



**UNITED
NATIONS**



**Framework Convention on
Climate Change**

FCCC/IDR.1/CZE
30 October 1995

ENGLISH ONLY

CZECH REPUBLIC

Report on the in-depth review of the national communication of the Czech Republic

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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 Czech Republic 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 June 1995 and included a visit by the team from 2 to 5 May 1995. The team included experts from Kenya and Poland.
2. The team confirmed that the Czech Republic is carrying out its commitments as an Annex I Party to the United Nations Framework Convention on Climate Change. In its first national communication, the Czech Republic has reported, with varying levels of detail, on policies and measures to mitigate climate change, and has followed, as far as possible, the guidelines¹ established by the Intergovernmental Panel on Climate Change (IPCC) for the preparation of national greenhouse gas (GHG) inventories. Moreover, the approved reporting guidelines for national communications were followed and considerable supporting documentation was made available to the review team during the country visit. This additional documentation greatly improved the understanding of outstanding issues relating to the national communication and also corrected some printing and statistical errors detected in the text that was originally submitted to the interim secretariat in 1994.
3. The Czech Republic anticipates achieving a significant reduction (approximately 17 per cent) of GHG emissions by the year 2000, as compared to 1990 levels, through the removal of subsidies and by carrying out the current programme of major economic restructuring. The restructuring of the Czech economy has gradually promoted a more intensive use of energy in several industrial sectors and mechanisms have been introduced to lead to a more economical and efficient use of existing sources of energy. It is widely accepted that attempts to overcome inefficiencies in the use of energy have in themselves provided opportunities for potential reductions in carbon dioxide (CO₂) emissions, such as through the phasing-out of uneconomical coal-fired power plants. The national communication describes a few so-called no-regrets measures, all of which address CO₂ emission sources. The review team found that these measures were either in very preliminary stages of implementation or even still in the planning stage. Among these the most relevant to a significant reduction in CO₂ emission levels are the gradual implementation of the *Clean Air Act* and the entering into operation of the Temelin nuclear power plant. The *Clean Air Act* sets emission limits to gases other than greenhouse gases and the Temelin plant is expected to generate 2000 MW after 1996 to meet domestic energy demand in view of the gradual phasing-out of inefficient and highly polluting coal-fired power plants. It is estimated that the discontinuation of coal-fired plants and the opening of the Temelin plant will reduce 11,300 Gg in CO₂ emissions, that is, about 7 per cent of total CO₂ emissions in 1990.
4. The team found, however, that if significant changes were to occur and thereby affect some of the present conditions and expectations, the introduction of additional no-regrets measures would become necessary for the Czech Republic to achieve the projected significant reduction in 1990 GHG emission levels by the year 2000. Some of the changes that could be envisaged include a much higher than expected growth in gross domestic product (GDP) in the

¹ See the IPCC Greenhouse Gas Inventory Reporting Guidelines.

period up to 2000 based on high energy-intensive industries, postponement of the plans to put the Temelin plant into operation by 1996 and unforeseen difficulties in current attempts to liberalize national energy prices. Another development which may have adverse impacts on emission trends could arise from an uncontrolled boom in private transportation if the corresponding increase in car fuel efficiency is not assumed by the Ministry of Transport. Even though the transportation sector, as a component of GDP, will not increase, it is currently the only sector from which CO₂ emissions are expected to increase by the year 2000 (a 14 per cent increase in emissions being projected for that sector). (The transportation sector is expected to account for 2 per cent of GDP by 2000 whereas it accounted for 3 per cent of GDP in 1990).

5. The Czech Republic has not set any specific national target concerning GHG emissions, although it has been generally stated that it will pursue the stabilization goal expressed in Article 4.2(b) of the Convention. The team was informed that uncertainties associated with the future growth path of the Czech economy prevented the Government at this stage from engaging in more ambitious reduction targets. It is generally accepted that current legislation is at present insufficient to promote effective reductions in GHG emissions motivated exclusively by climate change concerns. The general mitigation approach currently adopted aims at ensuring that existing energy efficiency programmes are implemented and, if conditions permit, enhanced, while no-regrets (and least-cost) measures are gradually introduced.

I. INTRODUCTION AND NATIONAL CIRCUMSTANCES

6. The Czech Republic ratified the Convention on 7 October 1993. Its national communication was received by the secretariat on 17 October 1994.

7. The in-depth review of the national communication was carried out between April and June 1995 and included a visit by a review team to Prague from 2 to 5 May 1995. The team included Mr. Edward Radwanski (Poland), Mr. Joseph K. Njihia (Kenya), Mr. Leo Breslin (UNFCCC secretariat) and Mr. Lucas Assuncao (UNFCCC secretariat, Coordinator). In the course of the visit, the team met representatives of the ministries concerned and members of the scientific and academic community, as well as representatives of a number of non-governmental organizations.

