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## **UNITED STATES**

Report on the in-depth review of the  
national communication of the United States of America

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Under Articles 4 and 12 of the Convention, Parties are required to prepare national communications on their implementation of the Convention. Guidelines for the preparation of national communications and the process for their review were agreed on by the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, by its decisions 9/2 and 10/1, and by the Conference of the Parties, at its first session, by its decisions 2/CP.1 and 3/CP.1 (see FCCC/CP/1995/7/Add.1). In accordance with these decisions, a compilation and synthesis of the first 15 national communications from Annex I Parties was prepared (A/AC.237/81).

When reviewing the implementation of the Convention by Parties, the subsidiary bodies and the Conference of the Parties will have this report available to them in English as well as the summary of the report in the six official languages of the United Nations. (These bodies will also have before them the executive summary of the first national communication of the United States of America and country-specific information drawn from a compilation and synthesis report covering all countries that have submitted national communications.)

### Summary

1. The in-depth review was carried out between April and August 1995 and included a visit by the team from 22 to 26 May 1995. The team included experts from the Philippines, the Russian Federation, Sweden and the International Energy Agency.
2. The team found the national communication of the United States of America to be generally transparent, well-documented and presented in accordance with the reporting guidelines established for Annex I Parties and recognized that the author country had put major resources into the preparation of the background material for the various sections.
3. The United States of America, having the world's largest economy, is responsible for slightly less than one fourth of global carbon dioxide (CO<sub>2</sub>) emissions (4520 000 Gg in 1990) and has the highest emissions of CO<sub>2</sub> per capita (20 tons compared to an average of 12 tons in countries of the Organisation for Economic Co-operation and Development (OECD), among the Parties that have submitted their communications. Another key factor identified by the team was the fact that low energy prices in the United States are likely to have created limited incentives for energy efficiency improvements and greenhouse gas emission reductions.
4. The team noted that greenhouse gas emission and removal estimates are highly uncertain in several sectors where the United States hopes to achieve significant reductions in net emissions (a problem common to such estimates for all countries), but acknowledged that the United States is putting a great deal of effort into reducing these uncertainties. In particular, the team noted the uncertainty surrounding United States estimates of removals of carbon resulting from anthropogenic activity and believes there is a need to develop common international definitions of "forest land" and "managed forest".
5. The United States Climate Change Action Plan (CCAP) builds and expands upon existing legislation and is primarily made up of a variety of mechanisms to promote and facilitate voluntary actions to deal with emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFC) and perfluorocarbons (PFC) as well as CO<sub>2</sub> removals by sinks. Efforts to mitigate climate change in the United States have been hampered by the fact that the United States Congress approved less than 50 per cent of the funding required to implement the CCAP in its first year and that it appears likely that the second year of the CCAP will receive an even lower share. Moreover, funding to implement important pre-CCAP programmes, for example under the 1992 Energy Policy Act, has also been cut back by more than 40 per cent and the methane landfill regulation is yet to be issued. The United States is now undertaking, with the participation of industry and environmental stakeholders, an official review on the status of implementation of the CCAP that will be made public in early 1996.
6. The team concluded that the innovative nature of a number of these measures warrant their consideration by other countries as one element of a climate change response strategy. In particular, other countries can benefit from the work the United States has done to create

milestones for each CCAP initiative and to develop systems to monitor their implementation and effectiveness. Even so, the team noted that the government is aware of the potential for double-counting the emission reductions associated with different voluntary programmes and the difficulty of separating emission reductions achieved through voluntary initiatives from the baseline emissions projection and that it has addressed this in its assessment.

7. While most of the United States voluntary programmes have met or exceeded their initial implementation milestones, it seems unlikely that more ambitious future milestones will be met unless these programmes are fully funded or modified to account for reduced levels of funding. Major budget cuts for the institutions operating them, notably the Department of Energy (DOE) and the Environmental Protection Agency (EPA), also represent challenges for the continuing of the programmes.

8. While the industry response to call for voluntary actions has been positive, many of the measures outlined in the CCAP are still at an early stage of development. This means that industry has, at this time, often made only very general commitments to take action to reduce greenhouse gas emissions.

9. The team also noted the importance of state and local governments in the implementation of the UNFCCC. In particular, deregulation of utilities and electricity markets envisaged to take place over the next decades, may have several effects on emissions, although the total effect is not clear. Furthermore, these governments also have responsibilities for, inter alia, building standards, highway planning and speed limits.

