

Informal Thematic Debate of the General Assembly
‘Climate Change as a Global Challenge’
Trusteeship Council Chamber, United Nations

Tuesday 31st July

10 – 10.30 am

Opening remarks by the President of the General Assembly
Statement by the Secretary-General of the United Nations

Panel 1 – Climate Change: the Science, the Impact and the Adaptation Imperative

10 .30 – 1 pm

Moderator: **Kemal Dervis** (Administrator, UNDP)

John Holdren (Harvard University)

Sir Nicholas Stern (London School of Economics)

Herve le Treut (Laboratoire de Météorologie Dynamique, CNRS)

Kenrick R. Leslie (Executive Director, Caribbean Community Climate Change Center)

Sunita Narain (Director, Centre for Science and Environment, India)

Respondent: **Neroni Slade** (Samoa)

Panel 2 - Mitigation Strategies in the context of Sustainable Development

3 - 6 pm

Moderator: **Mohamed El-Ashry** (UN Foundation)

Robert Socolow (Princeton University)

Anthony Olusegun Adegbulugbe (Obafemi Awolowo University, Nigeria)

Hasan M. Qabazard (Director of Research Division, OPEC)

Michael Liebreich (CEO, New Energy Finance)

Bjorn Stigson (President, World Business Council for Sustainable Development)

Yvo de Boer (Executive Secretary, UNFCCC)

Respondents: **Masayuki Sasanouchi** (Environmental Affairs, Toyota) and **Paul Bledsoe** (Director, US National Commission on Energy Policy)

Concluding address

6 – 6.15 pm **Jeff Sachs** (Director, Earth Institute, Columbia University)

August 1: 10-1pm and 3-6pm

Informal meeting of the Plenary. Member States are invited to make statements about their ‘National strategies and international commitments to address climate change’.

Special Envoys

Former President Ricardo Lagos (Secretary-General’s Climate Change Envoy)

Han Seung-soo (Secretary-General’s Climate Change Envoy)

Special Guests

Sha Zukang (USG Dept. Economic and Social Affairs)

Jacques Diouf (Director-General, Food and Agriculture Organization)

Jake Siewert (Vice President, Environment and Public Strategy, Alcoa)

Hans Verolme (Director, Climate Change Program, World Wildlife Fund)

Jim Rogers (Chairman and CEO, Duke Energy)

Kate Hampton (Head of Policy, Climate Change Capital)

Graeme Sweeney (Executive Vice President, Renewables, Hydrogen, CO2 & Power, Shell International Renewables B.V.)

Martin Khor (Editor, South – North Development Monitor)

Tariq Banuri (Director, Stockholm Environment Institute, Asia)

Yehia Bouabdellaoui (Director, Hassan II Institute of Agronomy, Morocco)

31 July 2007

**Statement of H.E. Ms. Sheikha Haya Rashed Al Khalifa,
President of the 61st Session of the General Assembly,
at the Fourth Thematic Debate of the 61st Session of the General
Assembly “Climate Change as a Global Challenge”**

Excellencies,
Ladies and Gentlemen,

Our debate today is a testimony to the political and moral importance of addressing climate change. I would therefore like to thank Member States, in particular, the ASEAN Group and the European Union for asking me to convene this debate.

I would also like to welcome Secretary-General Ban Ki-Moon; his climate change special envoys, H.E. former President Ricardo Lagos and H.E. Han Seung-soo; as well as our distinguished panelists and guests.

During this thematic debate, we have a real opportunity to raise our overall level of awareness about the science, the impact and the challenges we face from climate change; but, also the opportunities ahead for a more sustainable future.

Although the warming of the global climate has many aspects, it is fundamentally a development issue. Climate change should therefore be addressed in the context of our broader international development agenda. What is at stake is the fate and well-being of our planet. We must not lose sight of this point in our efforts to address this major concern.

I hope we will all take advantage of the presence of experts that have traveled here from across the world. They bring unique regional, scientific, and sectoral perspectives on the impact of and response to climate change.

Ladies and Gentlemen,

How we protect our environment, manage climate change, secure our planet and safeguard our future, for our children and generations to come, is one of the greatest international challenges of our time.

This message was central to the United Nations Framework Convention on Climate Change agreed at the Earth Summit in Rio de Janeiro fifteen years ago.

More recently, the United Nations Intergovernmental Panel on Climate Change has concluded that warming of the climate system is an established fact and a growing concern.

The weight of scientific evidence continues to accumulate month by month.

And as the causes are becoming increasingly clear, so too are the consequences.

The mutual concern of people across continents reflects the growing consensus that climate change needs to be addressed. It is urgent that we act now. The longer we wait, the more expensive this will be.

The cruel irony of climate change is that the countries least responsible for it will be worst affected - economic growth and poverty reduction will be undermined.

Greater variations of rainfall, combined with rising sea levels, will lead to more extreme weather, particularly in parts of Asia, sub-Saharan Africa and Latin America.

We therefore have a special responsibility to help those countries most affected to adapt to climate change.

This includes greater investment in climate-friendly energy production and energy efficiency. In the meantime, technology transfers must be actively pursued to help ensure that all the Millennium Development Goals are met.

Measures designed to address climate change should not be at the cost of economic growth, but to achieve it.

Together we can work towards a new framework that sees economic growth, social justice and environmental care advance hand in hand.

Excellencies,

I am pleased to announce today, that our thematic debate is carbon neutral.

Over the next two days the entire carbon emissions of the United Nations Headquarters, and the emissions from the air travel to bring experts to the debate, have been off-set.

Moreover, we are off-setting our carbon emissions by investing in a biomass fuel project in Kenya, thus creating new economic opportunities for local farmers.

I hope that this modest example will inspire similar initiatives in the future. We can begin by making simple changes in the way we affect the environment; by increasing our energy efficiency, recycling more, off-setting our carbon emission and supporting more sustainable lifestyles.

However globally, we must move towards a post-Kyoto framework based on the understanding in the United Nations Climate Change Convention – that we share common, but differentiated responsibilities.

We must agree on an overall strategy that reflects our shared desire to ensure that the requirements of economic growth take environmental and social considerations fully into account. We must adapt our needs and mitigate the consequences of consumption.

This will enable us, not only to improve living conditions for all, particularly the poorest, but also to ensure a sustainable long-term solution.

Fundamentally we require a global carbon cap, with a target for reducing emissions. In order to be meaningful, this will have to be translated into national targets as well. So, I look forward to hearing your national strategies to address climate change.

Within a global framework carbon trading has a fundamental role to play as a cost effective mechanism to deliver emission reductions. Used appropriately carbon markets could deliver investment in low carbon economic growth.

Excellencies,
Distinguished Delegates,
Ladies and Gentlemen,

In an interdependent world we must recognize and champion a multilateral solution to the problems we face.

The General Assembly has an important role to play in addressing climate change. It has implications across a broad range of issues: from the environment, health, energy, to economic development.

We will need to act with imagination, initiative and innovation on these complex set of interrelated issues. We all have an obligation to take action, in line with our capabilities and historic responsibilities.

I believe it is not just more urgent than ever before, but also, more possible than before to build a global consensus for tackling environmental change.

We have the technological capability and scientific know-how. However, a global consensus can only be secured if all countries can share in the benefits from action to address it.

It is up to us. It is our shared responsibility. It is our shared opportunity. And, working together, I believe it can be our shared achievement.

Finally, I would like to thank the sponsors of the thematic debate for their kind support – the Government of Japan, the European Commission, the United Nations Foundation, and the Rockefeller Foundation.

I look forward to the interactive debate today and the plenary discussion tomorrow.

Together, we can have a fruitful debate, and prepare the ground for the General Debate of the 62nd session of the General Assembly dedicated to climate change, the Secretary-General's High-level event on climate change in September, and a successful outcome of the Bali conference and beyond.

Thank you.

Purpose and Scope of the Second National Action Plan on Climate Change

The Bulgarian Government has clearly demonstrated strong commitment and willingness to join the international efforts in mitigating climate change by ratifying the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to the Convention (KP). The Second National Plan on Climate Change (Second NAPCC) is a governmental plan to streamline and guide the efforts of the Bulgarian government in mitigating climate change. The Second NAPCC includes mainly measures that do not require significant financial support from the state because the present economic situation in Bulgaria does not allow for the allocation of extensive government funding for implementing climate change related policies and measures.

In the short run the implementation of climate change policies and measures is hardly needed. According to the target of Kyoto Protocol, the country has significant reserve of emission reduction. The advantages of adopting the NAPCC however are numerous. It contributes to:

1. Meeting the requirements from UNFCCC and the Kyoto Protocol in regard to greenhouse gas emissions monitoring, evaluation and reporting;
2. Preparing for a situation of increased economic growth above the expected trend, making sure that the GHG emissions growth trend can be decreased compared to the economic growth rate;
3. Enabling Bulgaria to benefit from taking part in the so-called 'Kyoto flexible mechanisms' – a set of market-driven tools enabling countries to fulfil their obligations with minimization of costs. Attracting financing from those sources will stimulate investments in the country and increase the competitiveness of the Bulgarian economy;
4. Meeting the requirements of the EU Acquis Communautaire;
5. Anticipating the requirements of a future international climate regime, which is likely to include emission reduction obligations beyond the first commitment period 2008-2012.

The Bulgarian government will implement several actions to benefit from participation in the international climate change mitigation process. In addition, these actions will help further and more extensive implementation of climate change related policies and measures, especially when it comes to securing financing for implementation.

For the implementation of Joint Implementation (JI) in Bulgaria the operational guidelines for JI are developed, as well as the governmental capacity to control and monitor JI projects. Also, the legal framework for JI and Emissions Trading has been elaborated and the dissemination of information and training for project proponents and funding bodies have been improved.

The implementation of the EU Emissions Trading Scheme also requires considerable attention in the coming years. Tasks that will be completed include the evaluation of experiences in the new Member States of the EU and clarification of the functions and management of the emissions trading system and the necessary amendments of financial, tax, environmental and other legislation.

In order to improve the financing of the policies and measures, establishment of the Green Investment Scheme (GIS) is planned that will require further elaboration of the basic conditions and of the design of the GIS. At present Bulgaria cannot dedicate extensive funding from the state budget for implementation of climate change policies and measures. Subsidies are not envisaged at all. When it comes to financing investments, the sources will come mostly from funds outside the government. Such funds can be either domestic or international.

Donor funds from multilateral financing institutions such as EBRD and the World Bank can be instrumental in financing credit lines for investments in energy efficiency or renewable energy. In addition, funding for general improvements in infrastructure can be obtained from EU structural funds such as ISPA. Also the EU ETS can provide a financial stimulus for larger industrial emitters to reduce their emissions. Other financial sources will be directly linked to the Kyoto mechanisms as for example establishing on a national scale a Green Investment Scheme filled by earnings from selling excess emissions through International Emissions Scheme.

GHG emissions in Bulgaria are well below the target for the first commitment period. The country now faces the challenge to control and limit the expected future increase in emissions resulting from economic growth. Reducing or maintaining CO₂ emissions may be done as "no regret" at minimal costs now because in the years to come the marginal costs of future reduction measures will increase. The best approach for Bulgaria to maintain GHG emissions levels low is by avoiding carbon-intensive economic growth to the extent possible. Furthermore, climate change issues need to be considered when formulating and implementing the national economic development policies.

The NAPCC shows the importance of the Kyoto instruments for the realization of Bulgaria's objectives in climate change. The NAPCC provides the key elements and defines the actions to be taken to further increase the use of these instruments in Bulgaria. It sets the basic preconditions to bring additional investments and economic benefits to the country, decreasing the carbon intensity of the Bulgarian economy, while increasing its competitiveness.

Sectoral policies and measures for reducing GHG emissions in Bulgaria

1.1.1. Energy sector

The Bulgarian Energy Strategy was adopted by the Council of Ministers on May, 11th, 2002 and the National Assembly adopted it with Decision №39/2002. The strategy outlines the national energy policy and the main reforms envisaged for this sector. The Bulgarian energy sector will continue to be based on two major pillars in the future: nuclear energy and local extraction of lignite coal as a leading priority for the development of a competitive energy market. All other priorities are directly related to:

- Security of supply;
- Competition at the energy market;
- Environmental protection.

These priorities fully match the priorities of the EU energy policy.

● Improvement of the operation of nuclear power plant Kozloduy (NPP-K)

Kozloduy units 1-4 gradually are put out of operation (units 1 and 2 in 2002, and units 3 and 4 in 2006). To preserve the share of nuclear energy in the overall production of electricity in the country measures have been implemented to modernize units 5 and 6 and further improve their operation.

● E2 Accelerated development of hydro energy

The existing hydropower plants (HPPs) have been rehabilitated as a considerable part of them had outdated equipment. New automation and control systems were introduced. 70 % of the hydro potential is already utilized.

● Upgrading of cogeneration plants and district heating boilers

The overall efficiency could be increased to 80-90 %, which is much higher than that of existing cogeneration units or heat boilers. The introduction of new natural-gas combined cycle for replacing capacities at some of the existing thermal power plants and district heating plants forms part of the Implementation Programme for the Directive on Large Combustion Plants for the period after 2007.

- **Electricity transmission and distribution losses**

A reduction of the electricity losses will lead to fewer GHG emissions as a result of lower electricity production in coal-fired plants.

- **Heat transmission and distribution losses**

Losses of heat can be reduced through rehabilitation, modernization and improving the exploitation of the transmission and distribution networks. A reduction of the heat losses will lead to fewer GHG emissions as a result of lower heat production in heat boilers.

- **Biomass for electricity and heat production**

The assessment of the theoretical potential resulted in the following figures: firewood – 7.7 PJ per year; waste paper - 0.3 PJ per year; agricultural solid waste - 77.1 PJ per year; waste from live-stock breeding -11.3 PJ per year; municipal solid waste - 12.5 PJ per year and industrial waste wood - 0.4 PJ per year.

The Second National Plan on Climate change envisages an annual potential for CO₂ emission reduction of 3.3 mil. tons per year from the overall modernization of the heating companies in the country, 2 mil. tons – from heating loss reduction, 6.8 mil. tons from natural gas supply to household.

1.1.2. Industry

The industry policy aiming at transition to market economy, abolishment of subsidies and liberalization of the energy market has led to sharp reduction of the share of industry in GDP – from 61 % in 1987 to 29 % in 2002. The policy towards fast privatization resulted in almost complete privatization of the industrial plants. As a consequence, the most inefficient industries were closed.

The growth of industrial production is quite unsteady. At some enterprises the years of production growth are followed by years of reduction. Under these conditions the baseline development scenario for industry includes maintenance of liberalization and market principles without subsidies and preferences. Energy efficiency measures with pay-back period less than 2 years are also included in the baseline scenario. The implementation of these measures is possible at own expenses and limited loans from bank institutions under the conditions of unstable production programme. These measures will result in an average annual growth of energy consumption in industry of 1.7 % at 3.9 % GDP growth. This corresponds to a comparatively good rate of efficiency increase at the absence of designated state subsidies in this field.

- **Reduction of thermal losses in industry**

The use of heat in the form of steam and hot water is an important part of the industrial energy consumption. Reduction of heat losses can be achieved through thermal insulation, redesign and replacement or updating of heat exchangers leading to reduction of fuel consumption for its production.

- **Natural gas supply to the industry by development of gas infrastructure**

Industry is a large consumer of energy. Substituting liquid fuels with natural gas will lead to the reduction of the GHG emissions and higher efficiency.

- **Introduction of monitoring systems for energy consumption**

One way to achieve improvement of the efficiency of production processes is the establishment of systems for monitoring and control of energy consumption at different technological stages. This enables companies to have better insight in their energy

consumption in various parts of the process, showing where measures could be taken for increase of efficiency.

- **Upgrading of steam and heat generation and compressed-air plants**

In the light industry, food processing industry, machine building and metalworking, electrical and electronic industry can all reduce about 20 % of their energy consumption. This can be done through modernization of steam and compressed-air installations, regulation of the heat energy systems, energy management and control and introduction of small-scale co-generation at the relevant enterprises.

- **Reduction of fuel consumption in production of building materials**

Cement industry is a key GHG emissions source. Production of structural ceramics and quicklime consumes large amounts of fuels (both liquid and solid) as well. The energy use in this sector can be reduced by replacing part of the fuel by combustible waste such as car tires.

1.1.3. Policies and Measures for Residential and Commercial/Institutional Buildings

Considerable progress in energy saving was achieved by national programmes on the improvement of thermal insulation of the existing buildings, on the replacement of incandescent lamps with compact luminescent lamps, and on the introduction of automated control of street lighting.

The analysis of options for RES utilization in households and services revealed a practicable potential for GHG emissions reduction through implementation of measures in the following directions (reported by the Energy Efficiency Agency and municipalities):

- Solar collectors at public buildings;
- Introduction of hybrid installations for hot water at nurseries, schools and hospitals.

- **Gas supply to households**

The Gas Supply Program for Residential and Servicing sector plans for 720000 additional households to be connected towards 2020, which should lead to a reduction of 6.9 Mton CO₂ eqv. Assuming annual new connections varying between 20,000 households in 2004 till 60,000 in 2010, about 290,000 additional households will be supplied towards 2010, leading to an emission reduction of 2.3 Mton.

- **Solar collectors**

The geographical situation of the country provides for a substantial solar energy potential. The solar collectors transform solar energy in useful thermal energy. Due to the relatively low single capacities these panels are suitable for installation at institutional buildings and private homes.

- **Hybrid and other hot water installations**

RES potential studies have shown a potential for hot water installations using renewable energy such as hybrid systems combining solar collectors and biomass boilers, as well as hot water installations using only biomass.

1.1.4. Transport

The governmental investment policy in transportation is based on development of the country's transport infrastructure as an integrated part of the overall European transport network. The transport infrastructure will be reconstructed and updated in accordance with the international requirements and standards. The most important objectives of the National Government are the liberalization of the transport market, finalization of the legislative and institutional restructuring of the transportation sector and the provision of beneficial conditions for development of private transport companies and renewing of the mobile park.

- **Transports dispatching system**

A considerable part of the return trips of freight vehicles is done without cargo. Both from an economic and environmental point of view, this is not very efficient. The implementation of

central information dispatching system for the loads will lead to a decrease of empty or semi-loaded return trips of Lorries and trains.

- **Railway transport power dispatching system**

Supply of electricity to the electrified sections of the railway network and reduction of electricity losses require introduction of an automated system for collecting information and dispatching control. It will lead to an increase of the security of the electricity supply and, as a consequence, to a decrease of the emissions.

- **Modernization of Railways**

The consumption of residual oil and electricity for transportation of one cargo unit or passenger at a given distance by train is much lower than that in the road transportation. There are technical solutions that, if applied, can lead to additional reduction of the consumption of oil and electricity. The proposed measures have direct and indirect effects on the increase of the passengers and load flows in the railway transport as well as on GHG emissions reduction.

- **Improving the public transportation, reducing transportation flows in cities and renewing the transport park**

The improvement of public transportation and the reduction of private transportation in cities might contribute to lower GHG emissions from transportation. However, an increasing share of the public transport in total transportation activities can only be achieved if policies are accompanied by instruments which make the use of cars less attractive (e.g. increased fuel or road taxes, introduction of parking taxes, introduction of car-free zones in city centres). The strengthening of the control and quality of the periodical technical examinations will lead to the renewing of the transport park.

- **Introduction of biofuels**

The implementation of this measure will lead to reduction of GHG emissions. Bulgaria has the possibility to produce a substantial amount of biomass. Production of biofuels has a positive effect on employment in the agricultural sector.

1.1.5. Agriculture

The Government will carry out a uniform national strategy focusing on sustainable development of the agricultural sector in compliance with the general agricultural EU policy, taking into account the specificity of nature in Bulgaria.

- **Manure management**

Manure is one of the most considerable methane sources in agriculture. The modern manure management practices are not applied in Bulgaria.

Transportation tanks, underground disposal at cattle-breeding farms and poultry-farming sites, separation of manure into liquid and solid fraction at pig-breeding farms, etc. are used in liquid manure management.

- **Fertilization and irrigation**

During the last years fertilization was conducted in an uncontrolled manner. The amounts of nitrous fertilizers applied to soils often exceeded the recommended ones. The requirements for quality of production and lower prime costs grew strict due to expanded import of agricultural goods from the neighbouring countries.

1.1.6. Waste Management

The measures for reduction of GHG emissions to be implemented in this sector are related to management of municipal solid waste.

Landfill sites are widely used in the country. The typical amount of waste to be disposed at regional landfill sites varies between 50,000 and 100,000 ton per year. The governmental policy in this field is directed towards building up a system of 54 regional landfill sites and closing down those landfills which do not meet the legal requirements. With the setting up of

these regional landfill sites the environmental friendly waste treatment of all waste generated in the country will be secured.

- **Utilization of the captured methane for production of electricity**

At this moment the energy generated during the flaring of the captured methane is not used. The captured methane can be utilized for electricity generation in piston gas motors. Due to the presence of mixtures in methane, a comparatively low efficiency is accepted for this type of machines (30 %). The received electrical energy from the burning of one ton captured methane will be about 4.2 MWh under the assumption that the diesel-generators operate 6 000 hours per year. This utilization of equipment for electricity production means an installed capacity of 19,517 kW.

China's National Climate Change Programme

**Prepared under the Auspices of
National Development and Reform Commission
People's Republic of China**

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Foreword

Climate change is a major global issue of common concern to the international community. It is an issue involving both environment and development, but it is ultimately an issue of development. As noted by the *United Nations Framework Convention on Climate Change* (hereinafter referred to as UNFCCC), the largest share of historical and current global emissions of greenhouse gases has originated from developed countries, while per capita emissions in developing countries are still relatively low and the share of global emissions originating from developing countries will grow to meet their social and development needs. The UNFCCC stipulates clearly that the Parties to the Convention shall protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities, and accordingly, the developed country Parties shall take the lead in combating climate change and the adverse effects thereof. It further provides that all Parties shall formulate, implement, publish and regularly update national programmes to address climate change.

As a developing country of responsibility, China attaches great importance to the issue of climate change. The National Coordination Committee on Climate Change was established, and a series of policies and measures to address climate change has been taken in the overall context of national sustainable development strategy, making positive contributions to the mitigation of and adaptation to climate change. As it is mandated under the UNFCCC, the Government of China hereby formulates *China's National Climate Change Programme* (hereinafter referred to as the CNCCP), outlining objectives, basic principles, key areas of actions, as well as policies and measures to address climate change for the period up to 2010. Guided by the Scientific Approach of Development, China will sincerely carry out all the tasks in the CNCCP, strive to build a resource conservative and environmentally friendly society, enhance national capacity to mitigate and adapt to climate change, and make further contribution to the protection of the global

climate system.

Article 4, Paragraph 7 of the UNFCCC provides that “the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.” In this connection, while maintaining economic and social development, China will vigorously engage in effective and pragmatic cooperation with the international community as well as individual countries to implement this CNCCP.¹

¹ In case of any discrepancy between the English translation and the Chinese original, the latter shall prevail.

Part 1 Climate Change and Corresponding Efforts in China

Many observations in recent 100 years show that the earth's climate is now experiencing significant change characterized by global warming. And the trend of climate change in China is generally consistent with that of global climate change. To address climate change and promote sustainable development, China has carried out various policies and measures, such as economic restructuring, energy efficiency improvement, development and utilization of hydropower and other renewable energy, ecological restoration and protection, as well family planning, which has contributed significantly to the mitigation of climate change.

1.1 Observations and Trend of Climate Change in China

The Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has clearly indicated that most of the global warming observed over the past 50 years was likely induced by the increase in concentrations of greenhouse gases (GHGs), such as carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), due to human activities. In the context of global warming, climate in China has experienced noticeable changes over the past 100 years as well. The major observed evidence of climate change in China includes the following:

- Temperature. Annual average air temperature has increased by 0.5~0.8°C during the past 100 years, which was slightly larger than the average global temperature rise. Most of the temperature rise was observed over the last 50 years. The regional distribution of the temperature changes shows that the warming trend was more significant in western, eastern and northern China than in the south of the Yangtze River. The seasonal distribution of the temperature changes shows that the most significant temperature increase occurred in winter, and 20 consecutive warm winters were observed nationwide from 1986 to 2005;
- Precipitation. In the past 100 years, there was no obvious trend of change in annual precipitation in China, but there exists considerable variation among

regions. The annual precipitation decreased gradually since 1950s with an average rate of 2.9 mm/10a, although it increased slightly during the period of 1991 ~ 2000. The regional distribution of precipitation shows that the decrease in annual precipitation was significant in most of northern China, eastern part of the northwest, and northeastern China, averaging 20~40 mm/10a, with decrease in northern China being most severe; while precipitation significantly increased in southern China and southwestern China, averaging 20~60 mm/10a;

- Extreme climate/weather events. The frequency and intensity of extreme climate/weather events throughout China have experienced obvious changes during the last 50 years. Drought in northern and northeastern China, and flood in the middle and lower reaches of the Yangtze River and southeastern China have become more severe. The annual precipitation in most years since 1990 has been larger than normal, with the precipitation pattern being a dipole, corresponding to frequent disasters in the North and flood in the South;

- Sea level. The rate of sea level rise along China's coasts during the past 50 years was 2.5 mm/a, slightly higher than the global average;

- Glaciers. The mountain glaciers in China have retreated, and the trend is accelerating.

The trend of climate warming in China will further intensify in the future. The projections by Chinese scientists indicate that:

- The nationwide annual mean air temperature would increase by 1.3~2.1°C in 2020 and 2.3~3.3°C in 2050 as compared with that in 2000. The warming magnitude would increase from south to north in China, particularly in northwestern and northeastern China where significant temperature rise is projected. It is estimated that by 2030, the annual temperature would likely increase by 1.9~2.3°C in northwestern China, 1.6~2.0°C in southwestern China, and 2.2~2.6°C in the Qinghai-Tibetan Plateau;

- Precipitation in China would possibly increase during the next 50 years, with a projected nationwide increase of 2~3% by 2020 and 5~7% by 2050. The most significant increase might be experienced in southeastern coastal regions;

- The possibility of more frequent occurrence of extreme weather/climate events would increase in China, which will have immense impacts on the socio-economic development and people's living;
- The arid area in China would probably become larger and the risk of desertification might increase;
- The sea level along China's coasts would continue to rise;
- The glaciers in the Qinghai-Tibetan Plateau and the Tianshan Mountains would retreat at an accelerated rate, and some smaller glaciers would disappear.

1.2 Current GHG Emissions in China

According to the *Initial National Communication on Climate Change of the People's Republic of China*, China's total GHG emissions in 1994 are 4,060 million tons of CO₂ equivalent (3,650 million tons of net emissions), of which 3,070 million tons of CO₂, 730 million tons of CO₂ equivalent (tCO₂e) of CH₄ and 260 million tCO₂e of N₂O. According to tentative estimates by experts from China, China's total GHG emission in 2004 is about 6,100 tCO₂e (5,600 million tons of net emissions), of which 5,050 million tons of CO₂, 720 million tCO₂e of CH₄ and 330 million tCO₂e of N₂O. From 1994 to 2004, the annual average growth rate of GHG emissions is around 4%, and the share of CO₂ in total GHG emissions increased from 76% to 83%.

China's historical GHG emissions are very low and per capita emissions have been below the world average. According to the study carried out by the World Resource Institute (WRI), China's CO₂ emissions from fossil fuel combustion were 79 Mt in 1950, contributing only 1.13% of the world total at that time; cumulative emissions of CO₂ from fossil fuel combustion accounted for only 9.33% of the world total during the period of 1950~2002, and the cumulative CO₂ emissions per capita are 61.7 tons over the same period, ranking the 92nd in the world. Statistics from the International Energy Agency (IEA) indicates that per capita CO₂ emissions from fossil fuel combustion were 3.65 tons in 2004 in China, equivalent to only 87% of the world average and 33% of the level in Organization for

Economic Co-operation and Development (OECD) countries.

Along with the steady social and economic development, the emission intensity defined as the CO₂ emission per unit of GDP declined generally. According to IEA, China's emission intensity falls to 2.76 kgCO₂/US\$ (constant 2000 U.S. dollar) in 2004, as compared to 5.47 kgCO₂/US\$ in 1990, a 49.5% decrease. For the same period, emission intensity of the world average dropped only 12.6% and that of the OECD countries dropped 16.1%.

1.3 China's Efforts and Achievements in Mitigating Climate Change

As a developing country of responsibility, China is among the first to formulate a national Agenda 21 entitled *China's Agenda 21 - White Paper on China's Population, Environment and Development in the 21st Century*, soon after the United Nations Conference on Environment and Development in 1992, and adopted a series of policies and measures taking into account its specific national circumstances, making positive contribution to the mitigation of climate change.

1.3.1 Restructuring the economy, promoting technology advancement and improving energy efficiency

Beginning from the late 1980s, the Government of China paid more and more attention to the change of the economic growth pattern and the restructuring of economy, and integrated the reduction of energy and other resources consumption, the promotion of clean production, and the prevention and control of industrial pollution into its national industrial policies. The industrial structure has been significantly improved through the implementation of a series of industrial policies to accelerate the development of the tertiary industry and restructure the secondary industry. The breakdown of GDP across the primary, secondary and tertiary industries in 1990 is 26.9:41.3:31.8, while in 2005 it is 12.6:47.5:39.9. The share of primary industry declined continuously, and the tertiary grew greatly, especially in sectors such as telecommunication, tourism and finance. The secondary industry has slightly grown in the overall share, but its internal

composition has significantly changed, and the proportion of high value-added products has increased due to the rapid development in machinery, information technology and electronic sectors. Such change has brought about significant energy conservation benefits. During the period of 1991 ~ 2005, China has achieved an annual GDP growth rate of 10.2% with an annual growth rate of 5.6% in energy consumption, i.e. about 0.55 of the elasticity of energy consumption.

As early as 1980s, the Government of China adopted the principle of “equal treatment to development and conservation with immediate emphasis on the latter”, making energy conservation as a matter of strategic importance in energy policy. Energy conservation was effectively promoted through the implementation of the *Law on Energy Conservation of the People’s Republic of China* and relevant regulations, the development of specific energy conservation plans, the adoption and implementation of technology, economic, fiscal and management policies in favor of energy conservation, the development and application of energy efficiency standards and labeling, the encouragement of R&D, demonstration and diffusion of energy-saving technologies, the importing and absorbing of advanced energy-saving technologies, the creation and employment of new energy conservation mechanisms, and the promotion of key energy conservation projects as well. From 1990 to 2005, China’s energy intensity (energy consumption per Million GDP at constant 2000 RMB Yuan) went down from 268 to 143 tons of coal equivalent (tce), decreasing by an average annual rate of 4.1%. The energy consumption per unit of energy-intensive products in the industrial sector declined strikingly. In 2004, as compared with 1990, for generators with capacity of 6MW and above, the unit energy consumption for thermal power supply decreased from 0.427kgce/kWh to 0.376kgce/kWh; comparable energy consumption per ton of steel in key companies decreased from 997kgce to 702kgce; and comprehensive energy consumption per ton of cement in medium and large enterprises decreased from 201kgce to 157kgce. As calculated on the year by year comparison, during the period of 1991 ~ 2005, an accumulated 800 million tce of energy were saved by economy restructuring and energy efficiency improvement, which is equivalent to a reduction of 1.8 billion tons of CO₂ emissions, using China’s 1994 emission

factor of 2.277 tCO₂/tce.

1.3.2 Optimizing energy mix by developing low-carbon and renewable energy

Under national policy guidance and with financial support, the share of high grade and clean energy was improved by strengthening the development and utilization of hydropower, nuclear energy, oil, gas and coal-bed methane , and supporting the development and utilization of new and renewable energy including biomass, solar, geothermal and wind power in rural areas, remote areas and other suitable areas. Share of coal in China's primary energy mix decreased from 76.2% in 1990 to 68.9% in 2005, whereas the shares of oil, gas and hydro increased from 16.6%, 2.1% and 5.1% in 1990 to 21.0%, 2.9% and 7.2% in 2005, respectively.

By the end of 2005, the installed capacity of hydropower generation has reached 117GW in China, accounting for 23% of the total power generation capacity, and the corresponding power generation was 401 TWh, accounting for 16.2% of total electricity generation. There were more than 17 million household biogas digesters that generate 6500 million cubic meters of biogas annually. Over 1500 biogas digester construction projects at large-and-medium-scale have been constructed, generating biogas around 1500 million cubic meters each year. The installed capacity of biomass generation is about 2 GW, among which sugar-cane fired power capacity is about 1.7GW and landfill-powered 0.2GW. Production capacity of ethanol fuel based on crops was 1.02 million ton. More than 60 wind farms were built and connected to the grid with their installed capacity of 1.26GW, and there were also about 200 thousand small-scaled wind power generators operating independently with capacity of 40 MW locating in remote area. The total capacity of photovoltaic generation was around 70 MW, mainly operating for residential power supply in remote area. Heat collecting area of existing solar heaters was up to 85 million square meters. In 2005, the utilization of renewable energy in China equaled to 166 million tce (including large hydropower), accounting for 7.5% of China's total energy consumption in that year, equivalent to a saving of 380 million ton CO₂ emissions.

1.3.3 Launching national wide tree-planting and afforestation campaign and enhancing ecology restoration and protection

Since the reform and opening up to the outside world, tremendous achievement has been made in tree-planting and afforestation along with the implementation of key forest ecological projects. According to the *Sixth National Forest Survey*, the acreage of conserved artificial forests in China was 54 million hectares, ranking the top one in the world, and the amount of growing stock was 1505 million cubic meters. Total area of forest cover in China was 174.91 million hectares, and the percentage of forest coverage increased from 13.92% to 18.21% during the period from early 1990s to 2005. In addition to tree-planting and afforestation, China initiated many other policies for ecology restoration and protection, including natural forest protection, reclaiming cultivated land to forest or grassland, pasture restoration and protection, further enhancing the capacity of forest as the sinks of greenhouse gas. Meanwhile, urban green area grew rapidly in China as well. By the end of 2005, total green area in the built-up urban area in the whole country reached 1.06 million hectares with a 33% green coverage and 8.1 square meters of public green area per capita. The green area helps absorbing CO₂ in the atmosphere. Estimated by relevant experts, from 1980 to 2005, a total of 3.06 billion ton CO₂ absorption was achieved by afforestation, a total of 1.62 million ton CO₂ absorption by forest management, and 430 million tons of CO₂ from deforestation were saved.

1.3.4 Effectively controlling the growth rate of population through family planning

The Government of China has made it a basic national policy to carry out family planning all along, and the excessive population growth trend has been brought under effective control. According to the statistics of the United Nations, China's fertility rate was lower than that of other developing countries and the world average as well. In 2005, birth rate in China was 12.40‰, and the natural growth rate was 5.89‰, dropped by 8.66 and 8.50 permillage points respectively compared to the level of 1990, making China one of the countries with a low fertility rate in the world. As a country with underdeveloped economy, China has

accomplished a historic transition in population reproduction pattern from one featuring high birth rate, low death rate and high growth rate to one featuring low birth rate, low death rate and low growth rate in a relatively short period of time, such a change took decades or even up to a hundred years for developed countries to realize in the past. Since the implementation of the family planning program, over 300 million births have been averted nationally by 2005. According to the average per capita emissions from the IEA statistics, the averted births have resulted in an annual reduction of CO₂ emissions by about 1.3 billion tons in 2005. It is a significant contribution that China achieved in the fields of controlling world population and mitigating GHG emissions.

1.3.5 Strengthening laws and regulations, and policies and measures relevant to addressing climate change

To address newly-emerging issues in recent years, the Government of China has advocated for the Scientific Approach of Development and Strategic Thoughts of Building a Harmonious Society, and accelerated the building of a resource-conserving and environmentally friendly society, thus further reinforcing the policies and measures relevant to addressing climate change. In 2004, *China Medium and Long Term Energy Development Plan Outlines 2004-2020* (draft) was approved by the State Council. In the same year, the first *China Medium and Long Term Energy Conservation Plan* was launched by National Development and Reform Commission (NDRC). In February 2005, the National People's Congress adopted the *Renewable Energy Law of the People's Republic of China*, setting out the duties and obligations of the Government, enterprises and users in development and utilization of renewable energy and a series of policies and measures, including total volume target, mandatory grid connection, price management regulation, differentiated pricing, special fund, favorable taxing, etc. In August 2005, the State Council issued the *Notification on the Immediate Priorities for Building a conservation-oriented Society and Several Opinions on Accelerating the Development of Circular Economy*. In December 2005, the State Council issued the *Decision to Publish and Implement the Interim Provisions on Promoting Industrial Restructuring* and the *Decision to Strengthen Environmental*

Protection by Applying the Scientific Approach of Development. In August 2006, the State Council issued the *Decision to Strengthen Energy Conservation.* All those documents serve as the policy and legal guarantee to further enhance China's capability in addressing climate change.

1.3.6 Further improving institutions and mechanisms

China established the National Coordination Committee on Climate Change (NCCCC), which presently comprises 17 ministries and agencies. The NCCCC has done lots of work in the formulation and coordination of China's important climate change-related policies and measures, providing guidance for central and local governments' response to climate change. In order to fulfill conscientiously China's commitment under the UNFCCC, beginning from 2001, the NCCCC organized the work on the compilation of the Initial National Communication on Climate Change of the People's Republic of China, and presented the report to UNFCCC at the tenth session of the Conference of the Parties (COP10) in December 2004. In recent years, the Government of China has strengthened its comprehensive management of energy that is closely related to addressing climate change by establishing a National Energy Leading Group and its office, which has further strengthened its work on energy management. In October 2005, the amended *Measures for Operation and Management of Clean Development Mechanism Projects* was promulgated by the relevant departments of the Government.

1.3.7 Attaching great importance to climate change research and capacity building

The Government of China highly values its capability and capacity to support scientific studies and researches on climate change, and constantly enhances them. It has implemented a number of key research projects, such as *Study on Forecasting, Impact and Countermeasures of Global Climate Change*, *Study on Global Climate Change and Environmental Policies*, etc. Under the *National Climbing Program* and the *National Key Fundamental Research Program*, projects such as *Study on Formation and Prediction Theory of Key Climate and Weather*

Disasters in China, and *Study on Carbon Cycle in China's Terrestrial Ecosystems and Its Driving Mechanism* were conducted. Under the Innovative Research Program, *Carbon Balance Study in China's Land and Offshore Area* has been accomplished. Other key projects related to climate change were also conducted, including *China's Climate, Sea Level Change and Their Trend and Impact*. *China's National Assessment Report on Climate Change* has been completed. All those studies and researches provide scientific basis for developing national policies to address climate change and for China's participation in negotiations under the UNFCCC. Several projects on international cooperation in Clean Development Mechanism capacity building were also conducted by relevant departments of China.

1.3.8 Strengthening education, training and public awareness on climate change

The Government of China always attaches importance to education, training and public awareness on climate change. *The Program of Action for Sustainable Development in China in the Early 21st Century* states that China will vigorously develop all forms of education at all levels, to enhance the public awareness on sustainable development and enhance their scientific and cultural capacity for their participation in the sustainable development by reinforcing personnel training. In recent years, China has intensified its efforts to promote education, training and public awareness on climate change by organizing various kinds of lectures on climate change basic knowledge, conducting climate change training courses for policy makers at central and provincial levels, and organizing conferences such as Climate Change and Ecological Environment, as well as setting up an official bilingual website on climate change (China Climate Change Info-Net <http://www.ccchina.gov.cn>) in Chinese and English to provide comprehensive information on climate change. Commendable results have been achieved accordingly.

Part 2 Impacts and Challenges of Climate Change on China

Due to limitations on knowledge and analysis methods, there exist large uncertainties in the present assessment of climate change impacts carried out by various countries. Studies indicate that climate change has caused some impacts on China, such as sea level rise in the coastal areas, glacial retreat in northwest area, the earlier arrival of spring phenophase. It will also bring about significant impacts on China's natural ecosystems and social economic system in the future. Meanwhile, as a developing country at a low development stage, with a huge population, a coal-dominant energy mix and relatively low capacity to tackle climate change, China will surely face more severe challenges when coping with climate change along with the acceleration of urbanization, industrialization and the increase of residential energy consumption.

