

OCCASSIONAL PAPER: CLIMATE CHANGE AND THE CLEAN DEVELOPMENT MECHANISM: A VIABLE OPTION FOR DEVELOPING COUNTRIES?

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*The definitions are based on the explanations given in Resources for the Future's *Weatherwane* Glossary.

Abatement. The reduction of the degree or intensity of emissions.

Annex I parties. In climate change negotiations it refers to industrialised countries that are trying to return their greenhouse gas emissions to 1990 levels by the year 2000 as per Article 4.2 of the Kyoto Protocol. (Also referred to as Annex B parties)

Bubble. The idea that emissions reductions anywhere within a specific area count toward compliance. For example, if a plant with multiple emissions sources is treated as being "under an emissions bubble," regulators assess only the total emissions of the plant, and not the emissions of each individual source, in determining compliance.

Carbon Sequestration. Generally refers to capturing carbon, in a carbon sink, such as the oceans, or a terrestrial sink such as forests and soils, so as to keep carbon out of the atmosphere.

Certified Emissions Reductions. These are verified and authenticated units of greenhouse gas reductions from abatement or sequestration projects which are certified by the Clean Development Mechanism.

Clean Development Mechanism (CDM). This is a modified version of Joint Implementation that was included in the Kyoto Protocol for project-based activities in developing countries. Article 12.2 of the Protocol stipulates that the parties established the CDM for the purposes of assisting developing countries in achieving sustainable development and helping Annex I parties meet their emissions limitation and reduction obligations. An innovative aspect is that a share of the proceeds from project activities is to be used to cover the administrative expenses of the CDM. Another part of those proceeds will be used to help particularly vulnerable developing countries meet the costs of adapting to a changing climate. As the Protocol stands now, developing country commitments are restricted to voluntary participation in CDM and the undertaking of general obligations such as the formulation of national programmes and political as well as scientific cooperation among each other.

Climate Change. This can be caused by an increase in the atmospheric concentration of greenhouse gases which inhibits the transmission of some of the sun's energy from the earth's surface to outer space. These gases include carbon dioxide, water vapour, methane, chlorofluorocarbons (CFCs) and other chemicals. There is an increase in the concentration of these gases partly as a result of human activities such as deforestation; the burning of fossil fuels such as gasoline, oil coal and natural gas; and the release of CFCs from refrigerators, air conditioners, etc.

Commitment Periods. These refer to a range of years within which parties to the Kyoto Protocol are required to meet their greenhouse gas emissions reduction target, which is averaged over the years of the commitment period. The first commitment period will be 2008 – 2012.

Conference of Parties (COP). This is the supreme body of the United Nations Framework Convention on Climate Change. It comprises 184+ nations that have ratified the Convention. Its first session was held in Berlin, Germany in 1995 and it meets on a yearly basis. It periodically reviews existing commitments in the light of the Convention's objective, new scientific findings, and the effectiveness of national climate change policies.

Emissions. These are pollutants released into the air or waterways from industrial processes, households or transportation vehicles. Air emissions refer to atmospheric air pollution; water emissions refer to pollutants released into waterways.

Emission Taxes. Taxes levied on air or water emissions, usually on a per ton basis. Emission taxes provide incentives for firms and households to reduce their emissions

and therefore are a means by which pollution can be controlled. The greater the level of the emissions tax, the greater the incentive to reduce emissions.

Emissions Trading. In such a trading programme, sources of a particular pollutant, most often an air pollutant, are given permits to release a specified number of tons of the pollutant. The government issues only a limited number of permits consistent with the desired level of emissions. The owners of the permits may keep them and release the pollutants, or reduce their emissions and sell the permits. The fact that the permits have value as an item to be sold or traded gives the owner an incentive to reduce their emissions.

Flexibility Mechanisms. They are established by the Kyoto Protocol and seek to increase the flexibility and reduce the costs of making emissions reductions. The three primary mechanisms contained within the Protocol are the Clean Development Mechanism (CDM), emissions trading and Joint Implementation (JI).

Fossil Fuels. Includes coal, petroleum and natural gas.

Global Warming. This refers to the progressive gradual rise of the earth's surface temperature thought to be caused by the greenhouse effect and responsible for changes in global climate patterns.

Greenhouse Effect. This refers to the progressive, gradual warming of the earth's atmospheric temperature, caused by the insulating effect of carbon dioxide and other greenhouse gases that have proportionately increased in the atmosphere. The greenhouse effect disturbs the way the Earth's climate maintains the balance between the incoming and outgoing energy by allowing short-wave radiation from the sun to penetrate through to warm the earth, but preventing the resulting long-wave radiation from escaping back into the atmosphere.

Greenhouse Gases. These include the common gases of carbon dioxide and water vapour, but rarer gases such as methane and chlorofluorocarbons (CFCs) whose properties relate to the transmission or reflection of different types of radiation. The

increase in such gases in the atmosphere, which contributes to global warming, is a result of the burning of fossil fuels, the emission of pollutants into the atmosphere, and deforestation.

The Kyoto Protocol. It is an international agreement struck by 159 nations attending the Third Conference of Parties (COP3) to the United Nations Framework Convention on Climate Change (held in December 1997 in Kyoto, Japan) to reduce worldwide emissions of greenhouse gases.

