



**“Six years after Kyoto, where are we now?
Issues, challenges and partnerships in global climate change.”**

Presentation at Harvard University, 20 October 2003

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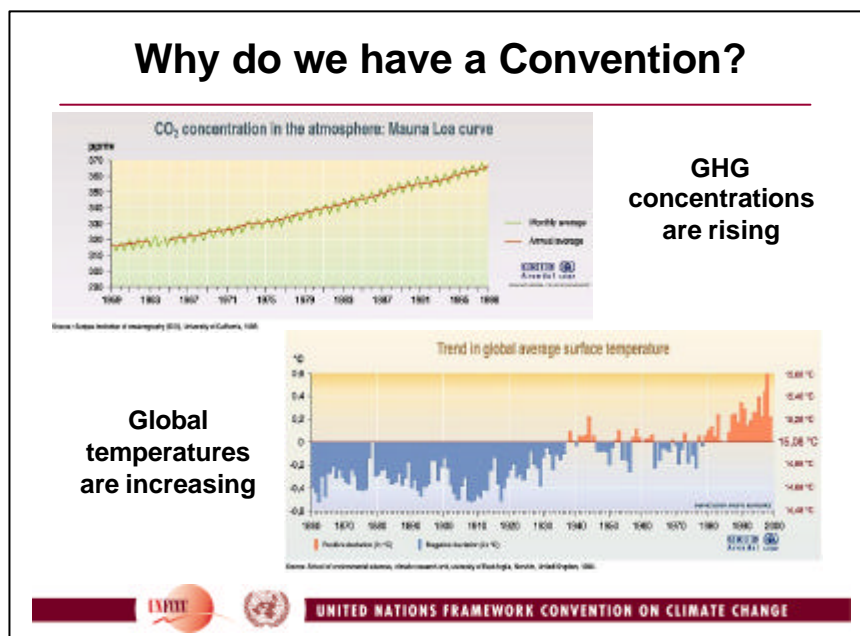
Introduction

I am extremely honoured for having been invited by the Alternative Energy Club to give a public lecture at such an august institution as Harvard School of Design. It is interesting as such that Harvard has an Alternative Energy Club. It shows vision of a future different from today's realities.

I will try to give you my view on the need for change, stemming from my work as Executive Secretary of the United Nations Framework Convention on Climate Change. I will concentrate on how a multilateral intergovernmental process reacts to, mainly scientific, calls for change and translates that in international decisions, that then have to be implemented.

I. Why do we have a Framework Convention on Climate Change, the science behind the Convention

Since the Industrial Revolution, concentrations of greenhouse gases in the atmosphere have risen steeply, mainly because of the use of fossil fuels, but also as a result of deforestation and other human activities. Like a blanket around the planet, greenhouse gases form a layer that stops energy escaping from the Earth's surface and atmosphere.



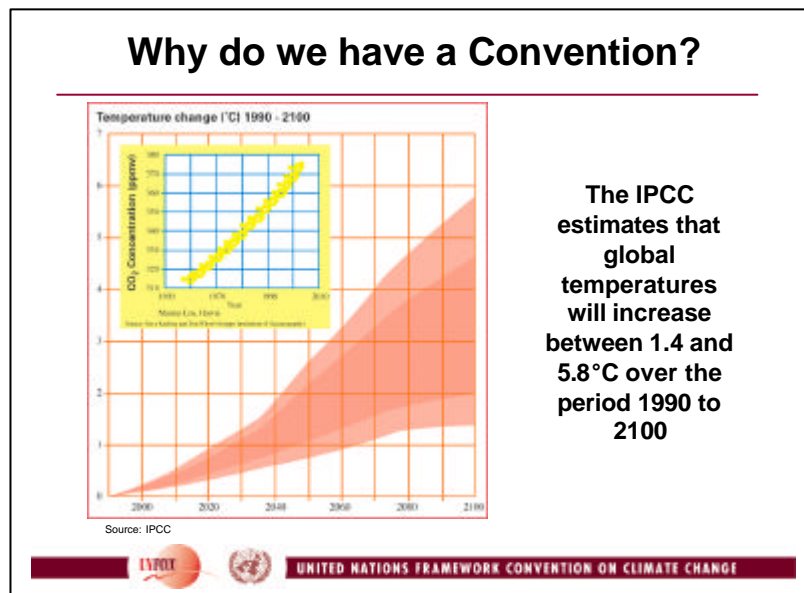
If levels rise too high, excessive warming occurs. This graph shows the monthly and annual averages CO₂ concentrations in the atmosphere since 1959 and clearly shows the significant increase that can be measured.

In its Third Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) confirms that the global average surface temperature has increased over the 20th century by between 0.6°C and 0.2°C. The global average surface temperature has increased since 1861, and most of the warming occurred during two periods, 1910 to 1945 and 1976 to 2000, as shown in the graph in the lower part of this slide

Globally, the 1990s were found to be the warmest decade and 1998 the warmest year in the instrumental record. The IPCC's analyses of proxy data for the Northern Hemisphere indicate that the increase in temperature in the 20th century is likely to have been the largest of any century in the past 1000 years. Reconstructions of climate data for the past 1000 years indicate that this warming was unusual and is unlikely to be entirely natural in origin. Because less data are available, less is known about conditions prevailing in most of the Southern Hemisphere prior to 1861.