2.1 China's Basic National Circumstances of Climate Change

2.1.1 Inferior climatic conditions and severe natural disasters

China has relatively harsh climatic conditions. Most of China has a continental monsoon climate with more drastic seasonal temperature variations compared with other areas at the same latitude such as North America and West Europe. In most part of China, it is cold in winter and hot in summer with extremely high temperature. Therefore, more energy is necessary to maintain a relatively comfortable room temperature. Precipitation in China is unevenly distributed both seasonally and spatially. Most of the precipitation occurs in summer and varies greatly among regions. Annual Precipitation gradually declines from the southeastern coastal areas to the northwestern inland areas. China frequently suffers from meteorological disasters, which are unusual worldwide in terms of the scope of affected areas, the number of different disasters, the gravity of disaster and the mass of affected population.

2.1.2 Vulnerable ecosystem

China is a country with a vulnerable ecosystem. The national forest area for 2005 is 175 million hectares and the coverage rate is just 18.21%. China's grassland area for the same year is 400 million hectares, most of which are high-cold prairie and desert steppe while the temperate grasslands in Northern China are on the verge of degradation and desertification because of drought and environmental deterioration. China's total area of desertification for 2005 is 2.63 million square kilometers, accounting for 27.4% of the country's territory. China has a continental coastline extending over 18,000 kilometers and an adjacent sea area of 4.73 million square kilometers, as well as more than 6,500 islands over 500 square meters. As such, China is vulnerable to the impacts of sea level rise.

2.1.3 Coal-dominated energy mix

China's primary energy mix is dominated by coal. In 2005, the primary energy production in China was 2,061 Mtce, of which raw coal accounted for as high as 76.4%. For the same year, China's total primary energy consumption was 2,233 Mtce, among which, the share of coal was 68.9%, oil 21.0%, and natural gas, hydropower, nuclear power, wind power and solar energy 10.1%; while the shares of coal, oil, and natural gas, hydropower and nuclear power in the world primary energy consumption were 27.8%, 36.4% and 35.8%, respectively. Because of the coal-dominated energy mix, CO₂ emission intensity of China's energy consumption is relatively high.

2.1.4 Huge population

China has the largest population in the world. In 2005, the population of China's mainland was 1.31 billion (not including Hong Kong, Macao and Taiwan), accounting for 20.4% of the world total. China is still at a low level of urbanization, with a huge rural population of about 750 million, and in 2005, urban population accounted for only 43% of the national total population, lower than the world average. Huge population results in huge employment pressure, with annually more than 10 million new labor forces in the urban areas and about 10 million new rural labor forces moving to the urban areas as a result of the urbanization process. Due to the huge population, China's per capita energy consumption is still at a low

level. In 2005, China's per capita commercial energy consumption was about 1.7 tce, only 2/3 of the world average, let alone the average level of the developed countries.

2.1.5 Relatively low level of economic development

China is currently at a relatively low level of economic development. In 2005, the per capita Gross Domestic Product (GDP) of China was about US\$ 1,714 (based on exchange rate of the same year, the same below), only about 1/4 of the world average level. Remarkable disparity in economic development exists among different regions of China. In 2005, the per capita GDP of the eastern areas of China was US\$ 2,877, while that of the western areas was US\$ 1,136, only 39.5% of the former. The income disparity between rural and urban residents is also great. In 2005, the per capita disposable income of the urban residents was US\$ 1,281, while that of the rural residents was only US\$ 397, equivalent to 31.0% of the former. Furthermore, poverty eradication is still a huge challenge for China. By the end of 2005, the poverty-stricken people in China's rural areas numbered 23.65 million, with the per capita annual pure income less than 683 Chinese Yuan.

2.2 Impact of Climate Change on China

2.2.1 Impacts on agriculture and livestock industry

Climate change has already had certain impacts on agriculture and livestock industry in China, primarily shown by the 2-to-4-day advancement of spring phenophase since 1980's. Future climate change can affect agriculture and livestock industry in the following ways: increased instability in agricultural production, where the yields of three main crops, i.e. wheat, rice and maize, are likely to decline if no proper adaptation measures are taken; changes in distribution and structure of agricultural production as well as in cropping systems and varieties of the crops; changes in agricultural production conditions that may cause drastic increase in production cost and investment need; increased potential in aggravation of desertification, shrinking grassland area and reduced productivity that result from increased frequency and duration of drought occurrence due to

climate warming; and potentially increased rate in disease breakout for domestic animals.

2.2.2 Impact on forest and other natural ecosystems

Climate change has brought impacts on forests and other natural ecosystems in China. For example, the glacier area in the northwestern China shrunk by 21% and the thickness of frozen earth in Qinghai-Tibet Plateau reduced a maximum of 4-5 meters in recent 50 years. Future climate change will continue to impact these ecosystems to some extent. Firstly, the geographical distribution of major forest types will shift northward and the vertical spectrum of mountain forest belts will move upward. The distribution range of major tree species for afforestation or reforestation and some rare tree species is likely to shrink. Secondly, forest productivity and output will increase to different extents, by 1-2% in tropical and subtropical forests, about 2% in warm temperate forests, 5-6% in temperate forests, and approximately 10% in cold temperate forests. Thirdly, the frequency and intensity of forest fires and insect and disease outbreaks are likely to increase. Fourthly, the drying of inland lakes and wetlands will accelerate. A few glacier-dependent alpine and mountain lakes will eventually decrease in volume. The area of coastal wetlands will reduce and the structure and function of coastal ecosystems will be affected. Fifthly, the area of glaciers and frozen earth is expected to decrease more rapidly. It is estimated that glacier in western China will reduce by 27.7% by the year 2050, and the spatial distribution pattern of permafrost will alter significantly on Qinghai-Tibet Plateau. Sixthly, snow cover is subjected to reduce largely with significantly larger inter-annual variation. Seventhly, biodiversity will be threatened. The giant panda, Yunnan snub-nose monkey, Tibet antelope and *Taiwania flousiana* Gaussen are likely to be greatly affected.

2.2.3 Impact on water resources

Climate change has already caused the changes of water resources distribution over China. A decreasing trend in runoff was observed during the past 40 years in the six main rivers, namely Haihe River, Huaihe River, Yellow River, Songhuajiang

River, Yangtze River, and Pearl River. Meanwhile, there is evidence for an increase in frequency of hydrological extreme events, such as drought in North and flood in South. The Haihe-Luanhe River basin is the most vulnerable region to climate change, followed by Huaihe River basin and Yellow River basin. The arid continental river basins are particularly vulnerable to climate change. In the future, climate change will have a significant impact on water resources over China: in the next 50-100 years, the mean annual runoff is likely to decrease evidently in some northern arid provinces, such as Ningxia Autonomous Region and Gansu Province, while it seems to increase remarkably in a few already water-abundant southern provinces, such as Hubei and Hunan provinces, indicating an increase of flood and drought events due to climate change; the situation of water scarcity tends to continue in the northern China, especially in Ningxia Autonomous Region and Gansu Province, where water resource per capita are likely to further decrease in future 50-100 years; providing that water resources are exploited and utilized in a sustainable manner, for most provinces, water supply and demand would be basically in balance in future 50-100 years. However, gap between water resource supply and demand might be expanded in Inner Mongolia Autonomous Region, Xinjiang Autonomous Region, Gansu, and Ningxia Autonomous Region.

2.2.4 Impact on the coastal zone

Climate change has brought certain impacts on the coastal environment and ecosystems of China in some extent, mainly represented by the accelerating trend of sea level rise along the Chinese coast in the past 50 years, which resulted in coastal erosion and seawater intrusion, as well as mangrove and coral reef degradation. The future climate change will have even greater impact on the sea level and coastal ecosystems of China. Firstly, the sea level along the Chinese coast will continue to rise. Secondly, the frequency of typhoon and storm surge will increase, aggravating the hazards induced by coastal erosion. Thirdly, some typical marine ecosystems, including coastal wetlands, mangroves and coral reefs, will be further damaged.

2.2.5 Impacts on other sectors

Climate change may increase the frequency and intensity of the heat waves, hence increase deaths and serious diseases induced by extreme high temperature events. Climate change is likely to stimulate the emergence and spread of some diseases and to increase the magnitude and scope of diseases like cardiovascular diseases, malaria, dengue fever, and heatstroke, endangering human health. Meanwhile, climate change tends to increasingly impact China's medium to large sized projects, due to the increase of extreme weather and climate events and related hazards. Similarly, climate change may greatly harm natural and human tourism resources, as well as tourism security in some areas. In addition, global warming will exacerbate the increasing trend of electricity consumption for air conditioning and impose greater pressure to electric power supply.

2.3 Challenges Facing China in Dealing with Climate Change

2.3.1 Critical challenge to China's current development pattern

Natural resources are fundamental to the development of a national economy. The industrial structure and economic advantages of a country are determined to a considerable degree by its resources availability and combination. China is a country with a large population and at a relatively low level of development, and its economic development has long been constrained by the scarcity of per capita resources and it will continue to be so for a long time. The development history and trend of various countries has revealed the obvious positive correlations between per capita CO₂ emissions, per capita commercial energy consumption and the economic development level. In other words, with current level of technology development, to reach the development level of the industrialized countries, it is inevitable that per capita energy consumption and CO₂ emissions will reach a fairly high level. In the development history of human beings, there is no precedent where a high per capita GDP is achieved with low per capita energy consumption. With its ongoing economic development, China will inevitably be confronted with growing energy consumption and CO₂ emissions. The issue of GHG mitigation will pose a challenge to China to create an innovative and sustainable development pattern.

2.3.2 Huge challenge to China's coal-dominated energy structure

China is one of the few countries whose energy mixes are dominated by coal. In 2005, 68.9% of China's primary energy consumption was coal, while the world average was only 27.8%. Compared with oil and natural gas, coal's carbon content per unit calorific value is 36% and 61% higher, respectively. China will face much more difficulties than other countries in decreasing its carbon intensity per unit of energy for mainly three reasons: its energy mix adjustment is constrained by the mix of energy resources to certain extent; its energy efficiency improvement is subject to the availability of advanced technologies and financial resources, and its coal-dominated energy resources and consumption structure will not change substantially for a long-term period in the future.

2.3.3 Great challenge to China's independent innovation on energy technologies

One of the main reasons for China's low energy efficiency and high GHG emission intensity is the backward technologies of energy production and utilization in China. On one hand, there are relatively large gaps between China and the developed countries in term of technologies of energy exploitation, supply and transformation, transmission and distribution, industrial production and other end-use energy; on the other hand, out-of-date processes and technologies still occupy a relatively high proportion of China's key industries. For example, the overall energy consumption per ton of steel in large-scale iron & steel enterprises is about 200 kgce lower than that in small enterprises, and the overall energy consumption per ton of synthetic ammonia in large or medium enterprises is about 300 kgce lower than in small enterprises. Owing to the lack of advanced technologies as well as the large proportion of out-of-date processes and technologies, China's energy efficiency is about 10% lower than that of the developed countries, and its per unit energy consumption of energy-intensive products is about 40% higher than the advanced international level. Science and technology are the ultimate resort for humankind to tackle climate change. As China is now undergoing large-scale infrastructure construction for energy, transportation and buildings, the features of intensive emissions associated with these technologies will exist for the next few

decades if advanced and climate-friendly technologies could not be made timely available. This poses severe challenges to China in addressing climate change and mitigating GHG emissions.

2.3.4 Challenges on the conservation and development of forest and other natural resources

To combat climate change, it is necessary for China, on one hand, to strengthen forest and wetland conservation to enhance capacities for climate change adaptation; and on the other hand, to strengthen forest and wetland restoration and afforestation to enhance capacities for carbon sequestration. Forest resources in China are far below the needs for social and economic development. With the acceleration of industrialization and urbanization, the quest for forest and wetland conservation is increasing. Aridification, desertification, soil erosion, and wetland degradation remain as severe environmental problems. Lands available for afforestation/reforestation are mostly located in areas suffering from sandy or rocky desertification, which pose a great challenge to forestation and ecological restoration.

2.3.5 Long-term challenges on adaptation to climate change in China's agricultural sector

China not only encounters frequent agricultural meteorological disasters that cause longtime instability in agricultural production, but also features low per capita cultivated land, a less developed agricultural economy and a very limited capacity for adaptation. In coping with the climate change, how to rationally adjust agricultural production distribution and structure, improve agricultural production conditions, control the prevalence of plant diseases and pests/insects and spread of weeds, reduce production cost, prevent the potential desertification expansion, and ensure sustainable development of China's agricultural production are some of the aspects that pose long-term challenges for China agricultural sector in terms of improving its capacity of adapting to climate change and resisting climatic disasters.

2.3.6 New challenges on China's water resources development and

conservation in terms of adapting to climate change

There are two objectives for development and conservation of water resources in adapting to climate change in China: to promote sustainable development and utilization of water resources; and to enhance adaptive capacity of water resource system to reduce its vulnerability to climate change. How to enhance water resources management, optimize water resources allocation, strengthen infrastructure construction, ensure the anti-flood safety of large rivers, key cities and regions, promote nationwide water-saving program, guarantee safe drinking water and sound social and economic development, and make a good use of river functions while protecting aquatic ecosystem are the long-term challenges on water resources development and conservation in terms of enhancing climate change adaptation capability.

2.3.7 Challenges on China's coastal regions in terms of adapting to climate change

The coastal regions in China are characterized by dense population and most active economic activities. Since most of these coastal areas are low and flat, they are vulnerable to marine disasters caused by sea level rise. At present, China clearly lacks capacity in marine environment monitoring, resulting in insufficient capacity of early warning and emergency response to ocean disasters associated with climate change. Lower standards for coastal anti-tide engineering also weaken the ability to resist ocean disasters. In the future, coastal erosion, seawater intrusion, soil salinization and back flow of seawater into the river estuaries caused by sea level rise will be among realistic challenges in coping with climate change in China's coastal areas.

Part 3 Guidelines, Principles and Objectives of China to Address Climate Change

China's social and economic development is now at the stage of important strategic opportunity. China will implement its fundamental national policy of resources conservation and environmental protection to develop a circular economy, protect ecological environment and accelerate the construction of a resource-conservative and environmentally-friendly society. In order to actively fulfill its international commitments under the UNFCCC, China will strive to control its greenhouse gas emissions, enhance its capacity to adapt to climate change and promote the harmonious development between economy, population, resources and the environment.

3.1 Guidelines

To address climate change and to make further contributions to protect global climate, China will be guided by the following:

- To give full effect to the Scientific Approach of Development;
- To promote the construction of socialist harmonious society;
- To advance the fundamental national policy of resources conservation and environmental protection;
- To control GHG emission and enhance sustainable development capacity;
- To secure economic development;
- To conserve energy, to optimize energy structure, and to strengthen ecological preservation and construction;
- To rely on the advancement of science and technology;
- To enhance the capacity to address climate change.

3.2 Principles

To address climate change, China will be guided by the following principles:

- To address climate change within the framework of sustainable development. It is not only the important common understanding of the international community, but also the basic option of all the parties to the Convention to address climate change. As early as in 1994, the Government of China formulated and published its sustainable development strategy --- *China's Agenda 21 --- A White Paper on Population, Environment and Development in the 21st Century*. Later in 1996, the Government of China, for the first time, adopted sustainable development as the key guideline and strategic goal for its national social and economic development. In 2003, the Government of China further formulated the *Programme of Action for Sustainable Development in China in the Early 21st Century*. China will continue to actively tackle climate change issues in accordance with its national sustainable development strategy in the future.
- To follow the principle of “common but differentiated responsibilities” of the UNFCCC. According to this principle, developed countries should take the lead in reducing greenhouse gas emissions as well as providing financial and technical support to developing countries. The first and overriding priorities of developing countries are sustainable development and poverty eradication. The extent to which developing countries will effectively implement their commitments under the Convention will depend on the effective implementation by developed country of their basic commitments.
- To place equal emphasis on both mitigation and adaptation. Mitigation and adaptation are integral components of the strategy to cope with climate change. For developing countries, mitigation is a long and arduous challenge while adaptation to climate change is a more present and imminent task. China will strengthen its policy guidance for energy conservation and energy structure optimization to make efforts to control its greenhouse gas emissions. Meanwhile, China will take practical measures to enhance its capacity to adapt to climate change via key projects for ecosystem protection, disaster prevention and

reduction and other key infrastructure construction.

– To integrate climate change policy with other interrelated policies. Since adaptation to climate change and mitigation of greenhouse gas emissions involve many aspects of the social and economic sectors, policies to address climate change and other related ones will only be effective if they are integrated. China will continue to consider energy conservation, energy structure optimization, ecological preservation and construction, and overall agricultural productivity advancement as important components of its national climate change policy. Therefore, China will give full consideration to climate change issues by integrating the policy of climate change mitigation and adaptation into its national social and economic development programme and pushing forward the policy in a coordinate way.

– To rely on the advancement and innovation of science and technology. Technological advancement and innovation are the effective way to mitigate greenhouse gas emissions and enhance the capacity of adaptation to climate change. Realizing the leading and fundamental function of scientific and technological advancement in mitigation and adaptation to climate change, China will make great efforts to develop new and renewable energy technologies and new technologies of energy conservation, to promote carbon sink technologies and other adaptive technologies, to accelerate scientific and technological innovation and importation, and to provide a strong scientific support to address climate change and promote the capacity of sustainable development.

– To participate in international cooperation actively and extensively. Global climate change is a serious common challenge to the international community. Though countries differ in the understanding of climate change and in ways and means of addressing this issue, they share a basic consensus for cooperation and dialogue to jointly address the challenges of climate change. China will continue to actively participate in the international negotiations of the UNFCCC and relevant activities of the IPCC. China is ready to strengthen international cooperation of addressing climate change, including cooperation of clean development mechanism and technology transfer, to join efforts with the international

community to tackle global climate change.

3.3 Objectives

The strategic goal of China to respond to climate change is to make significant achievements in controlling greenhouse gas emissions, to enhance the capability of continuous adaptation to climate change, to promote climate change related science, technology and R&D to a new level, to remarkably raise public awareness on climate change, and to further strengthen the institutions and mechanisms on climate change. According to this strategic goal, China will make great efforts to achieve the following specific objectives by 2010.

3.3.1 To control greenhouse gas emissions

- Accelerating the transformation of economic growth pattern; strengthening the policy guidance on energy conservation and efficient utilization; reinforcing governmental supervision and administration on energy conservation; expediting R&D, demonstration and deployment of energy conservation technologies; bringing new market-based mechanisms for energy conservation into full play; raising public and social awareness on energy conservation; speeding up the building-up of a resource-conserving society. By all these means, China will achieve the target of about 20% reduction of energy consumption per unit GDP by 2010, and consequently reduce CO₂ emissions.
- Optimizing energy consumption structure. Measures in this regard include: vigorously developing renewable energy; actively promoting nuclear power plant construction; and speeding up utilization of coal bed methane. The target is to raise the proportion of renewable energy (including large-scale hydropower) in primary energy supply up to 10% by 2010, the extraction of coal bed methane up to 10 billion cubic meters.
- Reinforcing industrial policy governing metallurgy, building materials, and chemical industry; developing a circular economy; raising resource utilization efficiency, and strengthening emission control of nitrous oxide. By 2010, the emissions of nitrous oxide from industrial processes will remain stable as that in

2005.

- Promoting the adoption of low-emission and high-yield rice varieties, the rice cultivation technique of semi-drought, and scientific irrigation technology; strengthening the R&D on outstanding ruminant animal breeds and large-scale breeding and management techniques; reinforcing the management on animal wastes, wastewater and solid wastes, and promoting biogas utilization to control the growth rate of methane emissions.
- Increasing the forest coverage rate to 20% and realizing the increase of carbon sink by 50 million tons over the level of 2005 by 2010. Measures in this regard include: continuously carrying out the policies and measures on afforestation, returning farmland to forest and grassland, and natural forest protection, and basic construction for farmland and other key engineering construction.

3.3.2 To enhance capacity of adaptation to climate change

- Through strengthening farmland infrastructure, adjusting cropping systems, selecting and breeding stress-resistant varieties and developing bio-technologies and other adaptive countermeasures, the targets by 2010 are to increase the improved grassland by 24 million hectares, restore the grassland suffering from degradation, desertification, and salinity by 52 million hectares, and strive to increase the efficient utilization coefficient of agricultural irrigation water to 0.5.
- Through strengthening the natural forest conservation and nature reserve management and continuously implementing key ecological restoration programmes, establish key ecological protection area and enhancing natural ecological restoration. By 2010, 90% of typical forest ecosystems and national key wildlife are effectively protected and nature reserve area accounts for 16% of the total territory; and 22 million hectares of desertified lands are under control.
- By 2010, the vulnerability of water resources to climate change would be reduced by effective measures, such as rational exploitation and optimized allocation of water resources, building-up of new mechanism for infrastructure construction and popularization of water-saving. At that time, the anti-flood

engineering systems in large rivers and the high standard for drought relief in farmland will be completed.

— By 2010, the construction and expansion of mangroves will be realized, the capability to resist marine disasters will be raised remarkably, and the social influence and economic losses caused by sea level rise will be reduced in maximum through scientific monitoring of sea level change and regulation of the ecosystem of marine and coastal zone areas and through taking the measures of rationally exploiting the coastline and coastal wetland and construction of coastal shelterbelt system.

3.3.3 To enhance R&D

— China will work hard to keep up with international advanced research on climate change in some fields by 2010, so as to provide an effective and scientific basis for the development of national strategy and policy on climate change, and scientific guidance for participation in international cooperation on climate change. Measures in this regard include strengthening basic research on climate change, further developing and improving research and analytical methodology, intensifying the training and capacity building for professionals and decision-makers on climate change.

— In order to build up a strong scientific support to address climate change, China will work hard to build up its independent innovation capacity, to promote international cooperation and technology transfer, to achieve breakthrough in R&D on energy development, energy conservation and clean energy technology, and to significantly enhance the adaptation capacity of agriculture and forestry by 2010.

3.3.4 To raise public awareness and improve management

— By means of modern information dissemination technologies, to strengthen communication, education and training to raise public awareness and participation in climate change. China will work hard to transfer the knowledge of climate change to all residential communities by 2010, to raise the whole society's awareness, and to create a friendly social environment to address climate change.

— To further improve the inter-ministerial decision-making and coordination

mechanism on climate change, and to establish an action mechanism for response to climate change involving a wide range of enterprise and public participation. By 2010, China will establish a suitable and high-efficient institutional and management framework to address climate change in the future.

Part 4 China's Policies and Measures to Address Climate Change

In accordance with the requirement of carrying out the Scientific Approach of Development, China will combine its efforts to address climate change with the implementation of sustainable development strategy, the acceleration of building-up a resource-conserving and environmentally-friendly society, and an innovative country, which will be integrated into the overall national economic and social development plan and regional plan; and China will mitigate greenhouse gas emissions and in the meantime improve its capacity to adapt to climate change. China will make its efforts to realize the objectives and tasks presented in this program through adopting a series of institutional, legal, economic and technological instruments in order to strengthen energy conservation, optimize energy mix, improve ecological environment, enhance adaptation capacity, intensify research and development and improve research capacity, raise public awareness and improve mechanisms for climate change administration.

4.1 Key Areas for GHG Mitigation

4.1.1 Energy production and transformation

(1) Formulate and implement relevant laws and regulations

Vigorously strengthen energy legislation to establish and improve energy legal system, promote the implementation of China's national energy development strategy, establish the legal status of medium and long term energy program, promote the optimization of energy mix, mitigate GHG emissions from energy production and transformation. Major policies and measures are as the following:

- Expedite the constitution and amendment of laws and regulations that are favorable to GHG mitigation. According to the requirement of China's social and economic sustainable development on establishing a stable, economic, clean and secure system for energy supply and service, constitute and promulgate national *Energy Law of the People's Republic of China* as early as possible, amend Law on

the *Coal Industry and Electric Power of the People's Republic of China*, and further intensify preferential policies to develop and utilize clean and low carbon energy.

— Strengthen research and formulate energy strategy program. Through preparing national medium- and long-term energy strategies, preparing or improving national energy program and special programs for coal, electricity, oil and natural gas, nuclear energy, renewable energy and oil repertory, China's capability in sustainable energy supply and clean development of energy shall be improved.

— Implement the *Renewable Energy Law of the People's Republic of China* in a comprehensive manner. Develop supportive regulations and policies, prepare national and local programs for renewable energy development, identify development objectives and integrate renewable energy development into assessment indicator systems for the construction of resource-conservative and environmentally-friendly society. Through legislation and other approaches, domestic and international economic entities will be guided and encouraged to participate in renewable energy development and utilization, and clean energy development will be pursued.

(2) Strengthen institutional innovation and mechanism construction

— Accelerate China's institutional reform in energy sector. Pushing the progress on reform of energy management institution, further optimize energy mix by market mechanism and government promotion, actively and carefully promote energy price reform and gradually formulate pricing mechanism that can reflect resource scarcity, market demand and supply and cost for pollution control, establish pricing system that helps to realize energy mix adjustment and sustainable development; deepen institutional reform of foreign trade in controlling export of energy-intensive, pollution-intensive and resource-intensive products, so as to formulate an import and export structure favorable to promote a cleaner and optimal energy mix.

— Further promote mechanism construction for renewable energy development. Based on the principle of integrating government guidance, policy support and

market force, stable mechanism for investment will be established through government investment, government concession and other measures. A sustainable and stably expanding market for renewable energy will be fostered, market environment for renewable energy will be improved and obligation of national electricity grids and petroleum sales enterprises under the renewable energy law to purchase renewable energy products will be implemented.

(3) Intensify relevant policies and measures in energy industry

— Properly develop hydropower on the precondition of protecting the ecosystem. Hydropower development should be regarded as an important countermeasure to promote a cleaner and less carbon intensive energy mix in China. On the precondition of environmental protection and proper migrants relocation, sufficiently develop and utilize the abundant hydropower resources, expedite the development of hydropower, with an emphasis on the development in western regions and the development of small-scale hydropower. Through the countermeasures mentioned above, it is expected that the GHG emissions can be reduced by about 500 Mt CO₂ by 2010.

— Actively promote the development of nuclear power. Nuclear power should be regarded as an important component of national energy strategy, hence the proportion of nuclear power in China's national primary energy supply will increase gradually, and construction of nuclear power stations in the coastal regions with faster economic development and heavy electricity load should be expedited; unify technology approach and adopt advanced technology to realize independent and domestic construction of large-scale nuclear power stations and improve the overall capacity of nuclear power industry by the principle of self-dependence, international cooperation, technology transfer and promoting independence. Through the countermeasures mentioned above, it is expected that the GHG emissions can be reduced by about 50 Mt CO₂ by 2010.

— Expedite technology advancement in thermal power generation. Optimize the mix of thermal power generation through phasing out small-scale backward units, properly develop small-scale distributed natural gas or coal bed methane electric

power generation. Develop 600MW or above supercritical (ultra-supercritical) units and large combined-cycle units and other high efficient and clean power generation technologies; develop heat and power cogeneration, cogeneration of heat, power and cool, and combined heat-electricity-coal gas multiple supply; strengthen power grid construction through adopting advanced power transmission, transformation and distribution technologies, and decreasing losses of power transmission, transformation and distribution. Through the countermeasures mentioned above, it is expected that the GHG emissions can be reduced by about 110 Mt CO₂ by 2010.

— Vigorously develop coal-bed methane (CBM) and coal-mine methane (CMM) industry. Coal-bed methane exploration, development and utilization should be adopted as important instruments to expedite the structural optimization of coal industry, reduce accidents of coal production, improve rates of resources utilization and prevent environmental pollution. Minimize energy wastes and methane emissions in coal mining processes. Major incentive policies include: surface extraction and exploring projects are exempted or partly exempted from utilization fees for prospecting and mining rights; adopt preferential tax policies for coal-bed methane exploration and utilization projects and other comprehensive CBM and CMM utilization projects; apply preferential policies as defined in *Renewable Energy Law of the People's Republic of China* to CBM and CMM power generation; CBM and CMM price for industrial and residential use should not be lower than the price of natural gas with the same calorific value; encourage the cooperation of CDM (clean development mechanism) projects. Through the abovementioned countermeasures, it is expected that the GHG emissions can be reduced by about 200 Mt CO₂e by 2010.

— Promote the development of bio-energy. Vigorously promote biomass energy development and utilization by attaching significant importance to bio-energy based power generation, marsh gas, biomass briquette and biomass liquid fuel. Construct or reconstruct straw-fired power plants and small to medium scale boilers in major crop production areas where biomass energy resources are abundant. Construct garbage-burning power plants in the areas with relatively

more developed economy but scarce land resources. Construct marsh gas projects and appropriately install power generation facilities at large-scale livestock or bird farms and sewage treatment plants for industrial wastewater and urban residential wastewater. Vigorously promote marsh gas and gasification technologies for agricultural and forestry wastes, aiming at increasing the percentage of gas in rural residential energy consumption and using biomass gasification technology as an important instrument to abate environmental problems caused by rural residential and industrial wastes. Make efforts to develop biomass solid briquette and liquid fuels, and put forward economic policies and preferential measures in favor of bio-ethanol and other biomass fuels to promote biomass energy development and utilization to a considerable level. Through the abovementioned countermeasures, it is expected that the GHG emissions can be reduced by about 30 Mt CO₂e by 2010.

— Actively support the development and utilization of wind, solar, geothermal and tidal energy. Through the development and construction of large-scale wind power farms, promote technology improvement and industry development for wind power, and realize domestic manufacturing of wind power equipments to reduce costs and improve the market competitiveness of wind power as early as possible; actively develop solar power and solar heating, including popularizing family-use photovoltaic power system or small-scale photovoltaic power plants in remote areas; disseminating integrated solar energy building, solar energy based hot water supply, space heating and cooling pilot projects in urban areas and popularizing household solar water heater, solar greenhouse and solar stove in rural areas; actively promote the development and utilization of geothermal energy and tidal energy through popularizing geothermal space heating, hot water supply and geothermal heat pump technologies that meet the requirements of environmental and water resource protection, and develop tidal power generation technology in Zhejiang, Fujian, Guangdong and other provinces while conducting research on power generation based on wave energy and other oceanic energy. Through the abovementioned countermeasures, it is expected that the GHG emissions can be reduced by about 60 Mt CO₂ by 2010.

(4) Strengthen the development and dissemination of advanced and suitable technologies

Vigorously improve technology self-innovation capacity for the development and utilization of conventional energy, new energy and renewable energy. Promote the sustainable development of energy industries and improve the capacity to address climate change.

— Technologies for the clean and efficient development and utilization of coal. Emphasize the research and development of highly-efficient coal mining technologies and supporting equipments, efficient power generation technologies and equipments such as heavy-duty gas turbines, integrated gasification combined cycle (IGCC), high-pressure, high-temperature ultra supercritical unit, and large-scale supercritical circulation fluid bed boilers; vigorously develop coal liquefaction, gasification and coal-chemistry and other technologies for coal conversion, coal gasification based multi-generation systems technology, and carbon dioxide capture, utilization, and storage technologies.

— Exploration, exploitation and utilization technologies of oil and gas resources. Focus on the technology development for oil and gas exploration in intricacy fault block and lithology stratum, and highly-efficient technology for the development of low-grade oil and gas resources. Improve oil recovery ratio technology, and deep oil and gas exploration and development technologies. Prioritize the research and development of deep-sea oil gas pool exploration technology and heavy oil reservoirs to enhance integrated recovery ratio technology.

— Nuclear power generation technology. Research and master fast reactor design and its core technology, including nuclear fuel and structural material related technology. Make breakthrough sodium circulation and other key technologies. Actively participate in the construction of and research on international thermonuclear fusion experiment reactor.

— Renewable energy technology. Prioritize the development of low-cost and scale exploitation and utilization technologies, including the development of large-scale wind-power generation equipments, high performance and low-cost

photovoltaic battery technology, solar thermal power generation, integrated solar energy building technology, and biomass and geothermal energy development and utilization technologies.

— Power transmission and distribution and grid safety technologies. Prioritize the research and development of large-capacity long-distance DC transmission technology and super high voltage transmission technology and equipment, grid transmission and distribution technology for intermittent power sources, quality monitoring and quality control technology for electric power, large-scale interconnected grid security technology, key technologies in West - to-East Power Transmission Project, grid management automation technology, information technology and efficient management of supply and distribution system.

4.1.2 Energy efficiency improvement and energy conservation

(1) Accelerate the formulation and implementation of related laws and regulations

— Improve exiting energy-saving regulations and standards. Amend and improve the *Energy Conservation Law of the People's Republic of China*, establish strict energy-saving management system, further clarify each entity's responsibility, intensify policy incentives, identify the legal executants, intensify efforts to discipline; constitute necessary supporting regulations such as *Electricity-saving Management Regulation*, *Petroleum-saving Management Regulation*, and *Building Energy-saving Management Regulation*; formulate and improve energy efficiency standards for main energy-consuming industrial equipments, domestic appliances, lighting appliances and motor vehicles, amend and perfect energy-saving design criterions of main energy-consuming industries, energy-saving standards for buildings, and accelerate the formulation of temperature control standards on building refrigeration and space heating.

— Strengthen supervision and monitoring on energy conservation. Improve institution of compelling phasing out of energy intensive and backward processes, technologies and equipments. Phase out backward and energy intensive productions and equipments according to the law; improve market entrance

institution of key energy-consuming products and new buildings, prohibit producing, importing and selling products that fail to meet the lowest energy efficiency standards, and forbid selling and using buildings that fail to meet the energy-saving building design standards; strengthen the supervision and monitoring of energy utilization status of key energy consumer entities; strengthen supervision of energy utilization status of energy intensive industries, government office buildings and large-scale public buildings; strengthen the inspection of the implementation of energy efficiency standards for products, building energy-saving design standards and industry design criterions.

(2) Strengthen institutional innovation and mechanism construction

- Establish target-oriented responsibility and assessment systems for energy conservation. Implement energy consumption per unit of GDP communiqué system, improve information dissemination system on energy conservation, timely publicize all kinds of energy consumption information by utilizing modern information dissemination technology, and guide local government and enterprises to strengthen energy conservation.
- Carry out comprehensive resource planning and electric power demand side management, integrate amount of energy saving as a kind of resource into overall planning so as to guide reasonable resource allocation, adopt effective measures to enhance end-use efficiency of electricity utilization, optimize electricity use pattern and save electricity.
- Actively promote the authentication of energy-saving products and implement energy-efficient labeling management system. Apply market mechanism to encourage and guide consumers to purchase energy-saving products.
- Put forward contract-based energy management to overcome market barriers in promoting new energy-saving technologies, and to promote industrialization of energy-saving practices, aiming at providing all-around services such as diagnosis, design, financing, renovation, operation and management for enterprises to implement energy-saving renovation.
- Establish for energy-saving investment assurance mechanism to promote the

development of energy-saving technological service system.

- Popularize energy-saving voluntary agreements to motivate enthusiasm from enterprises and industrial societies to save energy.

(3) Strengthen relevant policies and measures

- Vigorously adjust industrial structure and its regional distribution. Promote the development of service industry and increase its proportion in national economy. Integrate energy conservation, environmental protection and control of greenhouse gas emissions into regional economic development. According to the carrying capacity and development potential of the environment and resources, and in the light of the requirements for main function zones, determine the functions of different regions and promote diversified regional development pattern.

- Strictly implement the *Industrial Restructuring Guiding Catalog*. Control the scale of energy-intensive and pollution-intensive industries and reduce their proportion. Encourage the development of new and high-tech industries. Give priority to the development of information industry that plays a leading role in the economic growth with lower energy consumption. Develop and implement development plans and industrial policies for steel, non-ferrous metals, cement and other energy-intensive industries. Raise sectoral entrance thresholds. Develop and improve policies governing the export of domestically-scarce resources and energy-intensive products.

- Formulate preferential policies for energy-saving products. Focus on end-use equipments, including highly-efficient electric motors, fans, pumps, transformers, appliances, lighting products and energy-saving building products. Implement incentive policies for the production and utilization of energy-saving products included in the *Catalog*, and list energy-saving products in the government procurement inventory, support key energy saving projects and key energy-saving technology development and demonstration projects with investment and financial assistance or loan interest subsidies. Study and formulate economic incentive policies for the development of energy-saving and land-saving buildings and green

buildings.

— Study financial and tax policies to encourage the development of energy-saving and environmentally-friendly vehicles, and to speed up the elimination of fuel-inefficient vehicles. Implement fuel tax reform policy in an appropriate time. Formulate industrial policies to encourage the development of energy-saving and environmentally-friendly vehicles with low emissions, and develop consumer policy measures to encourage energy-saving and environmentally-friendly vehicles with small displacement, abolish various restrictions on energy-saving and environmentally-friendly vehicles with small displacement, and guide the public to embrace the idea of conservation-oriented automobile purchase and maintenance. Vigorously develop public transport system and improve the proportion of rail transport in urban areas. Study policies of encouraging the production and consumption of hybrid vehicles and electric vehicles.

(4) Strengthen the development and dissemination of energy conservation technologies in key sectors

— Iron and steel industry: coke ovens should be equipped with coke dry quenching facilities, and new constructed blast furnace should be equipped with furnace top pressure differential power generating equipment (TRT); apply advanced technologies and equipments such as beneficiated material feeding, rich oxygen coal spurt, molten iron pretreatment, large-scale blast furnace, converter, and super power electric arc furnace, external furnace refining, continuous casting, continuous rolling, controlled casting and controlled cooling.

— Nonferrous metal industry: mines should be required to mainly use large, highly-efficient and energy saving equipment. In copper smelting process, adopt advanced oxygen-enriched flash and oxygen-enriched bath smelting processes. In electrolytic aluminum smelting process, adopt large pre-baking electrolytic cell; In lead smelting process, adopt the new lead smelting process by oxygen bottom blowing and other technologies of direct lead smelting by oxygen; In zinc smelting process, develop new wet process.

— Oil and petrochemical industry: oil and natural gas exploitation should apply the systematic optimization technology for oil exploitation, energy saving supplementary technology for thick oil hot exploitation, optimized operation technology for water filling system, comprehensive energy saving technology for oil and gas enclosed collection and transmission, and recovery and reutilization technology for discharged natural gas. In the process of ethylene production, the raw material structure should be optimized and ethylene cracking furnace with advanced technology shall be retrofitted. Large-scale synthetic ammonia plants should deploy advanced energy saving technical processes, new catalyst and highly-efficient energy saving equipment, promote technology of recovering residual heat from flue gas of one-section furnace for gas-based synthetic ammonia, accelerate retrofit of replacing fuel oil with clean coal or natural gas for oil-based synthetic ammonia. Apply energy saving equipment and variable pressure absorption recovery technology to medium- and small-scale synthetic ammonia, employ the coal water slurry or advanced pulverized coal gasification technology to replace traditional fixed bed coal gasification technology. In the production of caustic soda, graphite anode diaphragm process should be gradually eliminated, and the proportion of ion membrane method should be increased.

— Building material industry: in cement industry, new dry process kiln with precalcinator technology should be developed; promote energy efficient grinding equipment and power generating technology by using waste heat recovered from cement kiln; improve the performance of existing large-and medium-size rotary kiln, mills and drying machines for the purpose of energy conservation; gradually phase out mechanized vertical kiln, wet process kiln and long dry process kiln and other backward cement production technologies. In glass industry, advanced float process shall be developed; backward Fourcault and Colburn processes shall be eliminated; and technologies of overall heat insulation for furnace and kiln and enriched oxygen and full oxygen combustion shall be promoted. In architectural ceramics industry, backward kilns of down draft kiln should be discarded, slab kiln, multi-hole kiln, and roller kiln technology should be promoted. In sanitary ceramics,

fuel composition shall be changed and the clean gas fuel shall be used so as to apply sagger-free burning technology. Further promotion activities should include application of new wall materials and thermal insulation and high-quality, environmentally-friendly and efficient sound insulation material, waterproof material and sealing material; increase the proportion of high performance concrete application and extend the life span of buildings.

— Transportation: speed up the elimination of old energy intensive automobiles and development of diesel automobile, heavy-duty and special vehicle. Popularize Vans, special transport vehicles such as container vehicle; promote the implementation of national standard on vehicle fuel consumption limit to constrain the development of low fuel economy vehicles. Accelerate the development of electrified railway; develop AC-DC-AC high efficient electric locomotive; promote pulling power factor compensation technology for electrified railways and other power saving measures, so as to improve electric power utilization efficiency; develop the technology of locomotive supplying power to passenger carriage; promote application of passenger carriage power supply and gradually reduce and eliminate diesel-fueled locomotive; adopt energy saving airplane, improve carriage rate, attendance rate and transportation turnover capability, improve fuel oil efficiency and reduce oil consumption. Accelerate the elimination of old ships by formulating technical standard on ships and introduce new types of ships and advanced power system.