10. While the team noted that the projections contained in the national communication were methodologically sound and based on reasonable assumptions at the time the CCAP was prepared, key assumptions pertaining to economic growth, energy prices, and funding for CCAP programmes need to be revised. As a result, the team concluded that net greenhouse gas emissions are now less likely to return to 1990 levels than was the case when the CCAP was released. The CCAP had anticipated that energy-related carbon emissions would increase by about 3 per cent between 1990 and 2000 under full plan implementation, with this increase offset by reductions in other greenhouse gases. When the review was carried out, it appeared that CO<sub>2</sub> and HFC emissions had higher growth potentials. In the course of the review, it was noted that energy-related CO<sub>2</sub> emissions had likely increased in 1994, because energy demand in that year was 1.5 per cent above the 1993 level. CO<sub>2</sub> emissions in 1993 were 4.1 per cent above 1990 levels.

11. The team noted that state and local governments are responsible for most formal education programmes in the United States, and that United States legislation restricts the role of the federal Government in public education on the climate change issue. Despite these limitations, several government agencies undertake public outreach efforts on climate change. The team recognized the crucial contribution of the United States to the scientific understanding of climate change and noted that this work forms the factual basis for many public education initiatives.

12. While the United States has worked hard to ensure that multilateral institutions incorporate climate change concerns into their financial assistance programmes, it remains unclear if the United States Congress will authorize the funding required for the United States to maintain its current level of official development assistance (0.15 per cent of gross domestic product (GDP), according to OECD/Development Assistance Committee statistics) and to meet its financial commitments to multilateral institutions. The review team was impressed by a number of United States bilateral assistance programmes related to climate change, particularly the United States Country Studies Program. Finally, the team noted that the first projects have been approved under the United States Initiative on Joint Implementation.

**Comments offered by the United States of America<sup>1</sup>:**

"The United States is pleased with the careful scrutiny and useful review provided by the Secretariat and its review team. It is clear to us that this report could not have been developed in the same comprehensive and thorough manner without the advantage of a country visit, nor would we have been able sufficiently to explain solely through written materials how and why we made various decisions in the course of preparing the U.S. Climate Action Report. We also note that our own domestic preparation for the country visit caused us to reexamine many of the underlying materials that were used in the preparation of the communication. In short, the review process, while still only in its formative stages, clearly serves a valuable purpose.

The United States urges that the review teams be careful to remain within the scope of their mandate: the review should focus on the rigor with which countries have followed the agreed reporting guidelines, and the validity of the analyses countries performed to determine their present and future emissions of greenhouse gases. In our view, it would not be appropriate for the teams to make policy recommendations about the relative merits of one or another policy choice by individual countries.

The United States appreciated the opportunity to make editorial changes to the text of the report prior to its publication. We believe that with such changes, the final product more accurately reflects up-to-date circumstances in our country."

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<sup>1</sup> This comment is included in accordance with decision 2/CP.1 (see FCCC/CP/1995/7/Add.1).

## I. INTRODUCTION AND NATIONAL CIRCUMSTANCES

13. The United States of America ratified the Convention on 15 October 1992. The secretariat received its first national communication on 21 September 1994. The in-depth review of the national communication was carried out between April and August 1995, including a visit from 22 to 26 May 1995. The review team consisted of Mr. Rodito Buan (Philippines), Mr. Alexey O. Kokorin (Russian Federation), Mr. Ebbe Kvist (Sweden), Mr. Trevor Morgan (International Energy Agency), Mr. Robert Hornung (Consultant) and Mr. Peer Stiansen (UNFCCC secretariat, Coordinator).

14. Since the United States submitted its national communication to the UNFCCC interim secretariat, there have been two political developments that are likely to limit the effectiveness of United States efforts to mitigate climate change.

15. First, the United States Congress provided less than half the amount requested by the President for the first year of activities under the United States Climate Change Action Plan (CCAP). Moreover, funding for several pre-CCAP initiatives included in the baseline emissions projection, for example under the 1992 Energy Policy Act, has also been cut by Congress. In particular, the implementation of greenhouse gas emission reduction activities under the aegis of the Department of Energy (DOE) has been hampered by these initial funding shortfalls.

16. Second, Congressional elections in November 1994 produced a new Congress that is likely to be even more concerned with deficit reduction, deregulation, and cutting taxes. Although the President's funding request for the second year of CCAP activities does not attempt to make up for the funding cuts experienced in the first year of the CCAP, it is still unlikely to be fully funded. Indeed, some of the budget proposals prepared by the House of Representatives and the Senate envision a 40 per cent reduction in the DOE's energy efficiency and renewable energy programmes, while other proposals seek to abolish the DOE altogether. The priorities identified by the new Congress also appear likely to place significant limits on the range of additional policy measures the President could successfully implement to further reduce greenhouse gas emissions.

