

GREENPEACE

Guide to the Kyoto Protocol

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Greenpeace International

Foreword

This guide to the Kyoto Protocol is meant to provide a basic background to the Kyoto Protocol, what is in it and what is not, what it means and what Greenpeace's concerns are. We have tried to write this in an accessible manner but to use language consistent with that of the Protocol, so that the reader can easily compare terms in the protocol with those found here. Our intention is to update this guide from time to time as the negotiations on implementing the Kyoto Protocol proceed. For more detailed information and justification of the analysis and positions outlined in this guide the reader is referred to the [Greenpeace Analysis of the Kyoto Protocol](#).

This guide has been written by Tessa Robertson with material from Bill Hare. Helpful comments and suggestions from Paul Hohnen, Janet Dalziell and Gary Cook are gratefully acknowledged. Heather Broadbent assisted with production.

Bill Hare
Climate Policy Director
Amsterdam
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For further information contact
Bill Hare Climate Policy Director, Greenpeace International
Keizersgracht 176, 1016 DW Amsterdam
The Netherlands
Phone: +31-20-523-6222
Fax: +31-20-523-6200
Email: bhare@ams.greenpeace.org

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WHAT IS THE KYOTO PROTOCOL?

History and Background

International concern over the environmental impacts of the world's uncontrolled use of coal, oil and gas has grown in the second half of the twentieth century. The damage caused to plants, animals and buildings by acid rain and the effects on human health of poor air quality and smog have led to a raft of national, regional and international agreements aimed at controlling these problems by cutting emissions of the gases which cause them.

In the mid-1980s, awareness began to increase of yet another problem caused by fossil fuels - climate change, also known as global warming or the greenhouse effect. The warming gases (known as greenhouse gases) given off when fossil fuels are burnt are increasing in the atmosphere, leading to rises in global temperature and sea levels. The most important greenhouse gas is carbon dioxide (CO₂). Concentrations of carbon dioxide in the atmosphere today are already 30 per cent higher than the levels which existed before the Industrial Revolution.

Growing scientific urgency

The emergence of a scientific consensus on the causes and impacts of climate change has driven the development of policies aimed at tackling the problem both nationally and internationally. In late 1988, two United Nations agencies, the UN Environment Programme and the World Meteorological Organisation, set up the **Intergovernmental Panel on Climate Change (IPCC)**. This brought together scientific experts from all over the world to assess the science of climate change, its impacts and the strategies needed to respond to it.

The IPCC's first report, known as the **First Assessment Report**, was agreed in August 1990, despite heavy pressure to block its publication from oil producing countries and industry. Some of its key conclusions are:

“We are certain ... emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases... These increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth’s surface ...”

“we predict ... a rate of increase of global mean temperature during the next century... greater than that seen over the past 10,000 years.”

In addition, the report found that immediate **60 to 80 per cent cuts** in emissions of carbon dioxide would be needed to stabilise carbon dioxide concentrations in the atmosphere at today's levels.

An international climate change treaty agreed in record time

The strength of the IPCC's findings led to widespread agreement among countries that the only way to deal effectively with the issue of climate change was by means of an international treaty, or convention. In November 1990, the United Nations General Assembly agreed to establish a process aimed at negotiating and adopting an international climate convention to be ready for countries to sign at the Earth Summit in Rio de Janeiro in June 1992.

The negotiating process involved nearly all the world's nations, as well as observers from business and industry and environmental organisations such as Greenpeace. While many countries wished to see legally binding limits on greenhouse gas emissions included in the convention, the USA refused to agree to this, claiming that there were still scientific uncertainties over the need to take action, and citing unacceptable economic consequences of cutting energy consumption. The USA is the world's biggest emitter of greenhouse gases, and it was essential that it signed the convention. The more progressive countries were forced to compromise their positions in order to get the USA on board, and as a result, the final treaty, known as the **United Nations Framework Convention on Climate Change (UNFCCC)**, includes only a legally weak and ambiguously worded 'aim' requiring the industrialised countries (listed in Annex I of the Convention) to return their greenhouse gas emissions to 1990 levels by the year 2000.

Annex I of the UN Framework Convention on Climate Change

Australia	Finland	Lithuania*	Slovenia*
Austria	France	Luxembourg	Spain
Belarus*	Germany	Monaco	Sweden
Belgium	Greece	Netherlands	Switzerland
Bulgaria*	Hungary*	New Zealand	Turkey
Canada	Iceland	Norway	Ukraine*
Croatia*	Ireland	Poland*	United Kingdom of
Czech Republic*	Italy	Portugal	Great Britain
Denmark	Japan	Romania*	and Northern Ireland
European Community	Latvia*	Russian Federation*	United States of
Estonia*	Liechtenstein	Slovakia*	America

*Countries that are undergoing the process of transition to a market economy and with Annex I as amended at COP3 (Decision 4/CP.3)

Lack of action by the industrialised world

The Convention required the first meeting of the Parties to the Convention (the first Conference of the Parties, known as COP1) to review the adequacy of the commitment to return emissions to 1990 levels by 2000. In the lead up to COP1 it became clear that few OECD countries (basically the industrialised Western nations) were making sufficient efforts and most were failing to achieve the commitment. Projections of future emissions provided by the industrialised countries in fact showed

that carbon dioxide emissions in most of the OECD countries were continuing to rise sharply as a result of increasing fossil fuel use.

It also became clear that despite this failure and the growing scientific consensus on the need to make real cuts in emissions, there was little political support among the Annex I countries for legally binding emission reductions to be agreed at COP1. In an attempt to increase the pressure for action, the Alliance of Small Island States (AOSIS), whose members include low lying island nations which are particularly vulnerable to sea level rise, proposed that the Annex I Parties should reduce their carbon dioxide emissions by 20 per cent by the year 2005. This target was supported by Greenpeace and other environmental groups, but was resisted by most of the OECD countries.

A new negotiating process set up

In the end, although the Parties at COP1, held in Berlin in March/April 1995, agreed that the Convention's greenhouse gas commitments for the Annex I countries were inadequate, they failed to agree new concrete emission targets. Instead, in a document known as '**the Berlin Mandate**', they agreed merely to set up a new negotiating process whose main purpose was to strengthen the commitments by agreeing greenhouse gas limitation and reduction targets to be included in a legal instrument, with the aim of adopting the instrument at the third Conference of the Parties.

The Berlin Mandate also stated that the negotiating process would not introduce any new commitments for the developing countries. This was because, as the Berlin Mandate said, it is the developed countries which are responsible for the largest share of historical and current global emissions and emissions per person are still relatively low in the developing countries. The Mandate also recognised that the share of global emissions from developing countries will need to grow to meet their social and development needs.

The negotiations on the Berlin Mandate were carried out by a committee which included most of the world's nations. The process also included hundreds of observers from business and industry and the environmental and development movements. It was this committee which negotiated what became known as the **Kyoto Protocol to the UNFCCC**.

Strong scientific consensus

At the end of 1995, the IPCC agreed its **Second Assessment Report**. This involved over 2,500 scientists and experts, and its historic conclusions included the statement that:

"The balance of evidence suggests a discernible human influence on global climate - that is we are already seeing the first signs of climate change".

A wide range of impacts of climate change on human society and on natural ecosystems were found for just a doubling of carbon dioxide concentrations in the atmosphere above pre-industrial levels. The IPCC predicts that this doubling could

occur as early as 2030 if measures to reduce emissions are not implemented. Some of the Second Assessment Report's findings were:

“Most systems are sensitive to climate change. Natural ecological systems, socio-economic systems, and human health are all sensitive to both the magnitude and the rate of climate change.”

“...Potentially serious changes have been identified, including an increase in some regions in the incidence of extreme high-temperature events, floods and droughts, with resultant consequences for fires, pest outbreaks, and ecosystem composition, structure and functioning, including primary productivity”

Specifically on human health the IPCC found that:

"Climate change is likely to have wide ranging and mostly adverse effect on human health, with significant loss of life."

Forests are projected to suffer significant damage:

“a substantial fraction (a global average of one-third, varying by region from one-seventh to two-thirds) of the existing forested area of the world will undergo major changes” and “...entire forest types may disappear..”

Some of the world's poorest developing countries may suffer the most from the impacts of climate change:

“There may be increased risk of hunger and famine in some locations; many of the world’s poorest people - particularly those living in subtropical and tropical areas and dependent on isolated agricultural systems in semi-arid and arid regions - are most at risk of increased hunger. Many of these at risk populations are found in sub Saharan Africa; south, east, and Southeast Asia; and tropical areas of Latin America, as well as some Pacific island nations..”

It is not surprising therefore that the IPCC found that early action is required and that emission reductions are possible:

“Failure to adopt policies as early as possible to encourage efficient replacement investments at the end of the economic life of plant and equipment (i.e., at the point of capital stock turnover) impose an economic cost to society.”

“Significant reductions in net greenhouse gas emissions are technically possible and can be economically feasible”.

Negotiating the Kyoto Protocol

The strength of the IPCC's findings and the widespread scientific consensus on climate change were major forces during the negotiations which culminated in the Kyoto Protocol. The acceptance of the science by countries meant that there were instead two main issues upon which debate focused during the negotiations. The first was the

impacts of action by industrialised countries to reduce their emissions and the second was the issue of developing country action to limit the growth in their emissions.

