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Report on the in-depth review of the national communication of Hungary

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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 33 national communications from Annex I Parties was prepared (FCCC/CP/1996/12 and Add.1 and 2).

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 Hungary and specific information drawn from a compilation and synthesis report covering all Parties that have submitted national communications.)

Summary ¹

1. Hungary ratified the Convention on 24 February 1994 and its national communication was received on 22 November 1994. The in-depth review of the national communication was carried out from November 1996 to May 1997 and included a visit by the review team from 25 to 29 November 1996. The team included experts from Fiji, Romania, and the Organization for Economic Co-operation and Development (OECD). The team found that the communication responded to the main requirements of the reporting guidelines. The additional information and material provided to the review team substantially improved the understanding of national circumstances and at the same time enhanced the transparency of the communication.
2. The Hungarian economy has gone through major structural changes in its transition to a market economy since the late 1980s. Industrial production has fallen significantly. Also agricultural production has declined over the last 15 years but this relatively important sector still represents 15-20 per cent of gross domestic product (GDP). However, the decline in GDP seems to have come to a stop midway through the 1990s. The Government is pursuing a major and rapid privatization and deregulation policy, including in the energy sector. High priority is placed on bringing its legislation into line with that of the European Community in anticipation of possible membership in the future, and on establishing a legal framework to support a market economy. At the time of the visit Hungary was facing challenges of building and empowering institutions to implement and enforce the new laws.
3. At the time of the visit, the annual rate of inflation was estimated at 20-25 per cent and the real interest rates were around 6-8 per cent. The unemployment rate was above 10 per cent, and Hungary had a considerable foreign debt. There has been a steady effort to arrive at market-based prices for energy commodities, and prices of some of them (notably oil products) have for some years been derived from the world market price. This, combined with the effects of taxes, has brought them to the same level as in some OECD countries or even higher. Some sectors and commodities (notably electricity, gas and heat for certain consumer groups) were not yet fully market based at the time of the visit. Coal output has declined dramatically, but some production is still expected to remain competitive. Reserves of other fossil fuels are small, while some renewables may have greater potential despite being little utilized at present. Half of the electricity supply is based on nuclear power. The energy efficiency is believed to be 20-30 per cent below the level of other OECD countries.
4. The communication emphasized the flexibility allowed by the Convention (Article 4.6) to Parties with economies in transition, which Hungary is using specifically on the choice of base year, the availability and quality of projections and some inventory data. Hungary has chosen the average greenhouse gas (GHG) emission figures of years 1985 to 1987 as its base period figures in the inventory, but it also presented figures for the year 1990. In March 1997,

¹ In accordance with decision 2/CP.1 of the Conference of the Parties, the full draft of this report was communicated to the Hungarian Government, which had no further comments.

figures for 1991 to 1994 were submitted as a supplement to the information presented in the First National Communication. In the base period, carbon dioxide (CO₂) emissions were reported to be 84 million tons, which represents a per capita level well below the average for OECD countries; 8 tons versus 12 tons. The recession and the economic restructuring led to a sharp drop in CO₂ emissions which reached 59 millions tons in 1994. Hungary is committed to stabilizing national emissions of CO₂, and the communication also made a reference in the preface to the commitment to stabilize greenhouse gas emissions.

5. Using the 1995 global warming potentials (GWP) derived by the Intergovernmental Panel on Climate Change (IPCC), the relative importance of CO₂ was 76 per cent, methane 21 per cent and nitrous oxide 3 per cent of the emissions in 1994, the last mentioned figure being low because of the low use of artificial fertilizers. Figures were also given for the indirect GHG carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC), but not for hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphurhexafluoride (SF₆), emissions of which the team assumed were small or zero in 1990. The CO₂ figures in the communication included emissions from bunker fuels and feedstocks. The lack of data for emissions from the waste sector for the base period and 1990 appeared to be the most important omission overall, for 1994 this sector contributed about 25 percent of the CH₄ emissions. These issues were transparently dealt with in the communication and explained by lack of appropriate methodologies, resources and background data. The additional documentation provided during the in-depth review threw further light on these issues and revised some previous estimates based on a more detailed assessment in line with the IPCC guidelines.

6. The team noted that the communication provided a broad overview of the energy conservation efforts as well as a description of management practices related to forests. Hungary has not established policies and measures motivated by climate change related to emissions from agriculture, waste and industrial processes, but other policies and measures have effects on these. The National Energy Efficiency Improvement and Energy Conservation Programme (NEEIECP), under which an action plan was approved in December 1995, was presented as an important framework to achieve substantial reductions in GHG emissions. The emphasis is on enhancing public awareness, improving energy efficiency on the demand side and better management of the transport sector. However, implementation has been severely hampered by lack of public funding, which is particularly important given the high inflation and interest rates. The team noted the important contribution of funds and expertise made through bilateral and multilateral projects, particularly with the European Community.

7. The projections for the year 2000 in the communication covered emissions from energy sources as well as agricultural and fugitive sources of methane. The team noted that, although an appropriate approach had been used for energy projections, the results were to be considered very uncertain given the lack of relevant historical data as a base for projection models, as a result of the transition process. Despite the uncertainties and the possibility that CO₂ emissions may have started to grow from around 1995, CO₂ emissions are expected to be significantly lower in 2000 than the average 1985-87 level and could even stay below the

1990 level. The team noted in particular the uncertainty posed by the restructuring and deregulation of the energy sector. The communication projected methane emissions from agriculture and fugitive sources to decline by about 60 per cent overall, largely because of the decline in coal mining. The team noted that emissions from the waste sector are expected to rise if the levels of waste is increasing with rising incomes, but this could be offset by the introduction of waste minimization and treatment policies. Nitrous oxide emissions from fuel combustion, which represented two thirds of base year emissions, were projected to decline by up to one third, while the visit made clear that agricultural emissions were not expected to grow.

8. The team noted that Hungary is particularly vulnerable to climate change affecting the water supply. It does not have an explicit and comprehensive adaptation strategy, although some ongoing activities, often at the research and development stage, are highly relevant. These issues were not covered in the communication. Hungary reported on research and systematic observation carried out over many years in the climatic, meteorological and ecological areas. However, public funding for research has been substantially reduced in the period of transition.

9. Many climate change related activities, both technical assessments and mitigation efforts, have taken place inside the framework of bilateral or multilateral international cooperation. This often provided funds and expertise to be used in Hungary, but Hungarian expertise is also utilized in cooperative efforts with other countries in transition as well as with international and regional institutions. The team noted that there are processes for involving non-governmental organizations (NGO) in implementing the Convention, and that a number of initiatives aim at improving public awareness.

