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**CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT MODELS,  
AND RENEWABLE ENERGIES**

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**I. CLIMATE CHANGE: A GLOBAL CHALLENGE**

1. Worldwide climate change is one of the central problems of our time. Alongside other important aspects of environmental protection, it has become one of the world's most urgent issues. The consequences of climate change can already be observed in many regions of the world: melting glaciers, desertification, the increasing incidence of hurricanes and flooding. It threatens not only the world in which we currently live but the development prospects of future generations. The Fourth Assessment Report published by the Intergovernmental Panel on Climate Change highlights the urgent need for action. There is still time to act to mitigate the worst effects of climate change. Throughout the world parliamentarians in particular have a responsibility to advance a committed environmental policy. The issue of sustainability must receive special attention. The Millennium Development Goals adopted by the UN in New York in 2000 are a response to the principle of globally sustainable development and translate this principle into demands in terms of political and parliamentary action.

2. Although we have long known that our biosphere is being progressively destroyed, recent developments show how little attention has yet been paid to the principle of sustainability. In recent years, CO<sub>2</sub> emissions have risen sharply throughout the world and are now almost 27 per cent higher than in 1990. According to projections of the International Energy Agency (IEA), the energy-related CO<sub>2</sub> emissions of the Organisation for Economic Co-operation and Development (OECD) industrialized nations will rise by 25.3 per cent (EU 25 by 9.1 per cent) in the period from 1990 to 2010-2012. The emissions of developing countries and emerging economies will double in this period (over 103.4 per cent), whereby per capita consumption will in most cases remain below that of the industrialized countries. According to longer-term IEA projections, worldwide CO<sub>2</sub> emissions will rise by as much as 90 per cent from approximately 20 billion to 38 billion tonnes by 2030. They could even rise to as much as 58 billion tonnes by 2050 unless steps are taken worldwide to halt this trend.

3. If immediate action is not taken, the world will be threatened not only by serious environmental changes but massive social and economic disruption as well, creating the risk of violence and instability which could jeopardize national and international security. What we fail to do today in terms of climate protection will result tomorrow not only in long-term

damage to the environment and health, but also in biodiversity loss. As the 2006 Stern Review (among others) has shown, if we do not take steps today, the price we pay in the future will be many times greater. Climate protection must become an intrinsic component of political action throughout the world.

4. Climate protection policy is a global task. Population growth, particularly in developing and newly industrializing countries, and the associated increase in energy needs and consumption of resources, will lead to a further increase in global greenhouse gas emissions unless countermeasures are taken. The success of global climate protection measures will certainly not be decided in the industrialized countries alone. The behaviour of the developing and newly industrializing countries is equally important. In these countries, too, it is important for rapidly rising energy consumption and greenhouse gas emissions to be decoupled from economic growth. The industrialized countries must act as role models and at the same time actively support the developing and newly industrializing countries in their climate protection efforts. Above all, it is essential for the USA, which has still not signed up to the Kyoto Protocol, to be brought on board with respect to climate protection efforts. This is the only way to achieve the goal of limiting the rise in global temperature to two degrees centigrade, as set out in the UN Framework Convention on Climate Change.

5. Greenhouse gas emissions worldwide are growing by one million tonnes a day. Even with the present climate protection system under the Kyoto Protocol it will be scarcely possible to alter this trend. All attention must therefore be focused on stepping up efforts to bring about a post-Kyoto agreement for the period following its expiry in 2012. The targets of the follow-on agreement must be set higher. New and binding international agreements are urgently needed to support the fight against climate change and the process of adapting to environmental changes such as the threat of flooding and desertification. A follow-on agreement must make the two degree target binding under international law and limit greenhouse gas emissions worldwide to the level necessary to achieve this target. Above all, it is essential to bring on board those industrialized countries that have not yet signed up, as well as developing and newly industrializing countries. The industrialized countries still have the highest per capita greenhouse gas emissions. They must therefore lead the way in climate protection and demonstrate to the developing and newly industrializing countries that climate protection is a prerequisite of rather than an obstacle to growth and economic prosperity.