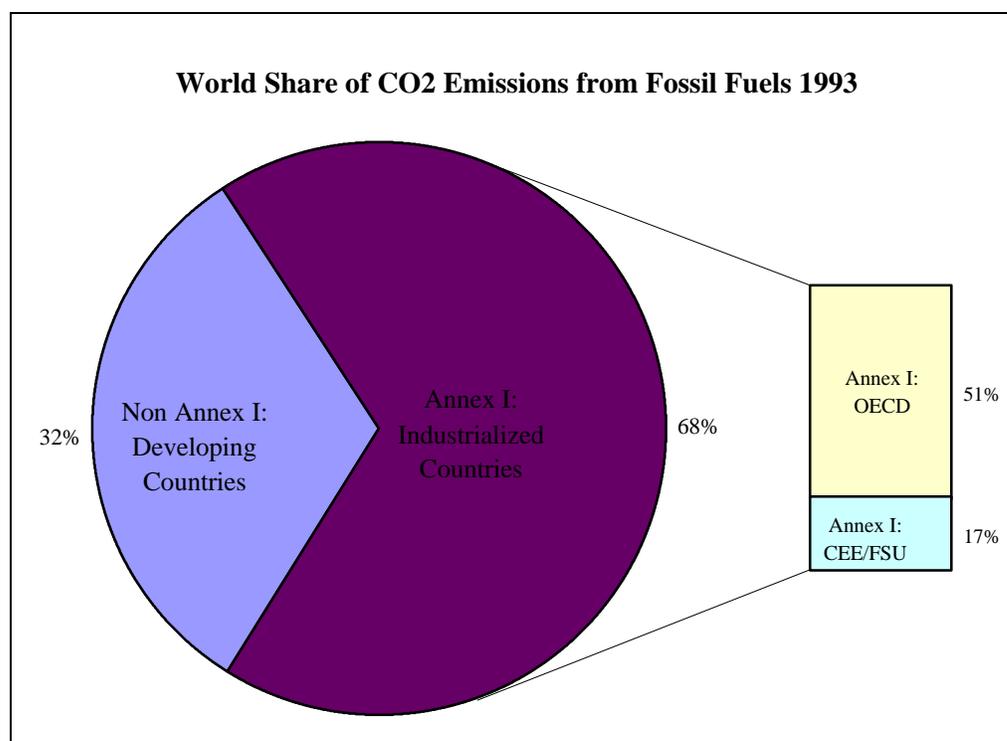
Industrialised country action needed now

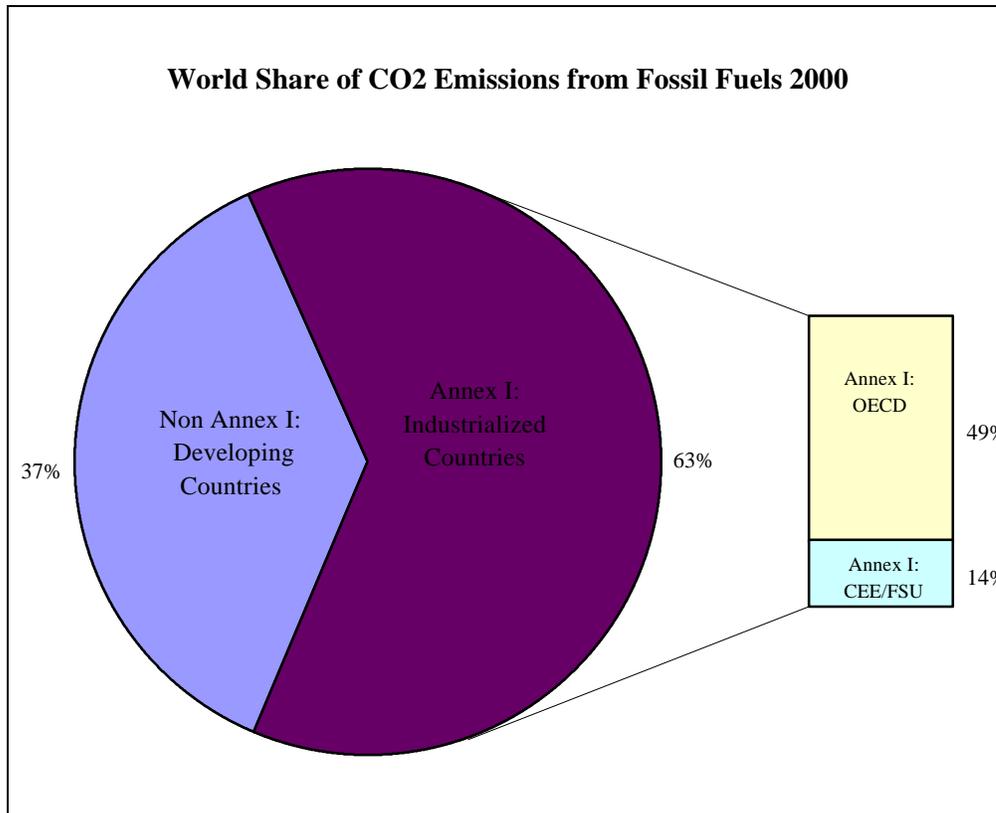
The biggest source of emissions in the developed world is the burning of fossil fuels to provide energy for domestic use, transport and industry. Action to cut emissions therefore requires energy to be used more efficiently and a switch to renewable energy systems such as solar and wind. Countries which are highly dependent on fossil fuels and those such as the OPEC countries, which produce fossil fuels, as well as powerful interests from the fossil fuel and industrial sectors, lobbied intensively throughout the negotiations to prevent agreement on emission reductions, stressing the adverse impacts such reductions would have on national economies and global economic growth.

However, other countries stressed the need for early action, pointing to the economic costs of delay, as well as the unacceptable consequences of inaction in terms of climate change impacts.

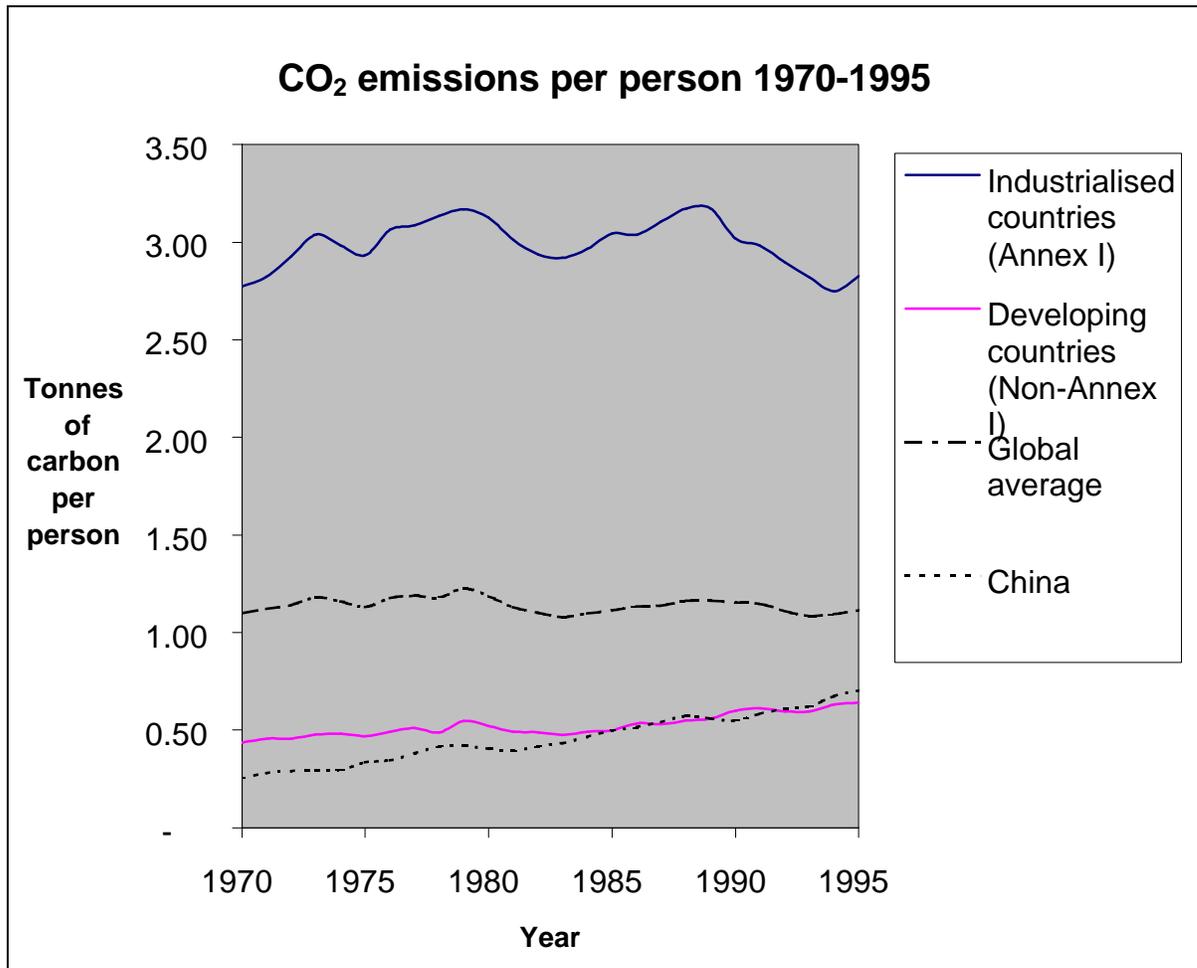
Industrialised countries still the major culprits

Although the Berlin Mandate specifically stated that there should be no new commitments for the non-Annex I developing countries, some OECD countries, particularly the USA, as well as the US fossil fuel lobby, argued that action by the developed countries would be overwhelmed by projected increases in emissions in the developing countries, and that the Protocol must therefore introduce, at a minimum, a timeframe for the introduction of emission commitments for developing countries.





Emissions in many large developing countries are undoubtedly growing rapidly, although from very low baselines. However, International Energy Agency figures show that in the 1990s two thirds of global emissions of carbon dioxide came from the developed countries, and project that these countries will still be the source of over half the world's emissions unless they take action to reduce their emissions.



It is the developed countries whose emissions since the Industrial Revolution have caused the climate change problem we are currently facing. It is therefore the responsibility of the developed countries to take action first. Many developing countries are already taking substantial action to reduce their emissions growth, and some have done much more to reduce their emissions than many industrialised nations. Developing countries should not be expected to take on board commitments to limit their emission growth until the industrialised countries have met their responsibilities.

The Kyoto Protocol to the Climate Convention - a new legal instrument

The new protocol, known officially as the **Kyoto Protocol to the UN Framework Convention on Climate Change**, was adopted in Kyoto, Japan on 11 December 1997 at the third Conference of the Parties to the UNFCCC.

The Kyoto Protocol is significant because it introduces, for the first time, legally binding greenhouse gas emission commitments for the developed countries (this includes most of the developed countries listed in Annex I of the UNFCCC). The commitments agreed to should, according to the Protocol, lead to an overall global reduction of at least five per cent in 1990 levels of greenhouse gases by 2008-2012.

However, the Kyoto Protocol is a far from simple document. Not only the commitments themselves but also the mechanisms by which the developed country

Parties may achieve them are extremely complex. Although countries recognise the need to cut global emissions of carbon dioxide and the other greenhouse gases to prevent dangerous global warming, many developed countries, aided by intensive public pressure from the fossil fuel industry, refused during the negotiations to agree to the kinds of cuts in their domestic greenhouse gas emissions which the science demands. The result was commitments in the Protocol which fall far short of what is really needed to protect the earth from major climatic changes.