Nitrogen Dioxide (NO₂). This is a form of air pollution that is a brownish gas produced when nitric oxide emitted from power plants combines with oxygen already in the atmosphere. It can damage trees and lead to acid rain, which can harm lakes and streams and also corrode exposed materials. In the presence of sunlight and volatile organic compounds, NO₂ can contribute to the formation of ground-level ozone, or smog.

Ozone. At the ground level it is a form of air pollution that is produced when nitrogen oxides and hydrocarbons react in sunlight. It is not to be confused with stratospheric ozone, which is found 9 to 18 miles high in the Earth's atmosphere and protects people from harmful radiation from the sun.

Renewable Resources. These are energy resources that do not use exhaustible fuels. Sources of renewable energy include water, wind, solar energy and geothermal energy, as well as some combustible materials, such as landfill gas, biomass, and municipal solid waste.

Sulfur Dioxide (SO₂). It is a form of air pollution that is a gas. It results from the combustion of fuels that contain sulfur. It is most prevalent in the combustion of coal.

Sustainable Development. This broad concept refers to the need to balance the satisfaction of near-term interests with the protection of the interests of future generations, including their interests in a safe and healthy environment. As expressed by the 1987 United Nations World Commission on Environment and Development,

sustainable development “...meets the needs of the present without compromising the ability of future generations to meet their needs.”

Technology Transfer. In the context of climate change policy, it most often refers to the process by which energy-efficient technologies and processes developed by industrialised nations are made available to the less industrialised nations. These transfers may be conducted solely through the efforts of private parties or may involve governments and international institutions.

Tradeable Emissions Permits. These are used in an environmental regulatory scheme where the sources of the pollutant to be regulated (most often an air pollutant) are given permits to release a specified number of tons of the pollutant. The government issues only a limited number of permits consistent with the desired level of emissions. The owners of the permits may keep them and release the pollutants, or reduce their emissions and sell the permits. The fact that the permits have value as an item to be sold gives the owners an incentive to reduce their emissions.

United Nations Framework Convention on Climate Change (UNFCCC). This Convention is the centrepiece of global efforts to combat global warming. It was adopted in June 1992 at the Rio Earth Summit, and entered into force on 21 March 1998. The Convention’s primary objective is the “stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (man-made) interference with the climate system. Such a 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.”

COP - Conference of Parties

CDM - Clean Development Mechanism

EU - European Union

GHG - greenhouse gas

IPCC – Intergovernmental Panel on Climate Change

SA - South Africa

UNFCCC - United Nations Framework Convention on Climate Change

USA - United States of America

1. Introduction

The aim of the paper is to provide the background on international developments that have taken place regarding climate change. In addition, it hopes to form the basis for ongoing analysis regarding South Africa's role in addressing the causes of climate change, nationally, regionally and internationally. The paper is not a scientific or in-depth study of climate change, but rather an attempt to encourage students to become involved in the important field of environmental diplomacy.

A brief introduction explaining climate change is followed by a general discussion on the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Kyoto Protocol makes provision for the Clean Development Mechanism (CDM) that allows for developing country participation. How to implement the CDM is one of the main stumbling blocks in the ratifying of the Kyoto Protocol and the views of the USA and EU regarding developing country participation is discussed.

Developments in South Africa, its concerns regarding the CDM as expressed in recent government papers, and regional co-operation is discussed in greater detail. In conclusion, the paper looks at outstanding issues to be thrashed out at the next Conference of the Parties (COP) meeting at The Hague in November 2000.

2. What is Climate Change?

Shifts in climate change have shaped human destiny ever since, according to the theory of evolution, human beings evolved when a drying trend some 10 million years ago was followed around three million years ago by a sharp drop in world temperature. This change brought about a change in vegetation that forced the ape-like primates to respond by two evolutionary jumps: the first, to adapt by walking upright for long distances and using their hands to carry their young and food and, the second, to creatures with larger brains who used tools and were omnivorous. The latter are generally considered to be the first humans. (UNFCCC 1999:2)

During a later series of ice ages, sea levels dropped and humans moved from Asia to America and the Pacific islands. Many migrations, innovations and catastrophes

followed. Humans suffered throughout the millennia under the effects of climate change, unable to influence these events. However, humans have now reached a point where, as a result of the industries and other activities, climate change isn't changing human beings, but human beings seem to be having an effect on the global climate. While the predictions are uncertain at this stage, if they are correct, the climatic changes over the next century will be larger than any since the start of civilisation. (UNFCCC 1999:3)

The most important change to date is in the earth's atmosphere. Human activities have changed, and are continuing to change, the balance of gases that form the atmosphere. This refers especially to such key "greenhouse gases" as carbon dioxide (CO₂) and water vapour, but also to gases such as methane (CH₄), nitrous oxide (N₂O) and chlorofluoro carbons (CFCs) (now banned) whose properties relate to the transmission of different types of radiation. Although water vapour is the most important greenhouse gas of all, it is not included in the list of gases addressed as the human affect on it is indirect. (Shogren and Toman 2000:5) These naturally occurring gases make up less than one tenth of one per cent of the total atmosphere, which consists mostly of oxygen (21 per cent) and nitrogen (78 per cent).