Projections

Overall, there is new and stronger scientific evidence that most of the warming observed over the past 50 years is attributable to human activities. Given the long atmospheric lifetime of GHGs, especially CO₂, human influences will continue to change atmospheric composition throughout the 21st century and global average temperature is projected to rise throughout this century.



The IPCC estimates that global temperatures will increase between 1.4°C and 5.8°C over the period 1990 to 2100.

As this slide shows, the projected rate of warming is much larger than the observed changes during the 20th century and is very likely to be without precedent during the last 10,000 years, based on paleoclimate data. Based on recent global simulations, it can be expected that nearly all land areas will warm more rapidly than the global average, particularly those at northern high latitudes in the cold season. Most notable of these is the warming in the northern regions of North America, and northern and central Asia, which exceeds global mean warming in all used IPCC simulation models by more than 40%. In contrast, the warming is less than the global mean change in south and South-east Asia in summer and in South America in winter.

Impacts

At first glance, these temperature estimates may appear to be relatively minor. However, in this context it is important to take into account that during an ice age, global temperatures fall by about 5°C. We know from paleoclimate data that such a fall in temperature means that ice-sheets advance over much of Europe and North America. Likewise, a rise in temperature, as estimated by the IPCC, will lead to increasingly visible changes on our planet, some of which are already evident:

- Satellite data show that there seem to have been decreases of about 10% in the extent of snow cover since the late 1960s, and ground-based observations suggest that there have been a reduction of about two weeks in the annual duration of lake and river ice-cover in the mid- and high latitudes of the Northern Hemisphere during the 20th century.
- There has been wide-spread retreat of mountain glaciers in non-polar regions during the 20th century.
- Northern Hemisphere spring and summer sea-ice extent has decreased by about 10% to 15% since the 1950s.
- Tide gauge data shows that global average sea level rose between 0.1 and 0.2 metres during the 20th century.
- In the mid- and high latitudes of the Northern Hemisphere over the latter half of the 20th century, it is likely that there has been a 2% to 4% increase in the frequency of heavy precipitation events.
- In some regions, increases in the frequency and intensity of droughts have been observed in recent decades.

The estimated impacts over the 21st century include:

- An increase in extreme weather events, such as floods and storms.
- Northern Hemisphere snow cover and sea-ice extent are projected to decrease further.
- Glaciers and ice caps are projected to continue their wide spread retreat during the 21st century.
- The Antarctic ice sheet is likely to gain mass because of greater precipitation, whereas the Greenland ice-sheet is likely to lose mass because the increase in runoff will exceed the precipitation increase.
- Global mean sea level is projected to rise by 0.09 to 0.88 metres between 1990 and 2100. This is due primarily to thermal expansion and loss of mass from glaciers and ice caps.

- The IPCC projects higher maximum temperatures and more hot days and heat waves over nearly all land areas.
- It is likely that there will be increased summer drying over most mid-latitude continental interiors, with an associated risk of drought.
- For some areas, projections point to a likely increase in tropical cyclone peak wind intensities, as well as mean and peak precipitation intensity.
- Furthermore, climatic zones could shift pole-ward and vertically, disrupting forests, deserts, rangelands and other ecosystems.



No wonder, then, that the insurance industry is taking keen interest in climate issues.

Vulnerability

It is developing nations that are most vulnerable to these climate impacts.

Developing countries are most vulnerable to climate change

Adapting to Climate Change		
Developing country region	Vulnerable sectors	Need to adapt
Africa	<ul style="list-style-type: none"> ● Agriculture ● Water resources 	Very high
Asia	<ul style="list-style-type: none"> ● Agriculture ● Terrestrial ecosystems 	High
Latin America	<ul style="list-style-type: none"> ● Agriculture ● Water resources 	High
Small island developing States	<ul style="list-style-type: none"> ● Water resources ● Coastal zone (sea level rise) 	Very high



 UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

They rely heavily on climate-sensitive sectors such as agriculture and forestry. Their resources, infrastructure and health systems leave them more at risk to the adverse impacts of climate change. Human settlements that depend heavily on commercial fishing, subsistence agriculture and other natural resources are particularly exposed to the adverse impacts of climate change. Also at risk are low-lying areas and deltas, large coastal cities, squatter camps located in flood plains and on steep hillsides, settlements in forested areas where seasonal wildfires may increase, and settlements stressed by population growth, poverty and environmental degradation. In all cases, the poorest people will be the most affected. Though climate change may often have less impact on this sector than will economic development, technological change, and other social and environmental forces, it is likely to exacerbate the total stress on settlements.

Many ecosystems are sensitive to humanity's management practices and increasing demands for resources. Ecosystems that are already under stress are particularly vulnerable to climate change. For example, human activities may limit the potential of forest ecosystems for adapting naturally to climate change.

In this context, the key development challenges that we face – alleviating poverty and increasing access to shelter, health, food, safe water and education – will prove even more difficult as the world attempts to adapt itself to the changing climate. This table highlights developing countries' most vulnerable sectors and their need to adapt. As such, climate change is a development issue.

II Where do we stand today - what has been the response of the international community?

With the increase in scientific evidence of climate change in the 1980s and early 1990s, there was an increasing international realization that actions to abate climate change were urgently needed.