Apart from the inadequate greenhouse gas emissions commitments, the Kyoto Protocol contains a number of provisions whose details were not resolved at the final negotiating session in Kyoto. These include the so-called flexibility mechanisms (emissions trading, joint implementation and the Clean Development Mechanism) and the use of sinks by developed country Parties to achieve their emission commitments. Within these provisions is the potential for a number of sizeable 'loopholes', elements which could sanction emission levels far above what was intended in Kyoto, and which have the potential to undermine and even overwhelm the Protocol's global reduction target of at least five per cent.

Parties to the Convention are now entering a new round of negotiations aimed at resolving the outstanding issues in the Kyoto Protocol, and there is a real danger that decisions will be taken which will permanently establish loopholes in the Protocol. These loopholes may be difficult, if not impossible, to close in the future, and could allow developed countries to avoid domestic action to reduce their emissions, and global emissions to increase.

WHY ARE THE EMISSION COMMITMENTS INADEQUATE?

What are the major sources of greenhouse gases?

The most important greenhouse gas is carbon dioxide (CO₂), and its biggest source by far is the burning of fossil fuels (coal, oil and gas) for energy. Six billion tonnes of carbon are released as carbon dioxide every year from this source. Burning fossil fuels also gives off two other greenhouse gases: methane (CH₄) and nitrous oxide (N₂O).

Carbon dioxide, methane and nitrous oxide are also given off as a result of deforestation, removal of grassland cover and agricultural practices. Deforestation is responsible for about 1.6 billion tonnes of carbon released as CO₂ per year. Methane is also emitted during the management and disposal of waste.

Chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons are chemical gases which cause both ozone depletion and global warming. They are being phased out or controlled under the Montreal Protocol and so are not included in the UNFCCC or its Kyoto Protocol. The three industrial global warming gases controlled under the Kyoto Protocol are hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

Although molecule for molecule, methane, nitrous oxide, HFCs, PFCs and SF₆ are more powerful greenhouse gases than carbon dioxide, they are not as significant as CO₂ because they are emitted in much smaller quantities.

The use of fossil fuels is by far the most important source of greenhouse gases. In the period 1990-1995, fossil fuel use was responsible for nearly 60 per cent of total greenhouse gas emissions.

How deep do emission reductions need to be?

Ecological limits

The ultimate objective of the Kyoto Protocol is the same as that of its parent convention, the UNFCCC. This is found in Article 2 of the Convention and states that greenhouse gas concentrations in the atmosphere must be stabilised at a level "*that would prevent dangerous anthropogenic interference with the climate system*", and that this level should be achieved "*within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner*".

But what does achieving the ultimate objective actually require? Clearly, Parties must agree on a set of **ecological limits** or **targets** which would safeguard ecosystems, food

production and economic development as required in Article 2 of the Convention, and then agree on emissions reductions which will achieve them. However, ecological limits were barely discussed during the Protocol negotiations and there is currently no international process for finalising and agreeing a definition.

Species and ecosystems are highly sensitive to temperature increase and sea level rise, both in terms of the magnitude of such changes and the rate at which they happen. The temperature and sea level rise sensitivities of many species and ecosystems are well known, and have been used by scientists to calculate their ecological limits. Using these, scientists have been able to establish global ecological targets beyond which species and ecosystems are unable to adapt naturally and which would result in serious impacts.

In 1990, the United Nations Advisory Group on Greenhouse Gases (AGGG) published environmental targets which stated that in order to minimise the risk to species, ecosystems and food production, temperature rise should be restricted to a maximum of 1°C above the pre-industrial level, the rate of temperature rise should be a maximum of 0.1°C per decade and the rate of sea level rise should be a maximum of 20mm per decade. Since then, other scientific research has been published which supports the AGGG's targets.

Based on this research, Greenpeace believes that international policy on greenhouse gas emissions should aim to meet the following **global ecological targets**:

- to limit the long term¹ increase in global average temperature to less than 1°C above the pre-industrial level;
- to bring the rate of temperature increase to below 0.1°C per decade within a few decades;
- to limit long term² global average sea level rise to less than 20 cm;
- to bring the rate of sea level rise to below 20mm per decade.

These targets aim to reduce the risk of serious damage to manageable or acceptable levels; in other words, they are 'low risk', not 'no impact'. Many, but not all ecosystems will be able to adapt to these limits. It should also be borne in mind that these targets might well have to be strengthened in the future as a result of further scientific developments. This occurred, for example, during the debate over whether CFCs needed to be phased out completely, when previous scientific estimates of stratospheric ozone depletion were shown to be drastic underestimates.

The Intergovernmental Panel on Climate Change (IPCC) estimates that if greenhouse gas emissions increase as predicted over the next hundred years (the "business as usual scenario"), then global average temperature will increase by 2.5-2.9°C above the pre-industrial level by 2100, and sea level will rise by 23-96 cm between 1990 and 2100. They estimate that the rate of temperature rise will be about 0.2-0.3°C over the next

¹ "Long term" refers to the period up to and beyond 2100.

century. The IPCC also predicts that the impact of such increases on many species and ecosystems and on global food production would be significant and often severe.

These changes are well above the low risk ecological targets proposed by Greenpeace and supported by the AGGG and other scientists. Unless the projected global emissions of greenhouse gases are slashed, we run the risk of severe and unpredictable climatic change.

The carbon logic

So by how much will greenhouse gas emissions need to be reduced if we are to achieve these ecological targets? Greenpeace has attempted to answer this question by assessing the amount of fossil fuels which can be burnt - and thus carbon dioxide released - before the targets are exceeded. This is described as a global **carbon budget**.

Estimating a global carbon budget involves making certain assumptions on, for example, the climate sensitivity, the importance of other greenhouse gases and the amount of carbon dioxide released from deforestation. We estimate that these result in uncertainties of about 50 per cent in our carbon budget estimate.

The results of our calculations show that achieving the ecological temperature target will require that no more than **225 billion tonnes of carbon** is emitted globally from the burning of fossil fuels over the next century.² However, this budget goes hand in hand with major initiatives to halt deforestation so that the world's forest cover remains at its current size, and with the start of a significant global forest regeneration and reforestation programme in the next century. If deforestation continues at its current rate then only **145 billion tonnes of carbon** can be emitted from fossil fuel use.

A carbon budget of 225 billion tonnes of carbon represents only about a quarter of the world's known resources of coal, oil and gas, and is only about five per cent of the estimated resources. If we continue to burn fossil fuels at the rate we are now, then the carbon budget will be used up in only 40 years. If demand for fossil fuel carries on increasing at its current rate of two per cent per year, then the budget will be exhausted in only 30 years. If we are to achieve the carbon budget and stay within ecological limits, then the obvious conclusion is that 75 per cent of the known resources of fossil fuels cannot be burnt.

Implications for emission reduction targets

² In making these calculations Greenpeace has taken a precautionary approach to the science of climate change. Instead of the IPCC "best-estimate" of the effect of a doubling of CO₂ in the atmosphere of 2.5°C, this calculation uses an estimate of 3.5°C, which may better fit observations. The corresponding carbon budget using the IPCC best-estimate is about 300 billion tonnes of carbon.

Translating the ecological targets into actual carbon dioxide emission reductions has been attempted by a number of scientists and modellers. One estimate is that carbon dioxide emissions from industrialised countries would have to be reduced by 30-55 per cent by 2010 if we are to achieve the targets and avoid ecologically dangerous climate change.³ This level of reduction is an order of magnitude higher than the purely political target of "at least five per cent" agreed at Kyoto.

Greenpeace is calling for:

- countries to support an early review and renegotiation of the Kyoto commitments with the aim of agreeing on legally binding targets for a phase out of fossil fuels as soon as possible.
- industrialised countries to adopt national policies and programmes to reduce substantially emissions of CO₂ and other greenhouse gases.
- an urgent phase out of the production and use of coal (which releases by far the most carbon per unit of energy produced than oil or gas).
- a transfer of subsidies from fossil fuel production and use to the support of renewable energy systems such as solar and wind.
- the placing of significant constraints on the development of known oil and gas reserves and a halt to exploration efforts for new oil and gas reserves. Since the vast majority of these can never be burnt if we are to avoid dangerous climate change, this is simply a waste of money which should instead be invested in clean renewable energy.
- a halt to the exploitation of unconventional oil and gas reserves such as oil shales and Orimulsion (a bitumen emulsion from Venezuela which can be used in place of oil for electricity generation).

³ Joseph Alcamo and Eric Kreileman (1996) Emission scenarios and global climate protection, *Global Environmental Change; Human Policy and Dimensions*, Vol 6, Number 4, September 1996; pp 305-334.

THE KYOTO PROTOCOL'S KEY ELEMENTS AND OMISSIONS

The Kyoto Protocol contains the following:

Emission commitments for the developed countries

'Differentiated' commitments for developed countries

The emissions targets for the developed countries are different - in other words, there is no single target which is the same for all developed countries. The USA, for example, has to reduce its emissions by seven per cent. The European Union and most of the Central and Eastern European countries have to reduce their emissions by eight per cent, Poland and Hungary by six per cent and Croatia by five per cent. Canada and Japan's target is a six per cent reduction. Scandalously, some countries are being allowed to increase their emissions, having argued that reductions would have an adverse impact on their national economies. These are Australia (an eight per cent increase), Norway (one per cent) and Iceland (ten per cent). Russia, the Ukraine and New Zealand argued successfully for targets which would allow their emissions to merely stabilise. The individual commitments are listed in Annex B of the Kyoto Protocol.

Commitments in terms of assigned amounts, to be achieved by a fixed period⁴

Each developed country's commitment is phrased in the Protocol in terms of an '**assigned amount**'. Developed countries have to achieve their assigned amounts within the five-year period 2008-2012, this being the first **commitment period** agreed under the Protocol. So, for example, although the USA has to make a seven per cent reduction in its 1990 level of greenhouse gas emissions, its assigned amount is described as 93 per cent of its 1990 emissions, multiplied by the five years of the commitment period. The individual developed country commitments are listed in Annex B of the Kyoto Protocol.

⁴ Sometimes this is referred to as a country's emission budget, however here we have chosen to use the language of the protocol to avoid confusion.