I. INTRODUCTION AND NATIONAL CIRCUMSTANCES

10. Hungary ratified the Convention on 24 February 1994. Its national communication was received by the secretariat 22 November 1994. The in-depth review was carried out between November 1995 and May 1997, including a country visit by a review team to Budapest from 25 to 29 November 1996. The review team consisted of Mr. Mahendra Kumar (Fiji), Ms. Serena Adler (Romania), Ms. Fiona Mullins (Organization for Economic Co-operation and Development), Mr. Samir Amous (consultant), and Mr. Peer Stiansen (UNFCCC secretariat, Coordinator). The visit included meetings with representatives of ministries, public agencies and the scientific community, as well as non-governmental organizations.

11. Hungary is located in the Carpathian Basin, in central Europe. Three quarters of the area is less than 200 meters above sea level. Its climate is characterized by both temperate continental, mediterranean, and temperate oceanic influence, implying considerable heating needs. Precipitation is limited and the relatively big agricultural sector relies heavily on surface water. Hungary suffered from droughts in the early 1990s. In 1993 the population was about 10.6 million, a figure which is likely to decrease by about 2-3 per cent during the present decade.

12. A decline in GDP in the order of 20 per cent and rapid structural changes in the economy, where industrial production by about 50 per cent, occurred from the second half of the 1980s, some time before similar developments began in other countries with economies in transition to a market economy (EIT). Agriculture waned by about 20 per cent in 15 years but still accounts for 15-20 per cent of GDP. The fall in production and rise in unemployment seemed to have come to a stop by 1993-1995, but a number of macroeconomic imbalances and the persistence of a high inflation rate (20-25 per cent) along with even higher interest rates, as well as outstanding market reforms, will have to be dealt with before the period of transition can be considered over. Hungary has experimented with market reforms for decades. It became a member of the OECD in 1996, a member of the International Energy Agency (IEA) in 1997 and it is making rapid progress in aligning its legislation and standards with those of the European Community, in anticipation of possible membership in the future.

13. Besides the political, economic and social effects, the transition also meant a change in the statistical system, which takes time and where there were significant problems in rearranging historical figures as well as producing appropriate data for the period of rapid change. On all these grounds Hungary stressed the necessity to apply the flexibility allowed to EIT countries under the Article 4.6 of the Convention; specifically regarding the choice of base year and the availability and quality of projections and some inventory data. It has taken the average greenhouse gas (GHG) emissions for the period 1985-1987 as a base figure, rather than the 1990 emissions, to compare with the stabilization target for year 2000. Flexibility to use 1985-1987 as base period was granted by the Conference of the Parties by its decision 7/CP.2.

14. Hungary has had an economy more open to the international lending institutions than other EITs, and has a higher foreign debt than these. On the other hand, foreign direct investment has also been relatively higher. The Hungarian authorities are very concerned about the large budget deficit and seek to limit it. These budgetary constraints represent an important framework for climate change related initiatives involving direct government expenditure (some GHG mitigation measures; research and development, information dissemination, etc.). On the other hand, they represent an additional incentive to fully apply market-based energy prices, by, for example, removing subsidies, and taxing energy commodities, which would stimulate mitigation.

15. In the early phase of the transition period, Hungary gave priority to developing a legal framework to support a market-based economy. Most of the broad framework legislation is now in place, but a major challenge still remains for Hungary to implement to enforce the new laws and the regulations that are based on them. Another challenge is lack of payment for energy services due to both low incomes and poor collection and enforcement capacity for chasing up non payers. Government institutions are being restructured to improve capacity for implementing and enforcing legislation, and the Government is pursuing decentralization, elimination of monopolies, gradual privatization of state conglomerates, (among which the energy companies constitute the largest state assets) and establishment of competition.

16. Hungary draws on some modest indigenous oil and gas reserves that are now declining due to depletion, as well as some coal reserves, the mining of which has declined since 1989 for economic reasons. Despite the significant drop in energy demand, the dependence on energy imports still stands at around 50 per cent. These imports, which traditionally came from countries of Eastern Europe, are likely to increase in the next few years to meet growing demand. Hungary has also traditionally also met a considerable proportion; up to 30 per cent, of its electricity requirements from imports, and despite the decline in demand since the 1980s, it still imports some electricity. Slightly less than half of the electricity consumption is supplied by the Paks nuclear power plant, while most of the remainder is generated by fossil fuel fired plants, often based on indigenous coal production. If additional demand is to be met domestically, alternatives could be both natural gas as well as coal. Renewables are believed to represent 2-3 per cent of the energy balance, mainly biomass. The team noted that there is significant potential for the use of biomass and considerable, mostly low-temperature, geothermal resources, but that there has been a limited tradition for using these sources, given the previous conditions in the energy sector. The costs of expanding their use significantly did not seem to be well known, although assessments are being done. The CO₂ emissions from the transport sector is still relatively low on a per capita basis.

17. In 1992, oil represented 32 per cent, natural gas 31 per cent, solid fuels 22 per cent and nuclear power 15 per cent of the primary energy supply. After a long period of growth, the energy demand started slowing down in the early 1980s, and then decreased by 21 per cent from 1987 to 1993, owing to the sharp decline in industrial production. The distribution of the decline on energy sources was disproportionate, with coal demand dropping by 41 per cent. The trend could remain erratic until economic development becomes stable. Energy consumption per capita is relatively low; in 1990 it was about 2.7 tonnes of oil equivalent (toe) compared to an OECD average of 4.8. However, primary energy consumption per unit of GDP was very high, reaching 0.43 toe per thousand US dollars, while the average OECD ratio was 0.28. Although this indicator also reflects differences in economic structure between countries, it is believed that energy efficiency is relatively low compared to OECD countries - 20-30 per cent lower according to case studies - and that there is a greater potential for energy conservation. Still, the fact that Hungary has the highest percentage of district heating (17 per cent of total final consumption) among the OECD countries could, especially if the systems are brought up to modern standards, contribute positively to energy efficiency. Per capita emissions of carbon dioxide (CO₂) were about 8 tons in the base period, dropping to about 5.5 tonnes in 1994, which is low compared to the OECD average (12 tonnes) as well as to EIT and European Community (EC) averages (8-9 tonnes).