TABLE 1. Types of greenhouse gases, their causes and percentage increase per year. (Adapted from the SA Discussion Document on Climate Change 1998:6 – 7)

<u>Greenhouse gas</u>	<u>Causes</u>	<u>Increase</u>
Carbon dioxide (CO ₂) (responsible for about half of the calculated increase in absorbed solar radiation)	<ul style="list-style-type: none"> - When oil, coal or natural gas are burned; - When industrial materials like cement is manufactured; - When natural vegetation is cut down; - Soil is ploughed in order to grow crops 	At a rate of about 1,5 parts per million (ppm) (0,4%) per year, currently at 360 ppm.
Methane (CH ₄) (Adds about one quarter to global warming)	<ul style="list-style-type: none"> - Rice paddies, urban waste landfills domestic livestock (cattle, sheep and horses), coal mining and leaks from natural gas pipelines. 	At a rate of 10 parts per billion (0,6%) per year over the past century.
Other gases, including: Nitrous oxide (N ₂ O) Sulphur hexafluoride Trospheric ozone gas	<ul style="list-style-type: none"> - Fertilisers - Synthetic gas used in industry - Formed by chemical reactions between nitrogen oxides (NO + NO₂), carbon monoxide and hydro carbon - all emitted by vehicles and the burning of coal. 	Each only present in tiny quantities.

Greenhouse gases are important in that they act as a blanket around the earth, without them, the earth's surface would be 30° C colder than what it is today. However, the

current problem is that human activity is making this blanket “thicker”. For example, the burning of coal, oil and natural gas releases vast amounts of carbon dioxide into the atmosphere. In addition, other human activities such as raising cattle and planting rice emits methane, nitrous oxide and other greenhouse gases. If these emissions continue to grow at the current rates, it is quite certain that atmospheric levels of carbon dioxide will double from pre-industrial levels during this century. If no steps are taken, these levels could triple by the year 2100. (UNFCCC 1999:3)

As already mentioned, climate change has been taking place for a long time, with dramatic changes between, for instance, the last ice age 20 000 years ago and the present. Human industrial and development activities during the last two centuries have caused changes above the normal variation though. Activities, particularly the burning of fossil fuels (oil, coal and natural gas) and deforestation, have increased the concentration of greenhouse gases in the atmosphere. This leads to more solar radiation being trapped and the earth’s surface warming up, referred to as the “enhanced greenhouse effect”. There are indications from data obtained from weather stations, melting glaciers and rising sea levels that the earth’s warming has started. The average global temperature is 0,5°C warmer than it was 100 years ago and is expected to increase between 1°C and 3,5°C by 2100. Sea levels are expected to rise by between 15 and 95 cm by 2100, flooding many low-lying coastal areas. (Enviro Facts 1999:3)

In 1979 the international community decided to address the potential problem.

3. International developments

As climate change affects the environment across borders of countries, no country acting on its own to influence the effects and causes of climate change will be successful in decreasing the enhanced greenhouse effect. In order to address the problems, policies that impact on the environment, political, economical and social sphere will have to be adopted by all countries.

The international community decided to address this problem at the first World Climate Conference in 1979. In 1988, the Intergovernmental Panel on Climate Change (IPCC) was established jointly by the World Meteorological Organisation and the United Nations Environment Programme. In 1990, the Intergovernmental Panel on Climate Change (IPCC) released its first assessment report that showed initial evidence that human activities might be affecting climate, but with significant uncertainty. At the Second World Climate Conference in the same year, agreement was reached to negotiate a "framework treaty." In 1992 the UNFCCC was established at the Rio de Janeiro "Earth Summit" by drafting the United Nations Framework Convention on Climate Change (UNFCCC). An important pledge was undertaken by Annex I developed countries to return their emissions to 1990 levels by 2000.

In 1995 the IPCC completed its Second Assessment Report that indicated a stronger conviction that human activities could be adversely affecting the climate. It confirmed that “the balance of evidence suggests there is a discernible human influence on global climate”. The report also indicated changes in rainfall patterns, increasing the threat of drought, floods or intense storms in many regions. (UNFCCC 1999:3) At

the first Conference of Parties (COP1) meeting in Berlin in 1995, agreement was reached to negotiate legally binding targets and timetables to limit emissions in Annex I countries. (Annex I countries are: Australia, Austria, Belgium, Canada, Denmark, European Economic Community, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and Northern Ireland and the United State of America. Provision was also made for countries that are undergoing the process of transition to a market economy. These countries are: Belarus, Bulgaria, Czechoslovakia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, and Ukraine.) Developing countries are referred to as non Annex I countries.

The next important milestone was the COP3 meeting in Kyoto, Japan in 1997. This meeting led to the Kyoto Protocol, whereby Annex I countries, now referred to as Annex B countries, agreed to binding emission reductions averaging 5% below 1990 levels by 2008–2012, with “flexibility mechanisms” (including emissions trading) for compliance. No commitments for emissions limitation by developing countries were specified. In 1998 at the COP4 meeting in Argentina, the emphasis was placed on operationalising the “flexibility mechanisms” of the Kyoto Protocol. The IPCC also began its Third Assessment. The COP5 meeting in Bonn, Germany concentrated on operationalising the flexibility mechanisms of the Kyoto Protocol, but little progress was made. While there has been intentions that implementing these mechanisms must be finalised by COP6 in The Hague in November 2000, a lot of questions remain. (Shogren and Toman 2000:11) These are discussed later.

The UNFCCC and Kyoto Protocol are discussed in greater detail below.

3.1 The United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC (hereafter referred to as the “Convention”) is a global commitment to take collective responsibility for climate change and is a mandate for the international community to take action to combat global warming. The Convention was adopted in June 1992 at the Rio Earth Summit and entered into force on 21 March 1998.