Annex B of the Kyoto Protocol - Emission Limits for Parties

Party	Quantified emission limitation or reduction commitment (percentage of base year or period)
Australia	108
Austria	92
Belgium	92
Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark	92
Estonia*	92
European Community	92
Finland	92
France	92
Germany	92
Greece	92
Hungary*	94
Iceland	110
Ireland	92
Italy	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg	92
Monaco	92
Netherlands	92
New Zealand	100
Norway	101
Poland*	94
Portugal	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain	92
Sweden	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland	92
United States of America	93

* Countries undergoing the process of transition to a market economy

Commitments in 'CO₂ equivalents'; inclusion of six greenhouse gases

Six greenhouse gases⁵ - carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) - are controlled under the Protocol. However, the commitments described above are not targets for each gas, but for all six gases added together in a 'basket' weighted by the relative effect of each gas. This means that a country can allow emissions of one

⁵ Although it is common to refer to the 'six gases' in fact the terms HFCs and PFCs refer to classes of greenhouse gases for which there are many different species.

greenhouse gas to increase, so long as corresponding decreases are made in the emissions of other greenhouse gases, and the country's commitment is achieved.

Assigned amounts are calculated using an estimate of the CO₂ equivalence of each gas, based on the global warming potentials (GWPs) of the six gases. GWPs are a measure of the amount of cumulative warming each gas delivers over different periods of time relative to CO₂.⁶ Methane, nitrous oxide, HFCs, PFCs and SF₆ are all more powerful global warming gases than carbon dioxide, molecule for molecule, and so have higher GWPs - 21 for methane, 310 for nitrous oxide, 1,300 for HFC-134a, 9,200 for perfluoroethane and 23,900 for SF₆ measured over 100 years. For the purposes of calculating assigned amounts, countries use the different GWPs to convert emissions of methane, nitrous oxide, HFCs, PFCs and SF₆ to their carbon dioxide equivalent.

One loophole written into the Protocol is that developed countries are allowed to choose either 1990 or 1995 as their base year for calculating emissions of HFCs, PFCs and SF₆. Emissions of HFCs were low in 1990 but had increased substantially in the majority of countries by 1995. Choosing 1995 allows these countries to increase their baseline emissions and thus their assigned amounts and increases the total assigned amount for the developed countries by around 0.6-0.7 per cent.

Assigned amounts calculated according to the 'gross' emissions of greenhouse gases in the base or reference year

The Protocol requires most developed countries to achieve their commitment using 1990 as a reference, or **base year**. Under the UNFCCC, countries with economies in transition (the former Soviet Union and Central and Eastern European countries) were allowed to choose a different base year because their emissions were declining by 1990, resulting in a lower emissions baseline.⁷ Emissions in the base year are calculated as the total amount of greenhouse gases resulting from the following sectors or sources: energy, industrial processes, solvent and other product use, agriculture and waste. These are known as **'gross' emissions**.

Assigned amounts which can be achieved using 'flexibility mechanisms'

The Protocol allows developed countries to achieve their commitments in four ways: joint fulfilment, or 'bubble' agreements between developed countries (Article 4 of the Protocol), Joint Implementation (JI) between developed countries (Article 6), emissions trading between developed countries (Article 17) and through the Clean Development Mechanism (CDM) established under Article 12 (the flexibility mechanisms are described in detail later in this document). The first three all involve the developed countries, that is, countries with legally binding commitments, and so

⁶ The reader should note that the use of GWPs, the method of their calculation, and the period over which gases should be compared, is not without controversy in scientific and policy terms. It is beyond the scope of this paper to review this issue, however. One issue is that of very long-lived gases. Perfluoroethane has a lifetime of 10,000 years, for example, and the question arises as to whether it is even appropriate to use GWPs for such gases.

⁷ Countries with economies in transition which have chosen to use a different baseline to 1990 are Bulgaria (1989), Hungary (the average of its emissions from the 1985-1987 period), Poland (1988) and Romania (1989).

although emissions are transferred between these countries, the overall global assigned amount (the "at least five per cent" reduction) is not changed.

However, under the CDM the developed countries can fund projects in developing countries which bring about reductions in the greenhouse gases which would have been emitted in those countries if the project had not taken place. The developed countries can add these emissions 'credits' to their assigned amounts.

The details of how emissions trading, JI and the CDM will operate have still to be worked out. There is a real danger that the flexibility mechanisms will result in loopholes which will threaten the success of the Protocol's emission controls.

Assigned amounts which can be achieved using 'sinks'

Developed countries are allowed to achieve their assigned amounts using sinks in a limited form. The term 'sinks' refers to those natural processes which absorb carbon dioxide from the atmosphere. These include oceans and forests. Growing forests absorb carbon dioxide from the atmosphere and store it, but deforestation releases stored carbon back into the atmosphere. In other words, sinks can become sources.

Under the Protocol, the emissions absorbed or emitted by certain land use change and forestry (LUCF) activities (specifically, afforestation, reforestation and deforestation activities caused by human activities since 1990) can be added to the developed country's assigned amount for the first commitment period. The result is an emissions total for the commitment period which is 'net' of these emissions. Since the base year for the majority of countries is calculated in terms of 'gross' emissions from sources rather than 'net', the result is an increase in emissions to the atmosphere.

As with the flexibility mechanisms, negotiations have begun on the use of sinks in the Protocol. There are well known practical difficulties with relying on sinks to offset emissions from industrial sources. These include the difficulty of measuring the actual carbon dioxide absorbed by the sink accurately and the fact that forest sinks can easily become sources of carbon dioxide due to deforestation, disease and so on. This issue therefore has the potential to be another major loophole.

Calculating assigned amounts

For a Party to meet its emission commitments its total emissions during the commitment period need to be less than its assigned amount. As a consequence of the mechanisms described above the assigned amount can be added to, or subtracted from. Below is a sample calculation of an assigned amount for the first commitment period which includes all the provisions:

Assigned Amount	=	Total 'gross' greenhouse gases in the base or reference year	Plus or minus	Emissions absorbed or released as a result of afforestation and reforestation activities since 1990	Minus	Emissions released as a result of deforestation activities since 1990	Plus or minus	Emissions bought from or sold to other developed countries through emissions trading in 2008-2012 period	Plus or minus	Emission reduction units transferred from host countries or to donor countries from JI projects in 2008-2012 period	Plus	Certified emission reductions resulting from CDM projects in host countries carried out from 2000-2012
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'Banking' of emissions

If a developed country does not emit the whole of its assigned amount by the end of the commitment period, it is allowed to carry forward the unused portion to the next commitment period. This is known as '**banking**' of emissions.

Ratification and entry into force

The Kyoto Protocol becomes binding under international law (or 'enters into force') ninety days after 55 countries which are Parties to the UNFCCC have ratified it. It is then binding on these countries, and on any others which subsequently ratify it. These 55 countries must include Annex I Parties which together account for 55 per cent of the carbon dioxide emitted by the Annex I countries in 1990. This means that no single country can block entry into force (the USA, for example, accounted for 36 per cent of Annex I carbon dioxide emissions in 1990).

Ratification can be a lengthy and time consuming process. Every country has a different method of translating international agreements into domestic law. Getting legislative approval in many democracies can take years. Although the Climate Convention was ratified and entered into force in two and a half years (reflecting the urgency of the issue for the international community), other international environmental treaties have taken much longer to become law - decades in the case of the Law of the Sea. From a practical point of view therefore, the Kyoto Protocol cannot enter into force before the year 2000, but the number of important outstanding issues and the controversial nature of the Protocol makes a longer timeframe much more likely.

Apart from the lack of specific details on key issues such as the flexibility mechanisms and sinks, the Kyoto Protocol has some serious omissions.

Compliance mechanism

The Kyoto Protocol includes a commitment in Article 18 to develop a compliance mechanism. At present the Protocol lacks a non-compliance mechanism with real substance or legally binding consequences if a Party fails to meet its emission commitments (ie is in non-compliance). A strong and effective non-compliance regime is crucial to the Protocol's ability to ensure real and measurable environmental benefits

and emissions reductions and to maintain international credibility and confidence. This is especially so given the development of an emission trading system.

What the Kyoto Protocol does not contain:

Controls on international aviation and marine transport fuels (bunker fuels) - an important loophole

Emissions from international air and marine transport are not included in the emissions commitments under the Protocol, despite widespread recognition that these sources (although relatively small when compared to, for example, emissions from electricity production) are growing rapidly. Since 1991, when negotiations first began on the UNFCCC, countries have been unable to agree on how to allocate these emissions between countries. As a result, emissions from these sectors are not included in the assigned amounts agreed at Kyoto. This is a significant loophole - Greenpeace estimates that if emissions from these sectors grow as predicted at about three per cent per year (some projections for air transport are as high as 7 per cent per year), then by 2010 they will bring about an increase in emissions equivalent to at least 1.5 to 2 per cent of the total industrial emissions given off by developed countries in 1990⁸.

Specific review of emission commitments

The Protocol does not contain a specific review procedure for the emission commitments, despite intensive efforts by Greenpeace and other environmental groups at Kyoto. Such a review process is crucial to the success of the Protocol since without it there can be no assessment of its effectiveness, a procedure to strengthen the commitments in the future or adjustments made in the light of emerging science. The Protocol does provide for general reviews, linked to reviews of the UNFCCC, and these must be developed to allow specific reviews of the emissions commitments. This is another outstanding issue that must be addressed as soon as possible.

⁸ If the growth were 7 per cent per annum then the loophole would be about 7 per cent rather than 1.5-2%.

THE FLEXIBILITY MECHANISMS

Emissions Trading

What the Kyoto Protocol says and what it means

Article 17 of the Protocol states that the industrialised country Parties listed in Annex B may achieve their commitments using emissions trading. Emissions trading works by setting a legally binding limit on each Party's emissions (the assigned amount) and then permitting Parties to trade part of this. After all trading is finished the total sum of emissions (assigned amounts) should equal the total sum before any trading began - in other words trading re-distributes the allowed emissions from one Party to another but keeps the total emissions within the originally agreed limit.

This means that developed countries whose emissions are less than their assigned amounts can sell the unused portion to countries whose emissions exceed their assigned amounts. The net result is the same as if both countries achieved their commitments, since emissions are deducted from the assigned amount of the selling country and added to the assigned amount of the buying country.

Most developed countries have so far failed to implement widespread energy efficiency measures, and so use energy very wastefully. There are huge opportunities in such countries to reduce domestic emissions very cost effectively by bringing in energy efficiency measures. In an emissions trading regime, there may well be an incentive for these countries to reduce their domestic emissions below their commitment. This is because the price they could receive for selling these "excess" reductions (technically, excess assigned amount units) may well be higher than the cost to them of reducing the emissions in the first place. In the absence of an emissions trading regime, these countries would have aimed to achieve their commitment but probably nothing more. Other countries, however, would be able to purchase these excess assigned amount units and thereby legally increase their emissions above their original commitment.