17. United States political and institutional systems can make climate change policy-making more complex and difficult than in many other countries. Although the CCAP was developed under the authority of the President, funding for its implementation must be approved by Congress. New regulatory initiatives or economic instruments that are designed to combat climate change also may require Congressional approval, which is often a time-consuming process.

18. Moreover, the federal Government does not control some important climate change policy levers. For example, decisions on how to allocate federal highway funds, set building standards and speed limits are made at the state level and the electric utility industry is significantly regulated by state governments. This means that decisions taken at the state level can have a significant impact on greenhouse gas emissions.

19. The review team noted that, despite these political and institutional realities, the United States had made a significant effort to involve as many interests as possible in the development of the CCAP. The CCAP was developed through an interdepartmental process coordinated by the White House that actively sought input from industry and environmental stakeholders. It is expected that all of these stakeholders will also provide input into the first official review of the implementation of the CCAP, to be completed by early 1996.

20. The United States has very low energy prices in comparison to other OECD countries. For example, gasoline prices in the United States are the lowest among OECD countries and electricity prices are the second lowest -- primarily because of low taxes. These low prices, coupled with climatic conditions and the fact that the United States has one of the lowest population densities among countries of the Organisation for Economic Co-operation and Development (OECD) (both inside and outside urban areas), help explain why the United States is much more energy and greenhouse gas-intensive on a per capita basis than almost all other OECD countries. As a result, there is likely to be significant untapped potential for cost-effective energy efficiency improvements, if energy prices rise.

21. Other factors, such as a population growth rate that is much higher than in most OECD countries (up to 1.1 per cent per year), will put significant upward pressure on United States greenhouse gas emissions in the future. Economic growth is currently more robust than assumed in the action plan.

## **II. INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS**

22. After examining the national communication and extensive background documentation provided by the United States, the team concluded that the United States greenhouse gas inventory is transparent, well-documented and in accordance with the reporting guidelines. Data are presented in the reporting format established by the Intergovernmental Panel on Climate Change (IPCC) and are widely available in both printed and electronic form. The presentation in the CCAP made use of available global warming potentials (GWPs) that have since been revised by the IPCC.

23. The inventory was compiled by the United States Environmental Protection Agency (EPA) using data gathered from several federal agencies and departments, most significantly the Energy Information Administration. Mandatory reporting of some greenhouse gas emissions by industry also contributed to the inventory in the industrial sector.

24. Carbon dioxide (CO<sub>2</sub>) accounted for 85 per cent of net United States greenhouse gas emissions in 1990, and the vast majority of these emissions were produced through the combustion of fossil fuels. Activity data and emission factors for CO<sub>2</sub> emissions from the energy sector are in general solid and reliable. While the United States used a bottom-up methodology to calculate CO<sub>2</sub> emissions from the energy sector, it also presented these emissions as calculated using the IPCC default top-down methodology. The United States

believes that this exercise provides a useful check on inventory results and found that the difference in results obtained through the two methodologies was about 1 per cent.

25. Almost 40 per cent of the greenhouse gas emission reductions projected to occur as a result of the CCAP, however, take place in non-energy sectors. The review team noted that greenhouse gas emission inventory estimates in many of these sectors are, as in other countries, much more uncertain than is the case with energy-related CO<sub>2</sub> emissions. There are significant uncertainties surrounding emission factors in the agriculture, waste, and non-energy industrial sectors that result in the creation of large uncertainty ranges around specific inventory estimates. For example, the United States has indicated that nitrous oxide (N<sub>2</sub>O) emissions from the use of fertilizers was equivalent to 14 000 Gg carbon (200 Gg N<sub>2</sub>O) in 1990, with an uncertainty range equivalent to 3 000 to 60 000 Gg CO<sub>2</sub> carbon equivalents, using a GWP value of 270. The United States is making significant efforts to reduce such uncertainties through improved data gathering and estimation methodologies. It has played and continues to play an important role in the development of methodologies in the area of emission inventories.

26. The team noted the problems of commercial confidentiality that arise when there are only a small number of emitters of gases such as hydrofluorocarbons (HFC) and perfluorocarbons (PFC). While commercial confidentiality must be protected, transparency requires that reviewers should have access to non-aggregated data. The United States was very helpful to the review team in this regard.