18. Over a period of just a few years, the Hungarian energy sector is going through a major privatization process, particularly in the electricity and gas sectors, which will leave a higher proportion of shares in private hands than in the case of many other member countries of the OECD. The privatization levels differ and may also change in the future; for the Hungarian Power Company (MVM), 50 per cent of shares plus one preferential share will be kept by the Government, which will also for the time being keep in full the company owning the national grid, the nuclear power station and the power stations that are integrated with mines. The Hungarian Gas and Oil Company (MOL) is to be 75 per cent privatized, and a level of

around 50 per cent had been realized at the time of the team's visit. The non-nuclear generating companies and the electricity distribution companies are expected to be fully privatized. At the time of the team's visit, 40 to 85 per cent of shares in the electricity generating companies were already privately owned. Private ownership in regional gas distribution companies was around 50 per cent at that time, while the rest was owned mainly by municipalities. Through purchase of private shares by foreign companies the energy supply sector is increasingly influenced by western owners. Steps are also being taken to establish a fully competitive market for electricity that would go beyond what is the situation in many OECD countries, but it is recognized that this will take time.

19. Liberalization of energy prices started in 1989, when prices were generally far below market based levels and thus did not reflect costs. Since then, prices have risen considerably. Market conditions were reached for oil in 1991, and taxes have brought prices for oil products close to Western European levels and higher than in some OECD countries. Also for coal and liquefied petroleum gas (LPG), prices ceased to be regulated from 1992. However, especially for some uses of electricity, natural gas and heat, prices were still not market-based at the time of the team's visit. The Government intended to take final steps to ensure that the remaining electricity and gas prices increase gradually to a market-based level from January 1997. Rather, new regulations would imply that electricity and gas prices will be based on a verified cost plus a normal profit. Many district heating companies are owned by municipalities, which determine prices. A considerable part, 60 per cent, of the heat is produced in the power stations and supplied by the power companies, but the prices have traditionally had to be approved by the relevant state authority. The team noted that if energy prices are kept low, this seriously reduces the incentives to conserve the energy.

20. Hungary established a commission on sustainable development in 1993, consisting of representatives of the relevant ministries and led by the Ministry of the Environment and Regional Planning. This has broad responsibility for the development of policies and measures related to sustainable development, including climate change. The implementation of policies and measures, as well as technical work in the various sectors is left to the ministries responsible. The commission was enlarged in 1995 and now includes seats for business and environmental non-governmental organizations, and the academic and information constituencies. The communication was officially published by the Commission, with input from ministries and to some extent from their agencies and some consultants. The team noted that some of the technical work used in the communication, for example that related to inventories, was done on an ad hoc basis and not as a regular activity of the ministries and/or agencies. The team also noted that strategies on climate change represent elements in the broader national environmental plan agreed upon by the Government just before the team's visit and to be discussed in parliament.

II. INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS

21. The inventories section of the communication covered carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O), as well as the indirect GHGs, carbon monoxide (CO), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOC). During the visit, the team was given transparent information that explained some shortcomings and areas for further work, which partly arose from problems related to the transition. The communication presented figures for the chosen base year average of 1985-1987, although estimates for 1990 were also presented for completeness. As part of the United States Country Studies Program Hungary is readdressing the inventories for the base period and 1990, but only preliminary results were available to the team. Hungary submitted inventories for 1991 to 1994 in March 1997. These latter estimates had a more complete coverage of sectors and also reflected some revisions in methodologies which primarily for non-CO₂ gases made an assessment of trends since the base period less applicable. The team noted that up to the time of the visit, inventories had been carried out on an ad hoc basis rather than as a regular activity of the relevant government institutions.

22. Using the global warming potentials derived in 1995 by the Intergovernmental Panel on Climate Change (IPCC) and correcting the nitrous oxide estimate as outlined below, the relative importance of CO₂ was 76 per cent, methane 21 per cent and nitrous oxide 3 per cent of the emissions in 1994. Estimates for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆), which the team assume were small or zero, could not be given. The additional documentation provided during the in-depth review filled most of the gaps in the information and revised some previous estimates based on a more detailed assessment in line with the IPCC guidelines. Although some of the preliminary revisions appear significant, the team felt that they do not change the overall emissions profile significantly.

23. In preparing the inventory, the IPCC methodology and IPCC emission factors were used as a basis for calculation. Hungary has focused on developing the inventory for CO₂ emissions, where the background data were considered good. Other estimates were considered to be of lower quality, partly since it is not clear to what extent use of default emission factors adequately describes the national situation. The team considered the most serious omission from the inventories to be CH₄ emissions from the waste sector. Also, it noted that the CO₂ emissions included emissions from bunker fuels and feedstocks, and that emissions from industrial processes other than cement were not presented. These issues were explained by lack of appropriate methodologies, resources and background data at the time. However, the communication did not present enough information to make the overall presentation fully transparent; in particular, some of the minimum formatting and presentation guidelines of the IPCC instructions were not completely respected. The inventory was not supplemented with IPCC minimum standard tables, and even if aggregate activity data were presented in an annex, these were not accompanied by relevant emission factors.

24. The estimates for CO₂ emissions in the communication for 1985-1987 were 83,676 Gg versus 71,673 Gg for 1990. These declined further to 56,196 Gg in 1994. In the base period,

the percentage shares for these emissions were: energy and transformation sector 44, residential 20, industrial energy use 13, processes 4, and transport only 9 per cent. Emissions from bunker fuels were not reported separately owing to unavailability of data at the time the communication was prepared. However, sea transport being non-existent and air transport relatively limited, these emissions were assumed to be rather low.

25. Fugitive emissions of CH₄ still represented about half of the methane emissions in 1994, after a drastic reduction in mining activities. The waste sector represented about one third, most of it from waste water, and agriculture represented about 15 per cent. Estimates of emissions from agriculture included methane from livestock sources and rice cultivation. Emissions from waste (landfills and waste water) were not included in the communication owing to the lack of reliable data, but covered in the 1991 to 1994 inventories. As the coverage of sectors and methodology differs for 1991 to 1994 compared to that used for the communication, the team felt that revised figures for the base period and 1990 should soon be available for comparison.

26. Simplified estimates for emissions of N₂O from energy and agricultural sources were presented in the communication. Industrial process emissions were only calculated in the submission covering 1991 to 1994, which also contained figures significantly different from those for the base period and 1990 in the communication, mainly owing to changes in methodology. The figure for emissions from agriculture for 1991 to 1994 also has an error and should be a thousand times lower. If the agriculture emissions are corrected, they represent about 15 per cent of the emissions, which is low compared to other countries owing to low use of fertilizers. Fuel combustion and industry represent almost all of the remaining emissions with about equal shares.