Many economists believe this system to be an economically effective means of achieving global emission reductions at least cost. If the trading system works well and no one sells too many permits then the total emissions from the Annex B Parties should be kept within the limit set originally for all Parties together. A trading regime could therefore, in theory, bring about a more cost-effective reduction in global emissions than would otherwise be the case and produce some other overall economic benefits. This would be the ideal situation, but there are many ways in which a global emissions trading regime could go badly wrong.

No rules on emissions trading in the Protocol

Article 17 is very brief. Although it establishes the principle of emissions trading, it does not include any details on how a trading regime would operate. These details are to be agreed by the Conference of Parties (COP) to the UNFCCC, and negotiations are going on now. It is essential that rules are agreed which ensure transparency and effective monitoring and verification of emission trades and include a liability system for trading as well as legally binding penalties for non-compliance.

The Kyoto Protocol does not have legally binding compliance rules. In other words if a Party's emissions exceeds its assigned amount (because, for example, it sells too many of its assigned amount units) there is no way at present of penalising the country. What this means is that there is only a weak incentive to comply with the obligations. While this is not a problem unique to emission trading, the fact that money can be obtained from selling assigned amount units means that this is a more acute problem with an emission trading system.

The trading rules must also take into account the rules developed for the other flexibility mechanisms. These rules must be negotiated and agreed *before* trading begins in order to ensure the widest co-operation among all countries, developed and developing, and the establishment of a fair and effective system from the very beginning.

A limit on trading: reductions at home are the priority

Article 17 also states that emissions trading should be "supplemental" to domestic action in the achievement of a country's commitment. In other words, no country would be allowed to achieve its commitment solely through buying unused emissions and do nothing to reduce its emissions at home. A requirement to reduce emissions at home is essential in industrialised countries to reverse wasteful energy consumption patterns and bring about an expansion in energy efficiency technology and renewable energy systems throughout the whole world. In any case, allowing domestic emissions to increase unchecked by relying on emissions trading to achieve commitments is a dangerous strategy. At some point in the near future, sources of unused assigned amounts are likely to become unavailable as future emissions reduction commitments increase and as energy demand grows in countries like Russia and the Ukraine which once had emissions to sell. Countries which relied heavily on emissions trading initially would be placed at a serious competitive disadvantage as the supply of available emissions credits decreased.

Article 17 does not define "supplemental". In other words, the Protocol does not state exactly how much of the commitment can be achieved through emissions trading. An agreement on this is part of the negotiation currently being carried out.

Those countries, such as the USA, which are resistant to domestic emission cuts and which would like to achieve the majority of their commitment through emissions trading and the other flexibility mechanisms, are opposed to a **quantitative limit**, or '**cap**' on the proportion of the commitment which can be achieved through trading and the other flexible mechanisms.

Problems with emissions trading

Emissions trading and 'hot air' - a major loophole

The issue of what has become known as '**hot air**' is the most important and worrying problem with emissions trading, and eliminating or limiting it severely must be a priority for the current negotiations.

The problem arises because greenhouse gas emissions from Russia and the Ukraine are likely to be well below their Protocol commitments (to stabilise their emissions at 1990 levels within the 2008-2012 commitment period). Projections from a number of international agencies and the two countries themselves estimate actual emissions in 2010 to be well below this - some projections are that carbon dioxide emissions in 2010 will be as much as 22 per cent below 1990 levels. The huge drop in emissions is due to the shutting down of inefficient industries since the breaking up of the Soviet Union and the moves towards market-based economies. In the absence of emissions trading, these excess emissions - or '**hot air**' - would not be emitted, and total emissions from developed countries would be seven to twelve per cent below 1990 levels.

Greenpeace has analysed the impact of hot air on global emissions reductions in an emissions trading regime using the conservative assumption that emissions from Russia and the Ukraine will be 15 per cent below 1990 levels in 2010. In this analysis, if hot air were not traded, emissions from Annex B countries in 2010 would be 8.4 per cent below 1990 levels. However, if other industrialised countries bought all of Russian and Ukraine hot air and added it to their assigned amounts, the 8.4 per cent reduction shrinks to only 2.2 per cent. If the USA and Japan bought all the hot air, their combined emissions would *increase* by 1.3 per cent. Under the Protocol, the two countries are required to *cut* their emissions by seven per cent and six per cent respectively.

Emissions trading and sinks

Although the Protocol allows certain sink activities to be used to achieve emission commitments, the concerns over the many scientific and policy uncertainties mean that limitations must be placed on this. Greenpeace believes that it is unwise to allow sinks to be included in the emission trading regime and the rules for trading should reflect this. However, the fact that sink activities do modify a Party's assigned amount and trading is done in terms of assigned amounts, makes it very difficult to control potential problems in this area.

Closing the loopholes and solving the problems

- **Hot air - imposing a selling limit**

Eliminating the hot air problem completely is not politically feasible. A number of powerful countries such as the USA and Canada favour trading in hot air in order to do less at home, and these countries supported Russia and the Ukraine being allocated the weak stabilisation commitments agreed in Kyoto. However, it is essential that trading in hot air is limited as much as possible. Greenpeace therefore wants a **limit** on the sale or transfer of assigned amounts to be included in the rules developed for emissions trading and for joint implementation.

A **selling limit** would mean that sellers of excess emissions would only be allowed to transfer up to an agreed maximum amount of their assigned amount. This would reduce but not eliminate the hot air problem. **Cutting the size of the hot air problem in the first commitment period to less than one per cent of the greenhouse gases emitted by the developed countries in 1990 would require a limit to be set at three per cent of the selling country's assigned amount.** This limit should apply **to all transfers from emissions trading and joint implementation.**

- **Ensuring domestic action is the priority - imposing a buying limit**
Greenpeace strongly supports a **quantitative cap** to ensure that developed countries do most of their emissions at home. We believe this should be done through the setting of an **upper limit** on how much a developed country can buy to add to its assigned amount. Greenpeace would like to see a **buying limit of ten per cent of base year emissions.** The ten per cent should apply **to all transfers received from emissions trading and joint implementation.**
- **Sinks**
Limiting sink activities to only those defined in Article 3.3 is one way of containing the potential damage from allowing sinks into the trading system. Another way to limit the problem is not to permit countries to trade assigned amounts created by sink activities.

Joint Implementation

What the Kyoto Protocol says and what it means

Article 6 of the Protocol allows the industrialised countries in Annex B to meet their commitments through the use of **joint implementation**. Unlike emissions trading, joint implementation, or JI, is a project-based system with a requirement that projects be additional to what would otherwise have occurred. Like emissions trading, economically it has the effects of evening out the costs of reducing emissions.

Joint implementation was first proposed in 1991 during the negotiations on the Climate Convention by developed countries which had already introduced measures to limit growth in their emissions (primarily through energy efficiency and renewable energy programmes). They claim that further reductions are relatively more expensive for them than for countries which have not introduced such measures.

These countries argued that it would be more cost effective for them to reduce emissions in other countries where there were large opportunities for improving energy efficiency or introducing renewable energy systems, and where cutting greenhouse gas emissions or limiting their growth was cheaper than at home. They proposed that this could be done through the paying for and setting up of **emission reduction projects** in these countries. The paying country becomes the '**donor**' country, while the country in which the project takes place becomes the '**host**' country. The result would be cuts in emissions for which the donor country would get the credit. As originally envisaged, JI could be between two countries with targets or between a donor country with a target and a host country without a target.

Under Article 6, both host and donor countries have emission commitments and so there will be no overall change in the global assigned amount for the Annex B countries because emissions reduced in the host country and deducted from its assigned amount are added to the assigned amount of the donor country. Emission reductions derived from projects are described in Article 6 as "**emission reduction units**" (ERUs).

According to Article 6, ERUs can be generated by both projects which cut greenhouse gas emissions from sources (a country's 'gross emissions') or which increase the removal of greenhouse gases from the atmosphere by sinks. These projects will therefore include, for example, those which improve the energy efficiency of a host country, which replace fossil fuel-produced energy with renewable energy and those which increase forest cover.

An important element of JI projects is that they must be "**additional**" to those which would otherwise occur. In other words, a donor country must not be able to claim credit for emission reductions which would have happened in the host country anyway in the absence of the project. Devising effective rules to ensure that ERUs are truly additional is an important priority for the current negotiations.

Who will be the hosts and who will be the donors?

Developed countries which have already introduced improvements in energy efficiency and/or use significant amounts of renewable energy include Japan, the Nordic countries, and Switzerland may be the most interested in doing JI projects in other countries. Annex B countries which are highly dependent on fossil fuels, particularly coal, and which use energy very inefficiently include the Central and Eastern European countries and the countries of the former Soviet Union, may be the most interested in hosting JI projects.

No rules on joint implementation in the Protocol

Although Article 6 is considerably more comprehensive than Article 17 on emissions trading, detailed rules on JI have still to be agreed. Under Article 6, it is the Parties to the Protocol which will decide on these rules at their first meeting after the Protocol enters into force. This is different to Article 17, which requires the Parties to the Climate Convention to make the rules on emissions trading. In practice, this could mean that rules on trading could be agreed before rules on JI, since it will be some years before the Protocol enters into force, while conferences of the Parties to the Climate Convention are likely to take place every year.

A limit on JI - reductions at home are the priority

As with emissions trading, the Protocol states that reductions achieved through joint implementation must be "**supplemental**" to domestic actions in the achievement of a country's commitment. Once again, supplemental is not defined, and is being debated as part of the current negotiations on the flexibility mechanisms.

As described in the section on emissions trading, Greenpeace supports a quantitative cap on the amount of a country's commitment which can be achieved outside the country using the flexibility mechanisms.

Problems with Joint Implementation

Joint Implementation and hot air - another loophole?

Hot air is also a problem in relation to JI in countries such as Russia and the Ukraine whose assigned amounts are *larger* than their projected emissions. This is because there is little incentive for such host countries to ensure that ERUs generated by a project are truly additional to those which would have otherwise occurred in the absence of the project. However, because of the requirement for additionality in JI projects, which does not exist for trading, the potential for JI projects to simply exploit the hot air may be quite limited.

In the case of a host country whose assigned amount is *smaller* than its projected emissions, it is in that country's interests to ensure that the project generates ERUs which can be proved to be additional, since it will be reluctant to part with any fraction

of its assigned amount unless it is sure that the project will help it to meet its commitment.