3.1.1 Objectives

Its primary objective is the “stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (man-made) interference with the climate system. Such a 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.” (Discussion Document on Climate Change 1998:13)

The Convention is not specific, but reflects a broad consensus in establishing institutions and procedures for further defining and approaching climate change. (Discussion Paper on Climate Change 1998:11) It is expanded by protocols such as

the Kyoto Protocol which was adopted in 1997. Climate change impact and policy priorities differ for developed and developing countries. The Convention addressed this by placing more obligations on Annex I than non-Annex I countries. Annex I countries are developed countries or countries whose economies are in a state of transition. Parties not listed in Annex I are regarded as developing countries. As of May 2000, 184 countries have ratified the Convention. (Fletcher 1999:2)

3.1.2 Principles of the UNFCCC

Principles upon which a common but differentiated approach is based is set out by the Convention. Included are the following:

- Climate change is a global problem and must be approached globally. Developed countries must accept the main responsibility for addressing the issue at the present time;
- Developed countries should provide financial assistance and technology to developing countries which will enable them to respond and adapt to climate change. While environmental damage must be minimised, sustainable development and poverty alleviation must not be impeded.
- The involvement of developing countries in all international climate change negotiations. (Discussion Document on Climate Change 1998:12)

3.1.3 Obligations of the UNFCCC

The countries that have ratified the Convention are required to comply with a comprehensive list of “to-do’s” which include the following:

- develop, update and publish national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases;
- formulate, implement and update national and regional programmes containing measures to mitigate climate change;
- promote and co-operate in the development and transfer of technology that controls, reduces or prevents anthropogenic emissions of greenhouse gases;
- promote and co-operate in the development and transfer of technology that controls, reduces or prevents anthropogenic emissions of greenhouse gases;
- promote sustainable management, conservation and enhancement of sinks and reservoirs of greenhouse gases;
- co-operate in preparing for the adoption to the impacts of climate change;
- take climate change considerations into account where feasible, in relevant social, economic and environmental policies and actions with a view to minimising adverse effects on the economy, public health and the quality of the environment;
- promote and co-operate in research, exchange of information, education, training, public awareness and the widest possible participation;
- report to the Conference of the Parties (COP). (Discussion Document on Climate Change 1998: 13 – 14)

3.1.4 Institutional bodies

Seven institutional bodies have been established that play a role in developing the Convention. The most significant body is the COP whose functions include reviewing the implementation of the Convention and the adoption of amendments,

protocols and decisions to promote the effective implementation of the Convention. (Discussion Document on Climate Change 1998:15)

As scientific consensus grew that human activities were having a discernible affect on global warming and that major nations such as the USA and Japan would not be able to meet the voluntary stabilisation target by 2000, parties to the treaty decided in 1995 to enter into negotiations on a protocol to establish legally binding limitations or reductions in greenhouse gas emissions. (Fletcher 1999:1)

3.2 The Kyoto protocol

The Kyoto Protocol (hereafter referred to as the “Protocol”) establishes binding GHG emissions targets for 38 industrialised countries for the period 2008 - 2012. The protocol is a legal instrument and sets out the main obligations for the industrialised countries. While fulfilling these obligations, the activities must not have an adverse affect on, amongst others, international trade, society, the environment and economies, especially of developing countries. The Protocol is seen as a significant victory for advocates who had sought to persuade world leaders to address climate change. They also express the hope that the acceptance by industrialised countries to accept binding emissions would make developing countries more willing to take emissions-limiting actions appropriate to their own circumstances.

3.2.1 Obligations

The obligations are as follows:

- the GHG emissions must not exceed the amounts assigned to Annex I countries with a view to reducing overall emission by five percent below 1990 levels in the first commitment period of 2008 - 2012. Demonstrable progress must be shown by 2005.
- the commitments may be undertaken jointly or individually and parties may participate in emissions trading;
- implement policies on climate change, or further elaborate existing policies;
- enhance energy efficiency;
- limit and/or reduce emissions in the waste and transport sectors;
- protect sinks for greenhouse gases;
- phase out market instruments that are counter productive to the aims of the Protocol (e.g. certain subsidies); and
- promote sustainable forms of agriculture and relevant research. (Discussion Document on Climate Change 1998:17)

At COP5 many governments urged rapid action to put the Protocol into force by 2002 otherwise the emissions reduction targets identified in 1990 will not be reachable by the Annex I countries. For example, according to an Environmental Protection Agency (EPA) draft report, USA GHG emissions has risen 11,5 percent since 1990. It is not possible for the energy sector of an economy to turn around in 5 years. (Thatcher (a) 2000:1)

The next COP meeting, known as COP6, will take place in The Hague in November 2000. By 13 January 2000, 84 parties have signed the Protocol. The Protocol will only come into force when fifty five countries, representing fifty five percent of the world's emissions, ratify the Protocol. Although some parties have ratified or acceded to the protocol (as of 22 May 2000) no Annex I party has yet done so. Most developed countries are waiting the outcome of negotiations on the operational details of the Protocol at COP6. Many parties have indicated that they wish to see the implementation of the Convention by 2002. The process however will continue. Like the Convention, the Protocol will be reviewed on a regular basis and talks on targets for the post 2012 period are due to start no later than 2005. The intergovernmental process on climate change will continue to evolve as scientific knowledge improves and political will increases. (United Nations 2000:2)

In order to make the attainment of those targets cost effective, four flexibility mechanisms were also established, namely emissions target bubbles, international emissions trading, Joint Implementation (JI), and the Clean Development Mechanism (CDM).