27. With regard to CO<sub>2</sub> removals, the team noted that the United States inventory of greenhouse gas sinks presented in the national communication is based on detailed data on the wood stock contained in managed forests in the year 1992 (excluding forests in Alaska and Hawaii).<sup>2</sup> The existence of these data allows the United States to calculate CO<sub>2</sub> fluxes directly by monitoring changes in the total wood stock. The United States simply assumes that any changes in this wood stock are the result of anthropogenic activity because these forests are considered to be managed. The review team noted a need to develop common international definitions as to what constitutes "forest land" and a "managed forest".

28. The team also noted that the numbers obtained are uncertain, as in most countries, because of differences between inventory of full forest carbon pool (including below ground wood, soil carbon, forest floor, green biomass, young trees, etc.) and inventory of time-dependent emissions from the product pool. This uncertainty does not change the fact that anthropogenic activity in United States forests is creating a carbon sink, but it does have implications for the size of the sink. Indeed, the estimate of the carbon sink generated by anthropogenic activity in 1990 was revised downward in 1994. These forest sink estimates, as in most countries, do not yet account for changes in the carbon content of forest soils or the release of greenhouse gases other than CO<sub>2</sub> from forest fires.

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<sup>2</sup> This is different from the CCAP, where CO<sub>2</sub> removal numbers are based on a 1987 inventory of the forest stock.



29. The United States has not adjusted its inventory estimates to account for climate or the import and export of energy. Warmer-than-average temperatures in the United States, as in 1990, can lead to either greenhouse gas emission reductions (reduced heating loads in winter) or greenhouse gas emission increases (increased cooling loads in summer). Taking both heating and cooling into account, the Department of Energy has estimated that the United States carbon dioxide emissions in 1990 would have been approximately 25 million metric tons (measured as carbon content only, equivalent to 73 MMT CO<sub>2</sub>) higher if evaluated under the average climate conditions of the previous thirty years rather than the 1990 conditions.

30. The United States revised its greenhouse gas emission inventory in 1995. The revised emissions inventory includes:

- greenhouse gas emission estimates for 1994;
- revised 1990 greenhouse gas inventory estimates based on the most recent global warming potentials (GWP) developed by the IPCC;
- revised estimates of 1990 carbon removal numbers;
- revised estimates of 1990 HFC and PFC numbers;
- emission estimates for sulphur hexafluoride (SF<sub>6</sub>);
- removal estimates associated with carbon storage in wood products.

31. CO<sub>2</sub> emissions in the United States increased in 1994 according to preliminary data, largely because energy demand in 1994 was 1.5 per cent higher than in 1993. CO<sub>2</sub> emissions in 1993 were 4.1 per cent above 1990 levels.

### III. POLICIES AND MEASURES

32. The team examined the United States national communication and background documentation and concluded that the United States has generally followed the reporting guidelines with respect to policies and measures. Although the national communication did not contain extensive information on the status of implementation of CCAP actions and the milestones that will be used to assess their progress, this information was provided in detail to the team in the course of its visit. Some of this additional information is presented below. The team believes that an examination of the milestones developed by the United States to monitor the implementation of CCAP actions could be a source of ideas and methods for other countries.

33. The CCAP was developed in consultation with industry and environmental groups and outlines a comprehensive set of measures to deal with emissions of CO<sub>2</sub>, methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), HFCs and PFCs, as well as CO<sub>2</sub> removals. Many of these measures build on, or expand upon, existing programmes implemented under the 1990 Clean Air Act, the 1991 Intermodal Surface Transportation Efficiency Act, and the 1992 Energy Policy Act.

34. The vast majority of the measures included in the CCAP are voluntary and represent a creative response to the political climate that existed at the time of their development and the uncertainties associated with greenhouse gas emission levels and possible mitigation options. They also reflect the President's view that there is a wide range of cost-effective opportunities to reduce greenhouse gas emissions that are not being implemented because of market barriers such as a lack of information. The review team concluded that the innovative nature of a number of these measures warrant their consideration by other countries as one element of their climate change response strategies.

35. The voluntary approach in the United States includes a variety of different mechanisms to promote and encourage voluntary action. Foundation programmes, such as "Climate Challenge" and "Climate Wise", encourage industries to independently develop comprehensive plans to reduce greenhouse gas emissions and to report on the results of those actions. By the end of 1995, 104 utilities (representing nearly 60 per cent of utility carbon emissions) had submitted action plans under the "Climate Challenge" programme, and 13 industrial energy users (representing approximately 4 per cent of total energy-use) had submitted plans under the "Climate Wise" programme.