— Agricultural machinery: phase out backward agricultural machineries; apply advanced energy-saving diesel engine technology so as to reduce diesel consumption by engines; promote advanced mechanized farming technology such as non-tillage and combination processes; adopt more electric motors in fixed production sites; apply renewable energy such as hydro, wind and solar energy to agricultural machineries. Improve the utilization efficiency and reduce and fishery oil consumption by phasing out backward fishing ships.

— Building: give priority to the development of green building design technology, building energy saving technology and equipment, integrated renewable energy device in buildings, fine construction and environmental friendly technology and

equipment for construction, energy saving and environmentally-friendly building materials, energy saving technical standards, energy saving improvement technologies and standards for existing buildings.

— Commercial and residential energy conservation: promote household and office electric appliances such as highly-efficient energy saving refrigerator, air conditioner, television, and washing machine; reduce energy consumption of stand-by appliance; implement energy efficiency standard and labeling; and standardize market of energy saving products. Promote highly-efficient fluorescent lamp products such as phosphorus energy saving lamp, high intensity gas discharge lamp and electronic ballast, decrease the use of incandescent lamp, gradually eliminate high pressure mercury vapor lamp, implement energy efficiency standard on lighting product, increase the proportion of high-efficiency energy saving fluorescent lamp.

(5) Further carry out the 10 key energy conservation priority programmes in the Medium-and-Long-Term Energy Conservation Plan

Actively promote the implementation of the 10 key energy conservation programmes, namely the Upgrading of Low-efficiency Coal-fired Industrial Boiler (Kiln), District Heat and Power Cogeneration, Recovery of Residual Heat and Pressure, Oil Saving and Substitution, Energy Conservation of Motor System, Optimization of Energy System, Energy Conservation in Buildings, Green Lighting, Energy Conservation in Government Agencies, Building the Energy Conservation Monitoring, and Technological Support System. Ensure the progresses and effects of these key programmes to realize stable capacity for energy conservation as early as possible. Through the implementation of these ten programmes, it is estimated that 240 Mtce can be conserved during the 11th five-year plan period (2005-2010), equivalent to 550 Mt CO₂ reductions.

4.1.3 Industrial processes

— To develop circular economy vigorously and follow the pattern of new industrialization. According to the principle of “reduction, reuse and recycle of waste” and the requirement of new industrialization, China will take various

effective actions and measures to further promote the development of clean production and circular economy in industrial sector, to accelerate the building-up of a resource-conserving and environmentally-friendly society. In order to reduce greenhouse gas emissions from the production and use of industrial products, China will work hard to save the use of cement, lime, iron and steel, calcium carbide and other raw materials to the uttermost while satisfying the necessary demand of these industrial products for the legitimate social and economic development.

— To encourage the saving of iron and steel, and restrict the export of steel products. For this purpose, China will further carry out the *Development Policy for Iron and Steel Industry*, encourage substitution of renewable materials for iron and steel and recycle of waste steel to reduce steel use; encourage the application of the short-flow process technique using waste steel as material for steel production; organize the revision and improvement of the *Standard for Constructional Steel Design and Utilization* to reduce steel service factor on the precondition that safety is ensured; encourage the research, development, and deployment of high-performance, low-cost and low-consumption new materials as substitute for steel; encourage iron and steel plants to produce high-strength steel and corrosion-resistant steel to enhance steel's strength and service life; restrict the export of ferroalloy, pig iron, waste steel, steel billet and ingot, rolled steel and other steel products; abolish the export tax rebate policy or at least lower the rebate rate for export of steel products.

— To further promote the production of bulk cement and slag cement. China will follow up the guideline of “discourage the production of bagging cement and encourage the development of bulk cement”; further strengthen the policy of collecting special fund for the development of bulk cement on selling and using of bagging cement from the producers and users; continue to implement tax concession and other preferential policies for slag cement and its products; further promote the process technique of premixed concrete and ready-mixed mortar, so as to maintain the fast growth momentum of bulk cement.

— To vigorously launch the campaign of building materials conservation.

Measures in this regard include: further promoting the construction of, namely, four-saving buildings characterized by energy conservation, water saving, material saving and land saving; put forward the new building system; promoting the application of high-performance, low-consumption, renewable and recoverable building materials; promoting the application of high-strength and high-performance concrete; promoting the recovery and utilization of construction rubbish and waste; making full use of straw to produce plant fiber board; fulfilling the regulations on design, construction, material use accounting and other requirements; revising the relevant standard for material consumption of engineering project to guide enterprises to put forward material-saving technology progress.

– To strengthen the emission control of nitrous oxide and other kinds of greenhouse gases. Measures in this regard include: Further promoting the development of CDM projects and other kinds of international cooperation in the sector of adipic acid production; actively seeking necessary financial resources and technical assistance for the emission control of nitrous oxide, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆); renovating the facilities of off-gas recovery in nitrous oxide production plants to update the emission control techniques; taking various measures to reduce the emissions of these gases.

4.1.4 Agriculture

– Strengthen the establishment and implementation of laws and regulations. Gradually establishing and improving the system of laws and regulations based on *Law of Agriculture of the People's Republic of China*, *Law of Grassland of the People's Republic of China* and *Law on Land Management of the People's Republic of China*, together with administrative rules and regulations, that can lead to improved agricultural production and increased agricultural ecosystem carbon storage; developing farmland and pasture protection construction plans, strictly controlling land reclamation in areas with fragile ecosystems, and forbidding any destruction of pasture or waste of land.

- Intensify the construction of ecological agriculture in highly-intensive production areas. Implementing projects on prevention and control of agriculture non-point source pollution, extending technologies concerning reasonable use of chemical fertilizers and pesticides to improve the farmland quality; implementing a new round of fertile soil programme, scientifically applying chemical fertilizers and guiding the increased use of organic fertilizer to promote soil fertility and reduce emission of nitrous oxide from the croplands.
- Further enhance technology development and transfer. Selecting and breeding rice varieties with high yields and low (GHG) emission rates, promoting semi-dry rice cultivation technology, scientific irrigation, research and development of microorganism technology, reducing methane emission from rice paddies; research and development of technologies to breed fine ruminant varieties, improving management practices for intensive livestock operations, and reducing methane emission from livestock; further promoting straw treatment technology, and enhancing/refining the technologies for household-type biogas digesters; developing and transfer of key technologies to produce environmentally sound fertilizers and to reduce nitrous oxide emissions from croplands; vigorously promote the return of straws to croplands and non-tillage technologies to increase carbon sink in croplands.

4.1.5 Forestry

- Improve formulation and implementation of laws and regulations: to accelerate the formulation, amendment, and streamline of forestry related laws and regulations, including development of regulations on conservation of natural forests, regulations on transfer rights of forests, forest products, and forest land use, etc.; and to enhance the implementation of laws and regulations, by means of improving the system, strengthening inspection, and expanding social supervision of law enforcement.
- Reform and optimize current industrial policies: to optimize target-oriented management responsibility system for afforestation by governments at all levels and forestry sectors, to probe ways of national voluntary tree-planting under

market economy, and to establish related policies to promote voluntary planting and governmental afforestation, so as to increase forest resources and carbon sequestration.

— Strengthen key forestry ecological programs: to continuously implement key forestry programs, such as the Natural Forest Protection Program (NFPP), the Conversion of Cropland to Forest Program (CCFP), the Sandification Control Program for Areas in the Vicinity of Beijing & Tianjin, Key Shelterbelt Development Program in Such Regions as the Three North & the Middle and Lower Reaches of the Yangtze River, the Wildlife Conservation & Nature Reserve Development Program, so as to protect existing forest carbon stock and enhance carbon sequestration.

4.1.6 Municipal wastes

— Strengthen the implementation of relevant laws and regulations, including, inter alia: *Law on Prevention of Environmental Pollution Caused by Solid Waste of the People's Republic of China*, *Regulations on the Management of City Appearance and Sanitation*, and *Measures for the Management of Municipal Domestic Waste*. The management focus will be shifted from the current end management to whole-process management, i.e. reduction of wastes from the source, recovery and utilization, and non-hazardous disposal. The processes of waste production and disposal will be normalized to the greatest possible extent, and the disposal of municipal domestic waste will be incorporated into the overall planning of the city.

— Further improving relevant sectoral standard. According to the evolving requirement, compulsory standards for wastes classification and recovery shall be formulated, so as to improve the comprehensive utilization of wastes resource and to reduce the amount of wastes from the source. The currently valid sectoral standards such as *Standards for the Classification and Assessment of Municipal Domestic Wastes*, *Technical Norms on Sanitary Landfill of Domestic Wastes*, *Standards for the Assessment of Non-hazardous Landfill of Domestic Wastes*, will be implemented more strictly and further revised, so as to improve the recovery

and utilization of combustible gas from the landfills and to reduce the emissions of methane from landfills.

— Reinforcing technological development and deployment. Great efforts will be made on the development and dissemination of advanced waste incineration technology, on the localization of relevant technologies, in order to decrease the cost and promote the industrialization of waste incineration technology. Research will be carried out on landfill gas recovery and utilization technologies and composting technologies suitable for China's circumstances and of suitable scale, and thus provide small and medium cities as well as rural areas with waste disposal technology which is of urgent need. Greater support will be provided to the research, development, demonstration and dissemination of relevant technologies, and the development of waste disposal and comprehensive utilization technologies will be accelerated.

— Making full use of the guiding function of the industrial policy. Guided by the industrial policy, charging system for disposal of domestic waste will be established, and measures such as charging fee for sanitary service, system of contracted economic responsibilities and enterprise management of public entities, will be implemented. These will promote the reform of the waste disposal system, improve the current dispersed wastes collection and utilization approaches, and thus promotes the industrial development of waste disposal.

— Formulating incentive policy for the recovery and utilization of landfill gas. Enterprises will be encouraged to construct and operate landfill gas collection and utilization facilities. The fee level for waste disposal will be increased, landfill gas power and waste incineration power projects will enjoy preferential feed-in tariff, and landfill gas recovery and utilization projects will enjoy preferential value-added tax and enterprise income tax relief and reduction within a certain period of time.

4.2 Key Areas for Adaptation to Climate Change

4.2.1 Agriculture

— Continue to improve agricultural infrastructures. Accelerate the construction of

supporting facilities of large-scale, water-saving irrigation areas; maintain/promote field engineering quality; upgrade aging electromechanical equipment; and improve irrigation and drainage systems. Continue to expand demonstration on water-saving irrigation, build pilot projects in the main grain production area, develop dryland water-saving agriculture and build demonstration projects on dryland farming in arid areas. Conduct small-scale hydraulic engineering focused on field irrigation and drainage projects, small-scale irrigation areas and watershed projects in the non-irrigation area for fighting drought. Strengthen the control and restoration of middle-and-low yield fields subject to salinization and alkalinization in the main grain production areas. Accelerate the construction of water collection and utilization engineering in hill mountain areas and other arid areas.

— Promote adjustment of agricultural structure and cropping systems. Optimize regional arrangement of agriculture. Promote the centralization of preponderant agro-products to preponderant production areas in order to form the industrial zones of preponderant agricultural products and to increase agricultural productivity. Extend the planting areas of economic and forage crops, and promote the shift of the structure of cropping systems from dual structure with food crop and cash crop to ternary structure with food crop, cash crop and forage crop. Adjust cropping systems, develop multiple cropping and raise multiple cropping indexes.

— Breed stress-resistant varieties. Select and cultivate new well-bred animal and crop varieties with high yield potential and quality, superior integrative stress resistance and wide adaptability. Improve crop and variety arrangement. Select and cultivate stress-resistant varieties with specific abilities of resistance to drought, waterlogging, high temperature, diseases and pests.

— Prevent aggravation of grassland desertification. Prevent further development of desertification by building artificial grassland, controlling grazing intensity, recovering vegetation, and increasing vegetation coverage of grassland. Strengthen the development of animal husbandry in the farm belt to improve the productivity of animal husbandry.

— Strengthen research and development of new technologies. Develop new technologies and strive to make greater progress in the areas of photosynthesis, biological nitrogen fixation, bio-technology, prevention of diseases and pests, stress resistance, and precision agriculture. Continue to implement “seed project” and “well-bred species project for animal and fishery”. Promote the construction of well-bred species bases for main crops, livestock and poultry. Enhance agricultural technology extension, and increase agriculture’s ability to adopt new technologies.

4.2.2 Forests and other natural ecosystems

— Formulate and implement laws and regulations relevant to climate change adaptation. Accelerate the amendment of *Forest Law of the People’s Republic of China* and *Law of the People’s Republic of China on the Protection of Wildlife*. Draft *Law of Nature Reserve and Regulations on Wetland Protection of the People’s Republic of China*, etc. Add and/or strengthen articles relevant to climate change adaptation to provide a legal guarantee for improving the capacity of forests and other natural ecosystems to adapt to climate change.

— Strengthen the effective protection of existing forest resources and other natural ecosystems. Strictly protect natural forests in logging ban areas to convert natural forest ecosystems from degradation to progressive succession. Conduct wetland conservation by effectively reducing human disturbance and damage to stop the declining trend of wetland area. Expand total area and improve the quality of nature reserves and develop bio-corridors among reserves. Strengthen forest fire control by establishing perfect systems for forest fire forecasting, monitoring, suppressing, saving, fuelbreaking and hazard assessing. Effectively integrate existing forestry monitoring systems into a comprehensive one for forest resources and other ecosystems. Enhance forest insect and disease control by improving systems for forecasting, early-warning, monitoring, quarantining of forest insect and disease, enhancing comprehensive control, and enlarging biological control.

— Strengthen technology development and extension. Research and develop technologies for forest fire control and forest insect and disease control. Select

and breed tree species with high cold-resistance, drought-resistance and pest and disease-resistance to enhance the adaptation capacities of forest vegetations to climate change. Develop technologies for biodiversity conservation and restoration, particularly those technologies related to management of forest and wildlife nature reserves, wetland conservation and restoration, and conservation of endangered wild animals and plants to alleviate the impact of climate change on biodiversity. Promote technologies for monitoring forest resources and forest ecosystems, including those for forest environments, desertification, wild animals and plants, wetlands, forest fire, forest pest and disease. Improve monitoring network and management system to enhance forecasting, early-warning, and emergency responding capacities.

4.2.3 Water resources

— Enhance water resources management. Adopting the principle of harmony between human and nature in water resource management, to take more effort to convert farmland back into lake or river course, remove polder dikes for flood way, dredge river channel and lake, and rehabilitate and protect rivers with serious ecological problems while strengthening dike construction and key water control projects. Enhance unified management of water resources through basin-wide integration of water resource planning, allocation, and management. Pay more attention to saving, protection, and optimizing the allocation of water resources. Change people's traditional way of considering water resource as inexhaustible. Convert water resource allocation approach from demand-based supply to supply-based demand. Establish national initial water right allocation and water right transfer systems. Develop investment and financing system and management system for key water conservancy projects consistent with the socialist market economy.

— Strengthen infrastructure planning and construction. Speed up building of the Project of South-to-North Water Diversion, and gradually generate the new pattern of optimized water resources allocation by three water diversion lines linking the Yangtze River, Yellow River, Huaihe River, and Haihe River, characterized by “four horizontal and three vertical lines”. Enhance the construction and improvement of

key water control projects (reservoirs, etc) and infrastructures in irrigation areas. Continue the construction of regional water storage and water diversion projects.

— Promote the development and extension of technologies for water allocation, water-saving, and sea water utilization. Focus the researches on the mechanisms of water exchange among atmosphere water, surface water, soil water, and groundwater, and technologies for optimizing water resource configuration, wastewater and rainfall utilization, and artificial rainfall enhancement. Exploit technologies for industrial water recycling, water saving irrigation, dryland farming and biological water saving, especially technologies and equipments for precise irrigation and intelligent management for water use in agriculture. Develop and extend technologies of domestic water saving and sea water utilization.

4.2.4 Coastal zones and coastal regions

— Establish and improve relevant laws and regulations. Formulate regional management regulations and detailed rules in accordance with *Marine Environment Protection Law of the People's Republic of China*, *Law of the People's Republic of China on Administration of Sea Areas*, etc., and characteristics of the specific localities in the coastal areas. Establish integrated coastal zone management (ICZM) system, the comprehensive decision-making mechanism and effective coordination mechanism. Handle timely various issues occurred in the development and protection of coastal zones. Establish demonstration sites of integrated management.

— Promote technology development and extension. Strengthen research and development of technologies for protection and restoration of the marine ecosystems, with emphasis on cultivation, transplanting, and recovery of coastal mangroves, protection and restoration of coral reefs and coastal wetlands to reduce the vulnerability of ecosystems in coastal zones. Accelerate the construction of the designated marine natural reserves, such as coral reef reserves, mangrove reserves, etc. Improve capability of protection of marine biodiversity.

— Improve the capability in marine environmental monitoring and early-warning.

Set up more observation sites and networks in coastal areas and on islands. Construct high-tech observation systems. Improve the capability of aerial remote sensing and telemetering of marine environments, especially capability of monitoring sea level change. Build early-warning and response system for tidal disasters in coastal areas. Promote comprehensive supporting capability of early-warning, strengthen service capability of early-warning systems and capability of production and distribution of early-warning products to increase the capability for early-warning against marine disasters.

— Strength adaptation strategies to address sea level rise. Adopt measures of combining slope protection with shore protection, combining engineering measures with biological measures. Raise design standards of sea dike height, heighten and consolidate existing sea dike engineering works to enhance the capacity of dealing with sea level rise. Prevent over exploitation of groundwater and land subsidence in coastal areas, by taking measures of artificial groundwater recharge in the areas where groundwater funnel and land subsidence occurred. Take countermeasures such as using fresh water from rivers or reservoirs to dilute and restrain brackish water against sea water intrusion in the estuaries. Raise protection standard for coastal cities and major projects, raise standard for designed height of port docks, and adjust outlet depth. Make efforts to construct coastal shelterbelt systems with multi-species, multi-layer, and multi-function of forests.

4.3 Climate Change Science and Technology

— To strengthen the macro-management and coordination for climate change related scientific research. Measures in this regard include: further understanding the significance of climate change related scientific and technological research; complying with the guiding principle of “making independent innovation, achieving breakthrough in key areas, supporting the development, and guiding the future trend” for scientific research; meeting the requirements of *Framework of National Program for Medium-to-Long-Term Scientific and Technological Development* on climate change related scientific research; strengthening the macro management

and policy guidance for scientific and technological research on climate change; refining the leadership and coordination mechanism for scientific and technological research on climate change; improving the regional and sectoral allocation of climate change related scientific research; further reinforcing the support to climate change related scientific research; speeding up the integration of climate change science and technology resources; encouraging and supporting innovation of climate change science and technology; and bringing science and technology into full play as the basic supporting force in response to climate change.

— To promote scientific research and technological development in key areas of climate change. Measures in this regard include: strengthening the research on scientific facts and uncertainty, impacts of climate change on social economy, analysis of the effectiveness of socioeconomic benefits and costs in response to climate change, technological options in response to climate change and effectiveness assessment; strengthening observation on climate change, R&D on global climate change monitoring technology, technology for reduction of greenhouse gas emissions and adaptation technology to enhance China's capacity in response to climate change and implementing the UNFCCC; paying special attention to the research and development of large-scale and precise climate change monitoring technology, energy efficiency and clean energy technology, emission control and utilization technology for carbon dioxide, methane and other greenhouse gas emissions in key sectors, biological carbon-capture technology, and carbon sequestration technology.

— To strengthen the construction of talents in the area of climate change science and technology. Measures in this regard include: strengthening personnel training; establishing effective incentive and competition mechanism and a favorable academic environment for talent development; paying special attention to foster academic leaders and eminent candidates with international vision and the ability to lead climate change studies, and encouraging young talents to distinguish themselves; strengthening the disciplinary development of climate change science; speeding up the construction and integration of talent teams; establishing the

“opening, flowing, competitive, cooperative” operation mechanism for climate change research institutes; making full use of various channels and approaches to enhance the research ability and independent-innovation capacity of China’s scientists and research institutions; building up a climate change science and technology management team and R&D team in the context of China’s national circumstances; encouraging and recommending China’s scientists to participate in international R&D programs on global climate change and get positions in international research institutions.

— To increase the financial support to climate change related scientific and technological research. Measures in this regard include: establishing relatively stable governmental-funded channels as the main financing sources to enlarge the official financial support to climate change related scientific and technological research; taking measures to ensure the full allocation and efficient utilization of governmental investment; raising fund through various channels and by various means from all circles of the society to support climate change scientific and technological research; introducing venture capital investment in the area of climate change study; guiding business and enterprises to increase their investment in R&D on climate change science and technology and giving them the role as the major body of technology innovation; utilizing the bilateral and multilateral funds from foreign governments and international organizations to assist China’s R&D on climate change science and technology.

4.4 Public Awareness on Climate Change

— Fully utilizing the promotion function of the government. All levels of government should regard raising public awareness as an important work to address climate change and carry out it with care. For this purpose, China will take various measures to promote the climate change awareness of all level of government officials and decision-makers of enterprises and institutions, to build up a high-quality leadership team with strong awareness of global climate change step by step. Furthermore, all walks of life of the society will be fully employed to disseminate China’s efforts and policies for response to climate change and to

promote public awareness of climate change.

— Reinforcing the publicity, education and training on climate change. Measures in this regard include: making full use of mass media such as books, newspapers, periodicals, audio and video products to disseminate knowledge of climate change to stakeholders in all walks of life; advocating sustainable life style including electricity-saving, water-saving, garbage classification, reduction, recycling and reuse; incorporating climate change publicity and education into the framework of basic education, adult education and higher education as an important component of China's overall quality education; holding various thematic training seminars targeting at different audiences and organizing different workshops on both popular and professional climate change science; taking full advantage of information technology to enrich the contents and functions of the government's climate change information websites and building them up into real, quick-response and effective platforms for information dissemination and communication.

— Encouraging public participation. Measures in this regard include: Incentive mechanism should be established to encourage the public and enterprise participation in the climate change issue and public supervision will be fully utilized; improving information publicity channels and regulations on climate change issues; widening the channels for public participation and supervision; giving full play to the media's supervision and guidance function on public opinion; increasing the transparency of decision-making on climate change issues; promoting the science and democracy in the area of climate change administration; giving full play to the initiative of social communities and non-governmental organizations.

— Reinforcing international cooperation and communication. Measures in this regard include: strengthening international cooperation on promoting public awareness on climate change issues; utilizing the experience of international good practice on climate change publicity and education; actively carrying out information exchange with foreign countries and exchanging publications, movies, televisions, audio and video tapes and other literature works on global climate change; building up open database on climate change and providing inquiry and

information retrieval services for domestic agencies, research institutions, and schools.

4.5 Institutions and Mechanisms

— Strengthening the leadership on addressing global climate change. The response to climate change correlates with economic, social, domestic and foreign issues. Therefore, the State Council decides to establish the National Leading Group to Address Climate Change headed by Premier Wen Jiabao, with Vice Premier Zeng Peiyan and State Councilor Tang Jiaxuan serving as the Deputy Directors of the Group. The Leading Group will be responsible for deliberating and determining key national strategies, guidelines and measures on climate change, as well as coordinating and resolving key issues related to climate change. The Office of the Leading Group, whose capacity shall be strengthened, is established within the National Development and Reform Commission. Relevant ministries and departments of the State Council shall seriously fulfill their responsibilities, and strengthen coordination and cooperation, so as to achieve synergies to address climate change. Local governments at different levels shall enhance the organization and leadership on local responses to climate change, and formulate and implement local climate change programmes as a matter of priority.

— Establishing a regional administration system for coordinating the work in response to climate change. Measures in this regard include: establishing regional administration agencies to fulfill and implement the national program, to organize and coordinate local activities and actions in response to climate change; building up local expert group on climate change and initiating proper climate change policy and measures according to local conditions such as geographical environment, climatic conditions and economic development level; meanwhile, strengthening the coordination between national and local governments to ensure the smooth implementation of relevant policy and measures in response to climate change.

— Making effective use of the Clean Development Mechanism Fund (CDMF). According to the pertinent articles of *Measures for Operation and Management of*

Clean Development Mechanism Projects, the Government of China will levy a certain proportion of the certified emission reductions (CERs) transfer benefits from CDM projects, and the revenue collected upon CERs transfer benefits from CDM projects will be used to establish the Clean Development Mechanism Fund to support the country's activities on climate change such as climate change related science and technology research, and raising national adaptation and mitigation capacity. The establishment of the Clean Development Mechanism Fund will also play an active role in relieving the pressure of demand for fund in response to climate change, and guaranteeing the effective implementation of this national program.

Part 5 China's Position on Key Climate Change Issues and Needs for International Cooperation

Climate change, the impacts of which have been felt all over the world, was mainly caused by the massive emissions of CO₂ and other greenhouse gases originated from developed countries since industrial revolution. Broad international cooperation is necessary to address climate change. In order to effectively address climate change and implement this national programme, China is ready to strengthen international cooperation with all countries. Meanwhile, China would like to appeal to the developed countries to sincerely fulfill their commitments under the Convention to provide financial assistance and transfer technology to developing countries so as to enhance their capacity to address climate change.

5.1 China's Position on Key Climate Change Issues

5.1.1 Mitigation of greenhouse gas emissions

Mitigating greenhouse gas emissions is one of the important components in addressing climate change. According to the principle of “common but differentiated responsibilities” of the UNFCCC, the Parties included in Annex I to the Convention should take the lead in reducing greenhouse gas emissions. For developing countries with less historical emission and current low per capita emission, their priority is to achieve sustainable development. As a developing country, China will stick to its sustainable development strategy and take such measures as energy efficiency improvement, energy conservation, development of renewable energy, ecological preservation and construction, as well as large-scale tree planting and afforestation, to control its greenhouse gas emissions and make further contribution to the protection of global climate system.

5.1.2 Adaptation to climate change

Adaptation to climate change is an integral part of addressing climate change. In the past, sufficient attention was not given to adaptation, but it is now required a shift in direction. When formulating further legal documents to address climate

change in the future, the international community should give full consideration to adaptation to the climate change already under way, especially the promotion of developing countries' capacity against extreme climatic events. For this purpose, China is ready to cooperate with the international community to actively participate in activities for climate change adaptation and formulation of relevant legal documents.

5.1.3 Technology cooperation and transfer

Technology will play the central role in addressing climate change. International technology cooperation and transfer should be strengthened to share the benefit of technological development worldwide. Measures in this regard should include the following: establishing an effective technology cooperation mechanism to promote R&D, deployment and transfer of technology of addressing climate change; eliminating obstacles to technology cooperation and transfer in terms of policy, institution, procedures, financial resources and protection of intellectual property rights; initiating incentive measures for technology cooperation and transfer to ensure its occurrence in reality; establishing a special fund for international technology cooperation so that environment-and-climate-friendly technologies are accessible and affordable to developing countries.

5.1.4 Full implementation of commitments under the Convention and the Kyoto Protocol

The UNFCCC has provided the objectives, principles and commitments to address climate change, based on which the Kyoto Protocol further set up the specific greenhouse gas reduction targets for Annex I country Parties for the period from 2008 to 2012. All parties are supposed to faithfully implement their respective commitments under the Convention and the Kyoto Protocol. The developed countries should fulfill their commitments of taking the lead to reduce their greenhouse gas emissions and providing financial assistance and technology transfer to the developing countries. As a country of responsibility, China will seriously fulfill its commitments under the Convention and the Kyoto Protocol.

5.1.5 Regional cooperation on climate change

The UNFCCC and the Kyoto Protocol are the major legal frameworks for the international community to address climate change, which do not close the door to regional cooperation on climate change. Regional cooperation on climate change, in any form, should function as a helpful complement to the UNFCCC and the Kyoto Protocol rather than replacing or weakening them. The purpose of regional cooperation should be to stimulate all efforts to address climate change and to boost practical international cooperation. China will participate in regional cooperation on climate change in this way.

5.2 Needs for International Cooperation on Climate Change

5.2.1 Needs for technology transfer and cooperation

— Technology need for observation and monitoring of climate change. Technology need for this purpose mainly are atmospheric observation, marine observation, terrestrial eco-observation, satellite technology on meteorological, marine and terrestrial resources, climate system simulation and calculation technology, etc. Among these needs, technology for manufacturing of advanced observation equipments, the high-resolution and high-precision satellite technology, technology for satellite data acquirement & remote-sensing information collection & reviewing, and high-performance climate change simulation techniques are on top of the list for China to establish its own climate observation system, and are the priorities of the country's need for technology transfer and cooperation.

— Technology need for mitigation of climate change. China is at the stage of large-scale infrastructure construction, and is in urgent need of technology for reducing greenhouse gas emissions. China's technology need for mitigation of climate change mainly covers advanced energy production and utilization technology, environmental protection and resource comprehensive utilization technology, high-efficiency transportation technology, new material technology, new-style building material technology, etc. Among these needs, the high-efficiency, low-pollution coal-burning power generation technology, large hydropower generation unit technology, new generation nuclear technology,

renewable energy technology, building energy conservation technology, clean fuel vehicle technology, hybrid vehicle technology, urban rail-based traffic technology, fuel cell and hydrogen technology, oxygen-rich coal-spray blast furnace & long-life span technology, comprehensive technology for transformation and expansion of medium and small nitrogenous production facilities, new paving material technology, and new-type wall-body material technology are the priorities. Introduction and diffusion of these technologies in China will make significant difference to the country's efforts to control greenhouse gas emissions.

— Technology need for adaptation to climate change. China's technology need for adaptation to climate change mainly includes high-efficiency water-saving agro-technologies such as spray & drip irrigation, water-saving and reusing technology of industrial water, treatment technology of industrial and household wastewater, household water-saving technology, high-efficiency flood-controlling technology, agro-biological technology, agricultural breeding technology, production technology for new-type fertilizers, disease and pest control technology for cropland, forest, and grassland, cultivation technology of fast-growing high-yield forest and high-efficiency firewood forest, technology for recovery and reconstruction of wetland, mangrove and coral reef ecosystems, technology for observation and pre-warning of flood, drought, sea level rise, agricultural disasters, etc. Timely-acquisition of these technologies can greatly help China reinforce its capacity for adaptation to climate change.

5.2.2 Needs for capacity building

— Development of human resources. Capacity building needs for development of human resources mainly include personnel training, international exchange program, discipline development and professional training in the area of fundamental research on climate change, policy analysis on mitigation and adaptation, information system development and CDM project management.

— Adaptation to climate change. Capacity building need for adaptation to climate change mainly includes development of adaptation projects, case studies on extreme climatic events, improvement of climate observation systems,

enhancing the adaptation capacity of coastal areas, water resource and agriculture sectors, etc.

– Technology transfer and cooperation. Capacity building need for technology transfer and cooperation mainly include following new progress and trend of international technology development, effective identification and assessment of advanced adaptation technology, analysis on barriers to international technological transfer and cooperation, improving the ability to adapt to and assimilate transferred technologies, etc.

– Public awareness. Capacity building needs for public awareness include developing medium-and-long term program and policy to enhance public awareness of climate change, establishing professional publicity and education network and institutions in line with international standards, training people working in media and climate change education, launching public campaigns for stakeholders from different regions and groups to disseminate the knowledge of climate change, and guiding the public consumption patterns in favor of the protection of global climate system.

– Information system development. Capacity building needs on information system development include distributed databases on climate change, internet-based climate-change-information sharing platforms, application-oriented information system and information service system, public information service system and industrial information service system, international information exchange and cooperation, etc.

– National communications. Capacity building needs for national communications include the establishment of statistical system catering to the compilation of emission inventory, collection of testing and monitoring data for emission factors,, methodologies for inventory quality control, assessment of climate change impact and adaptation, projection of future emissions, and the development and management of national greenhouse gas emission database.

CHINA'S NATIONAL CLIMATE CHANGE PROGRAMME

(Key Elements)

China attaches great importance to climate change, and has taken a series of policies and measures to address climate change in the overall context of its national sustainable development strategy and outstanding achievements have been made. In accordance with the provisions of the UNFCCC and its national circumstances, China has formulated *China's National Climate Change Programme* (CNCCP), outlining the guidelines, basic principles and specific objectives in addressing climate change, as well as policies and measures to mitigate and adapt to climate change in key areas. The key elements of CNCCP are as follows:

I. CHINA AND CLIMATE CHANGE

1. Adverse impacts on China. China is the most populous country in the world, with a relatively low level of economic development, a coal-dominated energy mix, and relatively weak capability to address climate change. Climate change has caused and will continue to cause adverse impacts on China's natural ecosystem and socio-economic system.

2. Low Historical Emissions and Low *per capita* Emissions. China's *per capita* CO₂ emissions from fossil fuel combustion in 2004 are 3.65 tons, about 33% of that of OECD countries. The CO₂ emission intensity per unit GDP is generally on a declining trend, with a decrease of 49.5% in 2004 as compared to 1990, while only 16.1% for OECD countries.

3. Serious Efforts and Outstanding Achievements.

—By restructuring economy and improving energy efficiency, **1,800 Mt CO₂ emissions avoided** from 1990 to 2005;

—By developing low-carbon and renewable energy to optimize the energy mix, which increased the share of renewable energy in the total energy consumption to 7.5%, **380 Mt CO₂ emissions avoided**;

-By afforestation, forest management and deforestation avoidance, **5,110 Mt CO₂ emissions avoided** from 1980 to 2005;

-By controlling population growth, which avoided over 300 million births by 2005, **1,300 Mt CO₂ emissions avoided** in 2005 alone; and

—Laws and regulations strengthened, institutions and mechanisms improved, climate change research and capacity building enhanced, and public awareness raised.

II. PRINCIPLES, OBJECTIVES AND MEASURES

1. Six Guiding Principles

—To address climate change within the framework of sustainable development;

- To place equal emphasis on both mitigation and adaptation;
- To integrate climate change policy with other interrelated policies;
- To rely on the advancement and innovation of science and technology;
- To follow the principle of "common but differentiated responsibilities"; and
- To actively engage in wide international cooperation.

2. Overall Objective

- To make achievements in controlling greenhouse gas(GHG) emissions;
- To enhance adaptation capacity;
- To make new progress in advancing science and technology R&D;
- To remarkably raise public awareness; and
- To further strengthen institutions and mechanisms.

3. Objectives by 2010

a. Endeavours to control GHG emissions

- To reduce energy consumption per unit GDP by 20%;
- To increase the share of renewable energy to 10% in primary energy supply;
- To stabilize nitrous oxide emissions from industrial processes at 2005 level;
- To control the growth rate of methane emissions;
- To increase the forest coverage rate to 20%; and
- To increase carbon sink by 50 million tons over 2005 level.

b. Endeavours to enhance adaptation capability

- To increase improved grassland by 24 million hectares, to restore the grassland suffering from degradation, desertification and salinity by 52 million hectares, and to increase the efficient utilization coefficient of agricultural irrigation water to 0.5;
- To place 90% of typical forest ecosystems and national key wildlife under effective protection;
- To increase nature reserve area to 16% of the total territory;
- To improve 22 million hectares of desertified lands;
- To reduce the vulnerability of water resources to climate change, to complete the construction of anti-flood engineering systems in large rivers, and to enhance the capability of farmland to resist drought; and
- To recover and expand mangroves area so as to remarkably raise the capability to resist marine disasters.

c. Efforts to strengthen scientific research and technology innovation

- To reach advanced levels in research on climate change in some fields;
- To make remarkable progress in technology R&D on energy development, energy conservation and clean energy; and
- To improve adaptation technology in agriculture and forestry.

d. Efforts to raise public awareness and to enhance management

- To widely disseminate knowledge related to climate change to raise public awareness on climate protection; and
- To establish and strengthen institutions and mechanisms to address climate change.

4. Projected Results by 2010:

- By developing hydro-power, **500 Mt CO₂ emissions to be avoided**;
- By developing nuclear power, **50 Mt CO₂ emissions to be avoided**;
- By expediting technological advancement in thermal power generation, **110 Mt CO₂ emissions to be**

avoided;

—By utilizing coal mine methane, **200 Mt CO₂ emissions to be avoided;**

—By developing biomass energy, **30 Mt CO₂ emissions to be avoided;**

— By developing wind, solar and geothermal energy, **60 Mt CO₂ emissions to be avoided;** and

—By implementing 10 key energy conservation priority programmes, **550 Mt CO₂ emissions to be avoided.**

III. CHINA'S POSITION ON CLIMATE CHANGE

Climate change is mainly caused by the massive GHG emissions originated in developed countries since industrial revolution, but its adverse impacts are global. China is willing and ready to strengthen cooperation with all countries to address climate change. Developed countries should fulfill their commitments under the UNFCCC to provide financial resources and transfer technology to developing countries so as to enhance the latter's capability and capacity to address climate change.

1. Mitigation: Parties included in Annex I to the UNFCCC should take the lead in reducing GHG emissions according to the principle of "common but differentiated responsibilities". The overriding priority of developing countries is to achieve sustainable development. China will, in accordance with its sustainable development strategy, take effective measures to improve energy efficiency, promote energy conservation, develop renewable energy, strengthen ecological preservation as well as carry out tree planting and afforestation in an endeavour to control its GHG emissions and to make contribution to mitigating climate change.

2. Adaptation: Adaptation is indispensable in the fight against climate change. The international community should place more emphasis on adaptation to enhance the adaptation capability and capacity of developing countries. China will actively engage in international cooperation on adaptation.

3. Technology Cooperation and Transfer: Technology plays a central role in addressing climate change. An effective mechanism on technology cooperation and transfer should be established to promote R&D, deployment and transfer of climate-sound technologies. It is crucial to remove various obstacles to, and provide necessary incentives for technology cooperation and transfer. A fund for international technology cooperation and transfer shall be established in order to make climate-sound technologies accessible and affordable to developing countries.

4. Implementation of the Convention and Its Protocol: The UNFCCC provides the objective, principles and commitments to address climate change. The Kyoto Protocol further sets up specific GHG emissions reduction targets for Annex I Parties for the period 2008 to 2012. The developed countries should fulfill their commitments to take the lead in reducing their GHG emissions and to provide financial resources and transfer technologies to developing countries. As a responsible country, China will do its part in implementing the commitments under the UNFCCC and its Kyoto Protocol.

5. Regional Cooperation: The UNFCCC and its Kyoto Protocol is the fundamental legal framework for the international community to combat climate change. Other regional cooperation mechanisms are to complement and supplement the UNFCCC and its Kyoto Protocol, rather than to replace or weaken them. China will actively engage in regional dialogue and practical cooperation on climate change accordingly.

Climate change is a global challenge that can only be addressed effectively through a global effort.

The UN Climate Change Conference in Bali in December 2007 should decide to launch a process for achieving a comprehensive, effective and fair post 2012 agreement under the UNFCCC by 2009.

In March 2007 EU Heads of State and Government endorsed an integrated climate change and energy strategy put forward by the European Commission which outlines the EU's proposals for a global and comprehensive agreement, structured around eight building blocks, to combat climate change after 2012.

Such an agreement should be guided by a shared vision to reach the ultimate objective of the UNFCCC. In this context the European Union has proposed that global mean surface temperature increase should not exceed 2° Celsius above pre-industrial levels in order to avoid unacceptable and potentially unmanageable global impacts and risks. The European Union acknowledges though that even below a 2°C increase, impacts and risks would remain serious.

Elements of such an agreement include agreeing on deeper absolute emission reduction commitments by developed countries, facilitating further fair and effective contributions by other countries, extending the carbon market, increasing cooperation on technology research, development, diffusion, deployment and transfer, enhancing efforts to address adaptation, addressing emissions from international aviation and maritime transport, and reducing emissions from deforestation through sustainable forest management and land use practices.

The European Union is fully committed to deliver its share of the international effort with ambitious emissions reductions from its part, and by working with international partners towards a low carbon future, inter alia through expanding its strategic partnerships and bilateral activities with third countries, in particular in relation to energy efficiency and renewable energy, as well as to emerging technologies, such as carbon capture and environmentally safe sequestration and to engaging more closely with international financial institutions and the private sector.

The European Climate Change Programme identifies a set of comprehensive measures that have been put in place to deliver on its Kyoto Protocol targets. Among these measures is the European Union Emissions Trading Scheme (European Union ETS) with links to the Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation (JI). With the implementation of planned additional policies and measures and the use of the Kyoto Mechanisms, the European Union and the Member States remain on course to meet their targets by 2012.