6. A series of resolutions and decisions taken at international level in 2007 and 2008 have given climate protection policy new impetus. Climate protection was placed at the very top of the agenda both at the most recent G8 meeting and during the current EU Presidency. In both cases the opportunity was seized to revitalize international climate policy, guided by two central goals: to initiate a switch over to sustainable energy and to further develop the Kyoto Protocol.

7. At their summit in March 2007, the European Heads of State and Government laid down an important marker for climate protection and adopted agreements to undertake the following:

- Cut greenhouse gas emissions by 30 per cent by 2020 (this ambitious target is linked to global agreements and can be implemented provided that other industrialized countries commit themselves to comparable emission reductions and the more advanced developing countries commit to making a contribution commensurate with their respective capabilities);

- Ensure that the EU will reduce its emissions by at least 20 per cent by 2020;
- Increase energy efficiency by 20 per cent by 2020;
- Increase the share of renewable energies in total energy consumption to 20 per cent;
- Increase the share of biofuels in total fuel consumption to 10 per cent.

8. At the G8 Summit in Heiligendamm (Germany) in June 2007 the Heads of State and Government of the leading eight industrialized nations voiced their support for a follow-on agreement to the Kyoto Protocol and recognized the United Nations as the central forum for the Kyoto Plus process. They also agreed a timetable under which negotiations on a new climate protection agreement are scheduled to be completed by the end of 2009. The Heiligendamm meeting also laid the foundation for the long-term goal of at least halving greenhouse gas emissions by 2050.

9. The Bali Road Map adopted at the UN Climate Change Conference in Bali in December 2007 paves the way for a Kyoto Plus agreement, thereby ensuring that the follow-on process can come into force without delay once the Kyoto Protocol expires. Consultations on a post-Kyoto climate protection agreement are currently under way.

10. It was agreed at the G8 summit in Hokkaido Toyako (Japan) in July 2008 to halve greenhouse gas emissions by 2050.

## **II. GLOBAL MEASURES FOR SUSTAINABLE CLIMATE PROTECTION**

### **A. EXPANDING EMISSIONS TRADING INTO A WORLDWIDE SYSTEM**

11. The European emissions trading system, launched at the beginning of 2005 provided a new market instrument for the trade in CO<sub>2</sub> emissions certificates, setting an upper limit on CO<sub>2</sub> emissions. Under the scheme, CO<sub>2</sub> can be cut within the trading system where it is most cost effective to do so. European emissions trading is currently developing into a global system. International emissions trading was launched at the beginning of 2008 under the terms of the Kyoto Protocol and includes all the parties to the Protocol. Even among non-signatories this climate protection initiative seems to be having an effect. In the USA, for example, a number of states, including California, have announced their intention to introduce trading in CO<sub>2</sub> certificates, and this could send an important signal to other countries.

12. A global emissions trading system and an expansion of the project-related mechanisms of the Kyoto Protocol could generate greater cost efficiency and flexibility with respect to achieving climate protection targets. It will also have the effect of promoting technology transfer in developing and newly industrializing countries, thereby helping to raise environmental, health and living standards and to link together ecological, economic and development policy goals.

13. Increasing energy efficiency, particularly with respect to household items and appliances such as light bulbs, computers and televisions, is an important step towards further cutting energy consumption. What is needed in order to achieve this are equivalents in other parts of the world to the Japanese "top runner programme", in which the most energy-efficient appliance sets the standard for all other appliances, thereby creating competition among manufacturers to continuously improve the energy efficiency of their appliances. In the European Union, the Eco-design Directive pursues the same goal.

14. The greatest potential for cutting greenhouse gas emissions lies in saving energy or using energy more efficiently. An "efficiency initiative" could be instrumental in exploiting this energy-saving potential in industry. The automobile industry has a particular responsibility in this respect to contribute to climate protection by stepping up efforts to develop alternative drive systems. Further important ways of contributing to climate protection include equipping and retrofitting buildings with systems for regenerative electricity, heating and cooling and increasing energy efficiency. Refurbishing existing buildings and incorporating modern technologies in new buildings can substantially cut energy input and consumption and hence greenhouse gas emissions. Solar energy, in particular, has a very important role to play in many regions of the world which enjoy high levels of sunshine. Such projects not only bring cost savings in the long and medium term, they also make a substantial contribution to cutting greenhouse gas emissions.