36. The "Star" programmes of the EPA are targeted at specific industries or specific end-users of energy. These programmes commit industry to examining actions to reduce greenhouse gas emissions and implement all actions that are found to be cost-effective. Other targeted programmes, such as the DOE "Motor Challenge" and "NICE 3", provide financial assistance to industry to design and develop demonstration projects that can illustrate to others the economic benefits of taking action to reduce greenhouse gas emissions. The important global role of the United States in technology development and dissemination ensures that these initiatives will also have an important influence beyond the United States borders.

37. Implementation of the "voluntary approach" in the United States has been strongly affected by Congressional decisions on funding for these programmes. While CCAP programmes implemented by the EPA received full funding for their implementation in the first year, most DOE programmes received only partial funding. It appears quite likely that both the DOE and the EPA will only receive partial funding for the second year of implementation. Although many voluntary programmes met or exceeded their modest initial first-year milestones for implementation, it is unlikely that these programmes will be able to meet their more ambitious future milestones and greenhouse gas emission reduction targets unless full funding is provided, or if the measures are modified to account for reduced funding levels.

38. While the industry response to voluntary actions has been positive, many of the measures outlined in the CCAP are still at an early stage of development. This means that industry has, at this time, often made only very general commitments to reduce greenhouse gas emissions. More specific commitments, and their implementation, are expected in the years ahead.

39. The United States is rightly putting a great deal of effort into the development and operation of monitoring systems to assess the progress of voluntary programmes in meeting the milestones established for them. Detailed reporting requirements have been established within some voluntary programmes and third-party verification of actions taken is required by others. In many programmes, economic benefits and reductions in other air pollutants are also being monitored. Efforts are now under way in the United States to create a comprehensive monitoring system that will facilitate the assessment of progress of all CCAP programmes and be publicly accessible through electronic media. The team believes that other countries can benefit from an examination of the United States monitoring system. However, that there are many methodological difficulties associated with monitoring the effectiveness of voluntary programmes.

40. The CCAP included two measures that required action by the Congress: approval of a new landfill rule and new legislation removing the tax subsidy for employer-provided parking. The team noted that neither of these measures has been put into effect, and that the latter is unlikely to reappear before Congress until 1996.

41. The United States has always been very clear that the CCAP is an evolving document that will have to be regularly reviewed and updated. The first review occurred in 1995 (after the team had carried out its review of the national communication), with input from industry and environmental groups, and the results will be made public in early 1996. This document will provide a clear status report on existing measures under the CCAP and is expected to include possible further measures that the United States could take to reduce greenhouse gas emissions in the short and longer term.

42. If commitments for further measures are made in the document, the current political context in the United States means they are unlikely to involve regulation, new taxes, or significant new government expenditures. Accordingly, the United States is likely to continue to rely predominantly on the voluntary approach for the time being.

43. During its visit, the team was informed of a variety of perspectives on the potential for additional voluntary actions to reduce greenhouse gas emissions before the year 2000. While there do seem to be some possibilities for cost-effective greenhouse gas emission reduction not targeted by the CCAP, there is significant uncertainty about the incentives for stakeholders to take such actions and the potential for government to fund additional voluntary programmes.

44. There is no space in this report for a comprehensive review of the CCAP. Accordingly, this section simply highlights some of the team's key findings with respect to the policies and measures included in the CCAP.

45. Transportation accounts for 31 per cent of United States **carbon dioxide** emissions and is one of the fastest growing emissions source in the United States. The team noted that the CCAP contains only four measures aimed at emissions from this sector and that these measures are expected to contribute less than 10 per cent to greenhouse gas emission

reductions under the CCAP. Only one of these measures, a programme stimulating use of telecommunications instead of travel, has been fully implemented, and two of them still remain in the planning stage.

46. The national communication indicated that a multi-stakeholder advisory committee would be established to explore other ways of reducing greenhouse gas emissions from transportation. The advisory committee, known as "Car Talk", was directed to produce consensus recommendations by September 1995. While consensus was not reached, the process did generate extensive discussion and analysis and its result is expected to assist the United States in taking decisions about further actions in this sector. It is unclear, however, whether any commitments to implement specific "Car Talk" recommendations will be included in the current update of the CCAP.