The existence of hot air could also be a problem from the point of view of outside investment in much needed energy efficiency and renewable energy systems in Russia and the Ukraine. This is because the purchase of emissions credits generated through trading in hot air would bring about flows of cash into Russia and the Ukraine, and so is likely to be extremely attractive to these countries. However, it would not encourage the investment in energy efficiency and renewables projects which JI could bring about if trade in hot air is outlawed or severely limited.

Joint Implementation and sinks

The Protocol states in Article 3.3 that only emissions resulting from afforestation, reforestation and deforestation activities since 1990 can be used to modify a developed country's assigned amount. However, Article 6 does not explicitly limit JI sink projects to these LUCF categories. In theory, this means that ERUs could be generated from *any* LUCF activity which brought about a reduction in emissions from sources or enhanced absorption by sinks which would otherwise not have occurred in the absence of the project.

Under the Protocol, ERUs transferred to donor countries have to be subtracted from the assigned amount of the host country. If the host country allows JI projects involving other LUCF activities beyond afforestation and reforestation, then the ERUs generated must be subtracted from its assigned amount. However, it is then unable to use these ERUs to achieve its emission commitment. In other words, its assigned amount is reduced without it being able to claim a corresponding benefit. Host countries *without* hot air in their assigned amounts therefore have an incentive to allow only JI projects involving afforestation and reforestation activities, since only these activities can be used to achieve their emission commitments.

However, there *may* be an incentive for a host country *with* significant hot air in its assigned amount to allow JI projects involving other LUCF activities (rather than those involving only afforestation and reforestation). The existence of hot air in such a country's assigned amount could mean that it may not be too concerned about the deduction of the resulting ERUs from its assigned amount without a corresponding benefit.

Closing the loopholes and solving the problems

- **Hot air - a selling limit for JI and emissions trading**

Dealing with the hot air problem can be done by means of the selling limit we propose in the section on emissions trading. Greenpeace supports a selling limit for emissions trading and JI together of three per cent of the selling country's assigned amount.

- **Ensuring domestic action is the priority - a buying limit for JI and emissions trading**

This can be ensured through the inclusion in the rules of the buying limit proposed in the section on emissions trading. Greenpeace supports a buying limit for emissions trading and JI together of ten per cent of a country's base year emissions/assigned amount.

- **Sinks**

JI sink activities should be limited to only those permitted under Article 3.3 (i.e. afforestation and reforestation). In addition, countries should not be allowed to trade any part of their assigned amount which results from ERUs generated from sink projects.

The Clean Development Mechanism

What the Kyoto Protocol says and what it means

The Clean Development Mechanism (CDM) is set up under Article 12 of the Protocol. Its stated purpose is to help the developing countries achieve sustainable development and the developed countries to achieve their emission commitments.

The CDM is essentially joint implementation between a donor country with a commitment (a developed country) and a host country without a commitment (a developing country). In other words, developed countries pay for projects undertaken in developing countries. Under Article 12, the projects must generate "**certified emission reductions**" (CERs) which the donor country can use to achieve its emission commitment.

The CDM is to be subject to the authority of the meetings of the Parties to the Protocol and will be supervised by an Executive Board. CERs will be certified by "operational entities" if they deliver "*real, measurable and long-term benefits related to the mitigation of climate change and reductions in emissions that are additional to any that would occur in the absence of the certified project activity.*"

Article 12 also states that a "*share of the proceeds*" from the project activities will be used to help developing countries which are particularly vulnerable to the adverse impacts of climate change (for example, low lying countries) to meet the costs of adapting to these impacts. The Alliance of Small Island States (AOSIS) whose members would benefit from such funding, calculates that at least ten per cent of CDM project financing will be needed to cover the anticipated adaptation costs.

The term "*share of the proceeds*" is not defined in Article 12, and it is unclear whether the host countries have to give up a proportion of the economic benefits they have received from the projects, or whether the donor countries have to pay a percentage of the money they have saved through funding emission reduction projects in developing countries rather than at home.

Article 12 allows developed countries to use CERs generated from the year 2000 up to the 2008-2012 commitment period to achieve their emission commitment for that commitment period. This is in effect '**pre-commitment period banking**'.

Unlike Article 6, which specifies that JI projects include both those which reduce emissions at source and those which enhance removals by sinks, Article 12 only states that CDM projects must deliver real, measurable and additional reductions. Whether sink projects should be included in the CDM is an important part of the current negotiations. One view is that the absence of a specific reference to sinks in Article 12 implies that these activities may not be included in the CDM. Other views argue that sinks should be limited to only those agreed under Article 3.3 (or additional activities under Article 3.4) or that all sink projects should be allowed.

On the surface, the CDM is an attractive concept to both developed and developing countries. Developed countries are provided with an opportunity to achieve their commitments more cost-effectively, while developing countries can be helped to achieve their developmental and environmental goals through investment in "clean development" which they might otherwise not be able to afford.

However, in reality the CDM contains a number of serious weaknesses which mean it could not only fail to deliver "clean development", but could actually allow global emissions to increase rather than decrease.

Problems with the CDM

The CDM *adds* to developed country assigned amounts

The CDM allows developed countries to add CERs generated from projects in developing countries to their assigned amounts. Unlike with emissions trading and JI, where any emissions 'credit' to a developed country's assigned amount is balanced by a corresponding 'debit' from another developed country's assigned amount, credits generated through the CDM are additional to the total budget (assigned amount) of the Annex I countries.

Sink projects in the CDM: no panacea for forests

The massive pressure on forests and the consequent high rates of deforestation in developing countries make the inclusion of sink projects in the CDM a potentially attractive proposition. If this were allowed, it is argued that the CDM could provide incentives to developed countries to invest in projects in developing countries which protect forests which would otherwise be destroyed. Such projects would, in theory, safeguard a store of carbon which would otherwise be emitted to the atmosphere during deforestation.

There are a number of significant problems with allowing forest projects to be included in the CDM.

Firstly, there is no guarantee that there would be a net reduction in deforestation emissions as the deforestation activity may simply be moved somewhere else. It may be impossible to know whether any real, additional reduction (as required by Article 12) had actually taken place from forest conservation projects under the CDM. For example, would the deforestation apparently prevented actually have occurred without the project? In addition, although deforestation may be prevented in one place in the developing country concerned, it may simply move to another location in the country.

Secondly, there is the very real risk that the way in which forest activities are counted in the Kyoto Protocol could create an incentive to clear natural forests and re-plant with fast growing plantations. This is called the problem of perverse incentives and arises for basically four reasons: developing countries are not required to report all of their deforestation activities, there is real potential to manipulate the accounting rules under the Kyoto Protocol to not count the emissions from deforestation but to count

the carbon stored in plantations, and fast growing young tree plantations store more carbon per year than natural forests.

Finally, inclusion of forest (sink) projects in the CDM would add very significantly to the assigned amounts of the developed countries. For example, assume that deforestation in developing countries results in one billion tonnes of carbon being emitted every year. If forest conservation projects under the CDM could "prevent" ten per cent of the one billion tonnes from being emitted, then the CERs obtained would increase the total developed country assigned amount in 2008-2012 by some five per cent. This would provide an incentive for developed countries to do less at home.

Projects may not result in real and additional reductions

CDM projects in developing countries could in theory bring about real reductions in global emissions by limiting the business as usual growth in those countries, but this cannot be guaranteed in the absence of developing country emission targets. The fact that the developing countries do not have emission targets means that there are no safeguards which would ensure that CDM projects generate real reductions in emissions as there would be a strong incentive to exaggerate the emissions baseline and the corresponding emissions benefit of a project. There is a real danger that donor countries could gain credits for emission reductions from projects which would have occurred in the developing country anyway if the CDM did not exist. There is, in fact, a perverse incentive operating, since both host and donor countries have an interest in maximising the reductions achieved by a project.

Will the CDM really be 'clean and green'?

An important debate within the current negotiations is the type of emission reduction technology which will be allowed under the CDM; or in other words, which kind of technology will be licensed to deliver CERs and which will not? The CDM has the potential to provide the renewable energy and energy efficiency technologies which the developing countries truly need. However, the CDM also provides a potential opportunity to the coal industry to expand 'clean coal' technology in the developing world. The urgency of the climate change issue requires more drastic action to limit emissions in developing countries than the marginal reductions achieved by 'clean coal' projects. In addition, building 'clean coal' power stations locks the host country into using coal for the life of the power station - which could be several decades.

The CDM is also being seized upon by the nuclear industry as a way of increasing its operations in the developing world. The unsolved problems of safety and radioactive waste disposal, the risk of nuclear weapons proliferation and the exorbitant costs of nuclear energy make this an unacceptable option for inclusion in the CDM.

What is actually needed in the developing countries is the introduction of highly energy efficient technologies and renewable energy systems, not the exportation of outdated and dangerous energy technologies whose time has already past.

The CDM allows 'banking' of CERs gained before the first commitment period

Supporters of this clause in the Protocol argue that 'pre-commitment period banking' of CERs will encourage developed countries to invest early in emission reduction technology and sink enhancement in developing countries. However, the ability to bank CERs generated between 2000 and 2007 and then use them to achieve their assigned amounts for 2008-2012 also provides yet another incentive for developed countries to do less at home. In theory developed countries could get away with doing little if anything at home, since they could accumulate enough credits to achieve their emission commitment without having to cut their domestic emissions.

"Operational entities" not defined

Article 12 does not define the term "operational entities". If confidence in the CDM is to be ensured, it is crucial that the operational entities are truly independent. They should not propose or operate CDM projects.

Closing the loopholes and solving the problems

- **Ensuring that domestic action is the priority - a limit on the use of the CDM**
The rules agreed for the CDM should include a **quantitative limit or cap on the amount of CERs which developed countries can use to achieve their emission commitments**. Ensuring that damage to the environmental effectiveness of the Kyoto Protocol is almost negligible would require the cap to be about **one per cent of a country's assigned amount**.
- **Limiting the increase in the total developed country assigned amount and dealing with pre-commitment period banking - partial crediting of CDM projects only**
Donor countries should only be allowed to claim a proportion of the emission reductions generated as a result of a CDM project. Emission reductions should therefore be discounted by an agreed fraction so that developed countries gain only partial credit.