The European Union is committed to more ambitious action in tackling climate change in the medium and longer term. In that regard, the European Union:

- called for a global emission reductions of up to 50% by 2050 compared to 1990 levels;
- reiterates that developed countries should continue to take the lead by committing to collectively reducing their emissions of greenhouse gases in the order of 30% by 2020 compared to 1990 with a view to collectively reducing their emissions by 60 to 80% by 2050 compared to 1990
- endorsed a 30% reduction in GHG emissions by 2020 compared to 1990 as its contribution to a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries to contributing adequately according to their responsibilities and respective capabilities;
- has already made a firm independent commitment to achieve at least a 20% reduction of GHG gas emissions by 2020 compared to 1990, without prejudice to the EU's position in international negotiations.

In July 2007 the European Commission adopted the green paper "Adapting to climate change in Europe: options for EU action" that sets out four lines of priority actions to be considered:

- Early action to develop adaptation strategies in areas where current knowledge is sufficient;

- Integrating global adaptation needs into the EUs external relations and building a new alliance with partners around the world;
- Filling knowledge gaps on adaptation through EU-level research and exchange of information;
- Setting up a European advisory group on adaptation to climate change to analyse coordinated strategies and actions.

The European Union welcomes this opportunity to provide additional information on its climate change strategy.

Additional and more detailed information on the strategies and commitments of the European Union and its respective Member States on climate change may be found in the attached documents and on the following sites:

European Union

http://ec.europa.eu/environment/climat/adaptation/index_en.htm

European Commission

http://ec.europa.eu/environment/climat/home_en.htm

Austria

<http://www.klimastrategie.at/article/articleview/55600/1/8790>

Belgium

www.climat.be
www.klimaat.be

Bulgaria

http://www.moew.government.bg/international/conventions/climate/climate_e.html

Cyprus

Czech Republic

<http://www.env.cz>

Denmark

<http://glwww.mst.dk/homepage/>

Estonia

<http://www.envir.ee/kliima/>

Finland

<http://www.ktm.fi/index.phtml?l=en&s=164>

France

<http://www.effet-de-serre.gouv.fr>

<http://www.ecologie.gouv.fr>

Germany

<http://www.bmu.de>

Greece

<http://www.minenv.gr/1/11/113/11301/g/1130102.html>

Hungary

www.vahava.hu

www.klima.kvvm.hu

Ireland

<http://www.environ.ie/en/Environment/Atmosphere/ClimateChange/NationalClimateChangeStrategy/PublicationsDocuments/FileDownload,1861,en.pdf>

Italy

www.minambiente.it

Latvia

http://www.vidm.gov.lv/eng/darbibas_veidi/global_climate_change/

Lithuania

<http://www.am.lt/VI/en/VI/index.php#r/144>

Luxembourg

http://www.environnement.public.lu/air_bruit/dossiers/plan_action_CO2/index

Malta**The Netherlands**

<http://international.vrom.nl/pagina.html?id=7383>

Poland

http://www.mos.gov.pl/2strony_tematyczne/ochrona_powietrza/konwencje_ekologiczne/konwencja_klimatyczna/Report.pdf

http://www.mos.gov.pl/2strony_tematyczne/ochrona_powietrza/konwencje_ekologiczne/konwencja_klimatyczna/IV_Raport_Rzadowy.pdf

Portugal

http://www.iambiente.pt/portal/page?_pageid=73.408080&_dad=portal&_schema=PORTAL&actualmenu=10140981&docs=10236023&cboui=10236023&old_menu=none&menu_childmenu=10140981

Romania

http://www.mmediu.ro/dep_mediu/schimbari_climatice/schimbari_climatice.htm

Slovakia

<http://www.enviro.gov.sk>

Slovenia

http://unfccc.int/files/kyoto_protocol/compliance/plenary/application/pdf/cc-ert-2007-5_report_on_ir_rev_of_slovenia.pdf

<http://unfccc.int/resource/docs/natc/sloenc1.pdf>

Spain

<http://www.miliarium.com/Paginas/Leyes/atmosfera/ue/kioto/Espana/EstrategiaCambioClimatico.pdf>

Sweden

<http://www.internat.naturvardsverket.se/>

United Kingdom

<http://www.defra.gov.uk/environment/climatechange/index.htm>

EU Action against Climate Change



Helping developing countries cope with climate change



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DG ENV.

Helping developing countries cope with climate change



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Introduction

As the world's largest donor of development assistance, the European Union is strongly committed to supporting developing countries in the fight against poverty, the fulfilment of the UN Millennium Development Goals and the promotion of sustainable development. Combating climate change, one of the gravest challenges facing mankind, forms an integral part of this agenda.

The EU is actively pursuing this objective both multilaterally through the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol as well as through regional and bilateral cooperation with partner countries in all developing country regions.

Climate change is not only an environmental problem but also poses a clear risk to development if not addressed effectively. The adverse impacts of climate change, for instance decreased precipitation in arid and semi-arid areas, will disproportionately affect poorer countries with economies dependent on natural resource-related sectors such as agriculture, forestry and fisheries. Rising sea levels pose a threat to the very existence of some small island states.

Developing countries with more diversified economies are also vulnerable since lack of financial resources, adequate technology and effective institutions limit their capacity to adapt to the consequences of climate change.

At the same time, increasing industrialisation by developing countries to meet their legitimate development needs will lead to higher energy consumption and greenhouse gas (GHG) emissions in these countries, even if their per capita emission levels are likely to remain below those in industrialised countries for the foreseeable future. It is thus in the interest of all parties to promote sustainable emission trends in developing countries in parallel with action by industrialised nations to limit and reduce their own GHG emissions.

The EU recognises that the most effective way to promote adaptation to and mitigation of climate change is to 'mainstream' these into strategies for poverty reduction and/or sustainable development. It also attaches importance to ensuring that these strategies are owned and driven by the developing countries themselves.



The 2005 European Consensus on Development⁽¹⁾ commits Europe to supporting its partners' efforts to incorporate environmental considerations into development and to helping strengthen their capacity to implement multilateral environmental agreements such as the UNFCCC and the Kyoto Protocol.

This brochure in the *EU action on climate change* series provides an overview of the many ways in which the EU is helping developing countries adapt to the negative effects of climate change and mitigate its causes.

Millennium Development Goals

The Millennium Development Goals are laid down in the Millennium Declaration adopted by 189 nations at the United Nations Millennium Summit in September 2000. The goals are to be met by 2015 except where stated otherwise.

Eradicate extreme poverty and hunger

- Halve the proportion of people living on less than one dollar a day
- Halve the proportion of people suffering from hunger

1

Achieve universal primary education

- Ensure that all children complete a full course of primary schooling

2

Promote gender equality and empower women

- Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015

3

Reduce child mortality

- Reduce the mortality rate among children under five by two thirds

4

Improve maternal health

- Reduce the maternal mortality rate by three-quarters

5



(1) The European Consensus on Development is a joint statement on EU development policy by the Council of the European Union, EU governments, the European Parliament and the European Commission. It was signed on 20 December 2005.

Combat HIV/AIDS, malaria and other diseases

- Halt and begin to reverse the spread of HIV/AIDS
- Halt and begin to reverse the incidence of malaria and other major diseases



Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes, and reverse the loss of environmental resources
- Halve the proportion of people without sustainable access to safe drinking water and basic sanitation
- Achieve significant improvement in the lives of at least 100 million slum dwellers by 2020

Develop a global partnership for development

- Develop further an open, rule-based, predictable, non-discriminatory trading and financial system (including a commitment to good governance, development, and poverty reduction — both nationally and internationally)
- Address the special needs of the least developed countries (includes: tariff- and quota-free access for least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous Official Development Assistance (ODA) for countries committed to poverty reduction)
- Address the special needs of landlocked countries and small island developing states
- Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term
- In cooperation with developing countries, develop and implement strategies for decent and productive work for youth
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.



EU cooperation with developing countries on climate change

Climate change has been an issue of growing concern in cooperation between the EU and developing countries since the UN Framework Convention on Climate Change (UNFCCC) was signed in 1992. In recent years specific cooperation on climate change has been significantly strengthened across a range of different frameworks.



The UNFCCC and the Kyoto Protocol, and institutions linked to them such as the Global Environment Facility (GEF), are naturally among the main channels through which the EU provides general support and financial assistance on climate change to developing countries. The EU also provides significant support through other multilateral and bilateral channels.

The EU was instrumental in the 2001 Bonn political declaration on climate change funding for developing countries, and since 2005 EU Member States are providing the bulk of the US\$ 410 million promised annually. The EU is a major backer of the Kyoto Protocol's clean development mechanism (CDM) (see p. 18). The EU also fully supports the operationalisation of an Adaptation Fund to be financed mainly from a share of CDM revenues.

In 2004 the EU further underlined its commitment to help developing countries tackle climate change by adopting an Action Plan on Climate Change in the Context of Development Cooperation for the period up to 2008.⁽²⁾

(2) Council of the European Union, 22 November 2004



EU Action Plan on Climate Change in the Context of Development Cooperation 2004-2008

Adopted by the EU Council of Ministers in November 2004, the Action Plan has five strategic objectives:

- **Raising the policy profile of climate change.** Measures include: putting climate change on the agenda of high-level consultations under EU development cooperation agreements; preparing country- or region-specific briefs on climate change; promoting exchange programmes between the EU and partner countries to foster mutual understanding.
- **Support for adaptation.** Measures include: supporting partner countries in preparing vulnerability and adaptation assessments and national adaptation programmes of action (NAPAs) for least developed countries; developing guidelines for integrating climate change into development programmes – including measures to avoid maladaptation – based on consultation with all stakeholders; supporting capacity-building in developing country institutions to prepare for and reduce the impact of climate change-related disasters.
- **Support for mitigation and low GHG development paths.** Measures include: supporting pilot projects to strengthen the links between government ministries and the research community; supporting partner countries to carry out research on low-carbon technologies and further develop local mitigation technologies; supporting capacity-building for developing countries' participation in the Kyoto Protocol's clean development mechanism (CDM).
- **Capacity development.** Measures include: building individual and institutional capacity in impact prediction and vulnerability assessment; identifying ways to support improved coordination between developing countries to prepare for climate change negotiations; establishing knowledge banks to disseminate information and provide training for action on climate change.
- **Monitoring and evaluation of the Action Plan.** Measures include: regular discussions on implementation of the Plan and encouragement of feedback from stakeholders; preparation of a biannual evaluation report and, based on this, modification and updating of the Plan.



Based on a strategy⁽³⁾ drawn up by the European Commission,⁽⁴⁾ the Action Plan seeks to help strengthen developing countries' capacities to cope with both mitigation of and adaptation to climate change.

One of the Action Plan's strategic objectives is to raise the policy profile of climate change. This is being achieved in practice by putting climate change on the agenda of high-level meetings between the EU and developing countries or country groupings with which it has cooperation agreements, such as the 78 African, Caribbean and Pacific (ACP)⁽⁵⁾ countries, the Asian and Latin America countries (ALA) and the Mediterranean, Eastern European and Central Asian countries.

In this context, in June 2006 ACP and EU leaders agreed a Joint Declaration on Climate Change and Development that includes commitments to cooperate closely within the UNFCCC process and to better integrate climate change considerations into the EU's development strategies, policies and programmes. Helping Africa, particularly least developed countries and small island developing states, to counter the effects of climate change is also an integral part of the EU Strategy for Africa endorsed by EU leaders in December 2005, which focuses on supporting Africa's own efforts to promote sustainable development and achieve the Millennium Development Goals.⁽⁶⁾

The EU has recently established important climate change partnerships with China and India, and the European Commission and Brazil have set up a dialogue on the environment and climate change dimension of sustainable development that is expected to develop into a broader EU-Brazil partnership. Concrete initiatives for closer cooperation on climate change are also planned with South Africa, Mexico and South Korea.

(3) *Climate change in the context of development cooperation*. Communication from the Commission to the Council and the European Parliament COM(2003) 85 final.

(4) The three major institutions of the EU are the European Commission, the Council of Ministers and the European Parliament. The Commission proposes policies and legislation and is responsible for ensuring the correct implementation of legislation once it is adopted. Legislation must be adopted by the Council of Ministers, which comprises representatives of the governments of the 25 EU Member States, and the European Parliament, which is made up of directly elected deputies from the Member States.

(5) Relations between the EU and ACP countries are governed by the Cotonou Agreement, signed in 2000.

(6) *The EU and Africa: Towards a strategic partnership*. European Council, December 2005.

We, the Representatives of the States of the African, Caribbean and Pacific (ACP) group and the European Community⁽⁷⁾ and its Member States, meeting in Port Moresby, Papua New Guinea, hereby agree to proceed as follows:⁽⁸⁾

At the level of the UNFCCC process:

- Commit to continued international collaboration given that climate change is a serious and long-term challenge to sustainable development and poverty reduction that has the potential to affect every part of the globe and by its global nature calls for the widest possible cooperation and participation in an effective and appropriate international response, in accordance with the principles of UNFCCC.
- Urge the implementing agencies of the Global Environment Facility, UNEP, World Bank and the UNDP to continue their engagement on climate change with ACP countries and invite the EU to continue to support a substantial replenishment of the GEF Trust Fund.
- Agree to consult regularly on issues related to climate change and sustainable development in the context of meetings of the Subsidiary Bodies and Conferences of the Parties to the UNFCCC.
- Build capacity and strengthen the effectiveness of ACP country participation in the upcoming negotiations on the future of the UNFCCC and Kyoto Protocol processes.

At the level of European Community and its Member States' development cooperation with ACP States through their respective cooperation agreements, including the Cotonou Agreement:

- Agree to enhance dialogue, involving relevant stakeholders at country level, and to improve the integration of climate change considerations into ACP country and regional development strategies, derived from the Poverty Reduction Strategy Papers (PRSPs), in coherence with the MDGs.
- Agree to continue support for all decisions of COP11, including on agenda item 6 "Reducing Emissions from Deforestation in Developing Countries: approaches to stimulate action," an important initiative launched by a number of ACP countries to link climate stability and the Millennium Development Goals.
- Support a better integration of climate change considerations into development cooperation strategies, policies and programmes of the European Community and its Member States, including the consideration of climate change aspects in strategic environmental assessments and environmental impact assessments.
- Consider the need to provide substantial resources for climate change activities, including support for the implementation of the UNFCCC.
- Agree to report on the progress of implementation of the EU Action Plan on Climate Change and Development at subsequent sessions of the ACP-EC Council of Ministers.

(7) The European Community is the first of the three pillars that comprise the European Union. Under this pillar policies and legislation are proposed by the European Commission and require approval by the Council of Ministers and the European Parliament.

(8) For space reasons the preamble to the Declaration is not reproduced here.



Supporting adaptation and capacity building

Developing countries, and especially the poor in developing countries, are particularly vulnerable to the adverse impacts of climate change, for example on water resources, agriculture and the spread of infectious diseases.

Adaptation strategies are needed to strengthen developing countries' resilience to these impacts while at the same time protecting national and EU efforts to eradicate poverty. Developing countries may also have



weaknesses in their human and institutional capacities to deal with climate change and need help to build these up.

To be effective, adaptation must be firmly integrated into development cooperation by both donors and recipient countries. The EU Action Plan on Climate Change in the Context of Development Cooperation for 2004-2008 (see p. 9) is an important first step in this direction.

Reflecting the particular vulnerability of less developed countries and small island developing states, the European Consensus on Development makes assistance for adaptation to climate change a central element of the Community's support.

Within the context of the UN Framework Convention on Climate Change (UNFCCC) the EU fully supports the frameworks for capacity-building for developing countries contained in the Marrakech Accords as well as the work under way on national adaptation programmes of action (NAPAs) for least developed countries. The EU is assisting NAPAs through contributions to the Least Developed Countries Fund and bilateral support.

The EU also strongly backs the operationalisation of the specific Adaptation Fund and the five-year programme of work on adaptation under the UNFCCC. The work programme provides a major opportunity to strengthen understanding of the impacts of climate change and of countries' vulnerabilities, adaptation needs and responses.

The BASIC project

BASIC⁽⁹⁾ aims to strengthen the national capacities of Brazil, South Africa, India and China to determine which initiatives to combat climate change best fit their national circumstances, interests and priorities. Supported by the European Commission's Directorate-General for Environment, the project is creating a multi-level network by bringing the governments of the four countries together with domestic and international non-governmental institutions with expertise in research, policy and implementation.

BASIC will provide an important starting point for shaping future climate policy, domestically and internationally, by supporting the capacity of the four countries to draw lessons from their implementation experiences. The project covers the core issues of mitigation, adaptation and legal, institutional and procedural considerations at the domestic and international levels. BASIC is running for two years until January 2007 but if successful should lead to a longer-term collaborative effort.

Beyond the multilateral framework, the EU is also supporting specific bilateral or regional projects to help adaptation and capacity-building efforts by developing countries.

For example, the European Commission-funded **ACCCA⁽¹⁰⁾ (Advancing Capacity to Support Climate Change Adaptation) project** will create a geographically diverse set of adaptation schemes to address climate risks in developing countries. It will bring together partnerships between stakeholders and scientific communities in Africa and Asian developing countries to help develop effective adaptation decisions that reduce vulnerability to climate change while promoting sustainable development.

These partnerships will carry out pilot projects to identify and prioritise relevant climate risks, then assess available knowledge about these risks and opportunities for adapting to them. Selection and adoption of appropriate responses will be aided by stakeholder forums. A call for preliminary project proposals was launched in June 2006.

With regard to capacity building, the European Commission is a major supporter of the **Climate Change Capacity Development (C3D)⁽¹¹⁾ project**, which, like ACCCA, is managed by the UN Institute for Training and Research (UNITAR). Launched in 2003, C3D is helping developing countries respond to the causes and impacts of climate change, particularly those that affect the poorest and most vulnerable. The project has created an innovative South-South training and capacity-building partnership between institutes in Senegal, South Africa and Sri Lanka that are focusing, respectively, on vulnerability and adaptation, greenhouse gas mitigation, and climate change and sustainable development. Each trains the others as well as local and regional stakeholders.

(9) www.basic-project.net

(10) www.acccaproject.org

(11) www.c3d-unitar.org



Their training modules have already helped define national climate change policy in South Africa, formulated sustainable development and climate change strategies in Sri Lanka and trained experts in West and Central Africa. The second phase of the project will help develop national and regional pools of expertise in both the science of climate change and international climate change negotiations.

Examples of other adaptation and capacity building projects supported by the the EU can be found in the sections *Stimulating clean development through EU emissions trading* and *Assisting developing countries through climate research*.



EU humanitarian aid and civil protection assistance

The EU is a major provider of humanitarian aid to help developing countries prepare for and cope with disasters, including those linked to extreme weather and climate change. In 2005, the European Commission spent just over €650 million providing humanitarian aid around the globe, €244 million of it in ACP countries. This included €45 million to aid victims of the conflicts in Sudan, where political rivalries are being exacerbated by competition for ever-diminishing natural resources – a phenomenon that could become more common worldwide as climate change intensifies.

Besides disaster relief, the EU's humanitarian aid effort includes the DIPECHO disaster preparedness programme to help the most vulnerable populations in disaster-prone regions prepare for natural catastrophes including cyclones, storms and floods. Over time the EU's ambition is to integrate disaster risk reduction measures not only into humanitarian aid operations but also long term development projects and national policies.

Through its Community mechanism for civil protection, the EU also provides urgent humanitarian and environmental assistance to EU Member States and third countries in the immediate aftermath of major natural or man-made disasters. This has included assistance to Bulgaria and Romania during floods in 2005 and the USA following Hurricanes Katrina and Rita. It can be expected that disasters caused by extreme weather events will account for an increasing share of EU civil protection assistance work as climate change progresses.

Providing clean and secure energy supplies

The EU Energy Initiative

Ensuring people in developing countries obtain access to modern and affordable energy services is a prerequisite for achieving the Millennium Development Goals, and in particular for eradicating poverty. The EU's framework for dialogue and partnerships with developing countries to meet this challenge is the EU Energy Initiative for Poverty

Eradication and Sustainable Development (EUEI), launched at the World Summit for Sustainable Development (WSSD) in Johannesburg in 2002.

The EUEI seeks to help end the limited access to energy services and heavy reliance on traditional biomass that are hallmarks of poverty in developing countries. Currently, 1.6 billion people do not have access to electricity, and 2.4 billion people rely on traditional biomass – wood, agricultural residues and dung – for cooking and heating. These fuels cause harmful indoor air pollution that leads to chronic health problems among women and children.

The EUEI is a joint commitment by the EU Member States and the European Commission to support improved access to sustainable energy services in developing countries. It is also a catalyst for action. Through the Initiative, the EU is working with developing countries to create the necessary conditions in the energy sector to achieve their national economic, social and environmental objectives. This is being done in particular by maximising energy efficiency, including more efficient use of fossil fuels and traditional biomass, and increasing the use of renewable energy. In this way the Initiative is also contributing to mitigating climate change.

Activities implemented under the EUEI are driven by the needs and priorities of the participating developing countries. Their ownership of activities is a key feature. Official Development Assistance (ODA) provides a basic funding framework for the Initiative but the aim is also to attract considerable funding from private resources for further investment.



Achievement of the EUEI's goals in Africa is being aided by the Africa-Europe Partnership on Infrastructure, which forms part of the EU's Strategy for Africa approved in December 2005. The Partnership will support development of cross-border and regional energy infrastructure including enhanced use of renewable and other sustainable local energy sources.

ACP-EC Energy Facility

A key result of the EUEI is the €220 million ACP-EC Energy Facility. Created in June 2005, it aims to facilitate access to sustainable energy services for poor rural populations in sub-Saharan Africa, the Caribbean and the Pacific. The Facility also contributes to projects supporting better governance and management in the energy sector, and to facilitating investments in cross-border electricity interconnections - in line with the priorities of the African Union's New Partnership for Africa's Development (NEPAD) and the Africa-Europe Partnership on Infrastructure.

A first open call for project proposals under the Energy Facility was launched in June 2006. Sustainability, including projects' impact on climate change, is one of the five selection criteria.

COOPENER programme

One of the first major vehicles for implementing the EUEI on the ground is the COOPENER programme, which is helping to strengthen developing countries' local capacities to use sustainable energy for alleviating poverty. So far 24 projects in sub-Saharan Africa and Latin America have been signed, involving activities in around 35 African countries and four in Latin America.

These projects include **MIRREIA** for mitigating risk and strengthening capacity for rural electricity investment in Africa, **PEPSE**, which targets poverty eradication and planning of sustainable energy, and **REEPASA** for renewable and efficient energy to alleviate poverty in southern Africa. A final group of projects in Africa, Latin America and South-East Asia will begin before the end of 2006 and run for two to three years.

COOPENER builds on earlier initiatives such as the European Commission-funded **Regional Solar Energy Programme**, under which solar photovoltaic systems for pumping water have been installed in hundreds of villages in nine West African countries.

Johannesburg Renewable Energy Coalition

The EU is also helping to expand the use of renewable energy in developing countries and elsewhere through the Johannesburg Renewable Energy Coalition (JREC)⁽¹²⁾. The coalition was launched at the WSSD by the EU and a number of other like-minded nations committed to promoting renewable energy.

JREC promotes active follow-up of the Johannesburg Plan of Implementation's recognition that there is a need to "substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply." It does this by promoting policy initiatives at national, regional and international level and cooperation, including sharing of best practice, between member countries.


Membership of the coalition currently stands at 88 countries, of which half are ACP nations. The European Commission acts as the secretariat for JREC and co-chairs the coalition together with the government of Morocco. Within the context of JREC the Commission has recently announced the creation of a €100 million public-private Global Energy Efficiency and Renewable Energy Fund to mobilise further investment in energy efficiency and renewable energy projects by providing affordable risk capital.

(12) <http://ec.europa.eu/environment/jrec/>

Stimulating clean development through EU emissions trading

The EU's strong support for the Kyoto Protocol's three flexible mechanisms – emissions trading, the clean development mechanism (CDM) and joint implementation (JI) – is helping developing countries move towards sustainability by promoting projects that use clean technologies to reduce greenhouse gas emissions.

Emission-saving projects located in developing countries are carried out under the CDM while those in



industrialised countries are covered by JI. CDM and JI projects promote sustainable development by transferring environmentally sound technologies to the host nation. The emissions saved generate emission reduction credits which can be sold and traded.

Several EU Member States have set up programmes to buy emission reduction credits generated by CDM and JI projects - either directly or through government-financed 'carbon funds' - in order to offset part of their national emissions and thus help meet their emission reduction or limitation targets under the Protocol. EU Member States plan so far to buy CDM and JI credits equivalent to 500-600 million tonnes of carbon dioxide (CO₂), and have budgetted more than 3 billion euros for these purchases.

Additional investment in CDM and JI projects is being spurred by the EU Emissions Trading Scheme (EU ETS), which caps overall CO₂ emissions from some 10,000 large emitters in energy-intensive industrial sectors and power generation in the EU. The scheme was launched in January 2005 and has rapidly become the driving force of the global carbon market.

The EU ETS is creating demand from European industry for emission reduction credits from CDM and JI projects because the scheme recognises most of these credits as being equivalent to the emission allowances allocated to industrial installations under the scheme. Since at the end of each year companies must surrender a number of allowances equal to their actual emissions, buying credits from CDM and JI projects provides an additional way for industry to meet this requirement. The scheme's acceptance of CDM and JI credits also increases the liquidity of the trading market created by the EU ETS as well as potentially lowering the price of allowances, and thus compliance costs, for industry.

The EU is committed to a balanced geographical distribution of CDM projects and under its SYNERGY programme has supported nine projects to help build the necessary capacities in selected developing countries. However, it is clear that further efforts are needed at international level to achieve a balanced distribution of CDM projects. The EU is determined to help increase the number of projects in Africa in particular.

Examples of CDM projects involving EU Member States

Denmark has contracted to buy 444,862 certified emission reductions from a biodiesel project in Gauteng province in **South Africa** between 2006 and 2012. The project will manufacture diesel fuel from fresh and waste vegetable oils as well as from waste containing fats and fatty acids. Biodiesel produces lower carbon dioxide (CO₂) emissions than fossil fuels because the biomass it is produced from absorbs CO₂ while it grows. Emission savings from the project are expected to average 84,736 tonnes of CO₂ equivalent per year. An application for the project to be registered under the CDM is in preparation.

The Netherlands, through its IFC-Netherlands Carbon Facility, is buying emission reduction credits from a CDM-registered wind power project in Rajasthan in **India**. Nine wind farms have been built and linked to give a total electricity generating capacity of just over 58 megawatts. This renewable energy project is reducing greenhouse gas emissions by producing electricity that would have otherwise have been generated from fossil fuels. Emission savings are estimated to be 98,225 tonnes of CO₂ equivalent each year between 2004 and 2014.

Capacity-building for CDM

The EU is helping to build developing countries' awareness and knowledge of the CDM as well as their capacities to identify and propose potential CDM projects. Under the **SYNERGY programme**, 13 capacity-building projects have been carried out jointly between organisations in the EU and sub-Saharan Africa, southern Mediterranean countries of the Euro-Mediterranean partnership⁽¹³⁾, Latin America, China, India and the Gulf.

Among these, the **CDM for Sustainable Africa project** has, among other things, produced an action plan to overcome institutional and other barriers to CDM projects in sub-Saharan Africa and identified both a number of existing projects plus numerous potential projects (mainly small scale) that would be suitable for CDM. It has also undertaken pre-feasibility studies for three potential projects, in Zambia, Botswana and Mozambique.

Promoting sustainable forestry

Forests play a crucial role in regulating the global climate and are also a vital resource for many developing countries. Forests help prevent climate change by acting as 'sinks' that absorb carbon dioxide (CO₂), but conversely deforestation is a major source of global CO₂ emissions – second only to the burning of fossil fuels.

Climate change - for instance a shift to hotter, drier conditions - can itself damage the health of forests, impeding their ecological functions and reducing their economic productivity.

Helping developing countries to manage their forest resources sustainably, combat illegal logging and monitor changes in their vegetation helps mitigate climate change and is an important aspect of EU development policy. As far back as 1991 the European Commission's Joint Research Centre and the European Space Agency set up the **TREES project** to monitor changes in forest cover in the tropics.

Through its budget line to support tropical forests and other forests in developing countries, the EU has provided 228 million euros for sustainable forest management since 2000.

The EU is contributing actively to scientific discussions under the UN Framework Convention on Climate Change to find approaches to stimulate and recognise developing countries' efforts to reduce deforestation, in response to the important initiative on this by a number of ACP countries.

(13) Morocco, Algeria, Tunisia, Egypt, Israel, Jordan, Lebanon, Syria and Turkey



The European Commission's Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan aims at helping build up the capacity of developing and emerging-market countries to control illegal logging as well as at addressing trade in illegal timber products between these countries and the EU.

Besides promoting mitigation of greenhouse gas emissions through sustainable forest management, the EU is also supporting adaptation-related forest projects in developing countries and the development of improved environmental data systems as a basis for more effective decision-making.

Among these is the **Tropical Forests and Climate Change Adaptation (TroFCCA) project** co-funded by the European Commission to help tropical forests and the communities who depend on them adapt to climate change. Managed by the Center for International Forestry Research (CIFOR) and the Tropical Agriculture Center for Research and Higher Education (CATIE), the four-year project is being carried out in Burkina Faso, Mali and Ghana in West Africa, Honduras, Nicaragua and Costa Rica in Central America, and in Indonesia.

Beginning with an evaluation of the impacts of climate change on tropical forest ecosystems and forest-dependent communities, TroFCCA will develop and test criteria and indicators for implementing 'adaptive' forest management to minimise the adverse effects of climate change and climatic variability. Policy-oriented adaptation strategies will then be elaborated, reflecting the project's broader objective of helping efforts to 'mainstream' adaptation to climate change into development policies.

The European **VEGETATION programme** provides daily monitoring of terrestrial vegetation cover through remote sensing by satellite. The **VGT4AFRICA project**, part of the joint EU-European Space Agency Global Monitoring for Environment and Security (GMES) programme, ensures timely distribution of VEGETATION data and derived information products to all African countries through the EU-supported PUMA network of national meteorological services and regional environmental monitoring centres.

These derived products include 'burnt area' information products which can serve to guide sustainable management of natural resources in Africa, particularly forests and biodiversity resources. Knowledge of burnt areas can be used among other things for rainfall predictions and estimates of greenhouse gas and other pollutant emissions from the burning of biomass.

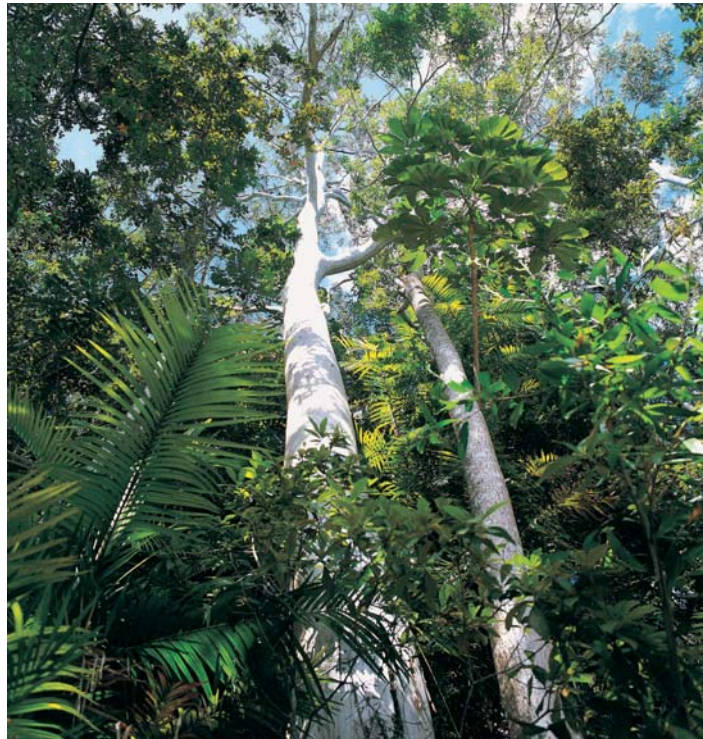


The **PUMA project** itself assists all 53 African countries and the four regional environmental monitoring services with equipment, training and application support so that they can use the received satellite data for multiple purposes. Fields for which applications are expected to be developed include forest fire monitoring and risk assessment, land cover changes, agricultural management, water management, and flood forecasting, monitoring and damage assessment.

ECOFAC


The Forest Ecosystems in Central Africa (ECOFAC) programme was launched by the European Commission in 1992 to help conserve the region's tropical forests through the creation of protected areas. Central Africa is home to the world's second largest tropical forest system after the Amazon and the livelihoods of some 65 million people there depend heavily on this vast resource.

Thanks to the ECOFAC programme, today no fewer than 28,000 km² of forest are managed as protected areas in six countries: Cameroon, the Central African Republic, Congo-Brazzaville, Equatorial Guinea, Gabon and São Tomé e Príncipe.



Assisting developing countries through climate research

Research is crucial to improving our understanding of climate change, and thus to developing the most effective strategies for adapting to its impacts and mitigating its causes. Climate change has consequently become an increasingly important area in the EU's research and technological development (RTD) programmes since the 1980s.



The current RTD framework programme, covering 2002-2006, allocates around €2 billion to research projects directly or indirectly addressing climate change, plus a further €1.2 billion for nuclear research. These sums are additional to the financial resources that the 25 EU Member States commit nationally to climate change-related research and development.

For the EU's 7th Framework RTD programme, which will cover 2007-2013, the European Commission has proposed an almost three-fold increase in funding for climate-relevant research.

Though Europe-led, EU research activities have a strong international dimension that benefits developing countries. The EU's RTD programmes are open to cooperation with research institutions in third countries. Over recent years this has led to some 125 researchers from ACP nations participating directly in a range of EU projects, many of them focusing on climate-relevant issues such as food security, health and ecosystem management.

Many projects carried out under the EU's RTD programmes concern global or regional climate change questions of relevance to developing countries. The results are also an important contribution to the Intergovernmental Panel on Climate Change's (IPCC) work on assessing climate change, its potential impacts and options for adaptation and mitigation.

Climate-relevant information is at the heart of a dedicated information system for Africa that the EU is developing under its RTD programme. Based on satellite and computer-mapping technologies and known as

the **Africa Observatory for Sustainable Development**, the system will provide information on food security, environment and crisis issues. This information is intended to assist Africa's decision-makers in steering their countries towards meeting the Millennium Development Goals and to guide the EU in setting priorities for its assistance to Africa.

Climate-relevant research projects funded by the EU and benefiting developing countries include the following:

The **CarboAfrica project** aims to quantify and predict the cycle of carbon and other greenhouse gases in sub-Saharan Africa in order to evaluate the region's potential as a global carbon 'sink.' Greater understanding is needed of photosynthesis and respiration by African ecosystems, which are subject to regular modification due to continual changes in land-use. The project will start in October 2007 and run until 2009. African partner countries are expected to include Congo-Brazzaville, South Africa and Sudan.

The EU is helping to build a Europe-South America climate research network. This is the goal of the **Europe-South America Network for Climate Change Assessment and Impact Studies (CLARIS)⁽¹⁴⁾ project**, which is promoting common research strategies to monitor and predict climate change and its socio-economic impacts in South America. The project will contribute to the development of adaptation strategies for sectors including agriculture, healthcare and hydro-electric power generation. It involves institutions in Argentina, Brazil, Chile and Uruguay.

The **Adaptation and Mitigation Strategies (ADAM)⁽¹⁵⁾ project** funded by the European Commission aims to improve understanding of the synergies, trade-offs and conflicts between adaptation and mitigation policies. Results will be relevant globally but will improve climate change projections for ACP countries in particular. The project, which includes China and India amongst its partners, started in March 2006 and will conclude in 2009.

(14) <http://eolo.cima.fcen.uba.ar>
(15) www.adamproject.eu

AMMA

A major example of EU research support to developing countries is the **African Monsoon Multidisciplinary Analysis (AMMA)**,⁽¹⁶⁾ to which the European Commission has contributed €11.7 million.

The region of the West African Monsoon underwent a dramatic change from wet conditions in the 1950s and 60s to much drier conditions in the 1970s to 90s. Since then, marked annual variations have resulted in extremely dry years that have had devastating environmental and socio-economic impacts. West African countries' vulnerability to variations in climate is likely to grow as demands on natural resources increase in line with their rapidly expanding populations.

AMMA was developed to meet this challenge. Involving partners in Benin, Burkina Faso, Ghana, Guinea, Mali, Niger and Senegal, the project aims to improve predictions of the monsoon and its impacts as well as forecasts of the influence of climate change on monsoon variability. The project is strengthening regional environmental monitoring systems covering topics such as the water cycle, atmospheric dynamics, crop yields and human health.

(16) www.amma-eu.org



European Commission

EU Action against climate change.

Helping developing countries cope with climate change

Luxembourg: Office for Official Publications of the European Communities

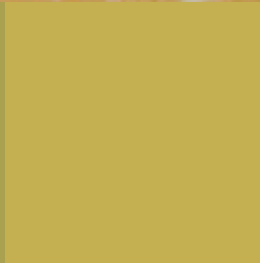
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EU action against climate change



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EU action against climate change

Leading global action to 2020 and beyond

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Global warming must be limited to 2°C



Climate change is happening.

The February 2007 science report from the Intergovernmental Panel on Climate Change (IPCC)¹ shows that the world has warmed by an average of 0.76° Celsius since pre-industrial times and the temperature rise is accelerating. Sea levels rose almost twice as fast between 1993 and 2003 as during the previous three decades. Man-made emissions of greenhouse gases are causing these changes.

The IPCC projects that, without action to limit emissions, the global average temperature is likely to increase further by 1.8° to 4°C this century. We cannot allow this to happen. The European Union considers it vital to prevent global warming of more than 2°C above the pre-industrial level. There is considerable scientific evidence that, beyond this threshold, irreversible and potentially catastrophic changes could occur.

In March 2007 EU Heads of State and Government endorsed an integrated climate change and energy strategy put forward by the European Commission which outlines the EU's proposals for a global and comprehensive agreement to combat climate change after 2012, when the Kyoto Protocol targets will expire.

The Commission's analysis shows that for the world to have a fair chance of keeping the average temperature rise to no more than 2°C, global emissions of greenhouse gases will have to be stabilised by around 2020 and then reduced by up to 50% of 1990 levels by 2050.

This ambitious goal is both technically feasible and economically affordable if major emitters act urgently. The benefits of doing so will far outweigh the limited economic costs.

Climate change is a global challenge that can be addressed effectively only through a global effort. This brochure presents and explains the EU's proposals for global action as well as the measures the EU is taking itself.

(1)The IPCC brings together the leading world experts to assess the scientific, technical and socio-economic information relevant for understanding the risk of climate change. Its reports represent the most authoritative global scientific consensus on climate change.



6



The high cost of failing to act

The growing evidence of the cost of climate change points to one simple conclusion: we cannot afford to do nothing.

Recent studies, such as the Stern Review on the economics of climate change, commissioned by the UK government, reaffirm the enormous costs of failing to act. These costs – not only economic but social and environmental too – will fall especially heavily on the poor, in developed and developing countries alike.

Allowing climate change to continue unabated would have serious local and global security implications.

The April 2007 report from the Intergovernmental Panel on Climate Change on the impacts of climate change shows that it is already having major effects on ecosystems, water resources and coastal zones across the world. Climate change is affecting people in various ways, including higher mortality during heatwaves, water scarcity, and changes in the distribution of diseases carried by vectors such as ticks and mosquitoes.

The Stern Review projects that, in the long term, climate change could cut global gross domestic product (GDP) each year by between 5% and as much as 20% if it is not brought under control by cutting greenhouse gas emissions. Taking global action to combat climate change is thus the pro-growth strategy for the longer term. The earlier we act, the less costly the action will be.

The European Commission's analysis shows that the investment needed to achieve a low-carbon economy would cost only around 0.5% of world GDP between 2013 and 2030. According to its projections, taking action against climate change would reduce global GDP growth by just 0.14% per year up to 2020. Global GDP growth over the period 2005-2020 would be 53%, barely lower than the 55% growth projected if no action were undertaken. And this figure does not take account of the benefits of cutting emissions, such as reduced damage from avoided climate change, greater energy security, and healthcare savings from less air pollution.