## **B. MAKING RENEWABLE ENERGIES AVAILABLE GLOBALLY**

15. Technologies to substantially cut greenhouse gas emissions are already available, both in the area of renewable energies and in more efficient energy generation and use. Steps must be taken to promote the use of climate-friendly technologies worldwide. Developing and newly industrializing countries, however, often lack the necessary means in this respect, although it is precisely in these countries that the potential for savings can frequently be tapped most cost effectively. One important approach is the use of climate-friendly technologies in these countries under the Kyoto Protocol, particularly the Clean Development Mechanism.

16. Protecting vital natural resources and preserving nature are core political concerns worldwide and should figure prominently in the work of parliaments. The principle of sustainable development combines economic and social prosperity with the protection of nature and the environment and quality of life. This is particularly important in the rural regions of our world with their diverse patterns of social and economic life.

17. Renewable energies (wind power, biomass and biogas, photovoltaics, water power, geothermal power), must become the main pillars of energy supply worldwide. In recent years, great technical advances have been made in this area and economic efficiency has also been improved. This is of considerable importance for worldwide climate protection as:

- Renewable energies make an active contribution to climate protection by virtue of the fact that their production does not involve the burning of fossil fuels, thereby cutting CO<sub>2</sub> emissions.
- Renewable energies contribute to fuel diversity and lessen dependency on fossil fuels (oil, gas, coal and uranium), which will enable many countries to achieve fuel autonomy and increase supply security.
- Renewable energies encourage regional value-added and safeguard jobs since they involve primarily local energy sources.
- Production plants for renewable energies can be easily dismantled or recycled at the end of their useful life. They do not leave behind radioactive waste or scar the landscape in the way that large-scale coal mining does, for example.
- Importantly, it is precisely the less developed regions of the world which offer great potential for renewable energy and energy efficiency because of both geographical and, in part, regional factors. This provides an opportunity for industrialized, newly industrializing and developing countries to act together in the area of climate policy.

**(a) Wind Power**

18. In many parts of the world the use of wind power as a particularly sustainable source of energy makes very good sense. Alongside land-based wind power plants, there is growing interest in offshore wind farms, not least because they avoid the need to despoil land. Wind power technology has made great strides in recent years and will grow in importance in the future. Ensuring a transfer of technology between the industrialized world and newly industrializing and developing countries which often have favourable geographical and climatic conditions for the use of wind power is therefore particularly crucial. The development of storage possibilities is one of the major technological challenges related to wind power.

**(b) Biomass**

19. Biomass (solid, liquid and gaseous) is a climate-compatible source of energy for the generation of electricity and heat. Since biomass production facilities largely use agriculturally produced raw materials (wood, dung, waste, etc.), they represent particularly suitable approaches to sustainable energy generation in newly industrialising and developing countries. It is, however, crucial to avoid overexploitation of vital natural resources such as wood, which are often in short supply. Ethanol made from biomass is another renewable source of energy. While it has many advantages over fossil energies in terms of CO<sub>2</sub> emissions, however, the cultivation of energy plants creates high levels of gases such as nitrous oxide, which are very harmful to the environment. Despite the fact that ethanol has a positive energy balance, there is an ongoing argument about how environmentally friendly its production is in the wake of the pressures on arable land (monocultures).

**(c) Geothermal energy**

20. Geothermics is still a young technology but one which leading climate protection experts believe will soon become very important in various parts of the world. Through the use of heat pumps and geothermal heating plants heat from the earth's interior can be tapped to heat buildings, feed district heating networks and produce electricity. Following recent technological advances, it is likely that geothermal energy will be making a significant contribution to energy supply within as little as five to ten years.

**(d) Water power**

21. Water power has long been underexploited in terms of its potential for sustainable energy production. As the use of water power grows, possible environmentally damaging consequences of projects such as the construction of barrages must be addressed immediately at the planning and building stages. Marine and maritime technology, using tidal power stations for instance, is a dynamically growing area of renewable energy generation.