A heavier discount should apply to CERs generated in the pre-commitment period.
- **Making the CDM clean and green**
Credits should only be given for CERs generated from CDM projects involving renewable energy systems or energy efficiency technology which is unequivocally at the top end of efficiency practice in the world. In particular,
 - no credits should be given for projects involving clean coal technology.
 - nuclear energy projects should not be eligible for CERs.
- **No sink projects in the CDM**
No land use change and forestry activities should be considered for credit under the CDM until the IPCC Special Report on Land Use Change and Forestry has been completed and its full implications considered by a future COP. .

Joint Fulfilment of Commitments

What the Kyoto Protocol says and what it means

Article 4 of the Protocol allows developed countries to fulfil their emission commitments jointly. This means that a group of countries can agree among themselves what their individual commitments can be so long as the total emissions which result do not exceed the total emissions commitment of that group of countries. This allows some countries in the group to do less than their required emission commitment under the Protocol as long as this is balanced by other countries in the group doing more.

Under this article, each country in such a group has to declare its new emission commitment and this becomes its legally binding obligation. The country is then allowed to achieve its new assigned amount using the flexibility mechanisms. If the group as a whole fails to meet its combined emissions commitment, only the country or countries which caused the failure by overshooting their individual declared emission commitment are deemed to be out of compliance.

Article 4 was written into the Protocol in order to accommodate the European Union (EU). The EU is a unique international organisation, with the ability to take legal measures which directly influence and in certain cases legally bind each country within it. It has the power to both negotiate and implement climate policy and can enforce EU legislation through the European Court of Justice. It therefore has the legal and economic structures in place to ensure that any joint fulfilment agreement is enforced. In its case, if the EU as a whole fails to achieve its total target under the Protocol of an 8 per cent reduction in emissions from 1990 levels, not only the individual member states responsible for exceeding their declared individual commitments, but also the European Community, are deemed to be out of compliance.

The individual member states of the European Union have agreed their individual emission commitments. Together these add up to the EU's 8 per cent reduction commitment. The agreement is known as '**the EU bubble**'.

Individual greenhouse gas emission commitments for EU member states agreed at EU Environment Council, 17 June 1998 (% reduction from 1990 levels)

Austria	- 13
Belgium	- 7.5
Denmark	- 21
Finland	0
France	0
Germany	- 21
Greece	+ 25
Ireland	+ 13
Italy	- 6.5
Luxembourg	- 28
Netherlands	- 6
Portugal	+ 27

Spain	+ 15
Sweden	+ 4
United Kingdom of Great Britain and Northern Ireland	- 12.5
TOTAL	- 8

Problems with joint fulfilment

Emissions trading with no controls

In theory, a group of non-EU developed countries could use Article 4 to set up a back door trading free-for-all, thus circumventing any rules on an emissions trading system which might be agreed under Article 17. A group of countries known as the Umbrella group has formed which includes the USA, Canada, Japan, Australia, New Zealand, Norway, Iceland and Russia, and which has hinted that if it does not get its way on emission trading rules then it would form an Article 4 type bubble. This group, by and large, wants very few rules on emission trading and does not want a strong compliance or liability system.

FORESTS AND THE KYOTO PROTOCOL

It is obvious that drastically cutting greenhouse gas emissions to the atmosphere is the only way of minimising the impacts of climate change and keeping within ecological limits. Greenhouse gases are emitted from the burning of fossil fuels and other sources, and are absorbed or emitted by forests and other sinks. It would therefore seem to make sense when calculating total greenhouse gas emissions to the atmosphere to subtract the amount absorbed by sinks from the amount emitted from fossil fuel burning and other sources.

This apparently common sense approach led to demands by countries during the negotiations on the Kyoto Protocol to allow emissions absorbed by sinks such as forests to be counted in the achievement of a country's emission targets. Many countries, as well as Greenpeace and other environmental groups which were concerned about the practical problems involved and the danger of taking the emphasis away from the need to cut fossil fuel emissions, opposed this. However, the proposals on sinks were introduced towards the end of the negotiations in Kyoto, and the complexities and intricacies of the issues involved were not properly debated or understood. The inclusion of sinks in the Protocol makes the achievement of real reductions in greenhouse gas emissions uncertain and provides incentives to developed countries to do less to reduce their use of fossil fuels.

What the Kyoto Protocol says and what it means

Article 3.3 of the Protocol allows developed countries to achieve their commitments by deducting from their gross emissions in the commitment period, the greenhouse gas emissions absorbed by "*direct human-induced land use and forestry activities, limited to afforestation, reforestation and deforestation since 1990*". In other words, assigned amounts are measured in terms of "**net emissions**".

Article 3.4 provides for an expansion of the land use and change and forestry (LUCF) activities which can be used to achieve developed country commitments beyond afforestation, reforestation and deforestation. A decision on which new activities should be included will be taken by the Parties to the Protocol at their first meeting after the Protocol enters into force. The new activities can be used by countries in the second and subsequent commitment periods, although Article 3.4 also states that countries can choose to apply them to the first commitment period, so long as the activities were carried out after 1990.

In 1990, sinks in the majority of developed countries absorbed more greenhouse gases than they emitted. In other words, in these countries, LUCF activities which absorb greenhouse gases (such as afforestation and reforestation) were greater than those which release greenhouse gases (such as deforestation). To put it another way, their forests and other carbon reservoirs were **net sinks**, rather than **net sources**, of greenhouse gas emissions. Under the Protocol, these countries are required to use a

gross emissions baseline for 1990 (or other baseline as chosen by Bulgaria, Hungary, Poland and Romania) which only includes emissions from sources of greenhouse gases (such as the burning of fossil fuels) and does not allow emissions absorbed by sinks in that year to be deducted. In these countries, assigned amounts are therefore calculated using a limited form of what is known as the '**gross-net approach**' (see box).

There are two developed countries (Australia and the United Kingdom) whose forests and other carbon reservoirs were net sources of greenhouse gases in 1990. Under Article 3.7, these countries are allowed to use a limited **net baseline for 1990** which includes emissions from land use changes, but not forestry. In these countries, assigned amounts are therefore calculated using a limited form of what is known as the '**net-net approach**' (see box).

<p>BOX</p> <p>The Gross-Net Approach New Zealand first proposed the gross-net approach during the Protocol negotiations. The proposal put no restriction on the LUCF activities which a developed country could count when calculating its assigned amount. New Zealand claimed that its approach would bring about a reduction in what the atmosphere actually sees in terms of emissions. In fact, the opposite is true: the gross-net approach would actually bring about an <i>increase</i> in emissions to the atmosphere.</p> <p>For example, say a country's gross industrial emissions were 100 million tonnes in 1990. This would be the country's baseline under the gross-net approach. Let's assume that the country's target agreed at Kyoto was to stabilise emissions at 1990 levels by 2008-2012 (a 0 per cent reduction). Under the gross-net approach, the country would claim an assigned amount for 2008-2012 consisting of its 1990 gross industrial emissions (100 million tonnes) plus the sink it estimates it would have in the commitment period (say, equivalent to 25 million tonnes), giving it a total assigned amount of 125 million tonnes. When the 25 million tonnes which the sink would remove from the atmosphere is subtracted, this would leave 100 million tonnes - the same as its 1990 baseline. On the face of it, the country has achieved the 0 per cent target.</p> <p>However, looking at it in terms of what the atmosphere actually sees gives a quite different picture. If the country had a sink equivalent to 30 million tonnes in 1990, then the atmosphere would actually see emissions of 70 million tonnes (its industrial emissions of 100 million tonnes minus its 30 million tonnes sink). But in the 2008-2012 period, as shown above, the atmosphere would actually see emissions of 100 million tonnes - an increase of 30 million tonnes over the actual emissions to the atmosphere in 1990.</p>	<p>of 1990 industrial emissions to 30 per cent in 2008-2012, the atmosphere would experience a 50 per cent increase in net emissions relative to 1990 while the country in question claimed that it had in fact stabilised its emissions.</p> <p>The unrestricted gross-net approach proposed by New Zealand would have allowed emissions from the developed countries to increase by six to eight per cent of their total emissions in 1990. Concern over the size of this loophole led to the agreement in Kyoto that LUCF activities counted in the commitment period should be confined to afforestation, reforestation and deforestation. This has reduced, but not eliminated, the loophole. Any expansion of these categories, as is envisaged in Article 3.4, would increase the loophole and allow emissions to the atmosphere to increase.</p> <p>The Net-Net Approach Australia's high rates of deforestation are the reason that its sinks were a net source of emissions in 1990. In the UK's case it was due to the fact that carbon dioxide emissions from soil were counted in its emission baseline for 1990 (few countries included soil carbon emissions).</p> <p>The agreement in Kyoto that Australia could add its emissions from land use changes to its 1990 baseline increases the overall developed country baseline for 1990, thus inflating the total emissions allowed in the first commitment period by 0.9 per cent.</p> <p>However, what was not widely known in Kyoto was that deforestation rates in Australia are declining - by 1994 they were some 31 per cent below 1990 rates. The result of this decline is that Australia is able to continue to increase its gross industrial emission almost without restraint - in other words, it can achieve its target without making any significant cuts in its use of fossil fuels.</p> <p>This unacceptable situation is summarised in the</p>
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Furthermore, if a country's sink actually declined in the period from 1990 to the 2008-2012 commitment period, then the atmosphere would experience an even larger growth in emissions. For example, if the sink declined from 50 per cent	following table (the figures for 1990 and 2008-2012 are purely illustrative and do not represent Australia's actual or projected emissions in those years):
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Illustrative example of Australian emissions using the net-net approach				
	1990 emissions	2008-2012 emissions budget (assigned amount) required under Protocol (108% of 1990 emissions)	Breakdown of emissions budget if deforestation rates are reduced by 50% by 2008-2012	Breakdown of emissions budget if deforestation rates are reduced by 75% by 2008-2012
Gross industrial emissions	100 million tonnes		122.5 million tonnes (22.5% increase in gross emissions)	128.75 million tonnes (28.75% increase in gross emissions)
Net emissions from deforestation	25 million tonnes		12.5 million tonnes	6.25 million tonnes
Total emissions	125 million tonnes	135 million tonnes	135 million tonnes	135 million tonnes

Problems and loopholes

General problems with the use of sinks

- It allows developed countries to increase their emissions from the use of fossil fuels so long as these are offset by the amount of emissions absorbed by sinks. This means that carbon which has been locked up for millions of years in the form of coal, oil and gas will be emitted to the atmosphere in exchange for carbon in forests which will only be stored for a few hundred years at best. The increased emissions allowed from fossil fuels could also slow the rate of introduction of energy efficiency technology and renewable energy.
- It makes the achievement of emission commitments unverifiable because of the huge uncertainties involved in calculating the amount of carbon absorbed by specific sinks and over whether stored carbon can be locked up in the long term.
- It could allow unpredictable releases of carbon to the atmosphere since the long term survival of forests planted to store carbon is impossible to guarantee.
- Forests and other carbon sinks may become sources of carbon, due to the predicted increase in droughts and forest fires due to climate change.
- The lack of an agreed method in the Climate Convention for measuring the emissions absorbed by different sinks means that countries have all used different approaches, making an accurate calculation of global emissions from sinks impossible.

