Climate Change Information Sheet
- ⁴⁷ ESRC Global Environmental Change programme: Principal researcher, Dr Elizabeth Shove, Centre for Science and the Environment, Lancaster University, UK. Research carried out 1991-94
- ⁴⁸ *Tomorrow*, July/August 2000, “Renewables’ Big AdVenture”, Carl Frankel
- ⁴⁹ ESRC Global Environmental Change programme: Dr Wolfgang Rudig, Department of Government, University of Strathclyde, UK. “Global Warming and the Political Process”, Research carried out 1992-94
- ⁵⁰ *Hotspot*, May 2000, Climate Network Europe,
- ⁵¹ *Tomorrow*, July-Aug 2000
- ⁵² BP 1999 Statistical Review of World Energy
- ⁵³ ESRC Global Environmental Change programme: Dr Peter Pearson, Centre for Environmental Technology, Imperial College, London. Research carried out in 1993
- ⁵⁴ *Tomorrow*, website: www.tomorrow-web.com, 18 Sept 2000
- ⁵⁵ *Natural Capitalism*, as note 42
- ⁵⁶ ESRC Global Environmental Change programme: Research led by Professor Jacquelin Burgess, Department of Geography, University College London, UK, 1993-4
- ⁵⁷ *Tomorrow*, Jan/Feb 2000, “A taxing problem”, Stewart Boyle
- ⁵⁸ ESRC Global Environmental Change programme: *International Agreements on Carbon Dioxide Emissions: Impact, Design and Sustainability*, principal researcher Professor David Currie, London Business School, UK, Research carried out 1991-94.
- ⁵⁹ ESRC Global Environmental Change programme: *Environmental Policy, International Trade and Imperfect Competition*; principal researcher, Professor Alistair Ulph, Department of Economics, University of Southampton, UK. Research carried out 1992-94
- ⁶⁰ *The Kyoto Protocol*, as note 5
- ⁶¹ As above