At the same time, the First Assessment Report of the IPCC, published in 1990, provided the basis for negotiations on the Convention. The UN General Assembly approved the start of treaty negotiations in December 1990, following which the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change met for five sessions in 1991 and 1992. The Convention was adopted in New York before the 1992 Rio Earth Summit and was opened for signatures at the Summit itself where 154 States plus the European Community (EC) signed it. The Convention entered into force on 21 March 1994. A decade after its adoption, 188 governments are now Parties to the Convention and it has near universal membership.

The ultimate objective of the UNFCCC is the “stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) 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.”

Thus the ultimate objective recognises that change is inevitable, but pace and intensity must be managed at levels that will allow people and ecosystems to adapt.

Brief overview of the Convention

In common with other international agreements from that period, the Convention sets out important guiding principles, which are often involved/referred to in today's discussions.

- The precautionary principle says that the lack of full scientific certainty should not be used as an excuse to postpone cost effective action when there is a threat of serious or irreversible damage.

- The principle of the "common but differentiated responsibilities" of states assigns the lead in combating climate change to developed countries given their historic contribution to its causes and the financial and technological resources they command.

The special needs of developing countries must be given full consideration and parties have the right to promote sustainable development. The latter has been given more prominence in the discussions following the World Summit on Sustainable Development held in Johannesburg last year. The interpretation of the right to promote sustainable development varies widely. It can include the notion that environmental and social measures should only be implemented if the economy allows; or that win-win scenarios should be identified, which fully integrate environmental, social and economic concerns; or that environmental and social concerns must be addressed now since economic development over time cannot be sustainable if they are not taken into account.

Industrialized countries undertake several specific commitments. Most industrialized countries (including most members of the Organization for Economic Cooperation and Development (OECD) plus the states of Central and Eastern Europe) – known collectively as Annex I countries – committed themselves through the Convention to an initial target of adopting policies and measures aimed at returning their greenhouse gas emissions to 1990 levels by the year 2000 (emissions targets for the post-2000 period are addressed by the Kyoto Protocol). They must also submit national communications on a regular basis detailing their climate change strategies. They must also submit on an annual basis an inventory of emissions of greenhouse gasses per sector of economic activity. This allows us in the secretariat to maintain a database of emission reductions and projections so that progress in the implementation can be monitored. The countries in transition to a market economy (Economies in Transition (EITs): Russia and the former Eastern Bloc) are granted a certain degree of flexibility in implementing their commitments. [Annex II Parties refer to the industrialised countries without the inclusion of EITs.]

The developing countries, currently numbering 145, make up the group of non-Annex I Parties. Financial assistance and technology transfer, together with support for capacity building, are critical to enabling this group of countries to address climate change and to adapt to its effects within the context of sustainable development. Particularly vulnerable developing countries have specific needs and concerns in this regard. Low-lying island nations, e.g. face high risks from adverse effects of climate change itself, while others, such as the oil-exporting nations feel more threatened by the potential economic consequences of response measures. They also submit their national communications on a regular basis, which show progress made in policies aimed at climate change mitigation and adaptation. It is important that funds are available for support to developing countries to address climate change. The Global Environment Facility, created at the time of the Earth Summit in Rio de Janeiro to support developing countries in addressing global environmental concerns, is the Financial Mechanism used by the Convention.

The institutional set-up

The supreme decision-making body of the Convention is its Conference of the Parties (COP). It meets every year to review the implementation of the Convention, adopt decisions to further develop the Conventions rulebook and negotiate substantive new commitments. The

meetings attract between 4000 and 6000 delegates from various backgrounds, including from governments, international organisations, NGOs, business and the media.

The Convention has two subsidiary bodies: the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI). Both bodies meet at least twice a year to carry out preparatory work for the COP. Usually, one of these meetings is held in Bonn, Germany, whereas the other is held together with the COP. SBSTA provides advice to the COP on scientific, technological and methodological issues, e.g. the co-operation with the IPCC. The SBI helps with the assessment and review of the Convention's implementation, including on financial and administrative issues.

The Secretariat provides support to the COP and the subsidiary bodies, performing such functions as preparing background documents, organising negotiation sessions, compiling emission data and giving advice on technical matters, as requested by the Parties. The Secretariat currently composes over 150 staff, including short-term staff and consultants and is based in Bonn.

What does the Kyoto Protocol contribute to the climate change regime?

When the Convention was adopted, governments knew that the commitments contained in it would not be sufficient to seriously tackle climate change. In a decision known as the Berlin Mandate, the Parties to the Convention thus launched a new round of talks to decide on stronger and more detailed commitments for industrialised countries. Two and a half years later, the Kyoto Protocol was adopted at the third Conference of the Parties to the Convention in Kyoto, Japan, on 11 December 1997. It took another four years to negotiate and agree upon the rules needed to make the Protocol operational and the process of ratification that will lead to its entry into force could start.

Status of ratification

The Kyoto Protocol has not yet entered into force, which translates into a major hurdle and politically difficult signal. The Protocol was opened for signature on 16 March 1998. It will enter into force 90 days after it has been ratified by at least 55 Parties to the Convention, including developed countries representing at least 55% of the total 1990 carbon dioxide emissions from this group. In other words, in order for it to graduate into a binding treaty, the industrialised nations representing 55 % of global emissions must ratify the Protocol. Currently a total of 119 countries have ratified, representing 44.2% of total global emissions. The United States and Australia indicated that they do not intend to ratify the Protocol. Russia, which accounts for 17.4% of global emissions, is currently assessing its option to ratify. Given the percentage it accounts for, Russia's potential ratification would make the Protocol enter into force, as this would push the total percentage of global emissions from industrialised countries up to 61.6%. Russia is currently in the process of studying all aspects related to ratification.