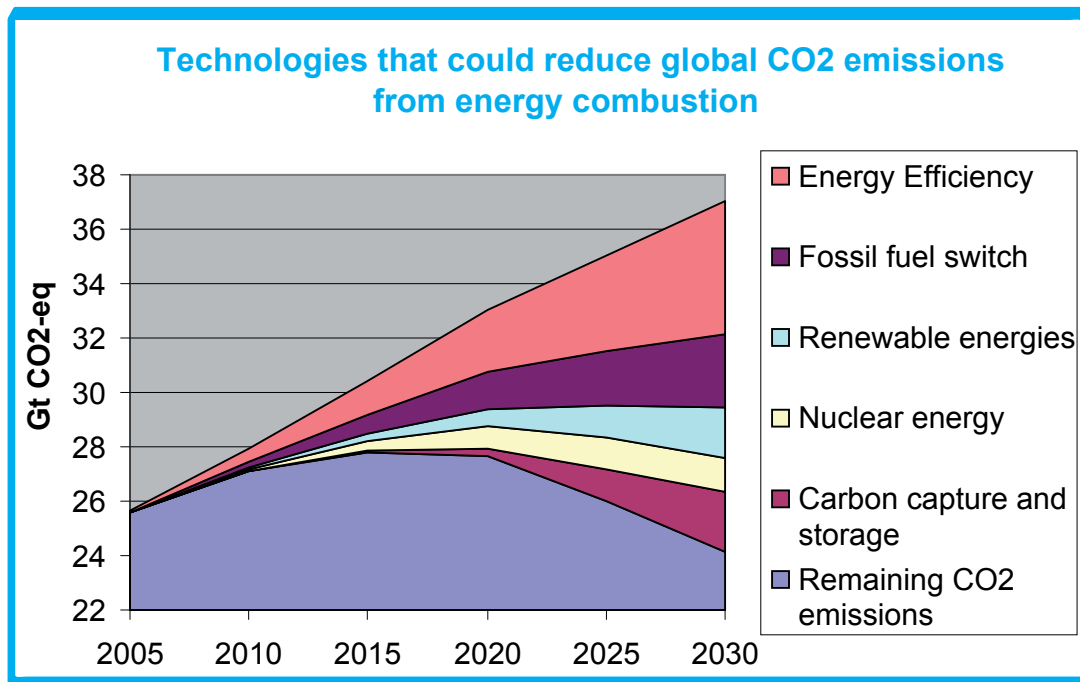


A global challenge that requires global action

Climate change is a global problem, and only worldwide action can win the battle against it. To limit global warming to no more than 2°C above the pre-industrial temperature, international discussions must move beyond rhetoric and lead to concrete commitments to reduce greenhouse gas emissions. Achieving an international agreement on post-2012 global action is a priority for the EU.

The basis for reaching an agreement is there. Even in countries that have not ratified the Kyoto Protocol, there is growing awareness of the dangers of climate change which is leading to regional initiatives to curb emissions. Business, more than some governments, is taking a long-term view and is becoming a driving force in fighting climate change by asking for a coherent, stable and efficient policy framework to guide investment decisions.

Most of the technologies required to reduce emissions either exist already or are well on the way to being operational (see graph). What is needed now is support from major emitters for a long-term agreement to ensure the deployment and further development of these technologies.



EU initiatives show the way ahead



The EU is showing the way ahead by setting out what needs to be done internationally to limit global warming to 2°C above the pre-industrial temperature and by committing to very significant cuts in its own greenhouse gas emissions.

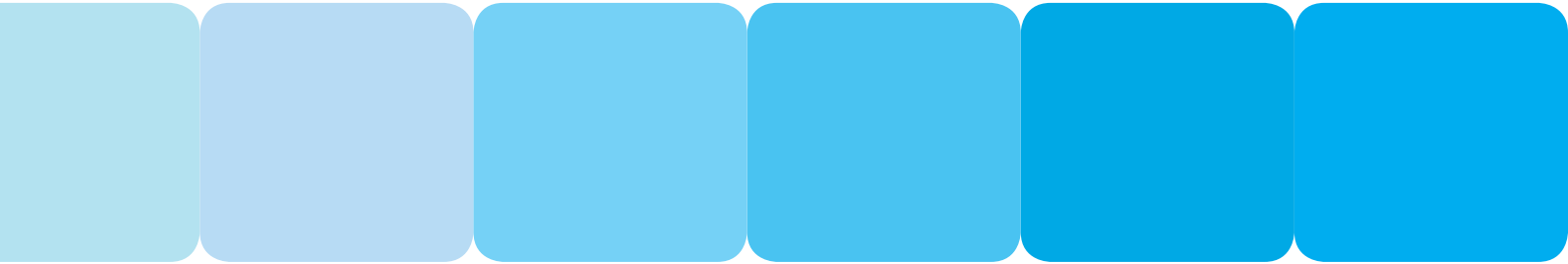
The EU and other developed countries have to continue taking the lead by reducing their emissions to 30% below 1990 levels by 2020, with a view to achieving cuts of 60-80% by 2050.

EU Heads of State and Government agreed in March 2007 that the EU will cut its emissions to 30% below 1990 levels by 2020 provided that, as part of a global and comprehensive post-2012 agreement, other developed countries commit to comparable reductions and advanced developing countries also contribute adequately to the global effort according to their respective capabilities.

The EU is not waiting to take action, however. It is determined to become a highly energy-efficient, low-carbon economy. The EU leaders therefore made a firm independent commitment that the EU will cut its emissions to at least 20% below 1990 levels by 2020.

This reduction will be achieved through a combination of measures already implemented through the European Climate Change Programme, such as the EU's pioneering Emissions Trading Scheme (EU ETS), and new measures contained in the integrated climate and energy strategy also endorsed by EU leaders in March 2007.

The key energy and climate change related measures, which not only will drive greenhouse gas reductions but also modernise Europe's energy system and prepare it for a low carbon future, are as follows:



Modernising EU energy policy

The EU Action Plan on energy, adopted by EU leaders in March 2007, sets out concrete actions to achieve a competitive, sustainable and secure energy system coupled with a major reduction in greenhouse gas emissions by 2020. They include:

- Cutting energy consumption by 20% compared with business as usual levels through a major improvement in the energy efficiency of a wide range of appliances and equipment
- Increasing renewable energy sources' share of energy consumption to 20%, from around 7% in 2007
- Raising biofuels' share of petrol and diesel to 10%, from around just 1% in 2007.
- Adopting a policy framework to ensure and promote environmentally safe use of carbon capture and geological storage (CCS)² technology. The aim is to deploy CCS technology in new fossil-fuel power plants, if possible by 2020. The European Commission aims to encourage the construction of 12 large-scale demonstration plants in Europe by 2015.

Strengthening the EU Emissions Trading Scheme (EU ETS)

The groundbreaking Emissions Trading Scheme³ plays a central role in Europe's long-term strategy to combat climate change. Launched in January 2005, the EU ETS is the biggest international trading scheme and a key pillar

(2) CCS makes it possible to capture CO₂ produced from large sources, such as power stations, before it reaches the atmosphere and then to store it long term in underground cavities such as empty oil or gas fields or coal seams.

(3) See also the brochure in this series *EU emissions trading: an open scheme promoting global innovation*

of the fast-growing global carbon trading market. Currently focused on industrial installations, the company-level system covers 45% of total EU CO₂ emissions. It is being reviewed with the intention of strengthening and extending it to cover a greater proportion of emissions from 2013.

The EU's independent commitment to cut its greenhouse gas emissions by at least 20% of 1990 levels by



2020 gives certainty to industrial operators about the EU ETS ' continued high level of ambition. This in turn creates investment certainty that will drive the large scale development and deployment of emission reduction technologies and low-carbon solutions.

Limiting transport emissions

While the EU is successfully reducing greenhouse gas emissions from manufacturing, energy and waste, emissions from transport have continued to grow. This trend has to be reversed.

- Legislation is under discussion to bring emissions from aviation into the EU ETS from 2011. Emissions from all flights arriving in or departing from the EU would be covered from 2012. The European Commission is also considering how to address emissions from shipping.
- Legislation is planned to ensure that the EU's target of reducing average CO₂ emissions from new cars to 120 grammes per kilometre is met by 2012.
- The European Commission has proposed new transport fuel quality standards that would reduce greenhouse gas emissions caused by the production, transport and use of petrol and diesel by 10% by 2020. Ways to achieve this include accelerating the development and use of sustainable biofuels produced from non-food sources.

Making reductions in other sectors

- Energy use in buildings can be reduced by up to 30% by expanding the scope of EU legislation on the energy performance of buildings and introducing performance requirements that promote very low-energy ('passive') buildings.



- Action is needed to reduce emissions of greenhouse gases other than CO₂, which make up 17% of EU emissions. This means taking measures to limit methane output, for example from gas engines, and nitrous oxide from combustion plants, for instance by including them in the EU ETS. Furthermore, measures to reduce the use of fluorinated gases and emissions from the agricultural sector will need to be reinforced.

Increasing research and technological development

The substantially increased budget of €8.4 billion allocated for environment, energy and transport under the EU's Seventh Framework Programme for R&D (2007-2013) should be spent early. This will enable the soonest possible deployment of clean technologies as well as further strengthening knowledge of climate change and its impacts. The research budget should be further increased after 2013 and this rise should be mirrored at national level.

Other measures

The EU is looking into possible policy measures, including trade-related ones, to encourage other developed countries to take effective action to combat climate change.

The Commission has already embarked on a major awareness-raising campaign to draw the general public's attention to the climate change impacts of their actions and engage it in efforts to reduce these.

Statement by EU leaders on post-2012 action, March 2007

EU Heads of State and Government outlined the EU's position on post-2012 global action to combat climate change at their European Council meeting in March 2007. The following are key extracts from their summit statement:

"The European Council underlines the vital importance of achieving the strategic objective of limiting the global average temperature increase to not more than 2°C above pre-industrial levels.

The European Council underlines the leading role of the EU in international climate protection. It stresses that international collective action will be critical in driving an effective, efficient and equitable response on the scale required to face climate change challenges. To this end negotiations on a global and comprehensive post-2012 agreement, which should build upon and broaden the Kyoto Protocol architecture and provide a fair and flexible framework for the widest possible participation, need to be launched at the UN international climate conference...at the end of 2007 and completed by 2009.

The European Council reaffirms that absolute emission reductions are the backbone of a global carbon market. Developed countries should continue to take the lead by committing to collectively reducing their emissions of greenhouse gases in the order of 30% by 2020 compared to 1990. They should do so also with a view to collectively reducing their emissions by 60% to 80% by 2050 compared to 1990.

In this context, the European Council endorses an EU objective of a 30% reduction in greenhouse gas emissions by 2020 compared to 1990 as its contribution to a global and comprehensive agreement for the period beyond 2012, provided that other developed countries commit themselves to comparable emission reductions and economically more advanced developing countries to contributing adequately to their responsibilities and respective capabilities. It invites these countries to come forward with proposals for their contributions to the post-2012 agreement.

The European Council emphasises that the EU is committed to transforming Europe into a highly energy-efficient and low greenhouse-gas-emitting economy and decides that, until a global and comprehensive post-2012 agreement is concluded, and without prejudice to its position in international negotiations, the EU makes a firm commitment to achieve at least a 20% reduction of greenhouse gas emissions by 2020 compared to 1990.

The European Council notes the increasing share of greenhouse gas emissions from developing countries and the need for these countries to address the increase in these emissions by reducing the emission intensity of their economic development, in line with the general principle of common but differentiated responsibilities and respective capabilities. The European Council stands ready to continue and further strengthen its support for developing countries in lessening their vulnerability and adapting to climate change."

How reducing greenhouse gas emissions will benefit the EU



Besides helping to avert the most damaging impacts of global climate change, reducing greenhouse gas emissions will bring the EU a range of co-benefits. These include improving energy security, reducing air pollution and associated health costs, and increasing employment. Other countries would see similar benefits if they followed suit.

Improving energy efficiency and security

The EU is becoming increasingly dependent on imported energy, so security of supply is a growing concern. With “business as usual”, the EU’s energy import dependence will jump from 50% of total EU energy consumption today to 65% in 2030. Reliance on imports of gas is expected to increase from 57% to 84% by 2030, and of oil from 82% to 93%. There is thus a very strong economic case for making more efficient use of resources, as a contribution towards improving EU competitiveness, even without the associated benefits of cutting emissions.

The measures the EU plans to take under its integrated climate and energy strategy will improve energy security by reducing imports of oil and gas by around 20% by 2030 compared with these business as usual projections. Without policy changes the USA, China and India are also expected to import 70% of their oil by 2030. As resources become scarcer the risk of price volatility and international conflict will grow.



Reducing air pollution and health costs

Cutting greenhouse gas emissions will also reduce air pollution, which still causes 370,000 premature deaths in Europe every year. Bringing down CO₂ emissions by just 10% by 2020 would yield healthcare savings of up to €27 billion per year. Air pollution is increasing in many parts of the world, especially in developing countries. The 10 cities with the highest levels of harmful airborne particles are in Asia and Africa.

Increasing employment

Eco-industries are one of the most dynamic sectors in the European economy, growing at around 5% a year in response to global demand for green technologies, products and services. They already employ over 2 million people.

Climate change policies create more new employment opportunities: for example, increasing the use of biomass for electricity production and of biofuels for transport could create up to 300,000 extra jobs across the EU.

Developed countries must continue to lead

Developed countries are responsible for 75% of the greenhouse gases in the atmosphere today if emissions from deforestation are not taken into account. These nations have the most financial resources and the greatest technological capacity to cut their emissions. They should therefore be the ones to make the greatest effort to tackle climate change over the next decade. Those developed countries that have not ratified the Kyoto Protocol have an even greater potential for reducing their emissions than EU members.

To limit global warming to no more than 2°C above the pre-industrial temperature, the essential next step must be for the EU and other developed countries to commit, under a new international agreement, to cut their collective greenhouse gas emissions to 30% below the 1990 level by 2020.

The international agreement on post-2012 action must contain binding rules for monitoring and enforcing the commitments undertaken. In a competitive global market, every country needs to have the confidence that others are playing fair and living up to their pledges.

Creating the global carbon market

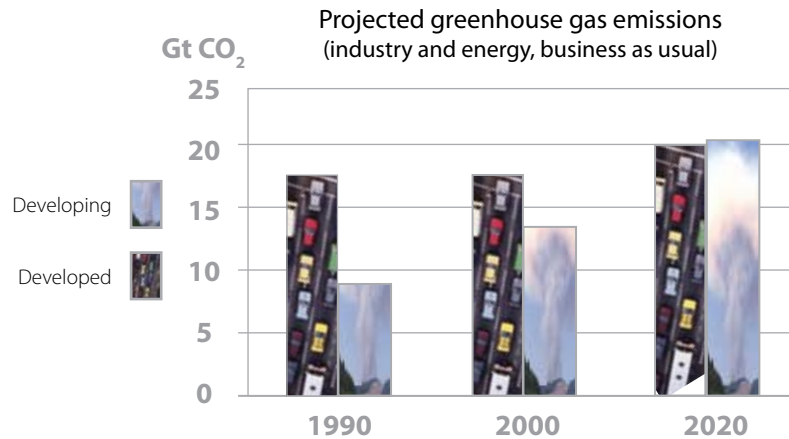
Estimates show that emissions trading schemes can reduce the cost of cutting greenhouse gas emissions by as much as 75%. Schemes similar to the EU Emissions Trading Scheme (EU ETS) will be a key tool in enabling developed countries to meet their future commitments cost-effectively. The post-2012 framework should enable comparable trading schemes to be linked with each other, with the EU ETS as the central pillar of the future global carbon trading market, in order to maximise trading opportunities and lower the costs of action as far as possible.

The EU ETS stimulates investment in emission-saving projects in third countries by accepting carbon credits from Clean Development Mechanism and Joint Implementation projects under the Kyoto Protocol, and this will continue after 2012. It will be crucial to improve and expand this type of instrument.



Action in developing countries is also essential

While the major effort to fight climate change in the immediate future must come from the developed nations, their actions alone will not be enough to reduce global greenhouse gas emissions. As developing countries expand their economies their emissions are increasing, and by 2020 these are projected to overtake total emissions from the developed world.



It is therefore indispensable that developing countries, and in particular the major emerging economies, start to reduce their emissions growth as soon as possible and then cut their emissions in absolute terms from 2020 onwards.

In addition, bringing an end to the destruction of forests is crucial. Emissions resulting from deforestation in developing countries need to be stopped and then reversed within two decades. Deforestation in developing countries generates 20% of global greenhouse gas emissions, more than all forms of transport combined. Halting and reversing this process would also bring important benefits for biodiversity conservation and sustainable development.

These actions are perfectly feasible without jeopardising economic growth and poverty reduction. Just as measures to combat climate change will benefit Europe and other developed nations, they are also in the long-term interest of less wealthy countries. Since vulnerable populations are the first to suffer the impact of floods, storms, droughts and the other effects of climate change, developing countries have every interest in joining the global effort.

By 2020, GDP is expected to double in China and India, and rise by 50% in Brazil. The European Commission estimates that taking action to cut emissions would shave just 1% off this GDP growth. In reality the cost is likely to be even smaller and probably even negative since it does not take into account the benefits of avoiding the damage that would otherwise be caused by climate change.



The EU recognises that it has a heavy responsibility to support developing countries and help them combat or adapt to climate change, and that it must set an example by cutting emissions itself.

Many developing countries are already making efforts that are resulting in significant reductions in their emissions growth. There are many policy options available to developing countries where the benefits outweigh the costs. These include:

- Boosting energy efficiency and thus also energy security
- Implementing policies to promote renewable sources of energy. These policies are often cost-effective, including for rural communities
- Improving air quality and thereby also public health
- Capturing methane from industrial and agricultural sources for cheap energy.

Such policies can be strengthened by sharing good practice. The EU will continue and increase its cooperation efforts in this respect to enable developing countries to play a greater part in global emissions reduction efforts.

There are various options for engaging developing countries to take further action through an international agreement for the post-2012 period:

Taking a new approach to the Clean Development Mechanism

The Kyoto Protocol's Clean Development Mechanism (CDM) should be streamlined and expanded. The CDM enables developed countries to offset their emissions by investing in emission-saving projects in developing countries that yield emission credits. The mechanism is generating considerable flows to developing countries of capital and technology for low-carbon growth. The scope of the CDM could be expanded to cover entire national sectors, rather than individual projects as at present, so that emission credits would be generated if a whole national sector met a pre-defined emission standard.

Improving access to finance for energy infrastructure

Developing countries are going to need investment of more than €130 billion a year in new infrastructure to generate the electricity they require for economic growth. Since power plants remain in use for several decades, it is vital that they make use of state-of-the-art clean technologies that will minimise emissions. This, however, will require an additional investment of some €25 billion annually. Developed countries can help fill the financial gap through a combination of instruments including development aid, innovative funding mechanisms such as the EU Global Energy Efficiency and Renewable Energy Fund (GEEREF), and targeted loans from financial institutions. The earlier this gap can be filled, the less developing country emissions will grow.

GEEREF

GEEREF, the Global Energy Efficiency and Renewable Energy Fund, is an innovative global risk capital fund set up by the European Commission in 2006 to mobilise private investment in energy efficiency and renewable energy projects in developing countries and economies in transition.

GEEREF will help to bring clean, secure and affordable energy supplies to some of the 1.6 billion people around the world who currently have no access to electricity. It will do so by accelerating the transfer, development and deployment of environmentally sound energy technologies. This will combat both climate change and air pollution, and will contribute to a more equitable distribution of Clean Development Mechanism projects in developing countries.

The Commission is putting €80 million into GEEREF over four years.. Additional pledges, including those from Germany, Italy, and Norway, bring the total amount of funding so far to €122 million. This funding is expected to mobilise additional risk capital of between €300 million and €1 billion in the longer term. GEEREF should be operational and have first funds invested before the end of 2007.



Introducing sectoral emissions trading

Another option is to introduce sector-wide, company-level emissions trading in industrial sectors in developing countries where the capacity exists to monitor emissions and ensure compliance. This would be particularly appropriate for energy-intensive sectors such as power generation, iron and steel, cement, oil refining, and pulp and paper. Such schemes would be either global or national; if the latter, schemes in developing countries should be linked with schemes in developed countries, such as the EU ETS. Targets for sectors covered would be strengthened gradually until they were similar to those set for the same sectors in developed countries.

Taking on binding emission limits as development advances

As they reach a level of development similar to that of developed countries, developing nations should take on binding emission reduction commitments. These should be tailored to their emissions levels and their own technical and financial capacities to limit and reduce them.

Exempting least developed countries from commitments

The least developed countries should not be subject to obligatory emission reductions because their level of emissions is low. These countries will suffer disproportionately from the impacts of climate change, so the EU will further strengthen its cooperation to help them to deal with climate-related challenges, for example through measures to strengthen food security and disaster preparedness. Additional support will be required to allow the most vulnerable to adapt to climate change. The EU and other developed countries should also help the least developed countries increase the numbers of CDM projects they host.

Further issues to address



A future international agreement should also address the following issues:

International cooperation on research and technology

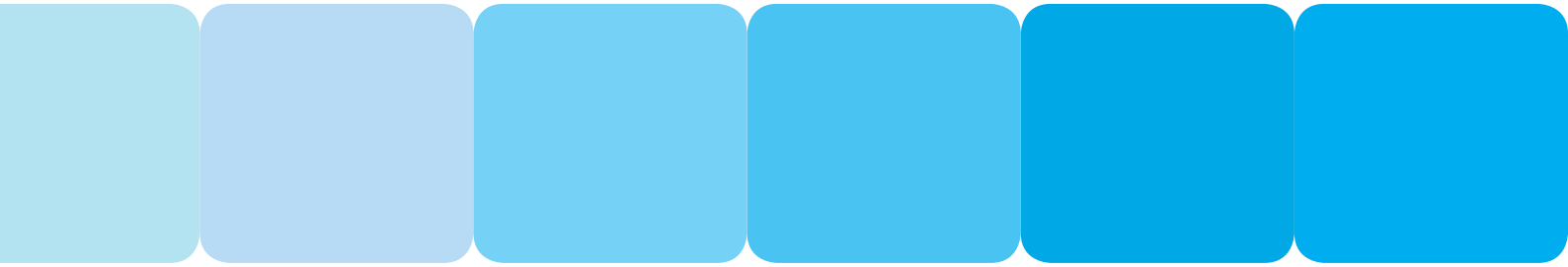
Further cooperation in this field will help speed up the technological change needed to achieve a low-carbon global economy. International research cooperation will increase understanding of the local and regional impacts of climate change, and help develop ways to enable populations to combat and adapt to it. The EU should show the way by stepping up its external research and technology cooperation, including setting up large-scale technology demonstration projects, particularly on carbon capture and geological storage, in key developing countries.

Adaptation to climate change

Measures to help developing countries adapt to the unavoidable consequences of climate change must be an integral part of the future international agreement. The need for adaptation to climate change should be taken into account in public and private investment decisions.

Energy efficiency standards

An international agreement on energy efficiency standards is needed with the active commitment of countries that manufacture appliances. This will facilitate market access as well as cutting greenhouse gas emissions.



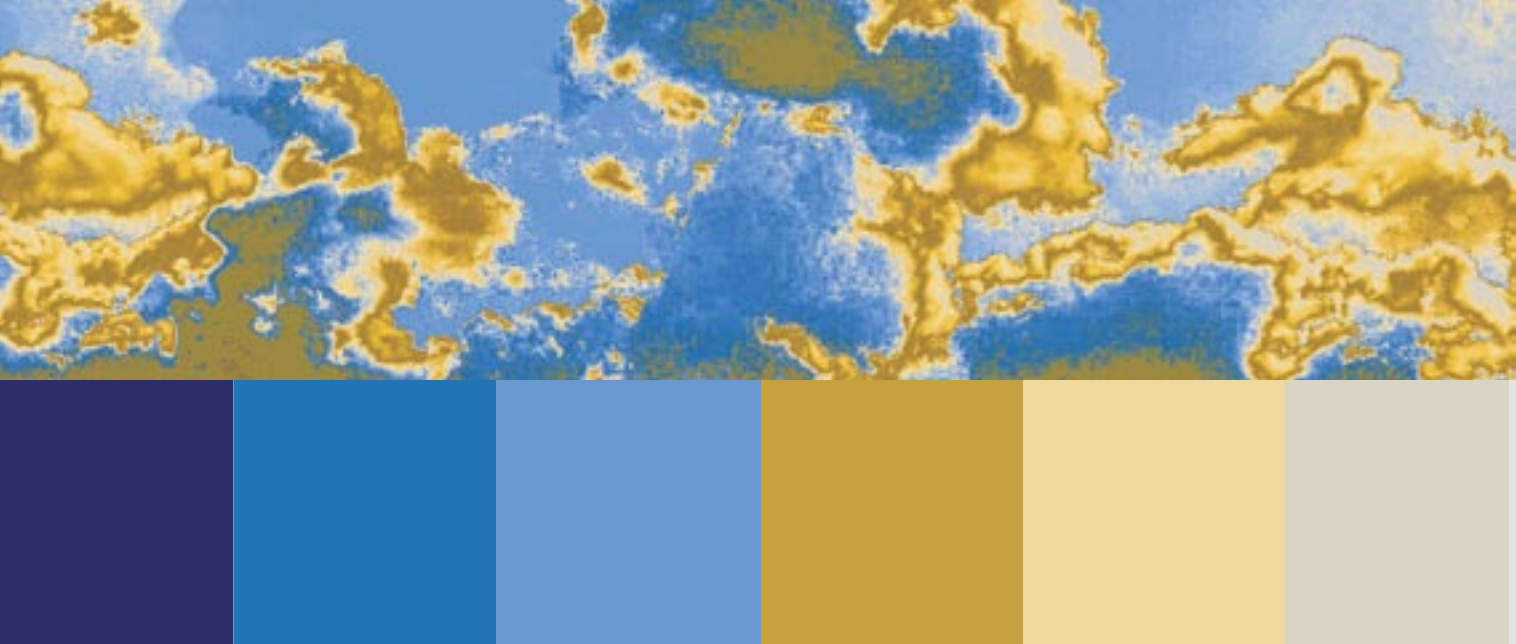
EU action against climate change



research and development
to stimulate climate-friendly
technologies



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The crucial role of research and development in addressing climate change



Climate change is a subject of enormous complexity and magnitude. Thanks to a focused research effort, we are continuously improving our understanding of the drivers and the options we have to reduce its impact.

Research has helped us to find out about the causes, manifestations and effects of climate change. Our knowledge is advancing rapidly, thereby reducing uncertainty. Research combined with economic analysis has enabled us to identify the most cost-effective measures to mitigate climate change. Research focusing on technological development plays an important role in preparing the low-carbon society of the future by improving existing climate-friendly technologies and devising those of tomorrow. Lastly, we need research to be able to predict climate-related changes, at global, regional and local levels, so we can take adaptation measures.

The European Union (EU) has financed research into climate change and technological development (R&D) since the 1980s, facilitating the formulation of realistic policy objectives. The EU's current R&D programme 2002-2006 allocates roughly €2 billion to research that directly or indirectly deals with climate change. Another €1.2 billion is being spent on nuclear research. These sums complement the financial resources that the 25 Member States commit nationally to climate change-related R&D.

In response to the need for greater efforts to deal with climate change in the future, it is proposed to increase EU funding for climate-relevant research approximately three-fold from 2007 onwards.



EU priorities

In broad terms, EU-funded research supports the following priorities:

- ⇒ *Understanding, observing and predicting climate change and its impacts*
- ⇒ *Providing tools to analyse the effectiveness and costs & benefits of different policy options for mitigating climate change and adapting to its impacts*
- ⇒ *Improving, demonstrating and deploying existing climate-friendly technologies and developing the technologies of the future.*



The EU's main instrument for R&D funding in Europe is the multi-annual framework programme. It brings together scientists from all 25 Member States and is also open to scientists from third countries. The current sixth framework programme runs from 2002 to 2006 and has a budget of €17.5 billion. Climate change falls under 'Sustainable Development, Global Change and Ecosystems' with a budget of almost €2.2 billion.

- ▶ €900 million are allocated to 'sustainable energy systems,' covering the development, dissemination and adoption of innovative technologies and sustainable solutions in energy production and consumption. This involves in the increased use of renewable energies, energy efficiency, clean burning of fossil fuels, use of alternative fuels, carbon capture and storage, and hydrogen and fuel cell technology.
- ▶ €700 million are allocated to 'global change and ecosystems.' Among other things, this covers operational forecasting and modelling of climate change, its impact on ecosystems and biodiversity, research into reducing greenhouse gas emissions, the evaluation of carbon sinks, ozone layer depletion and the creation of new management tools.
- ▶ €600 million are allocated to 'sustainable surface systems,' covering the development and introduction of environment-friendly, efficient and safe transport systems for passengers and goods by road, rail and sea.

The European Commission's Joint Research Centre, which provides research support for EU policymaking and is funded under the R&D framework programmes, is involved in climate modelling, adaptation and mitigation technologies, and scenario-building. The Commission is also actively participating in international technology partnerships, such as the International Partnership for the Hydrogen Economy and the Carbon Sequestration Leadership Forum.

The budget of the sixth framework programme represents around 5% of all public, non-military research spending in the EU. As most projects are only partially financed



by the EU, it mobilises additional funds. EU R&D programmes also signal to national research communities and the private sector what the European research priorities are, triggering additional research.

Looking to the future



In early 2005, the EU agreed on the need to scale up domestic and global efforts to fight climate change in the future, as proposed in the European Commission's policy document, "Winning the Battle against Global Climate Change". The report advocates a major push for innovation based on stronger and better focused research and on policies that spur the uptake of climate-friendly technologies at an early stage of their commercialisation.

In line with this, the Commission's proposal for the 7th R&D framework programme, to run from 2007 to 2013 with an overall budget of approximately €72 billion, roughly triples funding for climate change-related research. It includes three relevant thematic areas: energy (€2.9 billion), environment (€2.5 billion) and transport (€5.9 billion). Another €4.2 billion is proposed for nuclear fusion energy research, fission and radiation protection.

Additional funding will come from other activities and specific programmes. For example, the European Commission's Joint Research Centre will increasingly support EU climate change policies, and the Commission has proposed a 'Competitiveness and Innovation Framework Programme' (€4.2 billion) that will help enterprises and industry innovate.

The proposals will be discussed and adopted by the EU Council of Ministers and the European Parliament.

The three major institutions of the EU are the European Commission, the Council of Ministers and the European Parliament. The European Commission is the sole body that has the right of initiative in proposing and drafting EU legislation, and it is responsible for ensuring its correct implementation after adoption. Most legislation must be adopted by the Council of Ministers, which represents the 25 EU Member States, and the European Parliament, which is made up of 732 directly elected deputies from all Member States.



International cooperation - a key aspect of EU R&D

International cooperation has been an integral part of the EU R&D framework programmes. Under the 6th framework programme, €600 million are allocated to funding scientists from third countries so they can participate in EU-supported research projects, and to projects aimed at establishing international cooperation in specific fields.



As regards climate change, international research activities are explicitly encouraged by the United Nations Framework Convention of Climate Change (UNFCCC), which was agreed in 1992, and its 1997 Kyoto Protocol. The two agreements call on their signatories to promote, and to cooperate in, scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives.

European researchers in the field of climate change are therefore actively cooperating with their counterparts in third countries and disseminating the results of European research projects. The results also feed into the work of the Intergovernmental Panel on Climate Change (IPCC). Established in 1988 by the United Nations, the IPCC brings together more than a thousand scientists from across the world to assess and synthesise existing knowledge. So far, it has published three major reports. Many European researchers directly contribute to the work of the IPCC by making available their research, providing expert knowledge and peer-reviewing studies.



The 'push and pull' approach to ensure the uptake of new technologies

On its own, the development of climate-friendly technologies will not bring about the changes in our energy systems and economies that are necessary to limit climate change. The technologies must also be put to use. Their introduction in the market makes it possible to exploit the technological 'learning curve', which describes a



steady fall in costs and the continuous improvement of the technologies under real-life conditions. This virtuous circle in turn fosters deployment on a wider basis.

Studies indicate that the development and uptake of low-carbon technologies requires a complementary approach – 'technology push' through R&D and 'market pull' through incentives and the appropriate regulatory framework.

In this respect, market-based instruments are useful. For example, the EU emissions trading scheme, which began operating on 1 January 2005, encourages the use of emission-saving technologies by capping CO₂ emissions from some 11,500 energy-intensive installations in the EU. Other examples are green certificate schemes and fiscal incentives for renewable energy sources, which exist in several Member States.

As a result of focused research and policies 'pulling' wind power onto the market, particularly in Germany, Spain and Denmark, wind turbine power has increased by a factor of 100 in the last 20 years, while wind power generation costs have declined by some 80%. From units of 20-60kW in the early 1980s with rotor diameters of around 20m, generators of single wind turbines have increased to 5,000kW with rotor diameters of over 100m.





When all cost elements (including investment, operation and maintenance costs) are considered together, the cost of wind power generation in the EU has come down to approximately 4-5 €cents/kWh at sites with very good wind speeds, and to 6-8 €cents/kWh at sites with low wind speeds. These figures were calculated for 2003 when the wholesale cost of electricity produced by conventional power plants was around 3 €cents/kWh. Due to recent increases in electricity prices, wind power is now approaching competitiveness in locations with high average wind speeds.

What is more, European companies supply 90% of the global market for wind turbines - a market that is worth around € 8 billion and has been growing at 30% per year.

Other renewable energy sources and low-carbon technologies are ready to be used more widely if the right mix of policies is put in place. Renewables, carbon capture and storage techniques, and nuclear fission can decarbonise electricity production and reduce the combustion of fossil fuels to produce energy. Other existing technologies can improve the energy efficiency of buildings, power plants and vehicles. There are also techniques to manage forests and agricultural soil that can enhance the function of natural sinks.

At the same time, research remains crucial to devising the technologies that will play a role in the medium to long-term future. In this regard, hydrogen & fuel cell technology are promising options.



Clean, clever, competitive: the Environmental Technologies Action Plan

The EU's Environmental Technologies Action Plan (ETAP), launched in January 2004, seeks to improve the development and promote the wider use of eco-technologies in the EU, including climate-friendly technologies.

It is based on the recognition that many new environmental technologies have great potential to help resolve environmental problems and, at the same time, boost competitiveness and contribute to economic growth in Europe since the global market for environmental technologies is growing at 5% per year.

ETAP has identified 25 actions to overcome barriers that slow down the development and introduction of eco-technologies. These barriers include economic obstacles (distorting market prices and subsidies, the need for initial investments, the complexity of switching to a new technology), unfavourable regulations and standards, lack of targeted research, inadequate availability of risk capital, and lack of market demand.

The key priority actions under ETAP focus on three themes:

Getting from research to markets: a stronger and more focused research effort including demonstration projects and dissemination; the establishment of technology platforms bringing together researchers and business on specific issues to build long-term visions on research needs and future market developments; European networks for testing, performance verification and standardisation to provide business and consumers with the information they need.

Improving market conditions: development of performance targets for key products, processes and services to improve their performance and stimulate competition; mobilisation of finance to share the risks of investing in new technologies; review of state aid guidelines and subsidies to ensure they do not discriminate against new technologies; green public procurement to use the purchasing power of the public sector as a market driver; awareness-raising among business and consumers; training in the use of new technologies.

Acting globally: promotion of responsible investments in, and use of, environmental technologies in developing countries and countries in economic transition.

ETAP is being implemented by the European Commission, national and regional governments, industry and other stakeholders. By the end of 2005, Member States have to prepare national roadmaps for its implementation. While many of the actions are long-term, initial progress includes the establishment of technology platforms (on hydrogen & fuel cell technology, photovoltaics, manufacturing technologies, aeronautics, construction and steel), the establishment so far of three networks of validation centres, increased funding for eco-innovation in the proposed 7th R&D framework and competitiveness programmes for 2007-2013, the publication of a handbook on green public procurement with many practical tips for public authorities, and a recommendation to standardisation bodies in the EU to consider environmental aspects when setting standards.

More information is available at: www.europa.eu.int/comm/environment/etap/index.htm



Examples of EU-funded research projects

The following are examples of research projects funded by the EU under the 5th (1998-2002) and 6th framework programmes (2002-2006).

Connecting models to policy needs

In recent years, the focus has moved from developing large-scale climate models to linking these models to policy needs. EU-funded projects are now facilitating decision-making by providing a sound scientific base including estimates of uncertainties.

ENSEMBLES (2004-2009)

This UK-led project brings together 70 partners from the EU, Switzerland, Australia and the US, with EU funding of €15 million. The project aims to develop and test an ensemble prediction system for climate change, simultaneously using several models, and to quantify and reduce uncertainty in the representation of feedbacks in the Earth system. (Feedbacks describe the interlinkages between different components of the Earth System.)

www.ensembles-eu.org

CarboEurope (2004-2009)

Funded with €16.3 million from the EU and another €16 million from national governments, CarboEurope is a large integrated project with 61 partners from 17 European countries. It seeks to understand and quantify the present terrestrial carbon balance between uptake and return of CO₂ to the atmosphere of Europe and the associated uncertainty at local, regional and continental scale.

www.carboeurope.org



Evaluating the impacts and costs of climate change

Theoretical knowledge, observations, experimental results and newly developed tools are brought together under the EU umbrella to generate better understanding of the environmental and socio-economic impacts of climate change as well as the impacts and costs of mitigation and adaptation policies.

Scale and effects of climate change in Europe - ACACIA (1997-2000)

ACACIA is so far the biggest European attempt to assess the scale of climate change in Europe, its effects and options for adaptation. Over a three-year period, it harnessed the knowledge of 39 top experts on climatology, the environment and the human sciences from 12 EU countries and produced four future scenarios for Europe based of different levels of temperature increase. Acacia's forecast table is now the most comprehensive reference on the subject and represents a major European contribution to the work of IPCC.

<http://europa.eu.int/comm/research/success/en/env/0336e.html>

Economic effects of climate change policies - GECS (2000-2002)

With €700,000 from the EU, the project prepared economic assessments of climate change policies related to the Kyoto Protocol's flexible mechanisms up to 2030.

www.upmf-grenoble.fr/iepe/GECS

Vulnerability of human health - cCASHh (2001-2004)

Funded by the EU with €1.4 million, this project focused on the vulnerability of human health to adverse effects of climate change, such as heat waves and diseases, and analysed possible adaptation measures.

www.euro.who.int/ccashh

Coastal vulnerability - DINAS-COAST (2001-2004)

This project, funded with €1.4 million from the EU, combined state-of-the-art science and data from a range of different disciplines to help policy makers interpret and evaluate coastal vulnerability to climate change and sea-level rise in Europe.

www.dinas-coast.net

Vulnerability of freshwater eco-systems - EURO-LIMPACS (2004-2009)

The project is bringing together around 40 partners and will receive €12 million in EU funding. It is addressing the impacts of climate change on freshwater eco-systems.

www.eurolimpacs.ucl.ac.uk

Technology transfer under the Kyoto flexible mechanisms - TETRIS (2006-2007)

Supported with €700,000 from the EU, TETRIS seeks to explore the economic and industrial impacts of, as well as the prospects for achieving technology transfer with, the Kyoto flexible mechanisms.

<http://www.zew.de/en/forschung/projekte.php3?action=detail&nr=486>



Lessons from the ice: EPICA

The polar ice sheets are unique and very precious archives of changes in past climate and in the atmosphere's composition. Tiny air bubbles trapped in the ice provide clues to the composition of the Earth's atmosphere thousand of years ago, while the relationship between the levels of atmospheric CO₂ found in the bubbles and the temperature at which the ice formed reflects the extent of the greenhouse effect at that time.

EPICA (1996-2005) is an ambitious multinational European project for deep ice-core drilling in Antarctica. It is a joint project of the European Commission and the European Science Foundation, and has received EU funding of €8.5 million.

The aim of the project is to predict more accurately how global climate is likely to respond to increased emissions of greenhouse gases as a result of human activities. Some of the questions that EPICA seeks to answer are: is the relatively stable warm climatic period of the last 10,000 years an exception in the last 500,000 years? Were the rapid climatic changes of the last ice age cycle global events or restricted to the northern hemisphere, and are the climates of the two hemispheres linked? Which patterns do the transitions from the glacial to warmer periods, and vice versa, follow?

As part of the EPICA project, two new deep ice cores have been drilled in Antarctica. Drilling at one of the sites - Concordia Station, Dome C - was completed in December 2004, reaching a drilling depth of 3270.2 m, 5 m above bedrock. The retrieved core will extend the record back to around 890,000 years ago.