3.2.2 Flexibility mechanisms

The four flexibility mechanisms as explained in the USA Annual Economic of the USA President (2000:266 – 267) of the Protocol are briefly discussed below:

Emissions target bubbles - these allow a group of countries to aggregate their emissions targets into one mega target and to reallocate emissions to near targets within this group. The countries of the European Union (EU), for example, have Kyoto Protocol targets set at 8 percent below their actual 1990 emissions. The EU target is shown as 1990 -8, although individual countries within the group have varying targets, from 1990 -28 to 1990 +27. This means that those EU countries that expect to find it easier to reduce emissions effectively take on bubble allocations below their Kyoto Protocol targets, whereas those that find it more difficult get bubble allocations in excess of their targets.

International emissions trading - those may occur among all countries with binding emissions targets. Each country has so-called emissions allowances that allow them to emit the specified level of emissions. Trading occurs when one country agrees to sell some of its emissions allowances to another country. Firms and private sector entities that hold emissions allowances through domestic trading programs can also participate.

Joint Implementation (JI) - like international emissions trading, JI may occur among countries with binding targets. JI, however, is focused on projects, where a firm in one industrial country may invest in a project to reduce greenhouse gas emissions in another. If both countries' governments approve the project, emissions allowances from one country where the reductions occurred are transferred, in exchange for the investment, to the other country.

Clean Development Mechanism (CDM) - Of most importance to this paper is the CDM whose purpose is to assist developing countries to achieve the aims of the Convention and sustainable development as well as assisting Annex I countries in

meeting their emissions limitation and reduction commitments. The CDM allows industrial and developing countries to work together to design and implement projects in developing countries that abate GHG emissions, however, developing countries do not need binding emissions targets to participate in the CDM. Article 12 of the Protocol identifies specific goals for the CDM. They are: 1) to assist in the achievement of sustainable development; 2) to contribute to the attainment of the environmental goals of the Convention, and 3) to assist industrialised countries in complying with their emissions reduction commitments. (Toman and Cazorla 1998:2) The CDM holds promise despite linking the issues that are often seen as contradictory namely greenhouse gas emission reduction and economic development.

3.2.3 Implementing the CDM

An important issue and the cornerstone for a successful integration of climate and development policy is the role of positive impacts of CDM projects such as capital transfer, capacity building, job creation and reduction of local pollutants. CDM projects will most likely have a mixture of both positive and negative impacts. As each project will be substantially different from each other, the involvement of all stakeholders and the transparency of the decision-making process are very important.

Jeffrey A. Frankel, (1999:2) who has extensive experience of working on the Kyoto Protocol for the USA government, provides an outline on how growth targets for GHG emissions can be set for developing countries. He states that appropriate targets must be set for developing countries that are neither so tight as to retard economic development nor so generous as to confer enormous windfall gains. He argues that a fair allocation for potential new participants would be similar to the present patterns of emissions reductions agreed to by Annex I countries at Kyoto in 1997. Because emissions by developing countries are difficult to accurately determine at this time, it would create greater risks to fix precise quantitative emission targets now. He advises that indexing emission targets to a country's GDP growth would moderate the effects of uncertainty.

The USA government's Energy Information Agency (EIA), released its annual International Energy Outlook 2000, in which it identified that as the economy and living standards in developing nations continue to improve, their share in the world's overall energy consumption will increase dramatically. The EIA estimates a 60 percent average rise in overall world energy consumption from 1997 to 2020, with consumption in developing nations growing by 121 percent. Developing countries in Asia, Central America and South America will lead the growth in demand, their needs doubling between 1997 and 2020 and accounting for 83 percent of the projected growth in energy consumption developing countries. (Sotto 2000:1)

USA negotiators to the next COP meeting in The Hague have been urged by USA senators to ensure that the issue of developing country participation in the Kyoto Protocol is on the agenda. (Thatcher (b) 2000:1)

The USA has been involved since 1993 in providing financial and technical support to 55 developing and transitioning countries for climate change studies. A report released on these activities in August 1997 found that baseline (business-as-usual) emissions of GHG in most of the transitioning countries begin to increase in the first

decade of the 21st century, exceeding the 1990 levels at some stage during that period. For example, in the case of Mexico, a transition country, carbon dioxide emissions will roughly double in the period 1995 - 2010, growing faster than its GDP. The overall increase in Nigeria, as a developing country, will show increases in the same period ranging from 30 percent in the low-growth scenario to 80 percent in a high-growth scenario. The studies in these countries called for the need for foreign investment and international assistance on a larger scale to promote the transfer of technologies that offer GHG mitigation and other benefits. (Sotto 2000:1)

Argentina has been one developing country that has responded to the target and trade framework of the Protocol and has accepted quantitative targets for the period 2008 - 2012 at COP4 in Buenos Aires. Kazakhstan has also noted its intention to take similar action. It is still unclear at this stage how many other developing countries will make similar responses. Particularly the responses of China, India and Brazil, all large GHG emitting nations' will be closely watched. (Sotto 2000:1)

One of the key unresolved issues of the Protocol is how industrialised and developing countries will work together to reduce emissions. At the COP5 during 1999 in Bonn, very little progress was made on the practical details of the CDM. In addition, there are major differences between the USA and EU with regards to target restrictions.