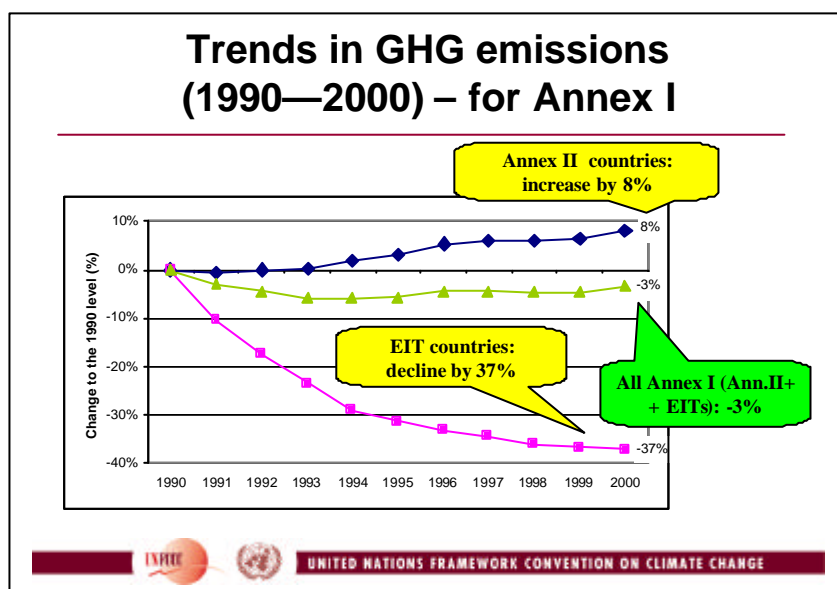
The Kyoto Protocol is aimed at strengthening the international response to climate change. It contains legally binding emissions targets for Annex I countries, which are to reduce their collective

emissions of the six greenhouse gases by at least 5% from their respective 1990 levels. This is to be achieved by the end of the first commitment period from 2008 to 2012. The reduction will be calculated as an average over the five years. Demonstrable progress must be made by 2005.

Countries will have some flexibility in how they achieve their emissions reduction targets. Concretely, the Protocol provides for three flexible mechanisms, including emissions trading, joint implementation and the clean development mechanism. These mechanisms make the Kyoto Protocol in my view unique. To my knowledge it is the first time that international market based instruments are included in an international environmental agreement, in an attempt to combine environmental effectiveness with economic efficiency. They require the active involvement of the private sector and push technology development, use and transfer. They were strongly advocated by the US during the negotiations leading up to the Protocol. Therefore all the more disappointing that the US administration no longer supports the Protocol.

I'll come back to these mechanisms later. Let us first have a look where we stand today in terms of emission reductions.

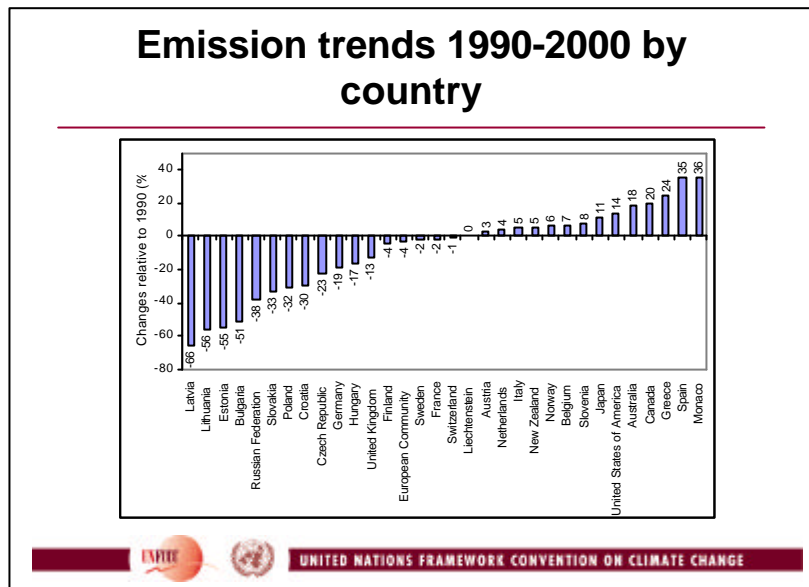
Under the Convention, Annex I Parties are required to regularly report on their GHG emissions and to submit reports - National Communications (NC) - which detail their trends in GHG emissions, highlight their major policies and measures aimed at reducing emissions, present an overview of emission projections and cover other information. Most Annex I Parties have submitted their 3rd NCs, which has enabled the secretariat to synthesise and compile trends in GHG emissions for the period 1990 - 2000, as well as to compile projections of emission trends up to 2010.