Achieving more sustainable energy systems

Sustainable energy systems are based on improvements in energy efficiency as well as the production of cleaner energy and/or renewable energy. Sustainable energy systems not only reduce greenhouse gas emissions, but produce ancillary benefits such as cleaner air, greater energy security of supply and lower vulnerability to oil price fluctuations.

Energy systems - DISPOWER (2002-2006)

The Dispower project – a consortium of 37 industry players and academic institutions, funded by the EU with €9.5 million – is supporting the transition from today's energy supply structures based on the traditional electricity grid design to a more market-oriented and decentralised supply structure that encompasses renewable energy sources and small generating plants.
www.dispower.org

Photovoltaics - CRYSTAL CLEAR (2004-2008)

The main objective of the CRYSTAL CLEAR integrated project (16 partners) is to allow photovoltaic modules to be produced at low costs while improving their environmental profile by 20%. The EU is supporting this project with €16 million.
www.ipcrystalclear.info

Biofuels - RENEW (2004-2008)

RENEW is an integrated project with 31 partners and EU funding of €10 million. It will develop and evaluate processing technologies for the synthesis of liquid fuels from biomass with a view to producing cost-effective premium fuels for current and future combustion engines.
www.renew-fuel.com

Geological storage of carbon - CO2SINK (2004-2008)

This project, which will receive €8.7 million from the EU, aims to explore geological storage of CO₂. It will investigate a former natural gas storage site and a deeper aquifer and, if safe, inject them with 100,000 tonnes of CO₂. The effects of the injections will be monitored with special monitoring techniques.
www.co2sink.org

Hydrogen - HYWAYS (2004-2007)

HyWays is an integrated project to develop the European Hydrogen Energy Roadmap. Funded with €4 million from the EU, it will carry out a comparative analysis of regional hydrogen supply options and energy scenarios for the periods until 2020, 2030 and 2050.
www.hyways.de

Fuel cells - FURIM (2004-2008)

The integrated project FURIM (EU funding: €4 million) is devoted to further developing fuel cell technologies, particularly the development of polymer membranes for operation above 100°C. This will support the commercialisation of the fuel cell technology.
www.furim.com



Effects of enhancing carbon sinks in agriculture and forestry - INSEA (2004-2006)

With EU funding of €1.5 million, INSEA seeks to develop an analytical tool to assess the economic and environmental effects of enhancing carbon sinks in agriculture and forestry.
www.iiasa.ac.at/Research/FOR/INSEA

Shift to a hydrogen-based economy - CASCADE MINTS (2004-2006)

This tool, being developed with €1 million in EU support, will analyse the prospects for a shift to a hydrogen-based economy and build scientific consensus on the impacts of policies aimed at promoting sustainable energy systems.
www.energytransition.info/cascade-mints

Analytical tools, models and databases developed with EU support

PRIMES - a large-scale model of the energy systems of EU Member States that allows for forecasting, scenario construction and policy impact analysis covering a wide range of energy, environmental and technological policies;

POLES - a world simulation model for the energy sector that allows for regional long-term projections of demand, supply and prices, analyses of the impacts of emission trading systems and the costs of CO₂ abatement policies, and technology improvement scenarios;

GEM-E3 - a model providing details on the macro-economy of EU countries or world regions and their interaction with the environment and the energy systems; allowing for a consistent evaluation of climate change policy measures;

NEMESIS - an econometric macro-sectoral model for EU countries to assess the impacts of economic, environmental and R&D policies in the short to medium term;

MURE - a database on policies and measures for the rational use of energy and renewables in the EU as well as their ex-ante evaluation;

GREEN-X - a tool box with a database calculating potential and costs of climate-friendly energy sources and technologies and the corresponding reductions in greenhouse gases. It uses a dynamic computer model linking and simulating different



Coordinating and harmonising Earth observation systems

Through space, meteorological, atmospheric, oceanic and terrestrial observation centres, European scientists are constantly monitoring the effects of human activities on the global atmosphere and water, as well as land use and ecosystems changes. This provides the necessary scientific background for solid policies. The EU has built up considerable experience in the design, production and operation of Earth observing tools.

Global Earth Observation System of Systems - GEOSS (2005-2015)

As part of the Group on Earth Observations, the EU is working on the ground-breaking Global Earth Observation System of Systems (GEOSS) project, which was launched by 50 countries and 40 international and scientific organisations in February 2005. GEOSS will bring together and make available information on the state of the global environment.

http://europa.eu.int/comm/research/environment/geo/article_2450_en.htm#4

Global Monitoring for Environment and Security - GMES (2002-2008)

Global Monitoring for Environment and Security (GMES) is a joint EU and European Space Agency programme. It represents a concerted effort to collate environmental and security-related data and link information providers with users.

www.gmes.info

Oceanic observation - MERSEA (2004-2008)

MERSEA aims to develop a European system for operational monitoring and forecasting on global and regional scales of the ocean physics, biogeochemistry and ecosystems. This integrated system will be the ocean component of the future GMES system.

www.mersea.eu.org

Oceanic observation - CarboOcean (2005-2010)

The CarboOcean project focuses on large-scale observation of the carbon cycle in oceans, in particular the Atlantic and southern oceans. It will receive €14.5 million in EU funding.

www.carboocean.org

Space-based observation

The EU has provided a comprehensive set of operational space missions with permanent and continuous observing capacities of the Earth's system. The European Commission's Joint Research Centre is developing methods to extract the information from space observations and to assist space agencies in meeting the needs of climate science.

Atmospheric observation - World Data Centre for Aerosols

The Joint Research Centre operates the World Data Centre for Aerosols, one of six World Data Centres set up in the framework of Global Atmosphere Watch, a programme of the World Meteorological Organisation.

<http://rea.ei.jrc.it/netshare/wilson/WDCA/>



International cooperation

Climate change is a global issue, and international co-operation has been an integral part of the priority thematic areas of all EU framework research programmes.

Climate change & African monsoons - AMMA (2005-2009)

The project, which will receive €11.7 million in funding from the EU, aims to reinforce regional environmental monitoring systems and to improve the ability to predict the impact of climate change on West African Monsoon variability.

www.amma-eu.org

Europe/South America cooperation on climate change - CLARIS (2004-2007)

The CLARIS project provides for the transfer of knowledge and expertise in Earth System models between Europe and South America and the creation of a high-quality climate database for South America. The EU supports the project with €500,000.

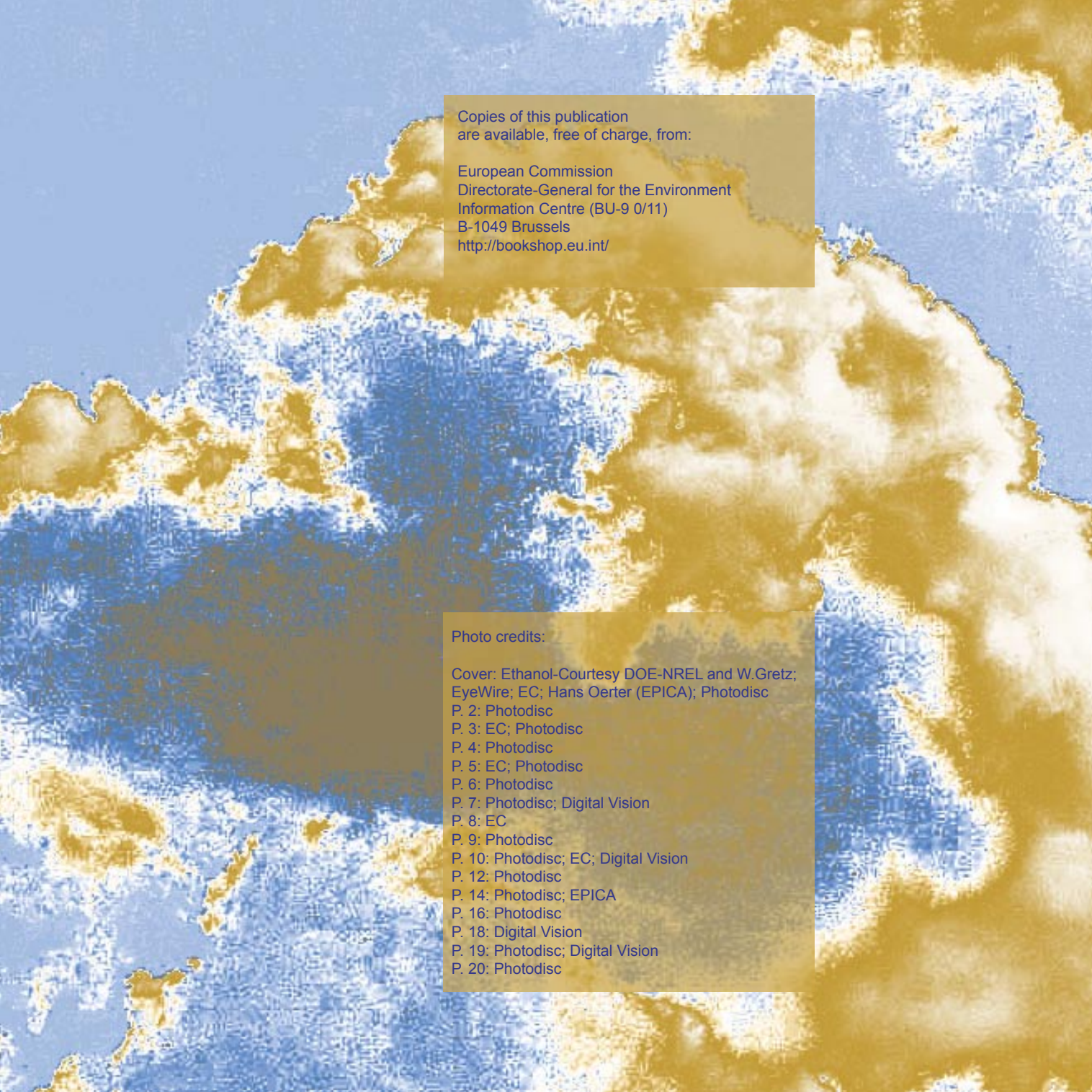
www.claris-eu.org

The Amazon ecosystem - PAN-AMAZONIA (2004-2007)

The project, supported by the EU with €400,000, aims to build and strengthen European cooperation with Latin American partners in building critical mass of human resources and techniques for monitoring and understanding the role of the Amazon ecosystem in climate change and biodiversity.

www.geog.ox.ac.uk/research/projects/panamazonia



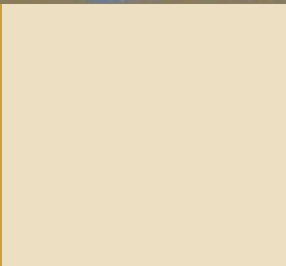
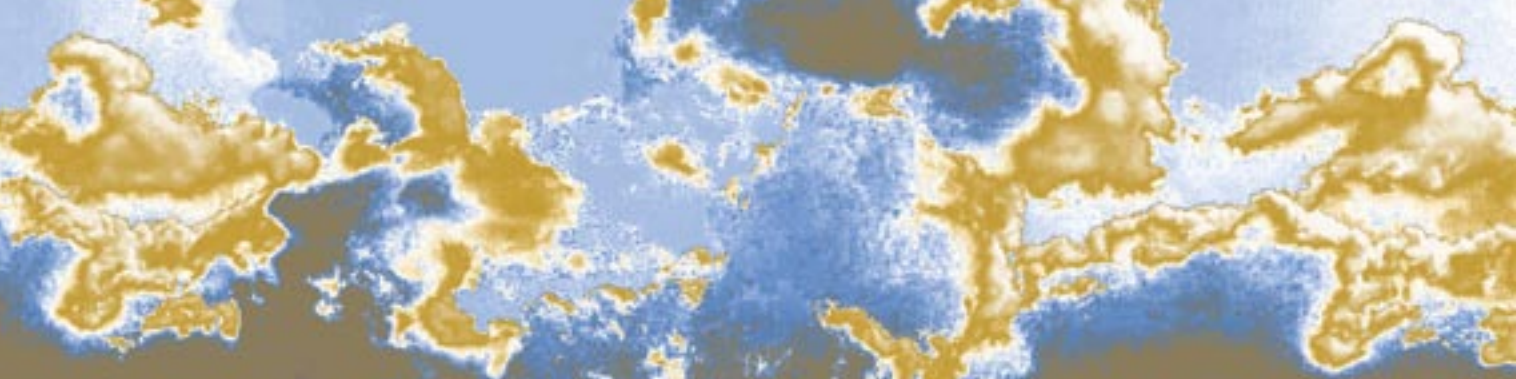


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NATIONAL STRATEGY ON CLIMATE CHANGE

MEXICO

2007

Executive Summary



INTERSECRETARIAL COMMISSION ON CLIMATE CHANGE

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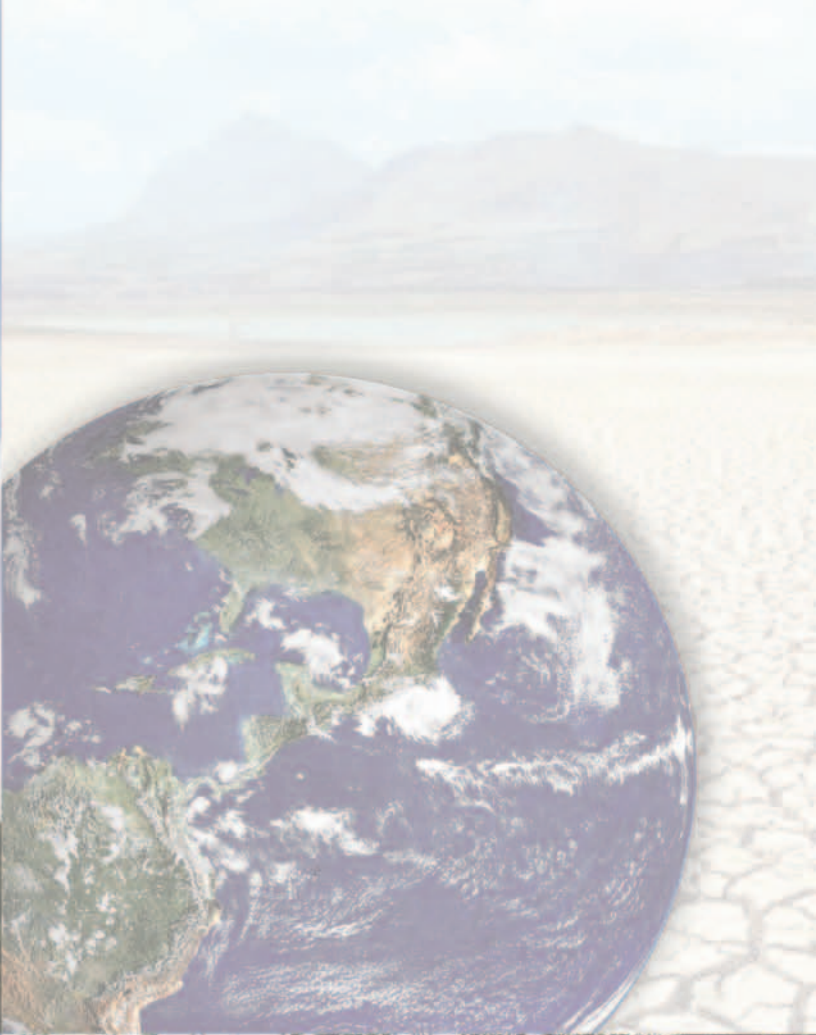
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Executive Summary

Executive Summary

The present document reflects the Mexican Government's commitment to climate change mitigation and adaptation, and its recognition of climate change as one of the major challenges currently faced by humankind.

The National Strategy on Climate Change ("ENACC", for its acronym in Spanish) identifies specific measures for mitigation, with estimates of their potential for emissions reductions. It also proposes a suite of research objectives as a tool for laying out more precise mitigation targets and outlines national requirements for capacity building for adaptation to climate change. While the scope of the ENACC encompasses only those measures within the competence of the Federal Government, it nevertheless contributes to a nationwide and inclusive process of consensus building which will:

- Identify opportunities for mitigation measures and emissions reductions.
- Acknowledge the vulnerability of diverse economic and social sectors and geographic regions to climate change, and take measures to develop the necessary national and local-level capacity for response and adaptation.
- Contribute to the development of strategies, priorities and policies for the Special Programme on Climate Change ("PECC", for its Spanish acronym), which will become an integral part of the National Development Plan, 2007-2012.

OPPORTUNITIES FOR GREENHOUSE GAS EMISSIONS MITIGATION

The general objective of greenhouse gas (GHG) emissions mitigation is the progressive decoupling of increased emissions from economic growth. In the present Strategy, sectoral opportunities and specific mitigation targets (within the timeframe of the present Administration) are identified in two major areas: A) Energy Generation and Use, and B) Vegetation and Land Use. All of these opportunities and targets will be further refined in the forthcoming PECC.

A) ENERGY GENERATION AND USE

The future development of the energy market in Mexico has the potential to generate opportunities for measures which, besides reducing GHG emissions, allow the provision of a cleaner, more sustainable, efficient and competitive energy supply matrix. The following table provides an overview of the principal opportunities for emissions reductions based on a prospective analysis to the year 2014.



National Strategy on Climate Change

ENERGY SECTOR OPPORTUNITIES FOR GHG MITIGATION TO 2014

AREA OR ACTIVITY	PROPOSED MEASURES	ESTIMATED REDUCTION (MtCO ₂ e)
Energy efficiency		
Standards and programmes of the National Commission for Energy Conservation ("CONAE")	Continue application of current energy efficiency standards and develop and implement new ones.	24.0
Energy efficiency and savings programmes of the Trust Fund for Energy Saving ("FIDE").	Strengthen current FIDE programmes and promote new ones.	3.9
Mexican Oil Company (PEMEX)		
Combined Heat and Power (CHP) ¹ in PEMEX	Install CHP plants in the facilities of the National Refining System and in other PEMEX facilities.	7.7
Centralized power supply to offshore platforms	Substitute individual generation plants for a 115 MW combined cycle plant connected to offshore platforms.	1.9
Improvement of energy performance in refineries	Increase PEMEX's energy efficiency target by 5%.	2.7
Fugitive emissions of methane (NH ₄)	Reduce fugitive NH ₄ emissions from natural gas production, transportation and distribution; increase efficiency of flares on offshore platforms.	2.4
Power generation and distribution (Federal Electricity Commission and Central Light and Power)		
Power transmission and distribution	Increase the efficiency of transmission and distribution lines by 2%.	6.0
Thermal efficiency in fuel oil-fired thermoelectric plants	Increase thermal efficiency of fuel oil-fired thermoelectric plants by 2%.	0.7
Conversion to natural gas and repowering of thermoelectric plants on the Pacific coast; modernization of the facilities of the National Refining System	This proposal requires simultaneous action: phase out and reorient fuel oil production incentives; install on the Pacific coast a gasification terminal for imported liquefied natural gas, and convert fuel oil-fired thermoelectric plants to combined cycle.	21.0
Industrial sector		
CHP	Develop the CHP potential of the national cement, steel and sugar industries, among others.	>25
Renewable energy		
Power generation from renewable energy sources	Install 7,000 MW of renewable energy capacity to generate 16,000 GWh per year (additional to the El Cajon and La Parota hydroelectric plants).	8.0
Biofuels	Introduce sustainably produced biofuels.	NA
Transport sector		
Vehicle replacement	Replace freight trucks and diesel busses ≥10 years old from 2008 onwards.	2.0
Freight by rail	Increase rail coverage for freight transportation by 10%.	1.5

¹ Combined Heat and Power (CHP) = Cogeneration



Executive Summary

In order to develop these mitigation opportunities, public policies should be guided by the following priorities:

PRIORITIES ON ENERGY GENERATION AND USE

1. Establish performance standards and GHG emissions' baselines for major activities and emissions sources.
2. Ensure accounting and reporting of GHG emissions and identification of emissions reductions projects in private and public companies under the Clean Development Mechanism (CDM) and other carbon markets.
3. Carry out an economic assessment of the costs of climate change and the benefits of actions to address it, along the lines of the "Stern Review".
4. Establish fiscal and financial incentives for investment in sustainable energy projects.
5. Design and implement measures to ensure that PEMEX has sufficient resources to improve its energy efficiency.
6. Eliminate subsidies for fossil fuel energy consumption and production.
7. Involve new stakeholders and initiatives in government energy efficiency and savings programmes, particularly in thermal efficiency and solar energy use.
8. Implement compulsory and voluntary standardization of equipment, vehicles, power generation systems and consumption in homes, offices and industry.
9. Reduce the use of fuel oil.
10. Promote renewable energy sources and low carbon technology.
11. Repower thermoelectric plants with combined-cycle technology.
12. Facilitate connection of independent suppliers to the national grid.
13. Encourage the regulated participation of private enterprise in low carbon energy generation (particularly in CHP and renewables).
14. Promote research on low carbon technologies and renewables.
15. Amend the proposed Law on the Use of Renewable Energy Sources to increase the share of renewables in overall power generation above the present target of 8%.
16. Increase the performance of the motorized transport fleet by promoting the acquisition of vehicles with low GHG emissions.
17. Implement policies to promote low carbon emissions in public transport and increased use of rail for freight.

B) VEGETATION AND LAND USE

In order to conserve carbon in forest ecosystems and reduce GHG emissions from land use, land use change, forestry and agriculture, three different categories of actions are considered: conservation of carbon stocks, carbon capture and carbon substitution. The following table presents a resumé of the opportunities identified in the ENACC to implement these actions:



National Strategy on Climate Change

OPPORTUNITIES FOR CARBON CONSERVATION IN FORESTS TO 2012

TYPE OF ACTIVITY	PROPOSAL	CARBON CONSERVATION (MTCO ₂ e)
Sustainable Forest Development	Increase the area under sustainable forest management by 2.6 million hectares per year.	6,000-12,000
Payment for Environmental Services	Expand coverage of current programmes of payment for environmental services ("PSAH" and "PSA-CABSA", for their Spanish acronyms) to cumulatively reach 2.49 million hectares by 2012.	1,500-3,100
Conservation of forest ecosystems in Protected Areas	Increase coverage of Protected Areas by 500,000 hectares per year to accumulate 3 million hectares in the National Protected Areas System ("SINAP", for the Spanish acronym).	500-1,000
Wildlife Management Areas	Integrate approximately 6 million hectares of tropical, temperate and arid zone ecosystems within Wildlife Management Areas ("UMA").	3,000-4,250
Forest health	Carry out phytosanitary diagnosis and treatment in approximately 640,000 hectares of forest per year.	1,800-3000



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OPPORTUNITIES FOR MITIGATION OF GHG EMISSIONS IN FORESTRY AND LAND USE TO 2012

TYPE OF ACTIVITY	PROPOSAL	CARBON CAPTURE (MTCO ₂ e)
Forestry		
Reforestation and recovery of lands apt for forestry	Reforest 285,000 hectares a year through the "ProÁrbol" Programme, to accumulate 1.71 million hectares by 2012.	10-20
Soil restoration with reforestation	Restore and reforest degraded soils in an area of 115,000 hectares annually, through ProÁrbol, to accumulate 690,000 hectares.	5-15
Commercial forestry plantations	Expand the area in commercial plantations at a rate of 100,000 hectares per year, to accumulate an additional 600,000 hectares.	3-7
Forest CDM	Identify opportunities for carbon capture projects in forest ecosystems under the CDM.	To be instrumented
Forest derived bioenergy		Estimated reductions (MTCO₂e/year)
Forest derived biofuels	Introduce 500,000 high efficiency wood burning stoves in rural communities.	2.5
Crop production		
Land use reconversion	Promote the reconversion of agricultural land to perennial and mixed crops in 900,000 hectares, through the Programme for Direct Support to Agriculture ("PROCAMPO").	4.2
Efficient use of chemical fertilizer	Develop standards for fertilizer use according to region and crop; produce a Manual of best practices and assess alternative options	NA
Prevention of forest fires from cropland burning	Promote alternatives to slash and burn agriculture in 100,000 hectares, to reduce from 50% to 35% slash and burn related forest fires.	NA
Conservation tillage	Employ conservation tillage and foster cover crops in 200,000 hectares.	0.9
Livestock production		
Rehabilitation of grazing and rangelands	Rehabilitate 450,000 hectares of grazing and rangelands through the Programme for support for cattle production ("PROGAN").	4.6



National Strategy on Climate Change

Additional measures which contribute to GHG emissions reductions and build capacity for climate change adaptation are incorporated in the Shared Agendas for Mainstreaming Environmental Policy which SEMARNAT is drawing up in conjunction with other Federal Government ministries and agencies.

This Strategy identifies the following priorities for developing mitigation opportunities in public policy related to land use, land use change, forestry and agricultural activities:

PRIORITIES FOR VEGETATION AND LAND USE

1. Articulate the implementation of the Ecological Land Use Planning Programme with actions for GHG emissions mitigation.
2. Promote and maintain the functional integrity of ecosystems and their environmental goods and services, by:
 - Reducing deforestation to minimize GHG emissions from this source.
 - Conserving the cover of primary ecosystems.
 - Expanding the capacity for gross primary production by capturing carbon through reforestation, afforestation and ecological restoration.
3. Consolidate the Mexican Carbon Programme to foster scientific research into the carbon cycle and the creation of human resources in this field.
4. Promote applied research, innovation and technological development for carbon conservation and GHG emissions reductions in agriculture.

Consolidation of the proposed measures for mitigation and the effective application and scope of the programmes, technological changes and investments set out in this Strategy require considerable resources, which are in turn dependent upon important economic growth and significant changes to national policies and budgeting. Specific goals and the necessary resources to accomplish them, will be clearly set out in the Special Programme on Climate Change.

Implementation of this Strategy will also depend, to a degree, on the implementation of relevant instruments for international cooperation.

PROGRESSIVE VALUATION OF CARBON IN THE NATIONAL ECONOMY

Mitigation of climate change through actions for reducing GHG emissions will not be sustainable without clear economic signals to promote them. However, the social costs resulting from emissions produced by different economic agents can become economic opportunities through cooperation agreements with external actors having mandatory emissions reductions targets in the context of the international regime on climate change.

For Mexico, the establishment of an integrated national scheme for emissions trading can be aspired to in the medium term, through a realistic, step by step process involving the strengthening of national capacities. The principle of progressive action employed in this Strategy sets out the possibility of increasing by phases both the number of participating sectors and the value of the carbon being traded. The scheme would operate with controlled carbon prices, set low, initially, which would be subject to periodic review until reaching equilibrium with international market prices. The phased deployment of this scheme would allow for its adaptive management to take advantage of opportunities arising from international negotiations on the climate change regime, thereby allowing optimum dividends for promoting cleaner development.



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POSSIBLE PHASES FOR THE PROGRESSIVE VALUATION OF CARBON IN THE NATIONAL ECONOMY

1. Consolidation of the Mexican Oil Company (PEMEX)'s virtual emissions trading scheme, setting limits on emissions from participating facilities and linking it to the voluntary GHG accounting and reporting system promoted by SEMARNAT. Integration of the Federal Electricity Commission (CFE, Mexico's national utility) and Central Light and Power (LFC, the utility for central Mexico) to the voluntary accounting and reporting system. Sustained promotion of CDM projects in all sectors, particularly energy.
2. Assignment of carbon and real exchange values by PEMEX, with minimum budgetary affectations for participating facilities. Periodic review of emissions caps. Integration of CFE and LFC within a notional emissions capping system.
3. Establishment of a carbon credit exchange system with capped values, between PEMEX, CFE and LFC. Introduction of regulatory measures that allow the consolidation and extension of this system, including any necessary changes to laws, regulations and standards.
4. Promotion of carbon credit trading with other economic sectors, public or private, managed via projects with simplified criteria, based on the CDM.
5. Integration of chosen economic sectors within a national "cap and trade" scheme, with capped carbon prices set by central government, which do not threaten the development of a healthy and competitive economy.
6. Integration of further economic sectors within an increasingly consolidated national scheme, with progressive price liberalization.
7. Coupling of the national cap and trade scheme with existing international schemes, whether derived from the Kyoto Protocol or not.

This progressive strategy, to be initiated under the present Administration, will not only reduce the costs of complying with emissions reductions targets, but will also accelerate the recognition of carbon values within the economy as a whole.

FOUNDATIONS FOR NATIONAL ADAPTATION

Mexico's geography, climate, topography and hydrology, contribute –along with other factors– to increase the country's vulnerability to hydrometeorological events which can lead to natural disasters. The occurrence and effects of such events will be aggravated by climate change, so vulnerability must be reduced by promoting a culture of disaster prevention in all aspects of economic and social development.

Capacity building for adaptation requires developing the abilities of different stakeholders to adjust to, and cope with, climate change –greater climate variability and extreme weather events–, in order to attenuate potential damage. By building capacity for adaptation to climate change, the vulnerability of the country can be reduced and the sustainability of economic development can be better ensured.

The areas identified in this Strategy for capacity building for adaptation are: hydrometeorological risk and water resource management; biodiversity and environmental services; farming; coasts; human settlements, and energy generation and use. Mexico's principal requirements for adapting to climate change are to:

- Preserve and strengthen natural buffering functions within watersheds.
- Design a programme promoting the natural recharging of aquifers in conjunction with the National Protected Areas System.
- Increase knowledge and deployment of information exchange and early warning systems.
- Adjust water treatment technology in line with changing climatic conditions.
- Review and strengthen the implementation of natural resource management instruments such as seasonal bans, marine and coastal Protected Areas and payment for environmental (hydrological) services, so as to adapt them to changing climatic conditions.



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- Establish biological corridors between Protected Areas, and evaluate the need to adjust the current boundaries of these and of Priority Regions for Conservation, to improve the adaptive capacities of ecosystems and species.
- Evaluate the experience acquired by vulnerable groups in the face of climate variability and design adaptation policies based on these evaluations.
- Preserve Mexican agrobiodiversity in situ through programmes jointly implemented by the Ministry of Environment and Natural Resources (SEMARNAT) and the Ministry of Agriculture, Rural Development, Fisheries and Food (SAGARPA).
- Develop and implement a climate information and monitoring system specifically designed for the farming community.
- Strengthen epidemiological monitoring systems.
- Plan for an increase in mean sea level of 40 cm between now and the end of the century, as a baseline for infrastructure development in coastal zones.
- Articulate the national policy for marine and coastal sustainable development with the strengthening of national capacities for adapting to climate change.
- Promote synergies between the tourism, fishing and water sectors, and with the National System for Civil Protection.
- Include appropriate environmental design criteria in all aspects of urban planning and development.
- Include the watershed management approach in schemes for environmental services protection and disaster prevention in peri-urban and rural areas.
- Design and build decentralised, small-scale, local energy supply systems.

Capacity building for adaptation to climate change requires the integration and coordination of disciplines, institutions and individual expertise, and the implementation of public policies which consider the following priorities:

PRIORITIES FOR ADAPTATION

1. Review the institutional structures currently in place for hydro-meteorological risk management, to scale up existing capacities.
2. Evaluate current capacity to respond to the impacts of climate variability and use it as a foundation upon which to build greater adaptation capacity.
3. Identify opportunities for the convergence of the activities of different sectors (cross-cutting policies).
4. Design and implement a programme for climate modelling as part of a national climate information system.
5. Enhance the use of ecological land use planning as an instrument to prevent or mitigate certain expected impacts of climate change.
6. Review policies and budgetary allocations to emphasise the importance of prevention planning.
7. Promote actions to reduce vulnerability, minimize risk and generate strategies for adaptation in regional and local development plans.
8. Promote insurance as an aid to reducing vulnerability in different sectors.
9. Design a public information and education strategy that disseminates the results of research, involves society and actively promotes its participation in the design of preventive and adaptive actions.
10. Develop human resources in operational meteorology and climate forecasting.

Implementing these priorities for adaptation is indispensable for strengthening existing capacities to deal with climate variability in different regions of the country, and to help society as a whole to prepare in an opportune way to address climate change.



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RESEARCH PRIORITIES TO ADDRESS THE PROBLEM

In order to strengthen decision making and policy response planning to tackle climate change, the present Strategy identifies the following priorities for research and knowledge creation in the fields of mitigation and adaptation:

PRIORITIES FOR RESEARCH AND KNOWLEDGE CREATION ON MITIGATION

Energy generation and use

- Potential for energy savings and energy efficiency at national and local level.
- Potential for the implementation of energy efficiency standards in key sectors.
- Economic analysis of energy efficiency programmes and measures with pay-back periods for reducing consumption.
- Feasibility of secondary oil recovery by CO₂ injection into extinct or low pressure oilfields.
- Carbon capture and geological storage.
- Feasibility of developing the CHP potential of the cement, steel and sugar industries.
- Technical, economic and environmental assessment of biofuels production and use.
- Identification of opportunities and feasibility analysis of mitigation measures in maritime and air transport.

Forest resources conservation and management

- Identification of opportunities for forest biofuels development.
- Potential of carbon conservation via the application of economic instruments.
- Assessment of the impacts of CDM forestry projects.
- Assessment of the potential feasibility and impacts of afforestation.

Crop production

- Genetic improvement of rice varieties for planting in Mexico's humid tropics in order to obtain better yields in drier conditions, and lower methane emissions.
- Creation of mechanisms for articulating crop reconversion with ecological land use planning, at different scales.
- Implement nitrous oxide emissions accounting under different methods of agricultural management.
- Assess the effect of conservation tillage on CO₂ emissions from crop soils.

Livestock production

- Identify grazing and rangelands susceptible to rehabilitation using a range of different techniques.
- Identify options for restructuring extensive livestock production, establishing semi-intensive grazing regimes and promoting "holistic management".
- Identify options for converting traditional livestock systems to sylvo-pastoral systems.

PRIORITIES FOR RESEARCH AND KNOWLEDGE CREATION ON ADAPTATION

Hydrometeorological risk and water resource management

- Greater use of climate information in decision making.
- Development of seasonal climate forecasts and regional scenarios.



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- Characterization of vulnerability by type of threat and social sector.
- Evaluation of climate change impacts on different stages of the hydrological cycle.
- Design bioclimatic architecture.

Biodiversity and environmental services

- Systematize information on effects on ecosystems and their components.
- Analyze the response capacity of key species for ecosystem functioning.
- Evaluate climate change impacts on those species in risk categories.
- Develop models of forest development under different climate scenarios.
- Assess functioning of existing biological corridors and propose routes for new ones.
- Implement ecological restoration activities for different ecosystems.
- Identify the potential distribution ranges of ecological “refuge” locations for the most vulnerable ecosystems.
- Conduct an economic valuation of environmental services related to flood prevention and impact mitigation in coastal areas and urban centres.

Agriculture

- Identify possible adverse impacts on production by agro-climatic zone and under different climate change scenarios.
- Assess the possible behaviour of crop pathogens under climate change.
- Identify the options for appropriate crop reconversion regimes under different climate change scenarios.
- Assess changing needs for irrigated crops under different climate scenarios.
- Assess the options for adaptation to climate change in the livestock sector.

Coasts

- Map coastal and marine vulnerability and risks from rising mean sea level.
- Model the potential distribution and abundance of marine and coastal species under different climate scenarios.
- Model the potential adverse impacts of climate change on fisheries.
- Conduct an economic valuation of the potential impacts of extreme weather events and the preventive measures that can be taken to mitigate them.
- Conduct research into the post-disaster rehabilitation of coastal ecosystems.

Human settlements

- Design sustainable cities for different climate change scenarios.
- Identify and establish suitable land banks for future urban growth.
- Assess the development potential of small settlements using the criteria of sustainability, self-sufficiency, CHP, network cooperation and other options that increase the adaptive capacity of urban society.
- Design for sustainable urban transportation.

Energy generation and use

- Damage assessment of energy-related infrastructure.
- Potential for the use of renewable energy under different climate scenarios.
- Assess the impacts of climate change on hydroelectricity generation.



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- Assess the impacts of an increase in water consumption and conduction or transportation, on energy demand.
- Assess the impacts on household and business energy demand arising from the earlier onset and later termination of the hot season.

Human health

- Assess the effects of climate change on the health of different social groups.
- Use information from epidemiological early warning systems to strengthen action plans on public health.
- Strengthen programmes for monitoring and control of vector-borne diseases.

OUTLINE OF MEXICO'S OVERALL POSITION IN RELATION TO THE INTERNATIONAL CLIMATE CHANGE REGIME

Problem relevance

- Climate change, caused by an increase in the atmospheric concentrations of GHG represents, along with ecosystem degradation and biodiversity loss, the major environmental problem of the XXI Century and one of the most urgent global challenges faced by humankind.
- Climate change is a problem of strategic security, the solution of which demands unprecedented efforts for mitigation and capacity building for adaptation, in the light of the predictable adverse impacts.
- Adaptation and mitigation are equally important and necessary strategies; neither of them can be employed to the detriment of the other.
- Inaction today will exponentially raise the costs of adaptation in the future, so reducing the potential scope of that adaptation.
- Given their socio-economic, political, and cultural implications, measures for mitigation and adaptation to climate change will increasingly feature in the decision making processes at the highest levels, involving the executive and legislative powers, state and municipal governments, and civil society.

International cooperation and national efforts

- The international regime should be strengthened through political agreements at the highest level that involve major emitter countries.
- The current division between "Annex I" and "Non-Annex I" countries has to move towards a more realistic differentiation.
- Mexico will employ every effort to implement measures to foster mitigation and adaptation in an equitable manner.
- The inaction of others should not be an excuse for one's own inaction.

Challenges and opportunities

- Climate change implies a major threat but also provides a great opportunity to drive the transition towards sustainable development.
- The economic analysis of the "costs of inaction" is of great value in reviewing current public policy both at national and international levels.

International legal instruments

- Mexico fully supports the multilaterally negotiated instruments to address climate change.



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- Mexico is open to the possibility of improving the Kyoto Protocol and agreeing a convenient framework for a second commitment period, and it will also be willing to consider the agreed substitution of the Kyoto Protocol for a more ambitious instrument that could gain wider consensus in the multilateral context.
- Mexico is keen to take part in partial or subregional initiatives as far as they operate in a complementary, rather than substitutional way, with regard to current multilateral agreements.

Towards the adoption of long term commitments

- Mexico is keen to participate in the joint adoption of one or more long term targets, possibly of an indicative, non-binding nature, attainable through collective action. In particular –and by way of addressing Article 2 of the United Nations Framework Convention on Climate Change– Mexico could agree that GHG concentrations should stabilise at levels below 550 ppm of CO₂ equivalent.

Equity issues

- Mexico has not and will not acknowledge “differentiated rights” on common goods or on the environmental services associated with the global atmosphere, and believes that all the Earth’s inhabitants have the same right to use those goods and services. In other words, no country has an inherent right to higher per capita emissions than others.
- Our country favours a process of “flexible convergence” of per capita levels of GHG emissions, in accordance with different national circumstances, as a guiding principle for the long term evolution of the climate change regime.

Evolution of climate change mitigation commitments: towards a post 2012 regime

- Mexico recognises that the structure and scope of agreed commitments under the United Nations Framework Convention on Climate Change and the Kyoto Protocol should evolve, in the sense that developed countries (Annex I) should make deeper commitments while developing countries, such as Mexico, progressively increase their participation.
- The differentiation of responsibilities, as acknowledged by current instruments, should include the differentiation of commitments, in terms of type and timeframe, in accordance with the principle of equity.
- Mexico considers that any voluntary enlargement of the commitments regime should be gradual, based on the progressive strengthening of capacities to measure and monitor GHG emissions from different sectors, identify opportunities for mitigation and develop emissions reduction projects.
- Mexico considers that implementation of effective mitigation measures is crucial, irrespective of whether or not they derive from adopting legally binding commitments.
- In the context of developing the post-2012 regime, reviewing the commitments of advanced developing countries, such as Mexico, could be based on the following parameters:
 1. Within the bounds of their existing capacities, they can undertake mitigation activities by voluntarily adopting policies and measures which, while aimed at achieving sustainable development, result in predictable co-benefits in terms of GHG emissions reductions.
 2. Policies and measures adopted could be subject to review and monitoring by international entities (“pledge & review”).
 3. In adopting said policies and measures, countries could indicatively agree to quantitative emissions targets: either absolute or relative in terms of “emissions intensity” per unit of product; or for a given economic sector or subsector; or for given regions of the country which, when taken together, represent a significant share (at least 25%) of a nation’s total GHG emissions.
 4. Voluntary commitments shall not undermine the right to development or the legitimate aspiration to secure an energy supply commensurate with meeting the essential needs of the population.
 5. The international regime will include mechanisms for cooperation and incentives to increase and complement mitigation efforts undertaken by these countries.
 6. The voluntary adoption of mitigation policies and measures and their associated quantitative targets will not imply the incurrance of any type of penalty for possible non-compliance (“no-lose targets”).