**(e) Photovoltaics / solar heat**

22. For many countries in the world's sun belt (Africa, Asia, Australia, South America) photovoltaics offer great prospects in terms of environmental-friendly energy generation. There is work to be done not only on further developing solar power technology, but on improving ways of storing that energy. In order to make widespread use of such forms of energy production (e.g. electricity from the Sahara), however, it will be necessary to establish properly functioning electricity networks at the national level and expand them supranationally.

### **III. STEPPING UP THE DEVELOPMENT OF ENVIRONMENT-FRIENDLY TECHNOLOGIES**

23. Despite the great potential offered by renewable energies, they are not yet able to provide all the energy required. For this reason renewables should be viewed in combination with other forms of energy production as part of an energy mix. Research and development on existing climate protection technologies needs to be improved at the same time in order to generate additional climate protection possibilities.

24. The use of nuclear power is an important but controversial subject. Different trends can be observed around the world: some countries are planning to phase out or are engaged in phasing out nuclear power while in other regions of the world nuclear power is enjoying a renaissance. While critics highlight not only safety aspects but also the unsolved problem of the final storage of nuclear waste and the issue that uranium is a finite resource, advocates argue in favour of nuclear power on the grounds that it avoids CO<sub>2</sub> emissions. Even if these advocates press for an expansion in nuclear energy, it must be clear that this technology cannot solve the long-term problems.

25. Coal is also a controversial source of energy because of its high emission values. In this context, separating and storing CO<sub>2</sub> underground using carbon capture and storage (CCS) technology, still in its test stage, presents a new and important prospect for the future. Low carbon coal-fired and gas-fired power stations open up new options for more environment-friendly energy production using fossil fuels as an interim solution.

26. The development of energy storage devices and alternative fuels is a matter of high priority. Similarly, research on hydrogen and fuel cells needs to be intensified. In tandem with this, the possibility of establishing worldwide hydrogen highways to use hydrogen technology needs to be explored.

27. Protection of the world's climate, conservation of valuable resources and sustainable global development are central challenges of the 21<sup>st</sup> century which can only be met if the industrialized countries, emerging economies and developing countries work together. Safeguarding ecological sustainability in the sense of the UN Millennium Development Goals requires the establishment of a global development partnership as well as a common commitment to the fight against poverty and hunger worldwide. Parliaments have a particular responsibility in relation to preserving vital natural resources on our planet. The survival of humankind depends on the ability of the world to work together and act with speed and far-sightedness.

### **IV. BIOFUELS AS AN IMPORTANT RESSOURCE OF RENEWABLE ENERGY**

28. The increasing scarcity of oil reserves makes it even more urgent to find alternative sources of energy. Significant research in areas that still receive little funding must be undertaken in order to improve the effectiveness of sustainable energy on a scale that will yield significant results in a reasonable period of time.

29. The present technologies allow the establishment of realistic targets for the reduction of GHG emissions. However, the least developed countries are not adequately aided in their requests for the necessary funds to develop clean technologies for energy generation.

30. The United Nations Environment Programme (UNEP), in a report published in August 2008, estimates that an annual reduction of 6 per cent in GHG emissions could be obtained if the global energy subsidies representing 0.7 per cent of the world GDP were eliminated.

31. According to the UNEP report, US\$ 300 billion are spent every year in order to maintain low fossil fuel prices and subsidize producers. These subsidies not only deprive the poor of benefits, but also increase the consumption of energy from non-renewable sources. In this context, the waste of finite resources is favoured over the inclusion of more sustainable sources of energy.

32. Fossil fuel subsidies are created for political reasons. The majority of these resources are used to guarantee low prices for fossil fuels such as oil, coal, and gas, and for energy generated by fossil fuels.

33. However, renewable sources of energy have been gaining ground in the international arena due to continuous and consistent improvements in the development of new technologies and in the expansion of production. Renewable energy considerably decreases the dependence of nations on fossil fuel imports.