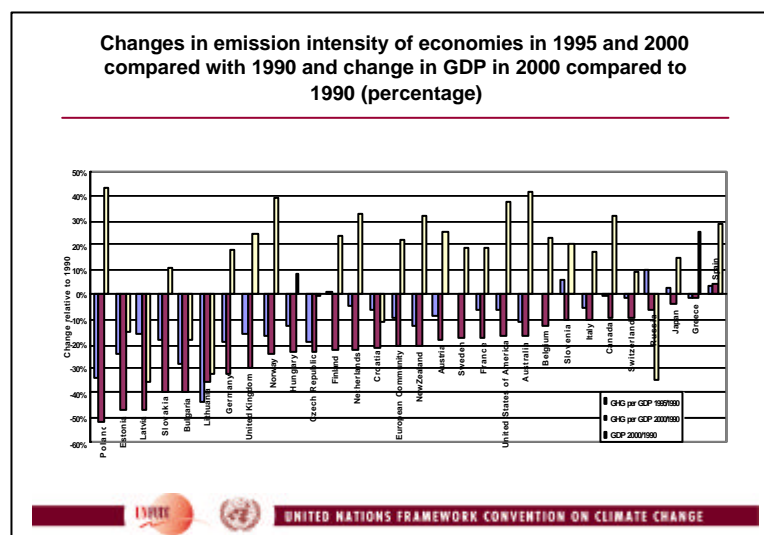
This graph shows that the total aggregated GHG emissions of Annex I Parties (excluding land-use change and forestry (LUCF)) decreased by 3% from 1990 to 2000 (green line with the

triangles). So, jointly, they have met the initial Convention objective to stabilize their emissions in 2000 at 1990 levels. But if you disaggregate this figure, the picture is less rosy.

The decrease was mainly due to a 37% decline in emissions from EIT Parties (pink squares), whereas emissions from Annex II Parties increased by 8% over this period (blue lozenges).

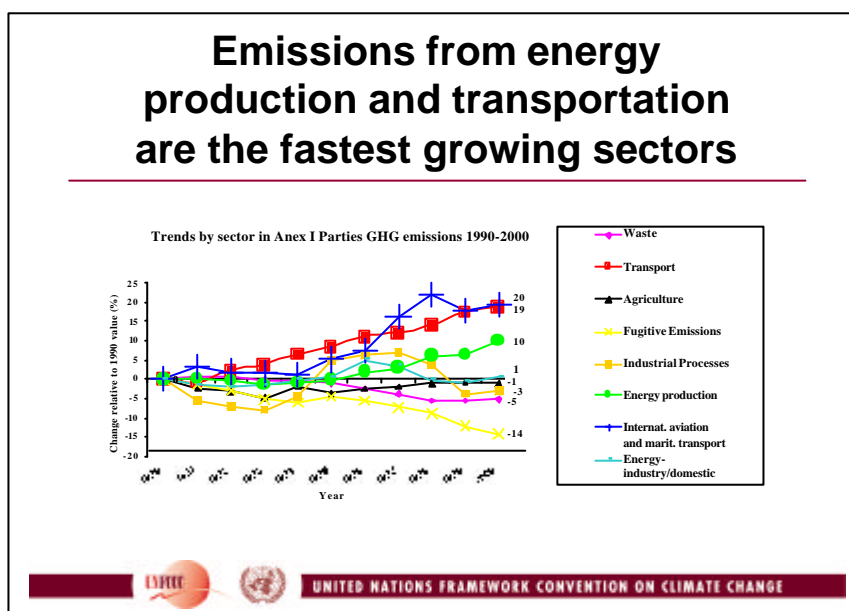


For individual countries, changes in GHG emissions varied widely: from a decrease of 66% (Latvia) to an increase of 36% (Spain), as this graph shows. This indicates that for about half of the reporting Parties GHG emissions in 2000 were below the 1990 levels, in line with the Convention. In addition to particular national circumstances, these reductions were apparently due to implementation of a number of policies and measures.



This next graph shows percentage changes in emission intensity of economies in 1995 and 2000 compared to 1990 and change in GDP in 2000 compared to 1990. They show to what extent countries were able to decouple emissions from economic growth.

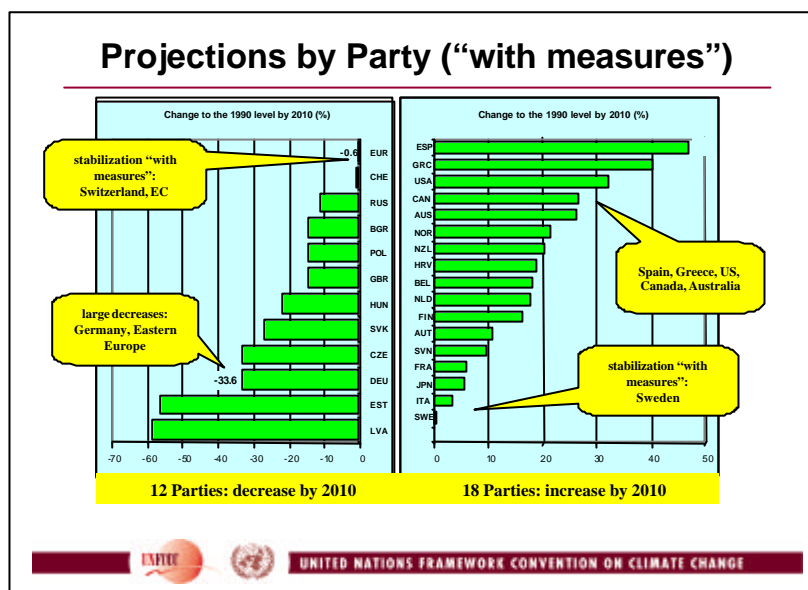
In the majority of developed countries (with the exception of Spain) the GDP increased whereas emissions per unit of GDP decreased, which is good, although in most instances they decreased insufficiently to meet the targets. Poland and Slovakia also experienced economic growth but reduced their emissions intensity much more sharply. For other transition economies energy intensity fell sharply while the GDP also declined. Russia, on the contrary, experienced a significant decrease in its GDP but in spite of that emissions per unit of GDP have increased up to 1995 and fell only slightly by 2000.