27. The team noted that emissions from venting and flaring in oil refining and from gas and oil drilling and production were not included, which was explained by low reliability of the existing data. Although these activities were limited, emissions could be significant. In addition, owing to unavailability or poor quality of data related to industrial processes, CO₂ from cement production was the only source where activity data were converted to emissions for the base year and 1990. Thus, other sources and gases such as N₂O, NO_x, PFCs, HFCs and SF₆ were excluded. The team noted that, since the communication was issued, a considerable qualitative and quantitative improvement seems to have been achieved in data collection regarding industrial processes to make inclusion of more detailed figures of emissions from industrial processes possible, which is partly reflected in the inventories for more recent years. It also noted that process emissions may have dropped sharply with the decline in industrial production, for example through the closure of aluminum plants, while the use of HFCs may have increased following their use as substitutes for gases covered by the Montreal Protocol on substances that deplete the ozone layer.

28. Estimates for the indirect GHG CO, NO_x and NMVOC were presented using simplified methodology, which was explained by the lack or inaccuracy of emission factors. The uncertainty was considered to be 30-50 per cent. The volatile organic compound (VOC) emission estimates also covers some CH₄ in addition to the NMVOCs, and the years they

refer to were 1988 and 1991. The methodologies appears to have been slightly revised for the 1991 to 1994 inventories.

29. The team noted that there seemed to be an extensive historical collection of data on the forestry situation in Hungary. However, privatization has entailed a major increase in the number of owners of forest, which could make data collection more demanding in the future. The sector is estimated to be a considerable net sink for CO₂, corresponding to 4 per cent of the gross emissions in the base period and 6 per cent in 1990. The communication only presented net uptake figures, without any separation of effective emissions from effective removals, and the team noted that activity data seemed to allow a more detailed presentation, which was done for the submission of figures for 1991 to 1994. The team found the presentation in the inventory chapter in the communication unclear, but the review confirmed that the figures in the annex should be used.

30. Since the communication was submitted, there has been major progress in improving and refining the estimates, as reflected in additional documentation made available to the team. In particular this has been done through the United States Country Studies Program. This included very comprehensive documentation of most of the missing activity data and emission factors, as well as the resulting total emissions. Preliminary figures were given, in particular, for emissions from non-energy uses and biomass, industrial processes and solvent use, agriculture, and emissions from waste management, and for non-CO₂ emissions from fuel combustion. Also, emissions from the period subsequent to 1990 were estimated. The team noted that almost all the weaknesses were addressed and were expected to be overcome in the next inventory version. It has also become possible to separate emissions from bunker fuels from other energy sources.

III. POLICIES AND MEASURES

The team acknowledged that the implementation and effectiveness of policies and measures in Hungary must be seen in connection with the process of transition. Particularly important facts are that although good progress has been made in raising prices to market levels, some energy prices were still not completely market-based at the time of the visit, that inflation was in the order of 20-25 per cent with corresponding market-based interest rates 6-8 per cent higher, thus limiting incentives for investments, that many participants in the markets are not yet used to acting under market conditions, that the Government has tight budget constraints and that legislation in many sectors is often new and institutions to enforce it still in the course of development or restructuring. The team noted the importance of the measures taken to address these issues, which, apart from often giving direct incentives to reduce emissions, are crucial to establishing a stable framework for implementing climate change related measures. The team also noted that in implementing many of these measures, especially those leading to price increases, the Government had to accept short-term political costs in order to achieve longer term economic and environmental benefits. Priority has been given to establishing the legal structure. The framework legislation relevant to environment,

energy and forestry issues is now seen as mainly in place and the challenge is to build and empower institutions to implement and enforce the law.

31. The communication placed most emphasis on mitigation measures related to energy transformation. Little attention was given to the transport sector measures. The communication also described measures to enhance carbon sequestration in forests, the reduction programme for NMVOCs. During the visit, the team also brought up the subject of policies and measures influencing emissions from agriculture (CH_4 , N_2O), waste management (CH_4 , CO_2), and industrial processes (N_2O , NO_x , PFCs, HFCs, SF_6), which were not covered by the communication. The Government, with the assistance of expertise and funding from international sources, has concentrated on activities aimed at raising public awareness. The team noted the importance of capital provided from foreign sources, which is a major source of funding for energy efficiency measures, apart from what industry, households and other energy users provide themselves.

32. Economic instruments such as product charges, subsidies, and tradable permits were mentioned in the communication among measures that could help achieve effective GHG mitigation goals in Hungary. However, this was seen as an expression of the Hungarian position, rather than a description of any concrete measures. It is clear from additional information provided during the visit that the main economic instruments to be used will still mainly consist of removing energy subsidies and putting additional charges on fuels. There is an environmentally motivated levy on transport fuels, which contributes to the funding for the Environmental Fund. In disbursing from the Fund the Government has given priority to local and regional environmental problems of little relevance to climate change mitigation.

33. Both regional and municipal authorities could play important roles in mitigating emissions. They are the main owners of the district heating system and major consumers in their own buildings and they could also influence transport patterns by providing public transport and carry out physical planning. The team noted that municipalities were in the process of preparing environmental strategies, and that some were also considering the possibilities of further use of renewable sources such as geothermal energy and biomass.

34. In 1993, the parliament approved a new energy policy, one of the main objectives of which was to improve protection of the environment. Some of the elements are security of supply, privatization of the energy sector, energy efficiency and development of competitive markets. Generally Hungary aims to develop a legal structure that conforms with European Community legislation, and in some areas such as electricity deregulation, it has gone further than the Community to enhance competition. Also the European Energy Charter forms an important framework for the development of the energy policy.

35. The National Energy Efficiency Improvement and Energy Conservation Programme was presented in the communication as the main framework for mitigation efforts related to energy emissions. The presentation outlines potentials in various sectors but is not very specific regarding measures to realize these. The Programme is under implementation after approval by the Government in 1994 and development of an action plan approved in

December 1995, following planning initiated already in 1991. However, it builds on various energy conservation activities that have been implemented over decades. The Programme is also an important follow-up of the energy strategy agreed on in 1993. Given the importance of the energy sector's share of emissions, the measures part of the programme has the potential to reduce emissions of the major direct and indirect GHGs substantially. The team was informed that only about one third of the funding needed to effect the estimated reduction potentials was becoming available at the time of the visit, and noted that this hampered the implementation of measures. The analysis behind the estimates of saving potentials is still considered valid, but they should be seen as potentials that could be realized in 5-10 years provided that legislation is implemented and funding is available. According to one scenario contained in an annex to the communication, half of the potential savings are estimated to flow from increased energy awareness and the rest mainly from utilization of better technologies and software systems.