47. The United States has imposed fuel economy standards for automobiles; these, specified under the Corporate Average Fuel Economy (CAFE) programme have been revised several times since they were adopted, most recently in 1985. While the CCAP contains no commitment to revise these standards, the Government is working in cooperation with United States automobile makers to develop a prototype automobile within a decade that would be 300 per cent more fuel efficient than conventional cars while continuing to provide the performance characteristics and affordability of conventional cars.

48. Reducing electricity use in all non-transport end-use sectors is a major element of both the CCAP and the 1992 Energy Policy Act. Moreover, a number of United States electric utilities have voluntarily developed comprehensive action plans for greenhouse gas emission reduction under the Climate Challenge programme. Fundamental restructuring of the electricity supply industry in the United States that could take place over the next decade may however pose a risk to the future implementation of actions by electric utilities to reduce greenhouse gas emissions.

49. Throughout the United States, changes are being contemplated in the regulation of electric utilities that will increase competition in the provision of electricity services to end-users. If these reforms are implemented, they may have significant effects on greenhouse gas emissions. Changes in price and cost structures within a more competitive environment may change the demand for electricity, shift investment patterns in research and development and new generation capacity, and affect demand-side management activity. Some of these developments could reduce emissions through increase use of natural gas. It is also possible that these changes could, result in increased greenhouse gas emissions by expanding total electricity use.

50. While there is considerable uncertainty about the extent of electricity industry restructuring and the speed of regulatory reform, it is unlikely that the move to increased competition in the provision of electricity services will have much of an impact on greenhouse gas emissions before the year 2000. The review team believes, however, that these changes could have significant effects in the post-2000 period.

51. The CCAP outlines measures to control emissions of **methane** from all major anthropogenic sources. While landfills are the most important source of projected methane reductions, the CCAP also contains measures that aimed at reducing methane emissions from natural gas production and distribution, ruminants and coal mines.

52. The single most important measure to reduce methane emissions, increasing the stringency of rules for the recovery and destruction of organic compounds in landfills, was actually implemented to reduce emissions of volatile organic compounds. This demonstrates the multiple benefits that may be derived from such action. Although the United States national communication indicated that the CCAP action of promulgating a more stringent landfill rule would occur in 1994, this was not the case.

53. The single most important measure to reduce **nitrous oxide** (N<sub>2</sub>O) emissions by the year 2000 is not part of the CCAP, but is instead a provision under the Clean Water Act that limits agricultural runoff into freshwater sources. This provision should help reduce the use of nitrogenous fertilizers and pesticides if successfully implemented.

54. There is only one measure within the CCAP itself, namely improving the efficiency of nitrogenous fertilizer use, that is specifically targeted at reducing anthropogenic N<sub>2</sub>O emissions. Although measures that reduce CO<sub>2</sub> emissions from fossil fuel combustion will also reduce N<sub>2</sub>O emissions, these emission reductions have not been estimated in the CCAP. While many countries have included measures to reduce N<sub>2</sub>O emissions from adipic acid production in their national communications, these measures are not included in the CCAP because they have already been accounted for in the baseline projection of future emissions. The United States has no actions in place, however, to reduce N<sub>2</sub>O emissions from nitric acid production.

55. The United States has outlined a number of voluntary and regulatory actions to deal with emissions of **HFCs and PFCs**.

56. On the enhancement of **sinks**, the review team noted, that unlike some other countries, the United States does not rely on afforestation or reforestation to increase removals of CO<sub>2</sub> by forests. Instead, the United States is focusing on efforts to enhance the health of private forests by better species composition, age, growth rate and volume of trees. This is being done through measures that seek to improve the management of non-industrial private forests as well as measures to encourage the recycling of paper and other wood products. Efforts to enhance carbon removals account for less than 10 per cent of the total net emissions reduction projected as a result of the CCAP.

#### IV. PROJECTIONS AND ESTIMATES OF THE EFFECTS OF MEASURES

57. The team believes that the United States has respected the reporting guidelines with regard to projections and estimates of the effects of measures. Other countries could benefit from the United States experience, but the team noted that United States efforts in this area

were very resource-intensive and involved the collaboration of numerous government departments and agencies.

58. The United States presented two **projections** in its national communication. The first was a baseline scenario that is defined as expected net greenhouse gas emission levels based on the implementation of all legislation already in effect and all federal programmes funded or expected to be funded at the time the CCAP was announced. The second projection was a combined policy scenario that adds to the baseline the estimated effects of the emission reduction and sink enhancement actions included in the CCAP. On the basis of the background material provided by the United States, the team judges these projections to be methodologically sound and believes that their underlying assumptions are reasonable.