3.2.4 Two views on target restrictions

According to Toman and Hourcade, (2000:15) disagreements remain about the implementation of policies for GHG trading among industrialised countries. Amongst developing countries, there are internal differences in views and interest.

There is a fundamental difference between the EU and USA approach to the CDM. The EU, in May 1999, proposed quantitative restrictions on international emissions trading, JI and the CDM that would limit industrial countries' opportunities to buy and sell emissions. The USA opposes quantitative restrictions on trading. It supports a system of seller liability for trading, co-ordinated with a strong compliance system. The USA stipulation that developing countries would have to accept emissions limits, have been vehemently opposed by developing countries for fear, amongst others, that they might stifle economic growth. (Anderson 2000:1) The USA Annual Economic Report 2000 suggest that, in order to address this concern, developing countries' limits could be indexed to their growth, for example, a ratio of GHG emissions to gross domestic product (GDP). The report contends that developing countries' economies do not need to go through the phases of heavy pollution industrialisation that most of the advanced economies suffered. It is clear what advantage world-wide emissions trading would have to the USA, as it has been estimated that it would cut its cost by 90 percent, compared with making the reductions in the USA itself. (Anderson 2000:2)

4. Developing Countries Participation

Expanding the scope of trading to more countries has significant potential for additional cost savings. The Clinton administration has announced that it will not send the Protocol to the USA Senate for ratification until it has been changed to apply

limits to the major developing countries as well. In addition, the USA wants the Protocol to authorise clearly a world-wide system of trading in emissions permits under which it contends, emissions reductions would be made wherever they are the cheapest - frequently this would be in the developing economies. The USA Annual Economic Report 2000 states that “Developing countries could generate billions of dollars in revenue annually through the sale of emissions allowances to countries with higher abatement costs.” It adds that the Protocol effectively provides the potential for low-cost abating developing countries to create an export industry whose product is emissions abatement. (Anderson 2000:1)

4.1 South Africa

South Africa, as part of the developing world has a leadership role to play in resolving the myriad of problems facing the implementation of the CDM. Its current position, concerns and regional developments are discussed below.

4.1.1 Current situation

Although South Africa is not currently obligated to reduce its GHG emissions, it finds itself in the top 20 countries in the world, emitting 1,6 percent of global GHG. (Draft White Paper on Energy Policy 1998:28)

It’s energy sector is the single largest source of GHG emissions in Africa. One of the main reasons is the fact that South Africa is dependent on coal for more than 75% of the country’s energy needs and it is expected that coal will be the dominant energy source in South Africa for many years to come. (Draft White Paper on Energy Policy 1998:28)

South Africa signed the Convention on 15 June 1993 and ratified it on 29 August 1997. It entered into force on 27 November 1997. The future role of South Africa regarding the Kyoto Protocol is led by the Department of Environmental Affairs and Tourism’s National Committee for Climate Change (NCCC). The Department of Minerals and Energy is actively involved in the activities of the NCCC. With regards to the expected ratification of the Kyoto Protocol by the end of 2000, the NCCC has recommended that South Africa ratify the Protocol. (Draft White Paper on Energy Policy 1998:29) As of May 2000, it has neither signed nor ratified the Protocol.

The Draft White Paper on Energy Policy (1998:29), has noted the affect that new and existing international trading emissions may have on South Africa’s coal exporting market. It also identifies the need for the Department of Minerals and Energy to increase its input on the development of South Africa’s position, as a developing country, in international negotiations around climate change issues.

The Discussion Document on Climate Change (1998:8-10) discusses the potential impacts of climate change on South Africa. Based on studies that were available in 1998, the most important areas of concern are water resources, health, agriculture and forestry, the coastal zone and biodiversity.

According to the Draft White Paper on Energy Policy, (1998: 9 –12) one of the five policy objectives forming the foundation for South Africa’s new energy policy is that the government will work towards the establishment and acceptance of broad national targets for the reduction of energy-related emissions that are harmful to the environment.

4.1.2 Concerns and drawbacks

The Discussion Document on Climate Change (1998: 28 – 29) identifies a number of concerns and drawbacks, including the following:

- There is a perceived unfairness in allowing some nations (usually the rich ones) to continue to have high emissions, while others usually the poorer (less developed ones) reduce emissions on their behalf;
- There are a number of practical problems in ensuring that the claimed emissions reduction have in fact occurred, and would not have occurred anyway;
- There is a worry that in allocating the tradeable quotas of GHG, a new form of global currency is created, with the high-emitting, already-wealthy developed world getting most of it.
- There is a concern in developing countries that selling the cheapest mitigation options now will leave the next generation with only expensive options when they need to achieve mitigation themselves;
- If industrialised countries, who have emissions limits, are permitted to trade emissions with developing countries, (that have not committed themselves to an emissions limit) the result could simply be a leakage of emissions from one part of the world to another, with no net reduction.

The Draft White Paper on Energy Policy (1998:20) identifies that the Department of Minerals and Energy will follow a “no regrets” approach in the energy sector with regard to the potential global environmental impacts of energy activities. The “no regrets” option is defined as that which decreases and minimises environmental impacts commensurate with cost effectiveness and positive cash flow.

The Draft White Paper on Energy Policy (1998:21) acknowledges that although it is unlikely that binding commitments will be applied to developing countries, it is possible that intermediate emission reduction or stabilisation goals will be negotiated in future for the wealthier or more carbon-intensive developing countries such as South Africa. South Africa also does not support the introduction of a voluntary carbon tax as it would decrease its international competitiveness at present. However, South Africa will have to increasingly factor such considerations into its resource investment and management decisions as part of its responsibilities towards the global environment.