The highest increase of GHG emissions is projected for transport, a trend already visible in the synthesis of emissions from transport for the period 1990 - 2000. During this period, the decline mentioned above, was visible in all major sectors, except transport and the energy sectors, as illustrated here in electricity production. GHG emissions from transport increased by 20%, whereas those from the energy industry increased by 10%. Transport is one of the largest and fastest-growing sectors, but policies and measures implemented by Parties so far have only had a limited effect on mitigation compared to other sectors.

Projections

When we look at the projections for the period up to 2010, based on information provided by our Parties, following agreed scenarios, then we see a mixed picture. These scenarios are an attempt to look at different options for policies, and must not be seen as predictions of the future.



The data reported indicates that after being relatively stable in the 1990s, GHG emissions are expected to increase after 2005 or have already started to do so since 2000.. Under the “with measures” scenario, the overall GHG emissions in 2010 are projected to be about 10% above the 1990 level. The increase is projected to occur both in Annex II Parties, and, contrary to the situation in in the late 1990s, in EIT Parties, reflecting an economic recovery that occurred in most EIT Parties in the late 1990s and is expected to continue.

As you see, only 12 out of 30 Parties, GHG emissions in 2010 are projected to be lower than in 1990; for 18 Parties, an increase is projected.

The measures included in these scenarios do not take into account the use of the flexible mechanisms that are included in the Kyoto Protocol. So let me give me a brief update on where we stand on the implementation of these mechanisms, which give you a little break from all these figures and percentages.

Let's first have a look at the CDM, the Clean Development Mechanism. CDM projects are meant to make a contribution to sustainable development in developing countries, while the emission reductions that they generate (and which are measured against a baseline), can be used by the Annex I country to meet its target under the Kyoto Protocol.

Much has been done over the past two years to make the CDM operational as soon as possible, after parties had decided that it should not wait for the entry into force of the Protocol. The determining characteristics of the CDM are that it is project based and involves the private sector. It is of paramount importance that for the system to work it must combine environmental integrity (real emission reductions) which asks for transparency, monitoring and validation of emission reductions, with a minimum of bureaucracy. We are now at a stage where the first methodologies that provide the background for projects, and that will constitute a body of case law, have been approved. An accreditation system that validates and monitors the emissions reduction has become operational. We expect the first projects that will generate emission credits, using those approved methodologies will be processed soon.

Promising areas for such projects identified so far include landfill gas capture and flaring, incineration of hydro-fluorocarbon waste streams, fuel switching and bio-power from rice husk.

Although emission trading between Annex I Parties as envisaged by the Protocol will only become operational once the Protocol has entered into force, we already see a variety of activities world wide. The EU has developed an internal trading scheme that will become operational next year and will be a key driver for trading programmes all over the world. We see initiatives in individual countries, including at the state level in the US, and in the private sector, e.g. through the Chicago Climate Exchange or within major companies like BP. These early initiatives are important to gain experience with the working of the market. Once the Protocol has entered into force, it will provide an overarching framework for these market that are now largely unconnected. With our Parties we are currently in the process of establishing an international transaction log for monitoring the overall integrity of trading.

Joint implementation, the third flexible mechanism, is mainly meant to generate credits for industrialized countries through investments in Eastern European countries that can thus sell their current surplus of emission credits. It plays an important role in the considerations of the Russian Federation with regard to the ratification of the Kyoto Protocol.

More generally speaking, the size of the market is of paramount importance for the success of the flexible mechanisms. It is undeniable that the absence of the US as an important buyer has a severe dampening effect on the price of carbon and thus on an effective use of these market based instruments.

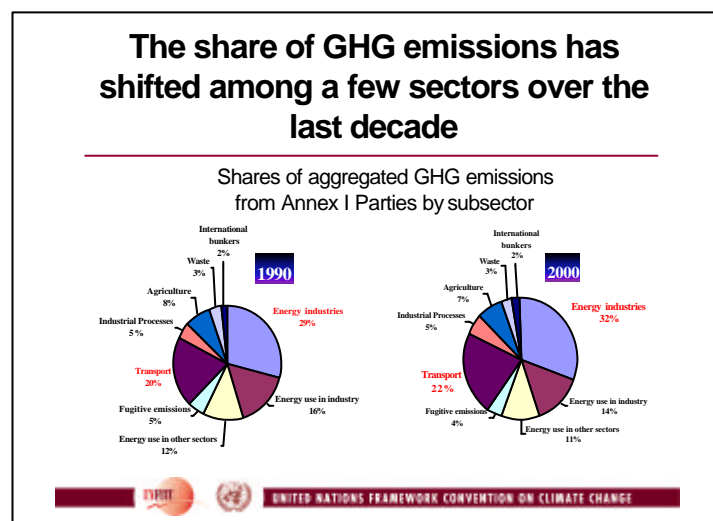
Let me conclude this first part of my presentation on where we stand today with a general conclusion. The first ten years since the adoption of the Conventions have shown that building the institutions for implementation at the national and international level takes time, possibly more time than originally envisaged. Most of the institutions at the international level are in place, while steady progress is made with national institution building. Entry into force of the Kyoto Protocol will give a major boost to further progress.