59. As the United States indicated in its national communication, however, energy-related CO<sub>2</sub> emissions have increased more rapidly than projected in the CCAP. In particular, the United States has experienced higher economic growth and lower energy prices than had been projected and some programmes referred to in either the CCAP or the baseline scenario have been implemented more slowly than projected as a result of funding shortfalls.

60. It is possible that changes in economic growth rate, energy prices and other factors over the next few years could help bring net greenhouse gas emissions back down to the levels projected in the CCAP. The team notes, however, that there is a real risk that net greenhouse gas emission levels may turn out to be significantly higher than projected in the CCAP. Indeed, it is reasonable to conclude that net greenhouse gas emissions are now less likely to return to 1990 levels by the year 2000 than was the case when the plan was released.

61. The October 1993 CCAP had anticipated that energy-related carbon emissions would increase by approximately 3 per cent between 1900 and 2000 under full plan implementation, with this small increase offset by absolute reductions in emissions of other greenhouse gases. From today's perspective, it appears that there is a higher growth potential for energy-related carbon dioxide emissions and chlorofluorocarbon replacements than had been anticipated in the original plan. These factors, together with only partial funding of CCAP programmes by the Congress, would seem to indicate that the United States would have to take additional steps to return net greenhouse gas emissions to their 1990 level by the year 2000.

62. The national communication indicates that, regardless of whether the CCAP is successful in meeting the year 2000 target, and despite the fact that the CCAP will affect net greenhouse gas emissions well beyond that date, emissions are expected to be at least 10 per cent above 2000 levels in the year 2010. The team notes that the review of the CCAP will likely provide some initial guidance as to the approach the United States plans to take to control net greenhouse gas emissions in the post-2000 period.

63. The review team noted that greenhouse gas sink capacity in the United States is likely to remain constant or to increase for the foreseeable future. While total forest area is not expected to change significantly, the varying age distribution and productivity of forests

across the United States should continue to create an anthropogenic forest sink. After declining significantly over the last 100 years, soil carbon in agricultural soils is also expected to remain stable or increase in the future.

64. The United States will produce new baseline and combined policy scenarios, extending to the year 2010, for the CCAP review. CCAP measures are expected to be included in the combined policy scenario, not the baseline. Indeed, it is likely that two combined policy scenarios will be prepared to reflect what would happen under fullfunding and partialfunding for CCAP measures.

65. The United States has provided **estimates of the effects of most CCAP measures** on an individual basis, as well as the effects of the measures outlined in the CCAP taken as a package. The United States has provided great detail of the estimated effects of the measures in the CCAP in a transparent manner that closely follows the reporting guidelines. A genuine effort appears to have been made to generate realistic and sober estimates of the effects of measures and the experience of the United States in this area could be a source of ideas for other countries.

66. Accurately estimating the effects of measures is a challenging exercise and the team recognized that greenhouse gas emission reductions can easily be double-counted. The fact that the CCAP is largely composed of voluntary measures makes the situation even more challenging for the United States. For example, there is a possibility that emission reductions under foundation programmes such as "Climate Wise" may already be accounted for in the emission reductions credited to specific voluntary programmes such as "Green Lights". The United States, well aware of this possibility, chose not to attribute any emission reductions to their "foundation" voluntary programmes. The United States has indicated however that it will make a cautious attempt to calculate the emission reductions associated with these programmes in the review of the CCAP.

67. There is also a possibility that emission reductions claimed under voluntary programmes may already be reflected in the baseline scenario. In other words, it is often difficult to determine if a greenhouse gas emission reduction action would have occurred with or without a voluntary CCAP programme. Industry representatives indicated that CCAP voluntary programmes accelerate the implementation of voluntary actions to reduce greenhouse gas emissions but are not the factor determining whether or not the actions would be taken in the longer term. In their view, the key deciding factor is cost-effectiveness, which implies that most of these actions would eventually be taken with or without a CCAP. The review team notes that the United States is clearly aware of these difficulties and is investing significant resources to ensure that the estimated effects of measures outlined in the CCAP are as reasonable as possible.

## V. VULNERABILITY AND ADAPTATION

68. The team noted that substantial work has been done to assess the potential impacts of climate change in the United States and that responsibilities for such issues are well reflected in the steering committees on science programmes. Most of this work concludes that the United States is for the most part sensitive, but not vulnerable, to the impacts of climate change. This implies that adaptation is a concern in the United States climate change strategy. In an assessment of 11 sectors with regard to the sensitivity and adaptability of both human activities and natural resources, two (industry and health) were identified as less sensitive (even though health was reconsidered recently), seven sensitive and two problematic.