36. At the time of the visit, the Government had just decided to establish a revolving fund of Ft 800 million for energy efficiency measures in public institutions. This would provide soft loans at half the normal interest rate and could be implemented from early 1997. The Government also intended to provide DM 30 million for improving energy efficiency in housing, mainly for the reconstruction of panel-built housing in Hungary. This would also be disbursed in the form of loans, with the Government subsidizing the interest. Hungary participates in the energy efficiency programmes of the European Community, and the team noted that it is making efforts harmonize its own regulations with those of the Community. Hungary is in the process of implementing energy labelling for certain energy consuming appliances under the SAVE programme, which could be in place in 1997. Implementation of European Community standards for certain appliances is expected to require more time.

37. The communication described a number of climate change mitigation initiatives carried out under bilateral or multilateral projects with foreign sources of capital. These include loans received from the World Bank over a number of years aiming to improve energy and economic efficiency and reduce negative environmental impacts, projects funded via the German Coal Aid Fund and various programmes in the European Community. The team found these past and ongoing programmes well documented, the status of their implementation generally clear, and the institutional structures to support policy decisions and implement measures well described. However, the effects of measures in terms of GHG reductions were generally not documented. Some of these initiatives were started before 1990.

38. The team noted that Hungary cooperates closely with the European Community through different programmes with relevance for mitigation of climate change. Since its inception in 1989, the PHARE programme has been and is a major source of funding and technical assistance for projects to help facilitate reforms in such sectors as agriculture, energy, industry and environmental protection. Projects to enhance energy efficiency have had high priority, and a new revolving fund (of 5 million ECU) targeting private small and medium-sized enterprises and public institutions will be implemented in 1997. The programme currently supports a five year project to increase public awareness of energy use, as well as demonstration projects on district heating and building insulation. The team was provided

with details of activities currently under way such as the survey of the results and the monitoring phase of the energy efficiency awareness campaigns carried out in 1996. The team noted that the Hungary-EC Energy Centre, supported both by the Government and through various EC programmes, offers significant resources for enhancing energy efficiency, aiming at target groups from households to professional energy managers and decision makers. This was seen as particularly important given the limited resources (two to three posts in the Ministry for Industry, Trade and Tourism and three to four in the Hungarian Energy Office) allocated to energy efficiency in the central Government. An additional programme planned by the Hungary-EC Energy Centre for the winter of 1996/97 was also presented but was dependent on decisions on content and funding of the European Community's SAVE II programme. New technology has also been demonstrated in Hungary through the EC THERMIE programme. Its SYNERGY programme has supported urban energy planning in Miskolc as well as energy efficiency audits in industry.

39. The German Coal Aid Fund, which has been operational since 1991, was seen as one of the most effective energy-saving initiatives in Hungary. Sixty per cent of the proceeds from the sale of German coal, worth DM 50 million, which was originally made available by Germany to help Hungarian households finance their purchases of coal for heating purposes, was converted into a revolving fund. This fund was then used for soft loans at half the normal interest rate, managed by the Hungarian Credit Bank, for purposes of improving energy efficiency, reducing energy losses, encouraging heat recovery (e.g. through loans to district heating companies), promoting renewable energy utilization, etc. The 400 projects approved during the first four years represent an investment of three times the amount originally provided by the fund, and generated an estimated energy saving of 1.7 PJ. About 170 projects had been completed at the time of the visit, while others were still under implementation.

40. Among initiatives that were not mentioned in the communication, the team noted that the Global Environment Facility (GEF) provides US\$ 5 million for installing more energy-efficient lighting devices in the public sector (schools, etc.). The project starts in 1997, and the money would be used to create a leasing system, where the repayment is financed out of the energy bills. In cooperation with the Netherlands, Hungary is also implementing a programme called SCORE. This is also aimed at improving energy efficiency in the public sector, particularly by raising energy awareness both in central and local government. Projects under SCORE are financed mostly from Dutch bi-lateral assistance, but must also contain a Hungarian contribution in the form of funding or other resources. The team noted the involvement of both official institutions and non-governmental organizations in SCORE supervising committee. SCORE has also established an expert group to consider incorporation of externalities in the price system. The European Bank for Reconstruction and Development and the European Investment Bank are other important funding sources for projects to improve energy efficiency in Hungary.

41. Use of renewables is limited and is only mentioned in a general way in the communication. The Government has a target of 5 per cent contribution by renewables to the energy balance in 2000, compared to an estimated 2-3 per cent in 1995. Most of the present

use as well as the potential involves biomass, both from forest and related industry and from agricultural waste. Biomass is used in some district or other bigger heating systems, often in combination with other fuels. At the time of the team's visit, Hungary was also in the process of launching a biomass in cooperation with the World Bank. The team noted that there are neighbouring countries which have a much higher utilization of biomass in industry and in district heating, without having a markedly different resource situation than parts of Hungary. Hungary also has some experience of utilizing landfill gas geothermal energy in a smaller scale, and some institutions are exploring further exploitation of the considerable geothermal resources. Other sources such as solar and wind energy are little used. The team noted that the new conditions in the energy market entailing higher prices should lead to a greater interest from the market itself in utilizing these resources.

42. The introduction of market-based conditions, privatization and the greater availability of natural gas, all seem to have led to a trend to replace or refurbish obsolete coal-based electricity plants (which have an efficiency of less than 30 per) as well as to meet new demand by less polluting technologies, such as those based on natural gas. This process is expected to yield favourable environmental effects, including effects on GHG emissions, improved efficiency, for some years still. The team noted that in a liberalized market with private owners, fuel and technology choices will be determined more by economic factors, and thus the Government needs to develop and apply tools that fit in such a system if it seeks better environmental effects than those generated by the market itself. The further development of cogeneration of heat and power in industry could increase energy efficiency and would lead to relatively less GHG emissions. An expansion would depend on the prices industry will have to pay for electricity and heat supply from the utilities as well as what they could get for production that is not needed for own use.

43. District heating supplies about 16 per cent of residential, public and commercial space heating and domestic hot water supply, and 16 per cent of process heat in industry. At the time of the visit, district heating was not covered by modern legislation. However, a new law was in preparation and could be submitted to parliament in 1997. This law was expected to contribute to achieving the high saving potential (possibly 30 per cent) by encouraging the reduction of network losses. However, the corresponding investments (Ft 30 to 50 billion a year) needed to bring Hungary up to OECD standards and the pay-back period (which could be 10 years or more at present prices and interest rates) may not provide sufficient incentives for the market to realize the potential on its own. Price reforms are needed, also to create the incentives for suppliers to produce heat in a more competitive market. The team noted that individual metering and payment for the amount of heat actually used, a measure which to some extent is being implemented, could enhance the consumers' awareness of their energy use, compared to lump sum payments, and thus lead to more economical use. The team also noted that a significant number of consumers do not pay their bills, owing to the low income of many households.