4.1.3 Developments

The Deputy Minister for Environmental Affairs and Tourism, R.T. Mabudaphasi, (2000:2) during a Departmental Policy Review Debate stated that South Africa’s

ratification of the Convention signifies the government's commitment to join the global community in finding solutions to the increasing greenhouse gas concentrations in the atmosphere. Despite South Africa not being obliged to a reduction target, the government has committed itself to a "sustainable development growth path underpinned by the following aspects which form the basis of the programme of action that will be implemented by the Department on climate change:

- On the domestic front an awareness about the value of energy efficient lighting and energy efficient heating in homes is a key contribution;
- Other energy intensive sectors, which produce a significant amount of greenhouse gas emissions, are also targeted to contribute to a decrease in emissions. In this regard action by local authorities will be the backbone of the collective mobilisation that is envisaged; and
- An increased export sector will result in greater scrutiny of South Africa's exports in as far as their coal intensity is concerned. South African Industry will need to invest in more environmentally sound technologies. Avoidance of future emissions could become ...[a] strategic business approach to more sustainable production." (Mabudaphasi 2000:2)

An important development, according to Deputy Minister Mabudaphasi, is that the response to mitigating the effects of climate change must be done collectively. For this reason, the SA cabinet has approved the collective involvement of the departments of minerals and energy, trade and industry, water affairs and forestry, transport and agriculture in working towards this objective. This collective action will culminate in a Response Strategy whose outline has been approved by Cabinet and is due for finalisation in December 2000.

In addition, the implementation of the US/SA Bilateral Grant Agreement will see the commencement of several projects in August 2000. These include Metro City Climate Change Initiatives. (Mabudaphasi 2000:3)

The USA Secretary of Energy and the South African Minister of Minerals and Energy also announced that an agreement was reached for the establishment of a Working Group to implement the Joint Statement on Clean Energy Co-operation in Support of the Environment under the Sustainable Energy Committee of the US/SA Binational Commission. The South African team will be led by the Deputy Minister of Minerals and Energy, Ms. Susan Shabungu and she will be supported by the National Committee on Climate Change. Programmes under development include:

- An electricity regulatory co-operation programme;
- Further development of South Africa's energy data collection system;
- Further development of South Africa's national Climate Change Action Plan;
- Implementation of a coal waste utilisation programme in research, safety, non-proliferation; and
- Enhancing a capacity building exchange programme. (IMMEDIATE 2000:3)

According to the Discussion Document on Climate Change (1998:2), a White Paper on Climate Change was due to be presented to Parliament in January 1999. However, no record can be found of such a submission. A closer look at the UNFCCC web-site also shows that South Africa also has not submitted its national inventory of GHG emissions by April 2000. South Africa had undertaken in the 1998 Discussion

Document on Climate Change to prepare its national inventory. (Note by author: A set of questions was sent to Mr. Jerry Lengoasa at the Department of Environmental Affairs and Tourism requesting information on outstanding issues on 13 June 2000. As soon as the response has been received they will be incorporated into the paper.)

In accordance with South Africa's foreign policy and in the spirit of the "African Renaissance" any formulation of an approach to climate change will take into account the rest of Africa.

4.1.4 Regional approach

South Africa, as part of the Southern African Development Community (SADC) will have to follow an energy policy that must seek to be compatible with the regional energy policy. The SADC has adopted an energy co-operation policy and strategy. (Draft White Paper on Energy Policy 1998:8)

According to a USA State Department press release, (2000:1 - 4) forty five African Ministers responsible for energy in their respective countries, and the USA Secretary for Energy met in Tucson, Arizona in December 1999. The meeting discussed the needs of Africa, including its serious energy shortages, limited access to exploitation and consumption of energy, and heavy dependence on traditional energy sources. According to the press release, the Energy Ministers agreed to "initiate a sustained cooperative effort, through governmental leadership and participation of private, business, and other sectors, including regional and sub-regional economic, intergovernmental, multilateral, and non-governmental organisations, to support the growth of adequate, accessible, environmentally safe and sound, secure and affordable energy supplies." In addition, the Energy Ministers stressed the importance of the energy sector's role in poverty alleviation, social and economic development, and enhancing the overall environmental protection on a local, national, and global basis to improve people's health and education, promote sustainable development and improve the overall quality of life. According to the press release, within the UNFCCC, all signatory countries have undertaken common, but differentiated responsibilities to address climate change. The Energy Ministers recognised that effective energy policies are fundamental to meeting these responsibilities and reaffirmed their commitment to the implementation of effective energy policies and to take concrete steps to establish policies in clean energy technologies. The value of technology transfer and the use of market-based mechanisms among others were also recognised to address climate change. The Energy Ministers also further recognised that countries may elect, through their commitments, to take full advantage of these mechanisms, if they wish to do so.

Agreement was reached on five principle areas for cooperation. These are Regional Energy Integration; Rural Electrification and Energy Supply; Clean Energy Source and Energy Efficiency; Urban Air Quality; and Energy Resource Management. In conclusion, the principles of cooperation imply that Energy Ministers "will actively support international, multilateral, regional, and bilateral cooperation in targeted fields; welcome investment and economic and technology cooperation throughout Africa on open and reciprocal terms to meet energy needs and protect the environment in a sustained way and will develop and progressively implement energy

policies and regulatory measures that enhance the climate for trade and investment in energy and environmental projects, taking into account the particular circumstances in their countries.”