69. While the United States is a world leader in adaptation research, few studies have attempted to compare the costs of adaptation strategies with the cost of greenhouse gas mitigation strategies because it is difficult to assess adaptation costs accurately when the regional impacts of climate change are highly uncertain. Consequently, priorities have been given to shorter term strategies.

70. At this time, the United States Coastal Zone Management Act is the only piece of federal legislation that specifically includes provisions to facilitate climate change adaptation. Nonetheless, the potential impacts of climate change are being considered in a number of other areas. For example, hydroelectric planners must now take into account the potential impact of climate change on future water levels. There are proposals for changes in the Clean Water Act to improve water use efficiency, and initiatives to accommodate environmental changes in the agricultural sector.

## VI. FINANCIAL ASSISTANCE AND TECHNOLOGY TRANSFER

71. The United States did not directly fund the pilot phase of the Global Environment Facility (GEF) but it did provide parallel financing. After the restructuring of the GEF, the United States pledged \$430 million to its first official phase. United States official development assistance represented 0.15 per cent of its GDP in 1993 according to OECD statistics, approximately US\$10 billion.

72. The team considers that the national communication went well beyond the reporting guidelines in this area and found the detailed description of bilateral United States programmes that are helping to reduce greenhouse gas emissions in developing countries particularly informative and useful.

73. The team was particularly impressed with the United States Country Studies Program. This bilateral initiative assists developing countries and countries with economies in transition in the development of greenhouse gas inventories, the preparation of greenhouse gas emission projections, and the identification of actions to reduce greenhouse gas emissions or enhance sinks. Fifty-six countries are now involved in the Program and the earliest initiatives will reach completion in 1996.



74. The United States has clearly made climate change considerations an important component of its international assistance programmes and funding for initiatives related to climate change mitigation has increased in recent years. For 1995, the United States Agency for International Development is seeking \$660 million for its energy and environment programmes, \$280 million of which is related to climate change. The United States is also encouraging multilateral lending institutions to incorporate the same concerns into their lending practices.

75. The team noted, however, that it is not at all clear whether the United States Congress will provide the funding required to allow the United States to maintain its current level of official development assistance and meet its financial commitments to multilateral institutions associated with the climate change issue.

### **Joint implementation**

76. Since the national communication was released, the United States Initiative on Joint Implementation selected its first seven private sector joint implementation projects from 30 applications. A second round of project applications closed in July 1995, with more projects being approved in December 1995.

77. The United States has established a mechanism to monitor and record the greenhouse gas emission reductions achieved through joint implementation. The team noted that the time required to implement these projects means that it is likely that most projects will not reduce greenhouse gas emissions until 1997 or 1998 and will not have anywhere near their full impact on such emissions before the year 2000.

## **VII. RESEARCH AND SYSTEMATIC OBSERVATION**

78. The United States provided a detailed overview of its support for basic and applied research on climate change in its national communication and the team considers that the United States respected the reporting guidelines in this area.

79. The United States is clearly a major contributor to international efforts on basic climate change science and applied technological research and development. Significant resources are being put into these efforts. The United States government is providing \$1.8 billion a year for basic climate research and \$2 billion a year for applied research. It should be noted that while the United States Government accounts for 80 per cent of basic research on the climate change issue, 75 per cent of the applied research is done in the private sector.

80. The United States overnment's role in short-term applied research is likely to decline in the future as there is a growing sentiment within the United States Congress that such research should be left to private industry. Funding for more basic research related to climate change may also be cut.

### **VIII. EDUCATION, TRAINING AND PUBLIC AWARENESS**

81. State and local governments are responsible for most formal education programmes in the United States. Nonetheless, the national communication describes several programmes that the federal Government is implementing to increase public awareness and provide education about the climate change issue and the team felt that the national communication did respect the reporting guidelines in this area.

82. Many of the educational programmes described in the national communication are closely linked with scientific research programmes on climate change. The United States Government produces and distributes scientific and technical information that can be used in the public sector, although it is prohibited by law for acting as an advocate for a particular goal. United States law does not permit the Government to be a public advocate on the climate change issue. The team noted that this situation does not prevail in all OECD countries.

83. During its visit the team was told that one of the major educational initiatives described in the national communication, the GLOBE programme (Global Learning and Observations to Benefit the Environment), was likely to have its funding significantly cut back by the United States Congress.

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