Specific problems with the use of sinks in the Kyoto Protocol

There are a large number of complicated issues specifically associated with the use of sinks in the Protocol. Many of these arise because so many of the Protocol's provisions on sinks and the terms that it contains are unclear and undefined. Greenpeace has carried out extensive analysis of the Protocol text and described its potential dangers and pitfalls in detail in reports made available to countries represented at the negotiations (see further reading section at end).

Examples of the potential dangers in the Protocol's LUCF provisions include the following:

- The Protocol does not define the terms afforestation, reforestation and deforestation used in Article 3.3. One problem with this is that it could in theory provide a perverse incentive for countries to cut down their old growth forests and replant them immediately with fast growing species capable of absorbing more carbon. This would not be defined as deforestation but as reforestation, since the area was being reforested immediately. This could be a real danger if CDM projects are allowed to include sink projects. . Indeed the proposals put on the table by Canada for these definitions under the Kyoto Protocol would have exactly this effect. The consequences for forest conservation and biological diversity would be unacceptable.
- Although it is clear in Article 3.3 that countries can claim credit for emissions absorbed by afforestation and reforestation activities, it is not clear that the subsequent loss of the forest (for example, as the result of fire, disease or some other event) would require the country to deduct the emissions from its budget (assigned amount). Again, this would also be a problem if sinks were allowed in the CDM.
- It is not clear in the Protocol whether developed countries have to include soil carbon changes emitted as a result of afforestation, reforestation and deforestation activities. If soil carbon is not included, then there could be substantial unreported losses of carbon from this source to the atmosphere. In addition, countries such as Australia, which are allowed to use the net-net approach, could add soil carbon losses to their 1990 baseline emissions, but fail to include them in their emissions budgets (assigned amounts). This would inflate the total baseline of the developed countries and thus increase their total assigned amount.
- Any expansion in the list of LUCF activities allowed under the Protocol, as provided for in Article 3.4, would increase the loophole which results from the use of the gross-net approach and thus allow an actual increase in greenhouse gas emissions to the atmosphere.

Solving the problems and closing the loopholes

Greenpeace continues to oppose in principle the inclusion of sinks in the Kyoto Protocol. However, negotiators in Kyoto agreed to allow sinks to be used to achieve emission commitments, and it is now essential that the uncertainties, ambiguities, perverse incentives and outstanding issues are resolved in a way which will minimise the potential loopholes. It is also important that the problems are not made worse by quick decisions.

The pressure to include sinks in the CDM, for example, is coming without the benefit of a rigorous review of all the issues involved. Many interests, particularly fossil fuel companies, see this as just an easy way to escape from emission obligations. Others concerned about forest conservation see the Kyoto Protocol as a panacea for forest protection, bringing economic resources to forest protection that would otherwise not be available.

Since long before Kyoto, Greenpeace has argued that the further development of the Land Use Change and Forestry provisions of the Kyoto Protocol should be driven by a thorough scientific and policy assessment. At the negotiating session in Bonn in June 1998, countries agreed that the IPCC should prepare a Special Report on all aspects of the sinks issue.

The IPCC Special Report should provide a full scientific assessment of all the issues surrounding the use of sinks in the Kyoto Protocol. These include the definitions of afforestation, reforestation and deforestation in Article 3.3, and the implications of an increase beyond these to other activities that may be used.

No decisions on the use of sinks in the Protocol should be taken until the Special Report is complete and its contents assessed fully. Since IPCC Special Reports take some two years to complete, decisions on sinks should not be made at the earliest before the sixth Conference of the Parties to the Climate Convention.

However, there are a number of issues that Greenpeace believes could have a serious impact on the success and effectiveness of the Protocol. These should be resolved as follows:

- Sink projects should not be allowed under the CDM. Consideration of this issue by the COP should not occur until the IPCC Special Report is completed.
- JI projects should be limited to only those LUCF activities allowed under Article 3.3 (afforestation, reforestation and deforestation since 1990).
- Sinks should not be included in the emissions trading regime.
- LUCF activities under the Protocol must not lead to adverse environmental impacts in other areas such as biological diversity. Definitions, methodologies and policies must be agreed which do not allow perverse incentives such as the clearance or harvesting of old growth forests in order to gain reforestation credits. No credits should be allowed for any activities that involve the harvesting or clearing of old growth forests. Specifically, afforestation, reforestation and deforestation should be defined as follows:

- Afforestation credit can be claimed for activities which establish a new forest by 2012 on lands which have historically not contained forests, and did not in 1990.
- Reforestation credit can be claimed for activities which re-establish a forest by 2012 on lands which had historically previously contained forests, but which had been converted to some other use as of 1990.
- Deforestation emissions must be reported for activities which converted lands which contained forests in 1990 to some other use in 2012.
- Expansion of LUCF activities under Article 3.4 should not be permitted.

THE GREENPEACE AGENDA

How deep do reductions need to be?

Greenpeace is calling for:

- countries to support an early review of the Kyoto Protocol's emissions commitments and the negotiation and agreement of legally binding targets for a phase out of fossil fuels as soon as possible.
- industrialised countries to adopt national policies and programmes to reduce substantially emissions of CO₂ and other greenhouse gases.
- an urgent phase out of the production and use of coal (which releases by far the most carbon per unit of energy produced than oil or gas).
- a transfer of subsidies from fossil fuel production and use to the support of renewable energy systems such as solar and wind.
- the placing of significant constraints on the development of known oil and gas reserves and a halt to exploration efforts for new oil and gas reserves. Since the vast majority of these can never be burnt if we are to avoid dangerous climate change, this is simply a waste of money that should instead be invested in clean renewable energy.
- a halt to the exploitation of unconventional oil and gas reserves such as oil shales and Orimulsion (a bitumen emulsion from Venezuela which can be used in place of oil for electricity generation).
- HFCs to be designated as 'transitional substances', indicating that their use is to be limited to sectors where environmentally safer alternatives do not exist.
- the use of HFCs to be prohibited in any application where the substance is directly and routinely vented into the atmosphere as part of the normal operation of a device or product.
- governments to hold corporations legally and financially responsible for damage to human health and the environment resulting from the use of HFCs.

Emissions Trading and Joint Implementation

Greenpeace is calling for the rules agreed for emissions trading and JI to include:

- a selling limit on countries to limit the size of the 'hot air' loophole. A limit of three per cent on the sale or transfer of assigned amounts would limit the hot air problem to less than one per cent of 1990 Annex B emissions in the first commitment period of 2008-2012.
- a quantitative cap to ensure that developed countries achieve most of their emission commitment by domestic action. This should be done through the setting of an upper limit on how much a developed country can buy to add to its assigned amount. The buying limit should be set at no more than ten per cent of a developed country's base year emissions.

The Clean Development Mechanism

Greenpeace is calling for the rules covering the CDM to include:

- a quantitative limit or cap on the amount of CERs that developed countries can use to achieve their emission commitments. This would ensure that domestic action is the priority and limit the problem of CERs inflating assigned amounts. Ensuring that damage to the environmental effectiveness of the Kyoto Protocol is almost negligible would require the cap to be about one per cent of a country's assigned amount.
- partial crediting only of emission reductions generated as a result of CDM projects. Emission reductions should be discounted by an agreed fraction so that developed countries gain only a part of the credit. A heavier discount should apply to CERs generated in the pre-commitment period.
- provisions to ensure the CDM is 'clean and green'. Credits should only be given for CERs generated from CDM projects involving renewable energy systems or energy efficiency technology which is unequivocally at the top end of efficiency practice in the world. In particular,
 - no credits should be given for projects involving clean coal technology.
 - nuclear energy projects should not be eligible for CERs.
- no credit to be given for projects involving Land Use Change and Forestry activities.

Forests and the Kyoto Protocol

No decisions on the use of sinks in the Protocol should be taken until the IPCC Special Report on sinks is complete and its contents assessed fully. Since IPCC Special Reports take some two years to complete, decisions on sinks should not be made before the sixth Conference of the Parties to the Climate Convention at the earliest.

However, there are a number of issues that Greenpeace believes could have a serious impact on the success and effectiveness of the Protocol. These should be resolved as follows:

- Sink projects should not be allowed under the CDM and the issue should not be considered by the COP until the IPCC Special Report on Land Use Change and Forestry Activities is completed and considered in detail.
- JI projects should be limited to only those LUCF activities allowed under Article 3.3 (afforestation, reforestation and deforestation since 1990).
- Sinks should not be included in the emissions trading regime.
- LUCF activities under the Protocol must not lead to adverse environmental impacts in other areas such as biological diversity. Definitions, methodologies and policies must be agreed which do not allow perverse incentives such as the clearance or harvesting of old growth forests in order to gain reforestation credits. No credits should be allowed for any activities that involve the harvesting or clearing of old growth forests. Specifically, afforestation, reforestation and deforestation should be defined as follows:
 - Afforestation credit can be claimed for activities which establish a new forest by 2012 on lands which have historically not contained forests, and did not in 1990.
 - Reforestation credit can be claimed for activities which re-establish a forest by 2012 on lands which had historically previously contained forests, but which had been converted to some other use as of 1990.
 - Deforestation emissions must be reported for activities which converted lands which contained forests in 1990 to some other use in 2012.

FURTHER READING

Greenpeace Analysis of the Kyoto Protocol. Greenpeace Briefing Paper prepared for the Fourth Conference of the Parties to the UNFCCC, Buenos Aires, 2-13 November 1998. Greenpeace International, October 1998, Amsterdam. Researched and written by Bill Hare and Tessa Robertson, this document provided the technical analysis for all of the issues covered in this Guide.

Fossil Fuels and Climate Protection: The Carbon Logic. Researched and written by Bill Hare, Climate Policy Director, Greenpeace International. Greenpeace International, September 1997, Amsterdam.

The Oil Industry and Climate Change. A Greenpeace Briefing by Kirsty Hamilton, Climate Campaign, Greenpeace International. Greenpeace International, August 1998, Amsterdam.