44. The team saw the establishment of pricing mechanisms reflecting costs and the introduction of fuel taxes as important instruments that will indirectly stimulate GHG emissions reductions through the market. Some oil products, such as kerosene used for

heating, have among the highest prices in the world, with two thirds of the price consisting of taxes. At the time of the visit, direct government control of energy prices was expected to be abolished and all prices were supposed to reach market based levels by 1 January 1997. This step implies changes in particular for electricity and natural gas prices, where the new regulation would lead to prices reflecting cost plus 8 per cent profit. However, it is recognized that this does not necessarily reflect what would have been realized in a completely competitive market, as the true cost of electricity supply, for example, is not well known. Prices of natural gas were expected to rise by 18 per cent. Prices of heat are also to be affected by the new energy pricing legislation if the heat comes from combined heat and power plants owned by electric utilities, which supplies 60 per cent of the market. For the moment, the price covers maintenance but not new investment requirements, thus energy efficiency improvements cannot be financed from heat bills, and interest rates are so high that they discourage investment in new plants.

45. The transport sector contributed 12 per cent of the overall CO₂ emissions in 1990, but was only briefly touched upon in the communication, as there is no specific programme for GHG mitigation in this sector. Before the transition, public transport had a relatively high market share, which has contributed positively to energy efficiency. The transition has brought an expansion of private transport while the tight budgetary constraints have hampered the development and modernization of public transport. Also, the ratio between prices of public and private transport has changed in favour of private. Additionally, large investments in road infrastructure and the expected closing of a part of the rail network for economic reasons, as well as price increases in public transport, have led to a significant shift from rail to road for people and freight, making the massive conversion of railway networks to electricity less relevant in terms of reducing GHG emissions.

46. The rapid change to a more efficient car fleet will affect the GHG emission profile positively. However, the number of cars is increasing rapidly although it is low per capita compared to western Europe, and the number of vehicles is expected to increase further as incomes rise. There has been a drop in average distance travelled per car in the transition. The team noted that more cars and higher mileage would easily offset the GHG benefits generated by renovation of the car fleet. This could happen despite the high tax component on gasoline and diesel fuel, amounting to two thirds of the retail price and including an excise duty, an environment fee, a road fund contribution and 25 per cent value added tax, all of which discourages private transport and encourages energy efficiency.

47. Policies and measures to reduce emissions from the main sources of CH₄, N₂O and HFCs, PFCs and SF₆ were not described in the communication. The team noted that emissions of N₂O from agriculture are already low due to the low use of artificial fertilizer, and that no specific actions are taken to reduce this use further. On HFCs, the team noted that Hungary is implementing the Montreal Protocol and thus is likely to use these substances as replacements for chlorofluorocarbons (CFCs), and that no other policies were in place to limit the use or emissions of these gases. Regarding PFCs, there were no policies and measures motivated by climate change, but aluminium production has been dramatically

reduced in the 1990s, thus probably reducing the process emissions. Use of SF₆ was not known.

48. Fugitive emissions of methane fell significantly from the base period to 1990, partly because of the closure of coal mines, a development that continued into the 1990s. Emissions from agriculture generally follow the number of animals, which is influenced by agricultural policies. A collapse in exports to Eastern European countries has led to a decrease in herd size in the 1990s. The team was given an overview of developments in the waste sector, where a policy was drawn up in 1996, to be followed by a new law and governmental decree in 1997. These efforts are expected to yield returns also in reducing GHG emissions. At the time of the team's visit, the number of landfills was estimated at around 2000, few of which were considered modern. Payment for waste collection has become compulsory throughout the country, and new legislation and technical guidelines are under development, including alignment of legislation and guidelines on landfills and packaging with European Community directives. These developments are expected to lead to a reduced volume of organic waste, and fewer and more controllable landfills, and thus counteract the tendency to increased waste volumes with increased income. The central government runs some subsidy schemes for the construction of new and reconstruction of old landfills. Currently, collection of landfill gas was only at the experimental stage, although one plant was established in 1982. Waste incineration is at present also rare, with one major plant in Budapest supplying hot water for district heating. The team noted that some product fees are applied to finance recycling schemes (for tyres, refrigerators, car batteries, etc.), which could represent the start of a selective collection of municipal solid waste which could later be extended to the organic contents.

49. Hungary is a party to the United Nations Economic Commission for Europe Convention on Long-Range Transboundary Air Pollution and its protocols on NO_x and NMVOC emissions. NO_x emissions were reduced by about 30 per cent from 1987 to 1994 mostly thanks to the restructuring of the economy and the energy sector. The NMVOC protocol commits Hungary to stabilizing these emissions at 1988 levels by 1999. The team noted that NMVOC emissions have also gone down during the transition, after peaking in 1986. Regarding NO_x, CO and NMVOCs, efforts to bring Hungarian regulations in line with European Community regulations, in particular regarding of catalytic converters for vehicles, will slow the growth in emissions.

50. The communication gave a comprehensive overview and analysis of the current situation in the forest sector, including the legal framework, ownership, research, monitoring, and historical figures, as well as policies and practices. In the past, a great deal of replanting took place in the felling areas and there was a considerable afforestation. A government resolution passed in 1991 projected afforesting 150,000 hectares between the years 1991 and 2000. While technically feasible, the expected targets are not likely to be reached - in fact, only 25,000 ha had been afforested between 1991 and 1995. In comparison, an average of 25,000 ha per year was afforested during the 1950s. The communication did not convert the effects of these measures into estimates of carbon stored. The team also noted that changes in land ownership regulations - more than 50 per cent of the forest was privatized recently -

have introduced some uncertainty concerning the degree to which carbon uptake capacities might be affected by forestry management initiatives from the Government.

IV. PROJECTIONS AND EFFECTS OF POLICIES AND MEASURES

51. The communication contained projections for the bulk of GHG emissions for the year 2000, and although some sectors and gases were not included, this was not seen as likely to influence the overall trends for CO₂ and CH₄. Figures were given for energy related emissions of CO₂, CH₄, N₂O, NO_x and CO, but not for CO₂ from the land-use change and forestry sector, NMVOCs, HFCs, PFCs and SF₆. Some small differences between the figures in the projections and those in inventories were explained to the team.