In recognising the priorities of development for Africa, the Energy Ministers agreed that sustainable energy policies and development are integral elements of any strategy to minimise or reduce GHG emissions and to reduce Africa’s vulnerability to the negative impacts of climate change.

In conclusion, issues facing the South African delegation to COP6 are mentioned below.

5. Issues at COP6

Some of the issues which need to be worked out by the time of the COP6 conference include who would initiate projects, who they would be financed by and how the emissions credits would be calculated and verified by an independent auditor.

In particular, the following issues have been raised by developing countries regarding the CDM. Some possible solutions or additional problems are discussed by Toman and Hourcade (2000:15 – 16) after each point.

1) Will the cheapest greenhouse gas reduction opportunities be sold to the developed world?

T & H: This concern still exists, but it forms part of a more sophisticated and legitimate concern about how developing countries that host CDM projects can equitably share in the benefits. Developing countries will be able to exercise sovereign authority over CDM investments. The question remains whether the CDM is designed to provide the greatest possible opportunities for mutually beneficial trade.

2) Will opportunities for investment be evenly distributed across developing countries?

T & H: A provision has been made for taxing the proceeds of CDM project and redistributing those proceeds. Host developing countries will, however, have to bear some of this tax and not just rich international investors. An alternative would be to enhance prospects for investing in carbon dioxide sequestration projects, like reforestation, which will benefit developing countries. However, this increases the technical complexities, thereby reducing developing country participation for the CDM.

3) Can developing countries launch their projects on their own?

T & H: For example, would infrastructure investments like the refurbishment of public facilities, that reduce energy use and carbon dioxide be eligible as a CDM project, or would it be regarded as the responsibility of a government in any case to reduce such emissions? In addition, would financial payments from outside investors to encourage policy reforms like a reduction of existing energy price subsidies be deemed eligible?

4) How are the proposed reductions from projects going to be measured?

T & H: One solution to ensure a more accurate measurement of reductions is by greater project-by-project scrutiny. This type of scrutiny would greatly increase the cost and reduce the economic viability of projects. A consequence will be depriving

developing countries from potential benefits they would have received, including large scale technological transfers and fewer opportunities for industrialised countries to take advantage of the most cost-effective means of reducing emissions.

5) Will participation now prejudice developing countries' position in future negotiations about national GHG limits?

T & H: As mentioned earlier, the EU and USA have opposing views on limiting the use of the CDM, with the EU supporting the limit and the USA opposing it. Under the Protocol, accumulating CDM credits was supposed to start in 2000. While the CDM is far from perfect, an implementing framework for the CDM is urgently needed while larger issues surrounding international climate change continue to be thrashed out.

There are several chasms which need to be bridged for any agreement on climate change to be politically viable. Adapted from Frankel, (2000:5) those are the chasm between government and environmental-concerned scientists and citizens on how genuine the problem is; the chasm between the extent of popular concern, on the one hand, and popular unwillingness on the other hand, to bear even a small increase in energy prices to address the problem, even more so in developing countries; the chasm between technology optimists and the pessimists; the chasm between American and European attitudes toward international trading of emission rights and the chasm between the USA and developing countries regarding the necessity of participation by the latter in any global plan to address global climate change.

6. Conclusion

The world's climate system is complex, and an increased understanding is needed by scientists in order to improve the predictions regarding the extent, timing and impacts of climate change. However, what is already known clearly alerts the international community to the potentially negative impacts on human health, food security, economic activity and water resources. According to the UNFCCC, farming could be seriously disrupted, leading to falling crop yields in many regions; tropical diseases are expected to spread; the geographical zone for potential malaria transmission could increase from around 45% of the world population today to approximately 60% by the latter half of this century; migration could also increase, accompanied by the problems associated with it. While it is clear that no one will escape the effect of future climate change, its negative impacts will be most clearly felt by the poorer people and countries.

It is clear that meaningful action needs to be taken soon regarding the Kyoto Protocol, otherwise it will be too late for Annex I countries to meet the 2008 - 2012 targets. One of the challenges that lie ahead with regards to the Kyoto Protocol is the improved application of the CDM internationally. Developing countries, with substantial air and water pollution problems can learn from the experiences of industrialised countries and employ the CDM to achieve better environmental quality with the scarce resources they have available. It is generally agreed that developing countries should resist adopting the same standards that prevail in industrialised countries, specifically for environmental problems that are confined within a

country's borders. Each country should be allowed to implement regulations in line with its economic circumstances. (Portney 2000:8)

The concerns raised by developing countries regarding the CDM cannot be divorced from the ongoing debate about foreign investment and financial assistance in developing countries. According to Toman and Hourcade, (2000:16) developing countries are concerned that the developed world would just rename existing foreign aid and call it support for the CDM, rather than providing new resources to help stimulate emissions limits. The issue of aid to developing countries has however already changed. The USA, for example, under the Clinton administration, has espoused a "trade, not aid" policy for a number of years.

It is clear there are many issues that still need to be addressed and a period of experimentation will be needed to try out different approaches. South Africa, as part of the developing country grouping, and in need of foreign direct investment to assist with its social upliftment programmes, has an important role to play in ensuring that developing countries concerns are adequately addressed and ironed out at the COP6 meeting in The Hague in November 2000.

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