34. Among the main renewable sources of energy, biofuels are in the spotlight due to the fact that they are the main energy alternatives available in a short period of time and due to their capacity to ensure energy security, associated with other positive results such as: energy diversification, agribusiness development, job and income generation, reclamation of degraded areas, reduction of CO<sub>2</sub> emissions and reduction of their impact on climate change.

35. It is important to emphasize that the annual growth foreseen for the world energy consumption is 2.1 per cent, while the annual growth foreseen for world oil and gas consumption is 1.9 per cent. Therefore, there is a deficit scenario between energy supply and demand for growth. Decreasing fossil fuel reserves, lack of guaranteed supply, and increasing environmental pressure further worsen this scenario.

36. Ethanol produced from sugarcane is sustainable because it consumes, during its production, fewer quantities of fossil fuels than ethanol produced from corn. In addition, corn ethanol production promotes a direct competition between the utilization of corn for food and its utilization for fuel. It is a negative effect that raises the price of corn and corn products in countries where this grain is a staple.

37. The production chain of ethanol from sugarcane does not contribute significantly to an accentuation of the greenhouse effect. The potential sugarcane production in the world is:

<b>Description</b>	<b>Area (millions of hectares)</b>
Area suitable for cultivation	351.9
Protected areas and forest-covered areas	153.7
Area currently in use	20.4
<b>Available area</b>	<b>177.8</b>

38. The area used for the production of biofuels throughout the world covers about 10 million hectares, while the overall area occupied by agriculture covers 1.2 billion hectares.

39. In Brazil, there is no significant competition for land use between food production and fuel production. Sugarcane occupies approximately 10 per cent of total cultivated lands, corresponding to only 1 per cent of lands available for agriculture in the country. The total area occupied by sugarcane to produce sugar and ethanol equals 5.6 million hectares.

40. According to Professor José Goldemberg, of the University of São Paulo, the Brazilian model of ethanol production from sugarcane can be replicated in other countries without significant impacts on the environment. The expansion of production following the model of the Brazilian ethanol programme, thus adding 30 million hectares of land in Brazil and other countries, would allow ethanol to replace 10 per cent of the gasoline used in the world. Such an area corresponds to a small fraction of the 2 billion hectares of cultivated lands in the entire world.

41. A report released by World Wildlife Fund (WWF)-Brazil in May 2008 points out the benefits of ethanol on the environment. The report claims that the production of ethanol from sugarcane has a positive impact on the environment, does not invade forest areas in the Amazon region, and does not bring about significant competition with food production.

42. The WWF report endorses the stance taken by the government of Brazil concerning the demonstrated environmental benefits of ethanol production from sugarcane and the use of ethanol as a substitute for gasoline.

43. Brazilian ethanol has a more positive energy balance than ethanol produced from corn. The WWF report analysed some of the myths surrounding ethanol production in Brazil and found that there is no real, immediate risk that sugarcane production will expand into the Amazon.

44. Another conclusion is related to hypothetical competition between sugarcane and other food crops, especially in the current world food production crisis situation. According to this report, the risk of competition is minor. Sugarcane does little competing with other food crops, basically because it occupies a small area.

45. The annual G8 summit held in June in Japan reinforced the conservative stance of the rich countries concerning GHG emissions reduction. At the meeting, World Bank President, Robert Zoellick, attributed to biofuels a share of the responsibility for the rise in food prices. UN Secretary-General, Ban Ki-moon, adopted the same logic. However, both presentations were careful to make the distinction between the biofuels produced from sugarcane and those produced from grains such as corn.

46. Unlike what happens in Brazil, ethanol production in the United States has caused three quarters of corn production to be diverted into alcohol production in recent years. According to the World Bank, grain prices have doubled in the past three years. So far, grain prices have risen by 60 per cent in 2008 alone. Reports from the World Bank reveal that Brazilian ethanol production has not significantly influenced the price of sugar.

47. The cost of ethanol produced from sugarcane is 28 cents a litre. Corn ethanol costs 45 cents a litre. Moreover, processed sugarcane delivers three times more alcohol per cultivated area than corn. Sugarcane ethanol reduces GHG emissions by a third, in comparison with fossil fuels, while corn ethanol reduces emissions by only 12 per cent.