52. Both in the communication and during the visit it was stressed that the projections were regarded highly uncertain by the lack of relevant historical parameters, owing to the transition from a centrally planned society to a market-based one. Dramatic changes in the economic structure and lack of relevant historical guidance make it difficult to give meaningful projections even for a period as short as six to seven years, which was the perspective when the communication was made. This situation had not changed at the time of the team's visit. The Government had not made any official economic forecast for the period in question, and the economic assumptions then had to be made for the purpose of GHG emission projections. Although the projections were made in 1993, they were still considered to describe relevant scenarios.

53. Two different scenarios for the energy-related emissions were presented, based on an energy-specific model. A business-as-usual scenario (2000BAU) reflected further transition and price reform and is thus not a status quo, while an energy-saving scenario (2000S) assumed additional measures and price increases compared to the 2000BAU. Both assumed modest economic growth in the short term (1995-1996) and a slightly more optimistic picture in the longer term (1997-2000). The model has a relatively simple representation of the emissions, which, together with some differences in inclusion of sources, resulted in figures that do not fully correspond to the inventories. This was mentioned in the communication and adequately described to the team, and does not change the overall trends.

54. The scenarios described a decline in CO₂ emissions till 1995, when they would start to grow. The 2000BAU projected CO₂ emissions in 2000 to be 10 per cent below the base year, but 6 per cent above the 1990 level. The corresponding proportions in the 2000S scenarios were 16 per cent below the base period and 0.5 per cent below the 1990 level. The difference between the scenarios corresponds roughly to the energy saving that is estimated as a result of the medium range minimum programme of the National Energy Efficiency Improvement and Energy Conservation Programme. One considerable uncertainty is thus the extent to which the current funding difficulties of the Programme will affect emissions.

55. The team noted that the ongoing reforms in the energy market cast a major uncertainty over the future trend of emissions. In particular, price elasticities are not well known owing to the lack of relevant historical data. A new market structure in electricity, including considerable foreign ownership, is likely to have an effect on who the participants in the market are, how they invest and which fuels they chose. Also the incentives for energy conservation on both the supply and the demand side will be influenced from new price signals. It is not clear whether this will lead to a systematic overall reduction or increase in emissions, as there are reasons to believe both in an increased energy efficiency, and in increased demand for energy as incomes grow. No new baseload for electricity was assumed before 2000, but the team noted that new lignite-based capacity of 1000 MW was planned and could be added to the system in three years' time. Beyond 2000, replacement of existing capacity is even more of an issue, as well as building additional capacity to meet increased demand. Towards the end of the next decade, significant changes can occur regarding fuel choices, where coal, natural gas, biomass, geothermal and other renewable sources are options both for electricity generation, and for other purposes. Expansion of the nuclear capacity could take place at the Paks site, if politically feasible, but this would imply a lead time of up to a decade for technical reasons. In addition to fuel choices, penetration of different technologies such as cogeneration will also determine the overall efficiency of the system and thus GHG emissions. The team noted that demand for transport may well grow considerably, and that it is uncertain whether it will be feasible to keep the current relative share or even absolute level of public transport.

56. Total methane emissions are expected to drop dramatically between the base year and 2000, a conclusion which the team saw as robust. This is mainly due to the collapse in the mining industry and its associated fugitive emissions, which has already taken place. Emissions from livestock are also expected to be lower in 2000, with the past collapse of traditional export markets. Emissions from energy-related sources, which are minor in comparison, are projected to be reduced by about 50 per cent. The reduction from all the above sources is projected to be 60 per cent. The waste sector is a major source that was not covered in the communication because of the lack of estimates of inventories. The volume of municipal waste to grow in the future, although various measures are likely to offset this growth to some extent.

57. The communication shows 26 per cent and 30 per cent drops in N₂O emissions from fuel combustion in 2000 in the 2000BAU and 2000S scenarios respectively. The transport sector is the only sector showing a significant increase, of 26 per cent (2000BAU) or 20 per cent (2000S) as compared to the base period, owing to the increase in private transport. Although energy-related emissions account for the major part of N₂O emissions, developments in the agricultural sector may change the overall picture. In the longer term, alignment with European Community policies and later possible accession may have impacts which are not clearly known.

58. The team noted that PFC emissions have most likely been dramatically reduced and are not likely to increase from today's level, since two of the three aluminium plants have been shut down in the 1990s. NO_x, CO and NMVOCs from sources other than energy were not

included in the projections, but they are also likely to decrease as a result of specific measures taken in alignment with the European Community, and economic restructuring. Given that Hungary is implementing the Montreal Protocol and phasing out CFCs, the team assumed that the use of HFCs has been growing in the 1990s and will continue to do so. There was not enough information to assess the possible development of SF₆ emissions, if there are any.

59. The communication did not give projections of the emissions and removals in the land-use change and forestry sector, but only mentioned qualitative impacts of forest management practices. The team was given additional information, and noted that there is considerable potential for afforestation. Up to one million hectares of agricultural land could and are even likely to be transformed into forests over the next decades because of changes in the agricultural market. Improved and sustainable management of forest resources will increase the sink capacity, since existing forests are often young, resulting in a level of net sequestration that may well be higher than the present level for several decades.

60. The communication gave various estimates of the potential energy savings from implementation of programmes. For the National Energy Efficiency Improvement and Energy Conservation Programme, the maximum potential was equivalent to 20-30 per cent of energy use, while the medium range minimum programme annexed gave a potential equivalent to 6-7 per cent of the total energy use. These potentials were accompanied by corresponding investment figures. The potentials were considered as highly uncertain and should be seen as a theoretical assessment of what could be achieved in five to ten years, depending on such factors as the rate of implementation of policies and measures, and availability of funding. The team noted that for the above minimum programme, which had a detailed specification, the transport, residential and commercial sectors had higher reduction potentials than average. These potentials were not converted to reductions in GHGs emissions. Limited information was given on the historical effects of measures, although the impact of a public awareness campaign had been well documented. The team also noted that the reforms in the energy sector could make it difficult to separate the effects of policies and measures from those of structural changes. GHG emission trends will become clearer in the longer term when the economic situation becomes more stable.

V. RESEARCH AND SYSTEMATIC OBSERVATION

61. Hungary has a long tradition of carrying out scientific monitoring and research related to the science of climate change. The activities considered most relevant were briefly described in the communication, and additional information was provided to the team during the visit. They improve the knowledge base in climatology and hydrometeorology as well as in matters related to the energy, agriculture and forestry sectors.

62. The team noted that Hungary has one station in the rural area of Kecskemét that provides continuous observation and measurement of the atmospheric concentration of

different gases. Hungary has also carried out monitoring of climatological parameters at about one hundred meteorological stations; 12 of them have provided more than 100 years of time series and two to three more than 200 years. Also climate modelling and assessment of the possible ecological, social and economic impacts of global and regional climate changes have been carried out, as well as analysis of past and future trends of GHG emissions, mitigation options and response strategies, and the impact of climate variability on the carbon uptake by forests.