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7. Target over-attainment could allow for the sale of carbon credits on the global market, under agreed conditions.
- The adoption of binding, quantitative emissions reductions targets, relative to total national GHG emissions, would be the final phase of a “step by step” process that comprises several intermediate phases as a prerequisite for the consolidation and strengthening of country commitments.

The Clean Development Mechanism (CDM)

- Mexico favours the development of a global market for carbon credits and, in general, the intensive use of market mechanisms to foster mitigation activities in a sustained manner and to reduce, globally, the costs of compliance.
- Mexico recognizes the pioneering role that the CDM has performed and, in order to scale-up its benefits, proposes that project processing flow be increased, additionality criteria be reviewed, transaction costs minimized, real facilities be provided for small scale projects, and that the thematic and geo-political distribution of projects attain a better balance -among other factors.
- The CDM should maintain its current environmental integrity, but should also attempt more ambitious, complementary schemes which transcend isolated projects to involve entire programmes or productive sectors, thereby expanding the scale of international cooperation.

New instruments for international cooperation

- The post-2012 regime should encourage more ambitious international cooperation schemes which transcend the scope of isolated projects to promote mitigation programmes at a national level or which involve entire economic sectors.
- The stabilization of GHG concentrations at an adequate level demands the rapid and progressive decarbonization of all economies, beginning with those industrialized countries having an historically accumulated responsibility.
- Productive processes also need to be transformed in emerging economies with notably high growth rates. In such countries, the gap between the reasonable efforts undertaken and the scale of the transformations actually required, can only be bridged by new, large-scale cooperation instruments backed by appropriate financial mechanisms. As a result, the global mitigation effort will then be shared by industrialized countries and the beneficiaries of these new instruments – which should be linked to the global market in carbon credits through discounting rates and other, similar schemes, which preserve the environmental integrity of the emerging climatic regime.

NOTE: It has yet to be determined which of the policies and measures outlined in this Strategy can be implemented with national public finance, and which require implementation in the context of international cooperation mechanisms that can ensure their feasibility.



National Strategy on Climate Change

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POLAND'S NATIONAL CLIMATE STRATEGY

1. Introduction

Poland has been a Party to the United Nations Framework Convention on Climate Change (UNFCCC) since 1994 and ratified the Kyoto Protocol on 13 December 2002.

The decision on the ratification by Poland of the UNFCCC and later of the Kyoto Protocol has been driven by its political will to join the international efforts in activities agreed upon jointly under the Convention to slow down climate change and to take both the individual and international responsibility for the processes leading to that change.

Since 1 May 2004 Poland has become a member of the European Union (EU-25), creating favourable conditions for further opening of the Polish market (including the labour market) and for developing foreign trade supporting the inflow of capital and modern technology as well as for providing access of public institutions and economic entities (including farmers) to the European Union funds supporting the implementation of EU policies that are important for the economy.

Poland is a moderately developed country, but among the poorest countries within the enlarged European Union: with its gross domestic product per capita, in terms of purchasing power parity, about 50% of the EU-25 average, and at the same time with the lowest in the Community level of employment for working age people (53.7%) and the highest unemployment rate (13.8% - in 2006).

Poland as a Party to the Kyoto Protocol has made a commitment to reduce its greenhouse gas emissions by **6%** selecting **1988** as the base year for commitments under the UNFCCC and the Kyoto Protocol regarding emissions of the three main gases: carbon dioxide, methane and nitrous oxide, and **1995** as the base year for industrial fluorinated gases: HFCs, PFCs and sulphur hexafluoride.

Political and economic transformation that has taken place since 1990, caused the national GHG emissions to drop much below Poland's target under the Kyoto Protocol. **Over the years 1988–2004, GHG emissions (without Land-use change and forestry) decreased by as much as 32% below the base year.** This reduction has been achieved by implementing a package of policies and measures primarily leading to the improvement of energy efficiency and restructuring of fuel consumption.

Poland as a country undergoing economic modernisation is likely to face an increase of greenhouse gas emissions. The reason for this is mainly the use-structure of fuels (hard coal and lignite), which makes further emission reduction difficult, by switching to gas or to nuclear energy, which does not yet exist in Poland. Modernisation and restructuring processes taking place in enterprises will always be targeted at energy-saving and environmentally friendly measures. Poland wishes to discount the CO₂ emission reductions obtained so far within the framework of the emission trading scheme.

On 4 November 2003 the Council of Ministers has approved *Poland's Climate Policy – the strategies for greenhouse gas emission reductions in Poland until 2020*, whose strategic goal is “for Poland to join the efforts of the international community for the protection of the global climate through the implementation of the principles of sustainable development, particularly within the scope of the improvement of energy consumption, expansion of the national forest and soil resources, rationalisation of the use of raw materials and industrial products as well as rationalisation of waste disposal in a manner ensuring the achievement of maximum long-term economic, social and political benefits”. This goal is consistent with the objectives of the European Union climate policy in which effective climate protection has been given the highest priority in the strategy for sustainable development.

2. National circumstances with respect to greenhouse gas emissions and removals

The Minister of the Environment is the leading body of the state administration responsible for supervising and coordinating work within the Government of the Republic of Poland in the field of environmental protection, including climate change. The Minister of the Environment is responsible for: the protection of the overall environment-related issues and the use of natural resources, meteorology, environmental control and monitoring, as well as forestry. Furthermore, the Minister of the Environment supervises the National Fund for Environmental Protection and Water Management and the 'State Forests' National Forest Holding. Control powers lie within the Chief Inspectorate for Environmental Protection, which is subordinated to the Minister of the Environment. Financial support for environmental activities is provided by the National Fund for Environmental Protection and Water Management and the voivodship (province), *poviat* (county) and *gmina* (commune) level funds. The funds' income comes from fees for utilising the environment and from fines imposed and executed for exceeding the permissible emission standards or for environmental contamination (environmental fees and fines). These financial resources are in return used for financing environment-friendly activities, including air protection, climate protection, environmental education and other fields.

From the point of view of the most important natural resources for social and economic development, Poland is a country with relatively large forest, biodiversity, landscape and mineral resources (including fossil energy fuels), but with rather poor water resources (its resources are four times smaller than the world's average).

Poland lies within moderate geographical latitudes of Central Europe, at the southern coast of the Baltic Sea. Poland's territory amounts to 312,685 km². By the end of 2005 the population of Poland reached 38.2 million. With respect to the population number Poland currently ranks 30th among all the countries in the world and 9th in Europe.

The forest cover index for Poland has a slightly lower level than the European average and is 28.7%. However, the relatively large forest area (over 8.8 million ha) is accompanied by qualitative deficiencies – poor composition of tree species over large forestland parts (large areas of Poland covered with coniferous monocultures, especially pine trees), as well as young age and unsatisfactory condition of a significant part of treestands. Zones of weak, moderate and severe damages connected primarily with the impact of air pollutants emitted by the industry cover 58.7% of the total forest area.

The most important usable mineral deposits found in Poland include: hard coal and brown coal (lignite), crude oil and natural gas, copper ores, zinc and lead ores, sulphur, stone salt and rock resources. There are also medical and geothermal groundwater resources. Poland also has considerable accessible renewable energy resources, mainly from biomass and wind power. High variability of climate and weather conditions causes smaller potential possibilities for using solar energy, whilst the deep location of underground geothermal water deposits affects the use of this source of energy. As for waters, their limited resources and small natural land gradients found over the majority of the country do not allow for increasing their use as hydropower.

The latitude parallel configuration of land relief with the growing altitude from the Baltic Sea basin towards the south constitutes an important factor for the development of climate conditions in Poland, allowing for unrestrained parallel exchange of air streams. In effect, the Polish climate has a typical transient nature, affected by both marine and continental climatic features, depending on the current location and activity of atmospheric pressure configurations over Europe. This causes considerable variability of climate conditions in different years, as well as weather variability in shorter periods.

Foreign trade was an important factor of economic development in 2005 – the export growth for the sixth time in turn has markedly overruled the import growth. Following a significant weakening of the dynamics of economic growth between 2001 and 2002, the year

2003 and especially 2004 have brought considerable improvement of the economic situation. In 2004 the GDP growth totalled 5.3% and was highest over the last seven years. In 2005 the economic growth rate has declined to 3.2%. Nevertheless, the GDP per capita level, in terms of purchasing power parity, has reached half the value of EU-25 average.

Despite significant progress in the improvement of energy efficiency in the Polish economy, Poland still has a high potential in this field. Considering an annual growth of GDP by app. 5% and expected energy demand increase by app. 80% in the perspective of 2025, Poland is likely to achieve further reduction of GDP energy intensity to app. 50% of the present level. This would significantly bring Poland closer to the standards of energy intensity achieved in highly developed countries.

Changes in the structure of final energy consumption in major economy sectors reflect the directions of economic development. The restructuring of industry and measures taken by enterprises that are targeted at energy intensity reduction caused a decrease in energy consumption in these sectors. Constant development of road transport and of the services sector causes a continuing growth of those sectors' share in domestic energy consumption. In the household sector due to a system of thermal insulations that was introduced, and an improvement in the efficiency of heating systems the energy use has reduced in 1995–2004, although this sector still remains most energy consuming from among all sectors of the economy.

Year 2005 was the second in turn in which the role of investment as a factor of developing the growth of GDP has increased, however despite increased gross expenditures on fixed assets (by 6.2% as compared to the 2004 level) the investment rate in the national economy has only reached 18.3% in relation to 23.7% in 2000. Companies with foreign capital are becoming a more significant element of the Polish economy. Transfer of foreign capital in the form of direct investment supports the growth of development-favouring activities. The annual inflation rate (from December 2005 to December 2004) totalled 0.7% against 4.4% in 2004.

There are still a number of state-owned enterprises in the Polish economy that have not accomplished their restructuring processes in the mining industry, metallurgy, energy sector, heavy chemical industry or in shipbuilding industry. The private sector is developing rapidly, not only with large private companies that have been privatised from the former state-owned enterprises, but also the ones that are newly developed.

Despite growing labour demand and high labour supply Poland still has a high unemployment rate, although its level has declined as compared to the recent years. At the end of 2005 there were almost 2.8 million unemployed persons and the unemployment rate dropped to 13.8% (in 2006) from 19% at the end of 2004. Nevertheless, it was the highest rate among the EU-25. By the end of 2005 the unemployment rate of young people (under 24 years of age) was 34.6%. People with the lowest qualifications are mostly affected by long-term unemployment and they constitute the largest group of the unemployed persons. A positive phenomenon is a constant rise in the educational level of Poles.

The health condition of the Polish citizens is systematically improving. The number of deaths per thousand people has declined from 10.2 in 1990 to 9.6 in 2005, including infants as much as from 19.3 to 6.4, respectively. In effect, the average expected lifetime duration has increased over the last 15 years by 4.2 years for men, and by 3.7 years for women.

A significant progress has been achieved in environmental protection over the last dozen years or so. The negative pressure of the economy on the environment has declined by reducing the energy intensity and material intensity of production processes, introducing changes in the system of financing environmental activity, and adjusting protective standards to those of the European Union. The state of the environment, currently, does not differ to a significant degree from the one observed in the developed countries. A positive effect is the constant growth of the protected areas in our country – between 1990 and 2004 this area has grown 1.7 times. At the same time, by becoming the EU member, Poland began to develop

the European Natura 2000 network of protected areas, which covers a significant part of the area already under protection.

3. Information related to greenhouse gas inventory

Each year, Poland submits detailed inventories of GHG emissions and removals to the Climate Convention Secretariat in Bonn. Since 2002, GHG inventory results have been submitted in the form of CRF (Common Reporting Format) – spreadsheet files. National GHG inventories are subject to periodic reviews carried out by expert review teams (ERT) designated by the UNFCCC Secretariat.

Poland, being a Party to the Kyoto Protocol, made a commitment to reduce its GHG emissions by **6%** and selected year **1988** as the base year for the three main GHG gases: carbon dioxide, methane and nitrous oxide, and the year **1995** for fluorinated gases: HFCs, PFCs and sulphur hexafluoride, for its commitments under UNFCCC and its Kyoto Protocol.

Greenhouse gas inventory results show that over the period 1988–2004 emissions decreased significantly (excluding sector 5. *Land use, land-use change and forestry*) reaching the level as much as 32% below the base year. The reduction of GHG emissions has been caused primarily by the decreases of emissions of: carbon dioxide, methane and nitrous oxide that dropped by 33.6%, 23.7% and 25.7%, respectively. The decreasing trend had continued until the year 2002, after which GHG emissions began to grow by 3.3% in 2003 and by further 1.5% in 2004. Total GHG emissions in 2004 were dominated by carbon dioxide, which accounted for 81.52% of the total. Methane emissions contributed 10.1% to the total, while the share of nitrous oxide was 7.7% and F-gases accounted for 0.7% of the aggregated 2004 GHG emission total.

4. Policies and measures

The national GHG emission reduction target pursuant to Annex B to the Kyoto Protocol (6% in the period 2008-2012) is going to be met by Poland. Some of the reduction commitments with respect to CO₂ are allocated – within the emission allowance trading mechanism – among installations in main sectors of the economy according to the National Allocation Plan - NAP (KPRU). The comprehensive GHG emission reduction measures include:

- a system of emission allowance trading,
- the use of the Joint Implementation mechanism,
- the monitoring of emissions and implementation of the Kyoto Protocol (GHG emission monitoring is carried out on a current basis and the results are reported in National Inventory Reports, while implementation of the Kyoto Protocol is presented in National Communications to the Conference of the Parties),
- financial mechanisms that support measures related to GHG emission reduction (financial mechanisms that stimulate emission reduction are introduced by the National Fund for Environmental Protection and Water Management (NFOŚiGW), EkoFund to support measures, inter alia connected with energy efficiency improvement).

Poland's energy policy is based upon the following principles: harmonized energy management under social market economy, full integration of the Polish power sector with the European and world energy market, market competitiveness and support to renewable energy sources. This policy formulates priorities and directions of measures such as: monitoring of the level of energy security, cost reductions in power sector and improvement of energy efficiency as well as strengthening the position of self-governing administration towards enterprises in the power sector.

The reserves of GHG emission reductions in the transport sector lie within broadly understood improvement of organisation of passenger and freight transport and related infrastructural measures, and also in increased use of biofuels.

The ultimate goal of the forest policy formulated in the document entitled the *National Forest Policy*, adopted by the Council of Ministers in April 1997, is to specify measures aimed at maintaining sustained multi-functional role of forests, their usefulness and protection and their role in shaping the environment. This goal is to be achieved by increasing the forest cover nationally to 30% in 2020 and 33% in the mid 21st century, reinstatement and rehabilitation of forest ecosystems and regeneration of devastated forest stands in private forests. Implementation of these measures should result in increased removal and capture of carbon dioxide.

The aim of waste management is to prevent waste generation “at source”, to recover raw materials, to recycle waste and to ensure environmentally safe final disposal of unused waste. The necessary condition to fulfill the aim is to reduce material and energy intensity of production, and to increase the use of alternative renewable energy sources, and to trace product “life-cycle”.

The main measures in individual sectors include:

- 1) In the energy sector:
 - promotion of renewable energy sources,
 - introduction of financial mechanisms that support energy production from renewable sources,
 - promotion of combined heat and power generation,
 - modernisation of existing technologies in energy production and improvement of energy transformation efficiency.
- 2) In industry:
 - improvement of technical standards for appliances and equipment,
 - implementation of best available techniques – integrated permits are granted to installations that implement BAT/BEP,
 - reduction of methane emissions from production and distribution of fuels,
 - development of means to support small and medium-sized enterprises, mainly in implementing innovations and for the improvement of effectiveness,
 - promotion of environment-friendly and effective practices and technologies in industrial activity,
 - support for the development of environment-friendly, technically feasible and cost-effective methods of GHG emission reductions.
- 3) In transport:
 - promotion and use of biofuels,
 - promotion of “ecologically clean” vehicles,
 - construction of motorways, ring-roads and express roads,
 - introduction of more stringent emission standards for motor vehicles,
 - promotion of public transport,
 - improvement of the quality of water transport,
 - measures for reducing GHG emissions from air transport.
- 4) In construction and housing:
 - implementation of energy standards in the construction sector,
 - thermo-modernisation of buildings,
 - increasing awareness of building owners and users with respect to energy saving.
- 5) In agriculture:
 - rational use of fertilizers, including nitrogenous fertilisers,

- efficient use of energy in agriculture, including energy production from biomass waste, slurry and manure,
 - support for the use of other renewable energy sources in production processes,
 - reduction of the demand for solid fuels, coal, coke,
 - technical modernisation of farms,
 - improvement of animal breeding systems, methane reduction from animal manure, the use of techniques to capture methane from litter-free rearing of cattle and other ruminants,
 - preferences to plant production with a high CO₂ removal factor,
 - development of new cultivation and harvesting techniques for plant biomass intended for use as renewable energy source and input material for the industry.
- 6) In forestry:
- counteracting land use change,
 - improvement of forest management,
 - incentives for and measures supporting afforestation,
 - protection of environmental stability of forests,
 - use of wood for energy purposes.
- 7) In waste management:
- recovery and recycling of waste, waste segregation prior to disposal at landfills,
 - modernisation of solid waste disposal at landfills,
 - minimization of waste generation,
 - waste reduction at source,
 - use of landfill gas and biogas for energy generation,
 - implementation of wastewater biological treatment processes based on BAT.

5. Projections of greenhouse gas emissions and the overall effects of policies and measures

Following the guidelines of the Climate Convention, two national projection scenarios were developed for GHG emissions: “with measures” scenario and “without measures” scenario for the years: 2005, 2010, 2015 and 2020. The key scenario is the “with measures” scenario in which currently implemented policies and measures were accounted for. Both scenarios were elaborated in accordance with the requirements for national GHG inventories in line with the methodologies presented in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, and in *Good Practice Guidance and Uncertainty Management*.

Macroeconomic assumptions used in the “with measures” scenario expect the annual averaged GDP growth to be 5.1% during 2005–2010, 5.2% in 2011–2015 and 4.8% during 2016–2020. According to demographic projections, Poland’s population will continue to decline in the projected period. In 2005-2020, according to energy forecasts, we may expect steady improvement of the energy efficiency in all sectors of economy, and also a significant increase in the use of natural gas and renewables for electric energy production. The demand for electric energy is expected to grow steadily.

In both scenarios GHG emissions are expected to grow in 2005-2020, whereas the growth is to be higher in the case of the “without measures” scenario. However, the projected emission for 2020 for both scenarios does not exceed the base year level. The projected emission increase would mainly be caused by the increasing demand for energy resulting in emission growth in sector 1. *Energy*.

Emissions of GHG have been reduced in Poland due to the implementation of various policies. The most effective policies and measures include: increased share of biomass in fuel balances, fuel conversion, increased share of cogeneration, use of biogas from landfills and

processing of sewage sludge and implementation of best available techniques as well as energy-saving and material-efficient technologies.

The national GHG emission reduction target is going to be met by Poland in the first commitment period of 2008-2012 without applying additional measures. Therefore, it is not justified to adopt and implement such measures both from the economic point of view and from the point of view of meeting the Kyoto Protocol targets.

A flexible mechanism in the form of emission allowance trading scheme, pursuant to Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Directive 96/61/WE has been transposed into Polish law in Act of 22 December 2004 on emission allowance trading for greenhouse gases and other substances. Pursuant to the decision of the European Commission of 8 March 2005, after introducing appropriate changes to the *National Allocation Plan for CO₂ Emission Allowances for the Years 2005-2007* (KPRU I), Poland has been incorporated in the Community emission trading scheme. Pursuant to the provisions of Directive 2003/87/EC, by 30 June 2006 each Member State should have submitted to the European Commission for acceptance its *National Allocation Plan for CO₂ Emission Allowances for 2008-2012*. Such a plan (KPRU II) has been submitted by Poland to the European Commission on 30 June 2006. The Polish NAP (KPRU II) was prepared on the basis of sectoral development strategies elaborated by industry associations representing economic entities covered by the system.

Poland does not take part in the implementation of the Clean Development Mechanism (CDM), but participates actively in the implementation of Joint Implementation (JI) mechanism by undertaking – on the Polish territory – jointly with other countries from Annex I to the United Nations Framework Convention on Climate Change, measures that reduce emissions of greenhouse gases. The common will to jointly undertake activities targeted at the Convention's goal through the mechanism of Joint Implementation was expressed by signing agreements and MoU (Memorandum of Understanding) by the Governments of Finland, Canada, Denmark, the Baltic States and the International Bank for Reconstruction and Development (Prototype Carbon Fund). Poland also participates actively in international programmes and funds dealing with the realisation of Joint Implementation projects, like e.g. the Dutch ERUPT programme. Several projects were carried out during the pilot phase of the mechanism of the Kyoto Protocol (under its Art. 6) – Activities Implemented Jointly (AIJ), as well as under the mechanism of Joint Implementation. Moreover, there are a number of potential Joint Implementation projects in various stages of preparation, beginning with those in initial phase, and ending with those in advanced phase, which are awaiting final approval. A new act is being drafted which will regulate matters concerning Joint Implementation projects in Poland, providing the legal basis for project approvals and for project implementation by the entities.

The major obstacles in the implementation of *Poland's Climate Policy* include:

- coal-based use structure of primary fuels, conditioned historically through availability of domestic resources and accompanying social circumstances,
- still relatively low energy efficiency of the economy,
- dynamic development of road transport.

6. Financial assistance and technology transfer under Art. 4.3, 4.4 and 4.5 of the Climate Convention

Poland as a Party not listed in Annex II to the Convention does not have a duty to fulfil the obligations under Articles 4.3, 4.4 and 4.5 of the Climate Convention. However, by understanding the need for supporting sustainable development in the developing countries and in those with economies in transition, provides such assistance to the extent possible.

The Polish development assistance undergoes constant increase, for instance, in 2004 Poland provided 137.3 million USD to support the development of the developing countries and of those in transition (mainly the developing countries). Additionally, over 20 million USD were transferred primarily to countries in transition. Poland also provides funds for promoting technology development. In 2005 the Polish ODA increased to 204 million USD and in 2006 to 296 million USD.

7. Research and systematic observation

Polish scientific research studies in the field of climatology cover a wide range of topics among which the following can be distinguished:

- physical climatology,
- topoclimatology (climatology of urban areas, in particular),
- dynamic climatology,
- regional climatology, applied climatology and climate change survey.

The following major issues may be identified in climate change research:

- historical research on climate change, modelling of climatic processes, and the development of scenarios for predicted climate change,
- climate change impacts on the natural environment, on the economy and the public,
- impact of human activity on climate,
and
- social and political aspects of climate change.

The *National Framework Programme* in which the environment is among one of its priorities in scientific research has been adopted in 2005. A research theme entitled *The economy as a climate change factor* has been launched under this Programme. Its aim is to define the ways of reducing greenhouse gas emissions in Poland and to increase their capture, reduce the use of non-renewable energy sources in favour of the renewables, as well as to combat the negative consequences of emissions of these gases to the economy and nature.

Around 80 research projects on climate change and on the process of global warming have been carried out between 1994 and 2004. They included both projects of European importance and those considered important at national and local levels, e.g.:

- assessment of climate changes in the 20th century,
- adaptation of living organisms and crops to climate change,
- applied research on the impacts of climate conditions on economic and technical activity,
- extreme meteorological and hydrological events in Poland.

Furthermore, scientists from various Polish research centres participated in numerous projects on climate changes and their specific consequences, which were funded with the use of foreign resources, mainly from the European Union.

8. Education, training and public awareness

Environmental education raises public awareness and awakens public interest in cross-cutting environmental, economic, social and political issues. It allows for every man to obtain knowledge and capabilities essential for environmental improvement, and creates new behavioral patterns, develops proper attitudes, approaches, values and opinions of the individuals and of social groups taking account of the concern for environmental quality. Environmental education covers the entire public, all age and occupational groups, as well as high-level governmental administration at central and local levels in the process carried out

by both the institutional entities specially designated for that purpose and also by non-governmental environmental organisations and the media.

Environmental education in Poland is conducted by a number of institutions, among which is the Ministry of National Education. The Ministry of the Environment is involved in environmental awareness raising of the Poles by organising various competitions, exhibitions, conferences, as well as other information and educational events.

A significant role in the process of developing environmental attitudes is played by mass media. The Minister of the Environment is cooperating with them to disseminate updated and reliable information on environmental protection and water management. The Minister also organises press conferences on climate change as well as seminars for journalists dedicated to this issue. This theme is also present in radio broadcasts commissioned by the Minister of the Environment and financed by the National Fund for Environmental Protection and Water Management.

The Ministry of the Environment publishes an information bulletin on *Climate change*, which contains a broad package of information, inter alia, on greenhouse gas emission trends, research projects, undertakings for preventing and adapting to future climate change, and on domestic and international measures that are taken.



27 July 2007

Ministry of the Environment

Swedish policies to combat climate change

The Swedish Government considers climate change to be one of the major environmental and political challenges of this century. This is reflected both in Swedish national policies and Sweden's efforts to contribute to an international future climate regime post 2012.

Sweden has a commitment with respect to the Kyoto Protocol and the EU burden sharing agreement according to which emissions by 2008-2012 should not be higher than a maximum of four percent above levels of 1990. One point of departure of the Swedish climate strategy is that Sweden is to set an example by showing that it is possible to combine proactive climate policies and economic growth. Sweden has adopted a national short term target stating that by 2008-2012 emissions should be four percent lower than in 1990. Greenhouse gas emissions in Sweden were seven percent lower in 2005 than in 1990. During the same period the economy has grown by 36 per cent. Furthermore, Sweden has one of the lowest emissions levels per capita among industrialized countries.

The success of Swedish climate policy is based on the use of economic instruments. In particular the carbon dioxide tax, which Sweden, as the first country in the world, introduced in 1991. Energy taxes have also been of some importance in limiting climate impact in a socially and economically efficient manner. The carbon dioxide tax is based on the carbon content and net contribution to greenhouse gases of various fuels and thus the tax is relatively high on coal, lower on natural gas whereas biofuels such as wood and ethanol are exempt from the tax.

These economic instruments have contributed to increasing the use of biofuels and district heating in the heating sector. Moreover, emissions from households and waste have been reduced as a result of efficient economic instruments. Swedish electricity production is largely carbon neutral since it is based on hydro and nuclear power. Sweden has a system of green electricity certificates to stimulate the production of electricity from renewable sources, such as wind power, hydro power and combined heat and power production (CHP) based on biofuels.

However, further challenges remain, in particular in reducing emissions from the transport sector. The Swedish government has made investments to contribute to research and development on environmentally friendly cars. In order to stimulate the use of environmentally friendly and fuel-efficient cars the Swedish government has introduced a rebate which is granted to private individuals purchasing a new green car. Moreover, delivering a car for scrapping is possible without charge. Product liability has been introduced. Starting on August 1st 2007 Stockholm will reintroduce a congestion tax.

The public sector is to take the lead and set a good example in order to accelerate developments amongst the public and for businesses. Thus there are requirements for a share of 85 percent of green cars in public procurement and leasing of cars. In addition, there is a requirement that at least 25 per cent of emergency vehicles are to be green cars. Measures are taken to improve energy efficiency in the public sector.

The Swedish government has taken a number of initiatives in order to increase involvement of the entire society in the endeavour of combating climate change, in particular to have broader and deeper cooperation with business and industry, the research community as well as the political sphere. These initiatives involve the setting up of a Commission on Sustainable Development, a Scientific Council on Climate Issues and a Climate Committee to review climate policy. One result of these initiatives will be a new climate policy bill which the Government intends to present to Parliament in 2008.

The work of the Commission on Sustainable Development will be action-oriented and focus on essential conditions to create sustainable development, analyse obstacles to sustainable development and develop cross-sectoral action strategies.

The Scientific Council on Climate Issues is to contribute to a scientific assessments to the government bill on climate policy in 2008. One important task is to provide scientific documentation and recommendations for future commitments to be made by the EU and Sweden, in particular what objective or objectives should apply to Swedish climate policy at both national and international level.

The Government has invited all parties represented in the Swedish Parliament to take part in a Climate Committee to review Swedish climate policy. The aim is to achieve broad political support for future Swedish action on climate policy. Its remit includes a broad review of Swedish climate policy and to assess the possibility of achieving the national target for the period 2008–2012 and to shed light on what additional action may be required.

Sweden works seriously with national climate policy, both in the short and long term. However, with a population of some 9 million, Swedish contribution to annual global emissions of greenhouse gases is nearly negligible. Therefore, Sweden believes that international co-operation is of

decisive importance in the effort to combat climate change. Sweden aims to take a leading position in developing a new climate regime after 2012. Sweden will hold the presidency of the EU in the autumn of 2009 – a point in time which may turn out to be crucial for a global climate regime post 2012.

Recently, on June 11-14 2007, the Swedish Minister of the Environment, Mr. Andreas Carlgren, hosted an informal meeting in Riksgården, Sweden for some 27 environment ministers to discuss climate change and a new climate regime. Discussions focused both on long term issues regarding principles and elements on a future climate change regime, as well as concrete issues related to the preparations for the important meeting in Indonesia. As stated in the Chairman's summary minister there was broad consensus that the forthcoming negotiations in Bali should establish a Road Map with a timetable and concrete steps on the future regime with a view to reaching agreement in 2009. Ministers discussed how the elements of a future international regime can be brought together and discussed a package that would include:

- Adaptation measures, to be adopted by all countries, but in particular for poor and vulnerable developing countries;
- More ambitious and legally-binding emission reduction targets for all developed countries;
- Enhanced mitigation actions by developing countries;
- Further action on the deforestation issue;
- Managing unintended consequences of adaptation and mitigation policies;
- Technology development, diffusion and commercialization, in order to support mitigation, adaptation, and more generally, decarbonisation of our economies.
- Investment, incentives, financing, capacity-building, awareness and education.

Ministers also discussed a shared vision for a future regime. The Chairman's summary underlined that the world needs an effective, fair and comprehensive multilateral regime based on concerted international efforts.

More information on

- Swedish Ministry of the Environment
 - Midnight Sun Dialogue Meeting, 11-14 June 2007
 - Swedish report to the UNFCCC (KP) on demonstrable progress
 - Fourth national assessment report to the UNFCCC
- and more can be found at: Swedish Government
<http://www.sweden.gov.se>

THEMATIC DEBATE OF THE GENERAL ASSEMBLY

UNITED NATIONS HEADQUARTERS, NEW YORK

31 JULY / 1 AUGUST, 2007

“CLIMATE CHANGE AS A GLOBAL CHALLENGE”

This document provides an overview of some of the key issues to be considered during the General Assembly's Thematic Debate on climate change, including:

- the latest scientific assessments;
- the two components of the response - adaptation and mitigation;
- the role of the private sector; and,
- possible next steps in the multilateral process.

An annex describes the existing commitments, financial architecture and progress to date of the institutional response to climate change under the auspices of the United Nations.

OVERVIEW

1. The average global temperature rose by 0.74°C during last century. This is the largest and fastest warming trend in the history of the Earth that scientists have been able to discern. Current projections show that trend will continue and will accelerate. The best estimate indicates that the Earth could warm by 3°C during the 21st Century. Scientists are now certain that most of the change is due to human activities that emit greenhouse gases. Greenhouse gases, of which CO₂ is the most important, trap heat in the Earth's atmosphere, leading to the overall rise of global temperatures, which are liable to disrupt natural climate patterns. Eleven of the last 12 years rank among the 12 warmest in the last 150 years. The warming trend has already affected all continents and oceans.

2. The most recent Intergovernmental Panel on Climate Change (IPCC) reports issued this year dispelled many uncertainties. Climate change is already having significant impacts in certain regions, particularly in developing countries, and on most ecosystems. It will affect developing countries' ability to achieve the Millennium Development Goals (MDGs). However, the reports also show that the problem can be addressed and that affordable mitigation solutions exist. Economic assessments indicate that the cost of inaction will exceed the cost of taking early action, probably by several orders of magnitude. Dealing with climate change is an

economic necessity to avoid serious disruption to global and national economic and social activity.

3. The challenge now is to develop a fairer and more effective global response to address this global problem. Some of the worst scenarios outlined by the IPCC can still be avoided by taking immediate action. This requires concerted efforts by all countries, especially industrialised countries and major emerging economies, to significantly reduce the amounts of greenhouse gas emissions. Since climate change is already negatively affecting people in many areas, it is necessary to develop methods that will allow people and communities to adapt to the realities imposed by climate change. Developing countries will be the most affected and are those with the most limited resources – a combination that will require collective efforts to address.

4. 2007 is a critical year and the UN is working to bring countries together to develop a global approach to address climate change. Many initiatives are being launched and commitments undertaken by Member States, groups of States, civil society and the private sector. These are essential but not sufficient by themselves. The UN and its Framework Convention on Climate Change offer the institutional framework within which a global solution can be achieved (see Annex A).

I. THE CHANGING GLOBAL CLIMATE: ASSESSING THE SCIENCE AND THE IMPACTS

IPCC latest assessments

- average temperature rise of around 3°C expected this century.
- during the last 100 years the earth has warmed by 0.74 °C, most rapidly over the last 50 years; Arctic temperatures have increased at almost twice this rate.
- atmospheric concentrations of carbon dioxide have increased from a pre-industrial value of 278 parts-per million (ppm) to 379 ppm in 2005.

5. The “blanket” of greenhouse gases that occurs naturally in the atmosphere serves the vital function of regulating the planet’s climate. Since the start of the industrial revolution some 250 years ago, emissions of greenhouse gases have been making this blanket thicker at an unprecedented speed. This has caused the most dramatic change in the atmosphere’s composition since at least 650,000 years ago. Unless significant efforts are made to reduce emissions of greenhouse gases, the global climate will continue to warm rapidly over the coming decades and beyond.

6. The IPCC – created in 1988 by the World Meteorological Organization and the United Nations Environment Programme – provides the most authoritative and comprehensive assessments of the state of knowledge on climate change every five years. These assessments also provide the basis for international policy-making on climate change. The IPCC does not conduct new research, but makes policy-relevant assessments of the existing worldwide literature on the scientific, technical and socio-economic aspects of climate change, drawing on the work of hundreds of experts from all regions of the world.

7. The latest IPCC assessment, released during 2007, shows that the warming of the climate system is unequivocal and accelerating. This is based on evidence of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.

8. Projections indicate faster warming is expected. If emissions continue to rise at their current pace and are allowed to double from their pre-industrial level, the world will face an average temperature rise of

around 3°C this century. To explain the magnitude of such seemingly insignificant global temperature changes from a different perspective: the difference between the present average global temperature and an ice age is 5 °C.

9. Serious impacts are associated with these scenarios, including sea-level rise, shifts in growing seasons, and an increasing frequency and intensity of extreme weather events such as storms, floods and droughts. Impacts of climate change will vary regionally, with the most significant impacts expected in the Arctic, the Asian mega-deltas, Small Island Developing States (SIDS) and sub-Saharan Africa. Climate change will further constrain water resources, already stretched by growing demand from agriculture, industry and cities. Rising temperatures will further diminish the mountain snow pack and increase evaporation, thus altering the seasonal availability of water.

10. Overall, developing countries are the most vulnerable to these risks. In the most vulnerable communities, the impacts of climate change pose a direct threat to people's very survival. The devastating effects of extreme events, temperature increases and sea level rise will worsen with consequences for all of us, particularly the poor.

11. Wildlife and biological diversity – already threatened by habitat destruction and other human-caused stresses – will face an increased risk of extinction. The most vulnerable ecosystems include coral reefs, boreal (sub-arctic) forests, mountain habitat and those dependent on a Mediterranean climate. The oceans will also experience higher temperatures, and as they absorb more carbon dioxide sea life will be negatively affected due to increasing acidity. In all regions, the faster the temperatures rise, the greater the risk of damage.

12. The climate does not immediately respond to reductions in greenhouse gas emissions. Some greenhouse gases survive in the atmosphere for years, decades or even centuries. As a result, climate change will continue for hundreds of years after atmospheric concentrations have stabilized. Significant reductions in global emissions of greenhouse gases are required. However, decisions on the precise level at which greenhouse gas concentrations should be stabilized to prevent dangerous climate change have not been taken yet.

II. ADAPTING TO CLIMATE CHANGE

13. Adaptation is a process through which societies make themselves better able to cope with the risks associated with climate change. These risks are real and already happening in many systems and sectors essential for human livelihood, including water resources, food security and health. Adaptation options are many and range from technological options such as increased sea defenses or flood-proof houses on stilts, to behavior change at the individual level, such as the sparing use of water, lower and more efficient energy consumption. Other strategies include early warning systems for extreme events, improved risk management, insurance options and biodiversity conservation to reduce climate change impacts on people, e.g. by conserving and restoring mangroves to protect people from storms.

14. Delay to adaptation, and that includes any delay in helping to finance and support concerted, long-term adaptation in developing countries, will mean increased costs and pose greater risks to humanity in the future. Droughts or loss of glacial melt-water, for example, could trigger large-scale population movements and heightened competition over scarcer resources such as water, food and energy. According to the Stern Review, these effects may exacerbate existing political tensions and could drive greater global instability.

15. The IPCC suggest that future vulnerability depends not only on climate change but also on development pathways. Sustainable development can reduce vulnerability. To be successful, adaptation should be mainstreamed in national and international sustainable development priorities and sectoral programs. Climate change can policies can also promote activities with multiple benefits to catalyze progress in achieving sustainable development goals, while contributing to adaptation objectives.

16. Effective national adaptation strategies may include:

- Measures to enhance the scientific basis for decision making;
- methods and tools for the assessment of adaptation;
- education, training and public awareness on adaptation, including for young people;
- promoting individual and institutional capacity-building;
- technology development and transfer;
- promotion of local coping strategies; and,
- legislation and regulatory frameworks, which promote adaptive-friendly action.

17. Many countries are starting to take concrete action to adapt to future climate changes. This needs to be expanded and integrated into national and sectoral plans to ensure that sustainable development and adaptation are progress together. The UNFCCC fosters adaptation by committing all Parties to formulate, implement, publish and update adaptation measures, as well as to cooperate on adaptation. A variety of support mechanisms for adaptation implementation in developing countries are supported; including, the provision of funding, insurance and technology transfer, as well as scientific and technical assistance.

18. National Adaptation Programmes of Action are an option for Least Developed Countries and provide a rigorous assessment of urgent adaptation needs. They aim to expand the coping range of communities. In addition, the 'Nairobi' work programme on impacts, vulnerability and adaptation to climate change assists all countries in understanding and assessing impacts, vulnerability and adaptation. It enables informed decision-making on practical adaptation actions and measures and provides a structured framework for cooperation. The UN System, its specialised agencies and other international organisations also mainstream adaptation into their relevant work programmes.

19. Adaptation must be implemented through a holistic approach incorporating both local (bottom-up) and national (top-down) levels. The role of the UNFCCC is to catalyze adaptation efforts through this integrated and cross-cutting set of actions, which take into consideration current climate variability and future climate change. These actions should be linked to national and sectoral policies and objectives, as well as environmental objectives of other Multilateral Environmental Agreements. Bilateral, multilateral and regional collaboration must be included both in terms of assessment and implementation of adaptation measures.

20. It is critical that adaptation be brought forward on policy agendas. Parties to the UNFCCC have already highlighted the major challenges and the most important elements that might be part of an enhanced multilateral response to climate change when the first commitment period under the Kyoto Protocol expires in 2012. Sustained sufficient funding for the implementation of large-scale adaptation initiatives is of key importance. Without sufficient and targeted funding, adaptation runs the risk of not being effectively addressed. Short-term emergency relief, or "reactive" funding, is costly and unsupportive of sustainable development approaches over the long term.

21. Adaptation does not obviate the need for mitigating greenhouse gas emissions. Both adaptation and mitigation strategies are necessary and complementary.

III. REDUCING THE EMISSIONS THAT CAUSE CLIMATE CHANGE

22. At present total annual emissions of greenhouse gases are rising. Over the last three decades, emissions increased by an average of 1.6 per cent per year with CO₂ emissions from fossil fuels use growing at 1.9 per cent per year. In the absence of further policy action, these emission trends are expected to continue. The IPCC observed that for the period 1970 - 2004, the largest growth in greenhouse gas emissions has come from energy supply and consumption, and road transport. At the same time, access to energy is crucial for achieving the MDGs, and is one of the over-riding concerns of developing countries, since economic growth demands increased or more efficient energy supply and consumption.