Developing countries need continued support for their efforts in this regard. A prudent start has been made with the development of markets for emission reduction credits.

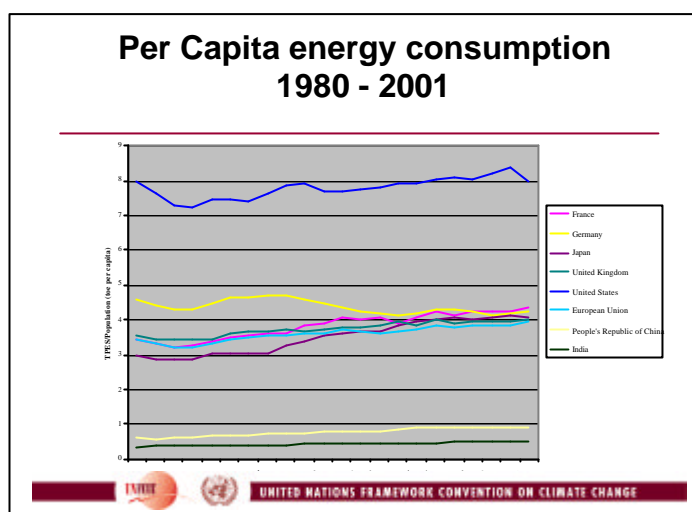
The mitigation achievements of Annex I Parties jointly so far have been insufficient. This is even more troublesome, as the Kyoto Protocol is only a first step towards achieving the ultimate objective of the Convention. So we have a major challenge ahead of us.

III. The challenges ahead

The IPCC suggests that in order to reach the ultimate objective of the Convention, emissions will have to be reduced by between 60% - 70%, which ultimately implies moving towards carbon-constrained energy economies. How can this be achieved and what approaches and steps are needed in the Convention process.



Looking at the current distribution of sectors that contribute to climate change shows the importance of action in the energy sector. This slide shows the increasing share of emissions from transport and energy industries. The picture for developing countries is similar, although the relative share of the energy related emissions seems to be slightly lower than in industrialized countries.



Looking at today's per capita energy consumption shows significant differences worldwide. Developing countries have a much lower consumption than industrialized countries and within the latter group, an average inhabitant of the US consumes almost double that of an average European and eight times that of an inhabitant of China or India.

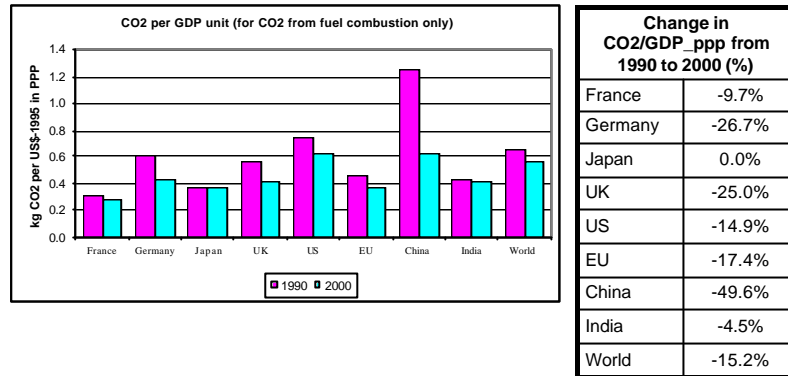
Linking climate change strategies to energy strategies will be essential if emission reductions in the order of magnitude of 60-70% are to be achieved by 2050. The World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa last year, reinforced the need to address energy on the international agenda. In the context of sustainable development, and in terms of achieving a sustainable energy future, the Summit concluded that energy must be produced, distributed and utilized in fundamentally different ways. The growing need for developing countries to have access to energy is of primary concern. The WSSD commitments center on energy efficiency, clean energy technologies and renewable energy.

These commitments were subsequently taken up in the "Delhi Declaration", adopted by the Conference of the Parties to the Climate Change Convention in November last year, thus making a direct link to climate change.

In terms of energy efficiency, we see a decrease in energy intensity per unit of GDP in most countries. China's performance stands out. Improving the energy efficiency of production and consumption is an essential component of modernizing economic structures. Measures aimed at enhanced energy efficiency generally improve competitiveness and reduce overall energy costs.

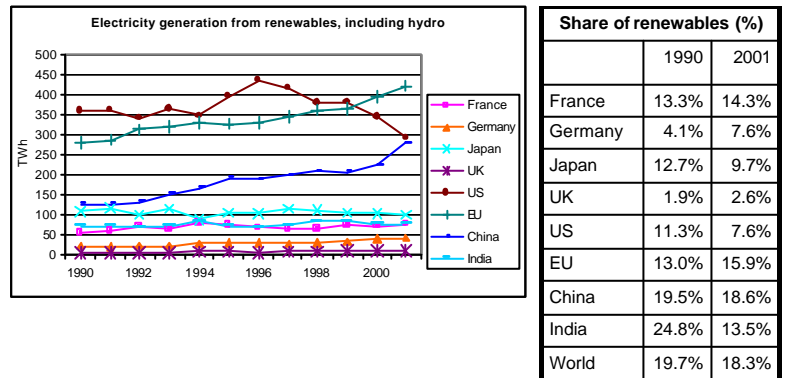
For countries dependent on import for their primary energy sources greater energy security and less money spent on imports are important considerations in favor of enhanced energy efficiency. It is telling that the UK's intention to reduce emissions with 60% by 2050 is part of their energy policy and justified on grounds of economic modernization.