63. As part of the reductions in public expenditure necessitated by the transition, there have been significant reductions in the funding for research and development in both universities and scientific institutes. Fundamental observations are still carried out, but the funds in particular to cover project costs over and above personnel are limited, and several institutions have been dramatically scaled down or even closed. Consequently, skills have been lost. However, this has also led to spinoffs in the form of consulting firms, as well as the transfer of people into more operational positions. There were indications that the situation could be stabilized by 1996 or 1997.

64. A number of the initiatives described in other chapters were supported by research. There were some studies supported by the Ministry of the Environment and Regional Planning on the role that could be played by the forests in general and large afforestation programmes to increase sequestration and thereby mitigate climate change. Hungary is also currently undertaking a study on the renewable energy potential, including biomass, geothermal and photovoltaic. There was also an important assessment covering issues related to climate change and the agricultural sector, called AGRO 21. Research and development on improved mitigation technologies was documented only to a limited extent in the communication and during the review. The team noted that there are relevant activities, for example on energy technologies including nuclear, but that the public expenditure is modest compared to other OECD countries, partly because of the general economic situation.

VI. EXPECTED IMPACT OF CLIMATE CHANGE, VULNERABILITY AND ADAPTION

65. The communication contained a section describing some climatological features of Hungary, but did not discuss the possible impacts of climate change or assess vulnerability and adaptation options. However, the visit confirmed that there is a growing awareness in the administration that Hungary is vulnerable to climatic variability and changes, and that there is a need to formulate and implement more explicit adaptation strategies. In general, these areas are still being researched. It is believed that Hungary would experience a warming of roughly the same magnitude as the global temperature changes projected by the IPCC (1 to 3.5 degrees in 2100), and precipitation could decrease by 10 to 20 per cent. Precipitation levels are close to the evaporation levels in several areas in Hungary and there is great interannual variability. However, Hungary is not likely to adopt rapidly significant adaptation measures such as changing cropping systems or introducing new agricultural technologies

66. The team noted that water availability, agriculture and forest management were of great concern in Hungary in the light of the climatic situation. Hungary has experienced a significant drop in precipitation all over the country over the last decades and there is a strong dependence on surface water. The focus on water management applies to water used in the economically important agricultural sector, as well as to drinking water, which deteriorates in quality when water levels are low. The team noted that raising prices of water has been an effective instrument in reducing the consumption. Ninety-five per cent of the water comes from abroad, mainly through the rivers Danube and Tisza. The team was informed that the Hungarian Academy of Sciences has assessed possible impacts and adaptation strategies particularly in the agricultural sector, where the AGRO 21 programme was seen as an important initiative. One of the programme's aims is to develop better methods of managing the limited water resources. Emphasis is also placed on developing and utilizing more drought resistant plant and tree species.

VII. INTERNATIONAL COOPERATION

67. Hungary cooperates extensively with other countries both on technical assessments of issues related to climate change and on mitigation options. Often this involves funding and/or expertise provided by industrialized countries and intergovernmental institutions for activities carried out in Hungary. However, there are also cooperative efforts with other countries in transition, and the team noted the relevance and importance of sharing experience for countries going through the same type of development. Bilateral cooperation with Germany, Netherlands and Norway was documented in the communication and is partly described in other sections of this report. Hungary takes part in the United States Country Studies Program, focusing on the improvement of the GHG inventory and the development of scenarios that would include response policies to climate change particularly involving energy conservation.

68. Hungary is also collaborating with the European Community on energy conservation initiatives, including public awareness programmes, research, development and demonstration projects, training and technical assistance as mentioned in the communication and elsewhere in this report. One important example is the Hungary-EC Energy Centre, which was set up in order to strengthen the cooperation in the energy field at national level as well as with the EC, and has become involved in assisting the Hungarian technical departments in developing their energy policies.

69. Cooperation with other countries or institutions such as OECD, the International Energy Agency and the International Institute for Applied Systems Analysis, were also mentioned in the national communication or discussed during the team's visit. A regional environment center was set up in order to develop cooperative programmes and information exchange on the environment between the Central and Eastern European States, with a particular emphasis on capacity building and with non-governmental organization and business community participation. The centre is funded for a limited period by the United States of America, the

EC and Japan, inter alia. Part of its budget is assigned to energy conservation initiatives and is thus relevant to GHG mitigation.

VIII. EDUCATION, TRAINING AND PUBLIC AWARENESS

70. Efforts aimed at raising public awareness of climate change were mentioned at various points in the communication, but it did not contain a separate and comprehensive chapter on the subject. However, the team obtained additional information during the visit. It noted that there is a framework for public participation in decision making in the environment field through the involvement of non-governmental organizations. Environment and industry organizations, as well as representatives from the academic community and the press, have seats on the Hungarian Commission for Sustainable Development together with ministries. As an example of the type of involvement of these groups, the communication was circulated to them for comment before being finalized. The Government also endeavours to give the public access to information on climate change by having material, from the IPCC for example, translated and published.

71. Much emphasis has been placed on raising public awareness of efficient energy use. The communication described three awareness campaigns carried out since 1985, using cartoons, film clips, publications etc. The last media campaign in 1993 was supported by the PHARE programme and carried out under the responsibility of the Hungary-EC Energy Centre, using a wide range of media and other instruments (television, cinema, printed press, publication of technical reports, targeted public relations efforts towards the news media, distribution of leaflets, school campaigns, etc.). The team noted that the various components of the campaign were evaluated, which could probably provide some relevant insights also for other countries.

72. The team noted the usefulness of such efforts, especially in the transition period with rapid changes and with consumers' behaviour inherited from a period of low energy prices. However, effects are seen to be strongest shortly after the campaigns, and repetition is needed to obtain more permanently improved awareness. The team noted that financial constraints may threaten the continuity, and hence the effectiveness of such actions. Concerning energy conservation, a recent public survey concluded that the majority of people are not sensitive to the environmental implications of energy use, making public awareness one of the most relevant initiatives to reinforce.

73. General public awareness of environmental protection is an integral part of the school curricula at for the different levels. Furthermore, environmental courses are taught in universities, including postgraduate courses. However it was recognized that environmental education and training should be reinforced and extended to all levels and branches of education. It is estimated that around 2,600 non-governmental organizations are active in environmental protection, an important part of their activities being public campaigns. More information on the work of these organizations relevant to climate change was provided during the country visit.