23. According to the reference scenario of the International Energy Agency (IEA), global energy demand will grow by 60 per cent by 2030. In the period up to 2030, the energy supply infrastructure world-wide will require a total investment of USD20 trillion, with about half of that in developing countries. The way in which these energy needs are met will determine whether climate change will remain manageable. Both national and international climate policies and actions are needed to “green” energy supply and economic growth. It is also, of paramount importance that the growth of emissions is decoupled from economic growth. Mitigation efforts over the next two to three decades will determine to a large extent the long-term mean global temperature increase and the corresponding climate change impacts that are avoided.

24. According to the IPCC, there is significant potential for mitigation, including increasing the use of clean technologies and improving end-use efficiency. There are significant economic potential for all sectors involved in mitigating global greenhouse gas emissions over the coming decades. This potential is sufficient to offset the projected growth of global emissions or even to reduce emissions below current levels. The IPCC suggest that the macro-economic effects of mitigation towards stabilization (between 445 and 710 ppm of CO_{2e}) in 2030 vary from a small increase in global GDP to a 3 per cent decrease, depending of the stringency of the stabilization target. The Stern Review suggests that the annual cost of emissions reductions leading to stabilization at 550 ppm CO_{2e} is likely to be around 1 percent of GDP by 2050.

25. Some of the available mitigation options are in fact “no regrets” opportunities that can yield multiple societal and environmental benefits. At the same time, concerns of developing country oil exporting nations, which center on the negative impacts that mitigation measures in developed countries may have on their economies, need to be taken into account.

26. The wide deployment of climate-friendly technologies is key to meeting the mitigation challenge. Existing clean technologies need to be rapidly picked up by the private sector and deployed widely, including through technological cooperation between industrialised and developing countries. Addressing climate change will, however, require continuous improvement through innovation and the development of new technologies.

27. Governments can play a major role motivating the private sector to invest in innovative technologies by providing incentives that are clear, predictable, long term and robust. Governments are successfully using a wide range of policies and measures that address climate change, including regulations and standards, taxes and charges, tradable permits, voluntary agreements, subsidies, financial incentives, research and development programs, and information instruments.

28. Effective mitigation requires a diversified portfolio of policies to address all major sectors. Some of the cheapest options for reducing emissions involve electricity savings in buildings, fuel savings in vehicles and increased soil carbon content in agriculture. Policies to promote a shift to less carbon-intensive energy sources are particularly effective. Governments can promote a range of energy options, including the encouragement of natural gas as well as mature renewable energy technologies such as large hydro, biomass combustion and geothermal. Carbon capture and storage technology is another option to isolate carbon emissions from the atmosphere, and to store them, for example in geological formation.

29. Approximately 30 per cent of the projected emissions in the residential and commercial sectors – the highest rate amongst all sectors studied by the IPCC – could be reduced by 2030 with a net economic benefit. Improvements relating to transport, such as providing public transport systems and their related infrastructure and promoting non-motorised transport can further reduce emissions. The greatest potential for reducing industrial emissions is located in the energy-intensive steel, cement, and pulp and paper industries. Options for reducing agricultural emissions are cost competitive in achieving long-term climate objectives.

30. Current rates of deforestation contribute to more than 20% of human-caused greenhouse gas emissions, making deforestation across the globe a significant contributor to human-induced climate change. The UN's Food and Agriculture Organisation estimates that between 2000 and 2005, an average of 12.9 million hectares of forests was lost annually, mostly in South America, followed by Africa and Asia. Arresting today's high levels of deforestation, promoting sustainable forest management and planting or promoting new forests could considerably reduce greenhouse gas emissions.

31. Climate policies can also bring many win-win benefits that may not factor into cost estimates – positive externalities. These include technological innovation, tax reforms, increased employment, improved energy security and health benefits from reduced pollution. Climate policies offering significant co-benefits have the potential to reduce greenhouse gases and provide substantial advantages for numerous economic sectors and for varying development goals.

32. Mainstreaming climate change mitigation is an integral part of sustainable development. The IPCCs findings confirm that sustainable development can reduce greenhouse gas emissions and reduce vulnerability to climate change. Increasingly, strategies to address climate change are being integrated into national planning and sustainable development strategies. Many countries have already launched major national strategies on climate change with a range of government policies to reduce greenhouse gas emissions from industry, agriculture, and forestry, as well as ambitious energy efficiency and renewable energy goals.

33. Projected climate changes can exacerbate poverty and undermine sustainable development, especially in least-developed countries. Global mitigation efforts can enhance sustainable development prospects in part by reducing the risk of adverse impacts of climate change. Effective multilateral cooperation significantly reduces the global cost of addressing climate change compared to the costs if each country was to act alone. The emerging carbon market resulting from the Kyoto Protocol is an illustration of how market incentives can be used to meet objectives set by an international agreement.

IV. THE ROLE OF BUSINESS IN SHAPING SOLUTIONS

34. The role of business as a source of solutions on global climate change is now universally recognized, and its interaction with the public policy agenda is increasing. The business community can offer new choices, innovate, apply knowledge and technology to problems and turn them into opportunities. Key to establishing such a role has been the growing number of corporations who have understood the vital importance of corporate social responsibility, risk mitigation, and performance dimensions associated with the sustainable production and use of energy. Actions to address climate change can also provide a platform for new economic growth, new jobs, new manufacturing and service industries, and new roles for sectors such as agriculture and forestry.

35. Many of the world's leading businesses are stepping up to the problem of climate change because they understand its risks and recognize the need to act to minimize those risks. They also see enormous opportunities in the development of new, climate-friendly technologies that will help economies advance and grow — without continuing to pose a threat to the global climate. They also want to improve their competitive position in the marketplace and to get a head start developing the technologies and the strategies that will contribute to reducing emissions in the years ahead.

36. There is a wide range of activities that businesses can undertake to reduce their contribution to climate change. They can implement green power programs and cogeneration projects; they can develop energy-saving processes and products, clean fuels, biomass energy, clean-burning vehicle engines and much more. With assistance from governments, they can play an important role in the climate effort through partnerships. Both research partnerships and partnerships in the development of climate policy, can help ensure a factual basis about what can be achieved, how to achieve it and when.

37. At the international and national levels, governments need to provide business with certainty of direction. The challenge is to continue to create the frameworks and partnerships that will allow business to play its essential role in protecting the climate. They need to know that climate change is a priority, to understand the direction and the ultimate goal of national and international climate policies. This will allow businesses to invest with confidence in the necessary technologies and strategies.

V. THE NEXT STEPS IN THE GLOBAL RESPONSE TO CLIMATE CHANGE

38. Around the world, discussions on climate change are moving with a new sense of urgency and openness. Climate change has been included in the agenda of several important international and regional meetings this year, many of which have called for successful outcomes at the United Nations Climate Change Conference to be held in Bali in December 2007. The Bali Conference will provide the world with an opportunity to further engage in the multilateral climate change process under the auspices of the UN and to collectively craft the next steps in the global response to climate change.

39. To facilitate an exchange of views and to galvanize political will for the Bali Conference, on 24 September 2007 the Secretary-General will convene an informal high-level event in New York on the margins of the General Assembly. The event will provide an opportunity to involve all countries and other stakeholders in the multilateral process.

Annex A

THE INSTITUTIONAL FRAMEWORK: THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE AND THE KYOTO PROTOCOL

40. General Assembly resolution 45/212 launched negotiations that resulted in the United Nations Framework Convention on Climate Change (UNFCCC). The convention was opened for signature on 4 June 1992 at the Rio de Janeiro 'Earth Summit' the United Nations Conference on Environment and Development. Fifteen years later, the UNFCCC is at the centre of the global response to climate change. The Convention recognizes that man-made emissions of carbon dioxide and other greenhouse gases are altering the world's climate. It has established a long-term objective to stabilize greenhouse gas concentrations in the atmosphere to prevent dangerous human interference with the climate system while allowing development to take place.

41. The provisions of the Convention were not sufficient so a substantial extension to the Convention – the Kyoto Protocol – was adopted at the third Conference of the Parties in December 1997. The Kyoto Protocol, which entered into force on 16 February 2005, established legally binding emission targets for industrialized countries. Since adoption, both instruments have been further elaborated by decisions of Parties at their annual meetings. These collective decisions now make up a detailed set of rules for implementation of both the Convention and its Kyoto Protocol.

A. Commitments under the UNFCCC

42. The UNFCCC sets an overall framework for international efforts to tackle the challenge of climate change. All Parties must develop and periodically submit special reports called national communications, which must contain information on the greenhouse gas emissions of that Party and describe the steps it has taken and plans to take to implement the Convention. Each national communication is subject to an "in-depth" review to provide a comprehensive, technical assessment of a Party's implementation of its commitments.

43. The Convention also requires all Parties to put in place national programmes and measures to control emissions and to adapt to the impacts of climate change. Parties also agree to promote the development and use of climate-friendly technologies; education and public awareness of climate change and its impacts; sustainable management of forests and other ecosystems that can remove greenhouse gases from the atmosphere, and to cooperate with other Parties in these matters.

44. Industrialized countries, which are called Annex I Parties under the Convention, have additional commitments. These Parties agreed to undertake policies and measures with the specific aim of returning their greenhouse gas emissions to 1990 levels by 2000. Annex I Parties must also provide more frequent national communications and must separately provide yearly inventories of their national greenhouse gas emissions, which are subject to an annual technical review process.

45. They must also promote and facilitate the transfer of climate friendly technologies to developing countries and to countries with economies in transition, as well as provide new and additional financial resources to help developing countries implement their commitments. Such financial resources are to be provided through the Global Environment Facility, which serves as the Convention's financial mechanism, and may also be provided through bilateral or other multilateral channels.

B. Commitments under the Kyoto Protocol

46. The Kyoto Protocol shares the Convention's ultimate objective to stabilize atmospheric concentrations of greenhouse gases at a level that will prevent dangerous interference with the climate system. The Kyoto Protocol builds upon and enhances many of the commitments already in place under the Convention. Only Parties to the Convention can become Parties to the Protocol. Although all Parties have agreed to further advance the implementation of their existing commitments under the Convention, only Annex I Parties took on new commitments under the Protocol. Specifically, these Parties have agreed to binding emission targets over the 2008 – 2012 timeframe.

47. To assist Annex I Parties in meeting these targets, and to promote sustainable development in non-Annex I Parties, the Kyoto Protocol adopted three innovative mechanisms, by which Annex I Parties may avail themselves of low-cost emission reductions achieved elsewhere. To support the implementation of these mechanisms, the Kyoto Protocol strengthened the Convention's reporting and review procedures and created a system of electronic databases, called national registries, to monitor transactions under the Kyoto mechanisms, and an international transaction log to verify transactions of emissions credits, including their issuance, transfer and acquisition between registries. It also established a compliance system designed to strengthen the Protocol's environmental integrity, support the carbon market's credibility and ensure transparency of accounting by Parties. It is overseen by a committee, which has the authority to determine and apply consequences for non-compliance.

C. Market Mechanisms and the Carbon Market

48. The Kyoto Protocol's market mechanisms seek to lower the costs of achieving emissions targets: the clean development mechanism, joint implementation and emissions trading. The clean development mechanism, or CDM, allows Annex I Parties to invest in projects in non-Annex I Parties that reduce emissions, or that enhance sinks through afforestation or reforestation. The Annex I Party can then use credits generated by these projects toward meeting its emission target. Similarly, through joint implementation (JI) Annex I Parties can receive credit for investing in projects in other Annex I Parties. Finally, emission trading allows Annex I Parties to trade credits or emission allowances among themselves.

49. Among these mechanisms, the CDM stands out, as it provides a vehicle to finance sustainable development projects that reduce greenhouse gas emissions in developing countries. It is overseen by an Executive Board, operating under the authority of the CMP, that approves methodologies for baselines and monitoring, registers projects and issues credits. With over 1200 projects in the pipeline, the CDM has an overall emission reduction potential of about 1.4 billion tonnes by 2012 (of which 590 million are already in the form of registered projects). The CDM is gaining speed very rapidly, but the market needs long-term policy certainty in demand beyond 2012 to continue to deliver.

50. Currently, CDM projects are not evenly distributed across geographic regions. As a result, the *Nairobi Framework* was initiated by the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), the World Bank Group, the African Development Bank, and the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) at the Nairobi Climate Change Conference in 2006. It aims to help developing countries, especially those in sub-Saharan Africa, to improve their level of participation in the CDM.

D. Financial architecture to address climate change

51. The contribution of countries to climate change and their capacity to prevent and cope with its consequences vary significantly. The Convention and the Protocol therefore call for financial assistance from countries with more resources to those less endowed and more vulnerable. The Parties to the Convention assigned operation of the financial mechanism to the Global Environment Facility on an on-going basis, subject to review every four years. The financial mechanism is accountable to the COP, which decides on its climate change policies, programme priorities, and eligibility criteria for funding. In addition, three special funds have been established:

- (a) **Special Climate Change Fund** to finance projects relating to capacity-building, adaptation, technology transfer, climate change mitigation and economic diversification for countries highly dependent on income from fossil fuels.
- (b) **Least Developed Countries Fund** intended to support a special work programme to assist the LDCs.
- (c) **Adaptation Fund**, will finance practical adaptation projects and programmes in developing countries and support capacity-building activities. It will be funded from the adaptation levy on CDM projects. Parties may contribute as well. It will become operational with the entry into force of the Kyoto Protocol.

52. Different financing efforts need to be reconciled in a long-term legal framework in order to provide security for carbon markets, investments and long-term policy results. Existing financial structures and project-based mechanisms need to complement each other so that available finances can best be directed at both adaptation and mitigation. Governments will consider existing and planned investment flows and finance schemes relevant to the development of an effective international response to climate change at Bali Conference in December 2007, with a particular focus on the needs of developing countries.

E. Technology

53. Clean technologies are central to combating climate change and many are already available. Cleaner technologies and energy efficiency can provide win-win solutions, allowing economic growth and the fight against climate change to proceed hand in hand. Given the continued dominant role of fossil fuels in the global energy mix, energy efficiency, cleaner fossil fuel and carbon capture and storage technologies are needed to allow their continued use without jeopardising climate change objectives.

54. Encouragingly, according to UNEP and New Energy Finance (NEF), sustainable energy investment has increased markedly over the past couple of years, with wind, solar and biofuels attracting the highest levels of investment. This reflects technology maturity, policy incentives and investor appetite. Investor appetite suggests that existing technology is ready for scale-up and that renewable energy can become a larger part of the energy mix without waiting for further technology development yet investments in climate-friendly technologies are still in their infancy

55. To fully meet the mitigation challenge across the globe, the scale-up needed requires greater cooperation between industrialised and developing countries. Clear and predictable policy frameworks for private investors to

operate within and, innovative financing approaches that allow public funds to attract private investment will also help.

56. The UNFCCC has facilitated a number of investment instruments and opportunities targeted at technology transfer. The current technology transfer framework provides opportunities to attract financing for climate change technology transfer by identifying priority technology needs of developing countries and working to create enabling environments for technology transfer. It is also important to build capacity at the national level to improve legal and regulatory framework, and to help project developers at the sectoral level to demonstrate to private financiers that proposed projects are financially attractive.

57. In addition, the Global Environment Facility (GEF) aims to play a catalytic role in the development of markets related to climate change. It allocates and disburses about USD 250 million per year in grants for climate change projects. GEF funds have been used to stimulate innovative financing mechanisms, such as risk mitigation schemes, loan guarantee programs and micro-finance.

58. The CDM also provides a number of opportunities for attracting finance for climate change projects by offering a legal framework and a marketplace for Parties that are required to reduce greenhouse gas emissions. The CDM makes it easier to attract financing for climate change projects, through sales of carbon emissions reductions. As such, the carbon market has an important role to play in bridging the technology and investment challenge, while addressing climate change concerns.

59. The interest of development finance institutions also indicates that there is an opportunity for climate change technology transfer in emerging markets. An important aspect of their activities is that they attract private financiers to climate change projects.

F. Deforestation

60. Reducing deforestation plays an increasing role in carbon mitigation, as well as in other sectors such as stemming biodiversity loss.

61. The UNFCCC acknowledges the need to protect forests as part of efforts to combat climate change. Under the Kyoto Protocol, emissions from deforestation in developed countries are taken into account as part of national commitments to reduce greenhouse gases. Tropical deforestation, however, was excluded from the Kyoto Protocol due to controversies surrounding sovereignty, uncertainty and implications for efforts to reduce fossil fuel emissions. Discussions on reducing emissions from deforestation

in developing countries are underway within the UNFCCC process, at the initiative of developing countries.

H. Calendar of meetings

- Fourth workshop under the Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention and the resumed fourth session of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG)
Vienna, Austria
27 - 31 August 2007
- Thirteenth session of the Conference of the Parties (COP 13) and the third session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP 3)
Bali, Indonesia
3 - 14 December 2007
- Sessions of the UNFCCC subsidiary bodies
Bonn, Germany
2–13 June 2008
- Fourteenth session of the Conference of the Parties (COP 14) and the fourth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP 4)
Poznan, Poland
1–12 December 2008
- Sessions of the UNFCCC subsidiary bodies
Bonn, Germany
1–12 June 2009
- Fifteenth session of the Conference of the Parties (COP 15) and the fifth session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP 5)
Copenhagen, Denmark
30 November to 11 December 2009

GENERAL ASSEMBLY INFORMAL THEMATIC DEBATE: “CLIMATE AS A GLOBAL CHALLENGE”

Summary

In her opening remarks, the President of the 61st Session of the General Assembly emphasized that managing climate was among the greatest challenges currently facing the international community. The thematic debate presented an opportunity to raise awareness and build momentum on climate change, in particular, in preparation for the Secretary-General’s high-level event in September, as well as for the Bali Conference at the end of 2007.

The President of the General Assembly noted that addressing climate change was one of the greatest challenges of our time. She noted the need for decisive global action to address climate change given the scientific conclusions of the Intergovernmental Panel on Climate Change (IPCC). And that action to address climate change must take into account the special responsibility to assist countries most affected and those least able to respond. Such efforts "should not be at the cost of economic growth, but to achieve it," she said, noting that "a global consensus can only be secured if all countries can share in the benefits from action to address" climate change. The President noted that a sustainable long-term solution would require a global cap, with a target for reducing emissions, which should be translated into national targets in order to be meaningful.

Furthermore, she stressed that a comprehensive global response must be pursued in the context of the international development agenda. She also added that steps, including investment in climate-friendly energy production and energy efficiency, as well as technology transfers, carbon pricing and trading, will help to ensure the achievement of the Millennium Development Goals (MDGs). She thanked the sponsors of the debate and announced that the operations of the United Nations Headquarters during the two day thematic debate had been offset or “carbon neutral”.

Noting that climate change was finally receiving the attention it merited, the Secretary-General stated that decisive action on a global scale is necessary. He noted that discussion of national strategies and international commitments at the debate would provide building blocks for the discussion of the global strategy that would take place at High-level Event at the political level, and operational level at Climate Change Conference in Bali. The Secretary-General emphasized his determination to have the entire UN system contribute to this effort and support action by Member States, especially those most vulnerable.

Panel 1: Climate Change: the Science, the Impact and the Adaptation Imperative

A panel of six experts and two respondents underlined that climate change is a reality and that human activities are the main cause. Special guests invited also made comments. The most important sources are carbon dioxide from fossil fuel use and deforestation. Carbon dioxide concentrations have risen sharply with increased fossil fuel use. The impacts of climate change vary, and will be felt differently in different parts of the world. It was emphasized that impacts such as droughts, floods, and water availability are already being experienced at current greenhouse gas concentrations and levels of warming.

It was noted that the continuation of current emission trends could, among other things, potentially result in large-scale population movements and decreased food security. Climate change affects economic growth, social progress and environmental protection and these aspects are best addressed in an integrated manner. The need for sustained investment in climate research was noted, which should include enhanced initiatives for sharing findings and information with developing countries.

Panellists underlined that timely and responsible action could reduce the risk and costs associated with climate change; however, while early action will reduce overall costs, mitigation would still require significant financial resources. Strong economic growth and development are compatible with responsibility on climate change issues. Panellists ***stressed*** that adaptation is ***the responsibility of all***, not only developed countries. However, developing countries are most vulnerable to the impacts of climate change and they lack technological and financial resources for effective adaptation. Developing countries have restricted choices with regard to livelihood and adaptation possibilities, which increase their vulnerability to climate change.

Interactive debate

Several delegations emphasized that climate change is a vital issue for Small Island Developing States (SIDS), and its impacts already affect the livelihoods of SIDS. A number of speakers underlined that climate change concerns touch on issues of proportionality, fairness and equity, and that political leadership is important. Several speakers underlined that development aid commitments made at Monterrey and Gleneagles must be fulfilled. Many delegations reiterated the continued role of the UN in supporting and facilitating the global response to climate change.

Several delegations highlighted the importance of integrating climate change considerations into national development strategies. A number of delegations noted that disaster risk reduction and adaptation are mutually reinforcing, and underlined that there are low-cost measures available for increasing community

resilience and reducing vulnerability to natural hazards and risks. It was noted that gender inequality is exacerbated in disaster situations, with more women dying in natural disasters. However, there was a real opportunity to link women's empowerment and gender equality with climate change.

Several delegations emphasized the need for deeper emission cuts by developed countries, while some also underlined the need for greater engagement by developing countries. Some speakers emphasized that full consideration must be given to the historic responsibility of industrialized countries in the development context.

Panel 2: Mitigation Strategies in the context of Sustainable Development

A panel of five experts and two respondents presented ideas on possible mitigation strategies followed by comments from special guests invited to the GA debate. Many panellists stressed the urgency of taking action now, and some pointed to the complex relationship between sustainable development and climate change. They highlighted that mitigation of green house gas (GHG) emissions could help to achieve sustainable development goals. Several highlighted the link between energy use and climate change and suggested ways to restructure energy systems to achieve GHG emissions reductions.

Some panellists noted that climate change not only presents challenges, but can provide economic opportunities, including opportunities for technology innovation as well as more jobs and business ventures. They emphasized that there are win-win options. These include improving energy efficiency, transitioning to a low carbon economy, increasing renewable energy use and better forestry management that can contribute to socio-economic development while mitigating GHG emissions. At least one panellist suggested the consideration of an international programme on technology transfer.

Many panellists addressed the need to increase financial resources for clean technology development and commercialization. They pointed out that this can be accomplished through market-based incentives and sound regulatory frameworks. Equity financing is still nascent, and ways of lowering investment risks to business and asset holders and enhancing capacities were discussed. Panellists highlighted the importance of specific policy objectives for financing, including building codes, incentives for renewable energy technologies and risk guarantees for new technologies.

Panellists also stressed the importance of developing and expanding local capital markets. Some noted that pricing carbon can be an essential component of an effective climate policy. Expanding both the Clean Development Mechanism (CDM) and the overall carbon market could assure greater capital flows for new infrastructure and technology development. Some panellists noted that trade finance has not been tapped fully.

Interactive debate

Many delegations stressed that climate change is a global challenge with socio-economic and development aspects as well as an environmental considerations that should be considered in an integrated manner in the context of sustainable development. Many stressed the need for an immediate and urgent global response to avoid adverse impacts. They highlighted the importance of negotiating a post-2012 (post-Kyoto) framework keeping in mind the principle of common but differentiated responsibilities.

Delegations stressed that the United Nations Framework Convention on Climate Change (UNFCCC) is the forum for an international agreement on climate change, and many said that negotiations on post-2012 commitments should be finalized no later than 2009. It was also emphasized that other climate change initiatives should support the UNFCCC process. Discussions on the forthcoming Conference of Parties and Meeting of Parties (COP/MOP) to be held in Bali, Indonesia in December included ideas for emissions targets, financing, technology transfer, and reducing deforestation.

Many delegations emphasized that developing countries, particularly the least developed countries (LDCs) and small island developing states (SIDS), are most vulnerable to climate change impacts, despite their smaller contribution to total GHG emissions. Some delegations noted that developing countries' contribution to GHG is expected to increase as their economies grow. Many delegations stressed that eradication of poverty is still the overriding priority of developing countries, and they need more support in terms of funding, capacity building and technology transfer.

Delegations noted the historical responsibility of developed countries and highlighted equity concerns. They also emphasized the need to take into consideration individual circumstances in dealing with climate change and discouraged one-size-fits-all solutions.

Some delegations stressed the need for more sustainable consumption and production patterns, the transfer of cleaner energy technologies, transport sector innovations, increased funding for research and development and highlighted the potential of bioenergy. Some noted the importance of multi-stakeholder partnerships among governments, NGOs, civil society and the business community. Others emphasised the leading role that the private sector led investment can make, particularly in developing countries. Others noted that within a global framework carbon trading has a fundamental role to play as a cost effective mechanism to deliver emissions reductions. Used appropriately carbon markets could deliver investment in low carbon economic growth.

National strategies and international commitments to address climate change

The Secretary-General's Special Envoys on Climate Change, H.E. Mr. Ricardo Lagos, Former President of Chile, and H.E. Mr. Han Seung-soo, Former President of the General Assembly, opened the second day of the debate by presented findings from their consultations. They noted that there have been notable accomplishments at the national level in many countries. They indicated that they were encouraged by the universal support for the Secretary-General's initiative to hold a high level event on climate change. The envoys indicated that leaders expressed interest in adaptation, cleaner technology and transfer of technology, the role of markets in delivering solutions and the need for stronger partnerships. The envoys informed the General Assembly (GA) that they would continue consultations in advance of the 24 September event.

The Under-Secretary-General for Economic and Social Affairs stressed the need for a global response that addresses climate change within the context of sustainable development. He noted that there are opportunities for win-win solutions including by integrating climate change into the development agenda. Countries implementing national sustainable development strategies can address policies aimed at both mitigation and adaptation. Many "Partnerships for Sustainable Development" established after the World Summit on Sustainable Development address aspects of the climate change challenge. Development and deployment of cleaner technology need to be accelerated and long-term measures are warranted. He highlighted the role of the UN in addressing these challenges in partnership with all stakeholders.

Delegations welcomed the initiative of the President of the 61st Session of the General Assembly, Sheikha Haya Rashed Al-Khalifa to convene such a timely and topical debate and supported the Secretary-General's initiative to hold a High-level Event on climate change. They noted that the General Assembly possesses a particular legitimacy in considering climate change and its related issues. They also noted that the UNFCCC is the appropriate forum for negotiations on climate change and the appropriate framework for the multilateral response to climate change.

Most delegations highlighted that climate change is a sustainable development challenge that requires coordinated global response. They noted that it should be addressed in an integrated, coordinated and balanced manner taking into account the three pillars of sustainable development. Delegations stressed the centrality of the principle of common but differentiated responsibilities. Issues of equity and fairness should be dealt with in the international regime.

Delegations underlined that climate change impacts affect all countries, but that African countries, least developed countries (LDCs), land-locked developing countries (LLDCs), and SIDS are often least able to respond and adapt. Many

delegations noted that those countries with the lowest GHG emissions are often the most affected by the adverse impacts of climate change. Delegations highlighted that climate change could be a major obstacle to the accomplishment of the Millennium Development Goals (MDGs) and other internationally agreed development goals. Delegations emphasized that both mitigation and adaptation measures are required in order to mount a collective response to climate change.

National strategies

Delegations reported on national and regional efforts to address climate change with respect to mitigation and adaptation. Many countries are integrating climate change mitigation and adaptation into their national sustainable development strategies and other development plans. Some countries also reported on existing and proposed national climate change strategies and plans. Many delegations underlined concrete efforts to promote cleaner energy technologies and to diversify their energy mix. Delegations presented examples of national programmes and activities in the areas of energy efficiency, renewable energy and cleaner energy technologies. Some expressed commitment to becoming carbon-neutral economies.

Several delegations mentioned programmes relating to forest conservation and reforestation and combating desertification as examples of domestic action on mitigation. Many delegations underlined their continued commitment to research on climate change and dissemination of related findings. Delegations highlighted their activities relating to the research, development, deployment, diffusion and transfer of clean and low-carbon technologies, including carbon capture and storage and clean coal technology.

Countries have adopted a wide range of specific policies and measures to achieve national and regional climate policy goals. Some delegations noted that a combination of customized policy instruments have been utilized to address climate change at the national and regional levels. Several delegations gave examples of national and regional targets related to: GHG emissions, GHG emissions intensity, energy efficiency, the share of renewable energy in total energy consumption, bio-fuel use, forest coverage, and the share of “green” buildings in total building stock. Other policies and measures employed include: removal of harmful subsidies, tax measures, emissions trading schemes, labelling and certification initiatives, development of mass transport systems, improved waste management and waste-to-energy programmes, voluntary agreements between government and industry, public funding of research and development (R&D), co-financing of pilot projects, payment for environmental services and public awareness campaigns on consumption and production patterns and standards and labelling programmes.

Delegations also reported on measures undertaken to reduce vulnerability to the adverse impacts of climate change and enhance resilience, including through strengthened early warning and response systems. Several delegations reported that having undertaken vulnerability assessment and capacity building in relation to adaptation, they were now advancing with the implementation of adaptation projects.

International commitments

Many delegations stated that the principle of common but differentiated responsibilities is the cornerstone for future action. The precautionary principle and the need for enhanced corporate social responsibility were also mentioned. Many delegations noted that other events and initiatives should complement and reinforce ongoing negotiations under the UNFCCC. Many delegations stressed the need for deeper emission reductions by developed countries and adequate action by developing countries.

Some delegations underlined that quantitative targets would not be commensurate with the development needs of developing countries, and some pointed out the need for incentives. Many delegations noted the crucial role of technology under any future global response to climate change, including not only R&D but also dissemination and deployment of existing technologies. Many underlined the important role that could be played by an expanded and enhanced carbon market. Some suggested recognizing the role of forest conservation. Several delegations stressed the need to change unsustainable patterns of consumption and production. One delegation suggested the consideration of external debt swaps for conservation measures.

Some delegations indicated that the forthcoming COP/MOP in Bali could decide on a negotiating “roadmap”, and several noted that this “roadmap” should include timetables, deliverables and milestones for the next two years. Some delegations expressed a willingness to conclude the negotiations on a post-2012 agreement by 2009, and some delegations suggested increasing the frequency of UNFCCC meetings. Several delegations noted that the dialogue on long-term cooperative action under the UNFCCC should be strengthened and extended.

Many delegations underlined the importance of fulfilling international commitments in relation to climate change, particularly with respect to technology transfer, capacity building and finance. Many delegations stressed the need for strengthened support to developing countries to mobilize financial resources, technology transfer and capacity building related to climate change.

Many delegations noted that implementation of internationally agreed goals is hampered by: insufficient financial resources for adaptation; degradation of natural resources; lack of access to and transfer of adaptation technologies; lack of capacity to predict the timing, frequency, and scale of adverse impacts of

climate change; inadequate integration of climate change policy and adaptation measures in national development strategies; and weak or sometimes absence of climate observation networks.

One delegation suggested creating a network of countries working toward becoming carbon neutral economies. Some delegations highlighted the special needs of developing countries dependent on fossil-fuel production and export. In the context of national emissions, reference was made to the emissions associated with manufactures for export.

While recognizing the positive contribution of the CDM, many delegations highlighted insufficient national institutional capacity for participation by many developing countries, particularly in Africa, LDCs and SIDS. They called for the expansion of the CDM, increased support for small-scale projects and simplified and speedier procedures.

Many called for the operationalization of the Adaptation Fund and the commitment of adequate resources to the other climate funds, in particular the Special Climate Change Fund under the UNFCCC. Some delegations emphasized the need to grant priority access to the Adaptation Fund without conditions, in particular for SIDS. Several delegations underscored the need for the Global Environment Facility (GEF) procedures to be streamlined.

Many countries called for the strengthening of North-South, South-South and triangular cooperation in research, development and demonstration initiatives for mitigation and adaptation. Many countries noted that development assistance can contribute to tackling the impact of climate change on vulnerable population groups. Some suggested that development assistance could be targeted to the promotion of sustainable development and capacity building in the vulnerable regions and populations. Some countries underlined that resources allocated to such activities should be additional and not detract from existing commitments.

Further details about the Thematic Debate, including the program, statements, presentations by panellists, international media coverage, national strategies to combat climate change and video recordings of the debate are available on the President's website;

<http://www.un.org/ga/president/61/follow-up/thematic-climate.shtml>



THE PRESIDENT
OF THE
GENERAL ASSEMBLY

27 August 2007

Excellency,

I have the pleasure to enclose herewith an informal summary of the proceedings of the fourth thematic debate on “Climate Change as a Global Challenge” that took place on 31 July - 2 August 2007.

As you may recall, the main objective of the debate was to raise awareness and provide a forum to the growing scientific consensus on climate change. The debate was of great success. This was reflected in both the depth of the discussions and the number of delegations that took the floor. In this regard, the debate was extended an extra day to give all Member States the opportunity to speak.

I would sincerely like to thank all Member States and invited guests for their support and active participation. I would also like to thank the Department of Economic and Social Affairs (DESA), in particular Mr. Sha Zukang for preparing the attached summary. I am hopeful that the summary will provide delegations with further input for the Secretary General’s High Level event on climate change on 24 September 2007, as well as the preparations for the Bali Conference that will take place in December this year.

Finally, I would like to take this opportunity to remind Member States that they are most welcome to provide a summary of their national climate change strategy that can be posted on the President’s website.

Please accept, Excellency, the assurances of my highest consideration.

A handwritten signature in black ink, reading "Haya Rashed Al Khalifa". The signature is written in a cursive style with a long horizontal line extending to the right.

Haya Rashed Al Khalifa

All Permanent Representatives and
Permanent Observers to the United Nations
New York



THE PRESIDENT
OF THE
GENERAL ASSEMBLY

9 July 2007

Excellency,

Further to my letter of 9 June, I have the honour to update you on the preparations for the thematic debate on “Climate change as a global challenge”, that will take place on the Tuesday 31 July and Wednesday 1 August 2007.

For your information, please find attached the programme setting out the status of participation in the two Panels as well as the names of other guests who have been invited to contribute to the interactive discussions. Furthermore, please also find attached a factual background paper provided by the Secretary-General at my request to serve as an input to the thematic debate. These and other papers are available on the website of the President of the General Assembly - <http://www.un.org/ga/president/61/>

I am pleased to confirm that the thematic debate will consist of a brief opening ceremony followed immediately by two separate interactive Panel discussions in the morning and afternoon of the first day. I encourage delegations to use this opportunity to pose questions and respond in an interactive manner to the comments and presentations made by panellists and other experts. Prepared statements focusing on national strategies and international commitments on climate change should be made on the second day, which has been set aside for a general discussion open to all Member States.

I would also like to remind Member States that there will be no formal list of speakers and standard General Assembly protocol will apply. The floor will be given to Member States on a first-come first-serve basis at the meeting, in accordance with the usual General Assembly practice. I strongly encourage concise statements that do not to exceed five minutes to allow as many delegations as possible to participate in the general discussions.

Please accept, Excellency, the assurances of my highest consideration.

A handwritten signature in black ink, appearing to read "Haya Rashed Al Khalifa", written over a horizontal line.

Haya Rashed Al Khalifa

All Permanent Representatives and
Permanent Observers to the United Nations
New York



THE PRESIDENT
OF THE
GENERAL ASSEMBLY

9 June 2007

Excellency,

I wrote to you on 24 May regarding the fourth thematic debate of the 61st session on the theme “Climate Change as a global challenge” at the request of the ASEAN New York Committee and the European Union. I have the honor to inform you that the informal thematic debate will take place on the Tuesday 31 July and Wednesday 1 August 2007.

The United Nations has a central role to play on climate change issues. In this regard, the debate can provide a forum to discuss the growing scientific consensus on climate change, which can be translated into broad political consensus for action on this important issue. The debate represents an opportunity to raise awareness and build momentum on climate change, in particular, in preparation for the Secretary-General’s High-level event in September. In order to facilitate an informed discussion, upon my request, the Secretary-General has kindly agreed to prepare a factual background paper as an input to the thematic debate. I will make this document available to you as soon as possible.

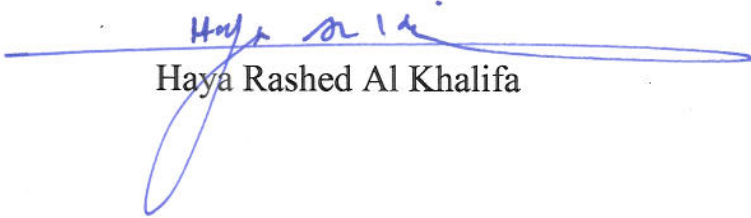
The format of the debate will consist of a brief opening ceremony immediately followed by two separate interactive Panel discussions. The Panels will bring together experts and spokespersons on a variety of climate change issues; including, the impact of climate change, mitigation and adaptation strategies, new technologies and finance. The second day will be set aside for a general discussion open to all. Member States are invited to make statements about their national strategies and international commitments to address climate change. The Secretary-General’s Climate Change Envoys will participate at the opening of the discussion.

All Permanent Representatives and
Permanent Observers to the United Nations
New York

There will be no formal list of speakers and standard General Assembly protocol will apply. The floor will be given to Member States on a first-come first-serve basis at the meeting, in accordance with the usual General Assembly practice. Given the time limitations and as a courtesy to all Member States that would like to make statements, I would strongly encourage these not to exceed five minutes to allow as many as possible to participate in the discussion.

I will revert shortly to you with a detailed program of the event.

Please accept, Excellency, the assurances of my highest consideration.



Haya Rashed Al Khalifa



24 May 2007

Excellency,

I would like to draw your attention to the attached letter from the H.E. Hilario G. Davide, Permanent Representative of Philippines and H.E. Thomas Matussek, Permanent Representative of Germany. On behalf of their respective groups, the ASEAN New York Committee and the European Union, they have asked me to convene a debate under the theme "Climate Change as a global challenge" at the earliest possible convenience.

Given the importance of this issue for the international community I intend to hold this meeting in the second half of July. I will shortly provide you with further details on the exact date and arrangements for the meeting. The Facilitators responsible for consultation on International Environmental Governance will assist me in preparing for this debate.

In this regard, I am pleased to inform you that H.E. Permanent Representative of Mexico, Claude Heller Rouassant will take over from his predecessor, Ambassador Enrique Berruga, as facilitator on International Environmental Governance. I am grateful to Ambassador Heller for accepting this responsibility, which he will carry out in close cooperation with H.E. Peter Maurer, Permanent Representative of Switzerland. I would like to take this opportunity to express my sincere appreciation to Ambassador Berruga for his dedication and tireless efforts to move this process forward.

Please accept, Excellency, the assurances of my highest consideration.


Haya Rashed Al Khalifa

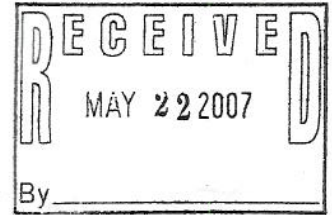
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MISYON NG PILIPINAS SA MGA
NAGKAKAISANG BANSA



Ständige Vertretung
der Bundesrepublik Deutschland
bei den Vereinten Nationen
New York



22 May 2007

Excellency,

On behalf of our respective member countries, we have the honor to request your Excellency to convene a thematic debate under the theme "Climate Change as a global challenge" at the earliest opportunity.

There is now broad agreement within the international community that climate change is one of the immediate global challenges. There is also broad agreement that the world needs to urgently deal with this issue.

As the United Nation's chief deliberative, policy-making and coordinating body, the General Assembly must, therefore, address this issue. The thematic debate would serve to enhance the current momentum on this issue. It could also feed into the Secretary-General's thinking to convene a high-level event on climate change prior to the 62nd United Nations General Assembly. All these steps help to keep priority attention on climate change and will hopefully help create conducive conditions for the 13th Conference of Parties of the United Nations Framework Convention on Climate Change and the 3rd Meeting of Parties of the Kyoto Protocol negotiations in Bali, Indonesia at the end of the year.

We hope that you will give this proposal serious consideration. We would be grateful if this letter could be circulated as an official document of the General Assembly.


HILARIO G. DAVIDE, JR.
Permanent Representative

Chairman, ASEAN New York Committee



THOMAS MATUSSEK
Permanent Representative
EU Presidency

H.E. SHEIKHA HAYA RASHED AL KHALIFA
President
United Nations General Assembly