Changes in carbon intensity of the GDP



The carbon intensity of the GDP follows more or less the same pattern as that of energy intensity.

Electricity from renewables (including hydro)...



Enhancing the share of renewables in the energy mix is being pursued in many countries and regions and a great number of countries took the initiative at the WSSD to work towards higher targets for renewables than the current 4.5% of total energy production.

Many of the technologies needed to reduce the emissions from the energy sector be it through cleaner fossil fuel technology or through renewables, are currently available, but not used to their full potential. Accelerated market penetration is hampered by price policies, including subsidies that fail to internalise environmental externalities. What is needed is the political will to change those policies.

Other technologies are at the stage of research and development or early application. A shift towards hydrogen as an energy source, and the infrastructure to support its wide spread use, carbon capture from emissions in the energy production sector, storage of carbon in geological formations are the subject of enhanced research and development. If indeed these developments will be considered feasible and safe from a technological perspective, then their application will lead to the type of change that I referred to at the beginning of my presentation. Again, this will require political leadership and courage. International cooperation, including with developing countries and cooperation between the private and public sector are essential components of a successful strategy.

Future negotiations

How does all of this relate to future negotiations? What follows are my personal views, as Parties have not yet expressed themselves on how they address future action.

First of all, it is important that all countries participate in the regime that will follow the first commitment period of the Kyoto Protocol, i.e. after 2012

The involvement of the US is needed not only because of the size of its emissions, but also to enhance the potential for cost effective solutions.

It is equally important that the developing countries are actively involved in a future regime. In our negotiations the developing countries operate as a block. In reality the group is not homogenous. It comprises:

- The big industrialising countries, like India, China and Brazil, which are undergoing rapid industrialisation and have associated increases in emissions. Although we witness that these countries are taking measures at the national level, they do not want to be bound at this stage by international commitments.
- The OPEC countries that fear a lack of export earnings from measures targeted at fossil fuels and therefore oppose them.
- The Least Developed Countries that hardly contribute to global emissions, but are most vulnerable to the impacts of climate change on their mainly agriculture-based economies and therefore primarily need support on adaptation to climate change
- The small islands, united in the Alliance of Small Islands Developing States (AOSIS) that are directly threatened in their subsistence by sea level rise. They have played a very active role in pushing mitigation commitments in addition to soliciting support for adaptation.

At this stage the level of trust between the industrialized and developing countries in the negotiations is not high. As long as all industrialized countries do not fully live up to their commitments to reduce emissions and to provide financial and technological support to developing

countries, this is not surprising. Enhancing the level of confidence is a first important step. Squarely positioning climate change measures in the context of sustainable development may be a prudent strategy.

Burden sharing based on equity will undoubtedly be an important point of departure. Of course, equity has many facets and ways to measure it. E.g.:

- The equal right of each human being to emit. This is an argument for the convergence of per capita emissions over time as global emissions are contracted.
- Historic responsibility in causing climate change
- The right of all human beings and countries to economic growth and sustainable development. Annex I Parties have had the opportunity in the past to develop without being constrained to certain levels of emissions. This is obviously a right that developing countries also wish take advantage of.

Maybe future commitments for emission reductions could take the form of a multistage approach. This would entail separate stages of commitment through which Parties graduate as they meet set development criteria. Alternative stages could for example be:

- No quantitative commitment or commitments of a qualitative nature, such as contained in the convention
- Energy intensity commitments that would take account of technological developments
- Carbon intensity commitments that would take account of technological developments
- Emission reduction commitments.

Active involvement of the private sector is essential for developing and implementing new commitments. Up to now, parts of the proactive business community have been important drivers of the climate agenda. New ways and means to complement commitments by governments with commitments by the private sector are worthwhile exploring. They could take the form of international public-private partnerships or sector agreements for energy intensive sectors. The latter would allay competitiveness concerns that are often voiced today as a reason for non-action.

NGOs also have an important role to play in terms of advocacy and implementation and as providers of information. It is interesting to note the increasing numbers of cooperation and agreements between companies and NGOs, resulting in voluntary targets taken up by a company, which are “monitored” by NGOs.

But whatever mitigation action will be agreed upon, given the long life time of GHGs in the atmosphere, adaptation to climate change will be necessary. We have seen an enhanced focus on adaptation and financial support for adaptation in developing countries in recent negotiations. This has increased action in developing countries and especially the LDCs on developing adaptation strategies, based on an assessment of their vulnerabilities. Building on these developments and addressing support for adaptation in a future negotiating package may increase its chances for success.

In conclusion

The rather haphazard way in which I have presented my suggestions shows that it has never been easy and it will not be easy in the future to link international negotiations to the need for fundamental change that is required if we want to effectively deal with climate change.

Climate change is a long term and global problem. It requires political will and courage to take measures today in light of long-term needs. Careful assessment of the costs of action and of inaction must underpin the decision-making. At the same time, our society is not static. New, unexpected opportunities may surface as a result of creative thinking in places like Harvard. We need the scientific and academic community to provide the information on which political decisions can be made. May I count on your creativity and ingenuity for a lasting solution?