8. The Czech Republic lies in central Europe and is composed of the Czech lands of Bohemia and Moravia and part of Silesia. It covers an area of 78,864 square kilometres, of which approximately 33 per cent is covered with forests; it has a population of some 10.3 million. The climate is mixed, the continental tendencies being influenced by the oceanic climate with both substantial variations in temperature and precipitation.

9. Until 1990, the Czech economy was centrally planned. Since then, a major transition to a genuine market economy has been taking place, characterized by a sharp drop in production and an extensive economic restructuring process that includes the liberalization of most energy prices. The disintegration of the Soviet bloc and its Council for Mutual Economic Assistance,

the weak trade ties with other Western economies and the slump in domestic consumption, led to a decrease in real GDP of approximately 23 per cent from 1990 to 1993. The gradual opening up of the economy and the general deregulation of prices, coupled with an increased level of foreign investments, have now brought back positive growth rates, especially in the construction and services sectors. In the energy sector, however, subsidies are only gradually being removed owing to social concerns associated with an abrupt increase in electricity and gas prices in the residential sector. The country has a relatively high level in energy-related CO₂ emissions per capita, that is, approximately 14 Mt CO₂ compared to 12 Mt CO₂ for member countries of the OECD and 8 Mt CO₂ for OECD-Europe. The decline in the use of coal and the increase in the use of nuclear energy and natural gas suggest a substantial GHG reduction potential. However, a rapid recovery in energy-intensive industries and a substantial increase in private transportation could bring emission levels closer to 1990 levels by the end of the century.

10. On 1 January 1993, the Federal Republic of Czechoslovakia was dissolved and the Czech Republic and the Slovak Republic became independent States, each of which has undertaken its respective commitments as legal successor to Czechoslovakia, which is listed in Annex I to the Convention. It is expected that Annex I to the Convention will be amended accordingly. The separation of the two countries does not appear to have added to the complexity of preparing the national communication of the Czech Republic under the Convention.

11. At the policy level, implementation of the Convention within the Czech Republic is under the general supervision of an inter-ministerial committee established on the initiative of the Ministry of the Environment. The committee is chaired by the Ministry of the Environment and brings together representatives of all ministries concerned.

II. INVENTORIES OF ANTHROPOGENIC EMISSIONS AND REMOVALS

12. In the Czech Republic, CO₂ accounted in 1990 for 89 per cent of GHG emissions, using 1992 for global warming potential (GWP) figures. Methane (CH₄) accounts for 5 per cent and nitrous oxide (N₂O) for 6 per cent. During the in-depth review, GHG emissions were not substantially revised except for N₂O, which was estimated at 26 Gg in 1990 in contrast with the 41 Gg reported in the communication. For CO₂, the largest source is fuel combustion processes (97 per cent), the second largest being cement production (2.5 per cent). The sink capacity of Czech forests absorbed less than 2 per cent of total CO₂ emissions in 1990 (approximately 2,300 Gg per year). For methane, the energy sector (coal mining) accounts for 51 per cent of total emissions, while agriculture and waste management each generate approximately 23 per cent. Estimates for N₂O emissions are highly uncertain and preliminary at this stage. Although significant in 1990, chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) emissions have declined considerably in recent years. (No data has been provided regarding perfluorocarbons (PFCs).)

13. The emission inventory of the Czech Republic was elaborated for the 1990 base year

using the IPCC/OECD methodology and supplemented by selected emission factors from the CORINAIR² 1990 emission inventory. The preparation of the GHG inventories presented in the first national communication was commissioned by the Ministry of the Environment from the SEVEN-Energy Efficiency Center, an independent research centre in Prague. Both Government officials and the review team shared concern over the lack of documentation in the communication, particularly regarding the estimation processes adopted and other basic information used in preparing the national inventories. During the visit, however, the review team met extensively with SEVEN and Government staff, and several additional reports as well as inventory data were provided to the review team.

14. The national inventory covered all gases included in the IPCC Guidelines. However, several emission sources were omitted, or not reported separately in the categories indicated in IPCC table formats. Subcategory A.1 (Energy and transformation industries) and subcategory A.2 (Industry) of IPCC table 6A were considered as one subcategory. In the land use change and forestry category, the subcategories 5A (Forest clearing), 5B (Grassland conversion) and 5C (Abandonment of managed lands) were omitted. Emissions from international bunker fuels have not been estimated and were presented neither in the first communication nor during the country visit. While GHG inventories were reported according to the format of IPCC table 6A, only four additional minimum tables were provided in the communication, namely, for energy fuel combustion activities (table 1.A), fugitive fuel emissions (oil and gas) (table 1.B1), fugitive fuel emissions (coal mining) (table 1.B2) and waste sewage treatment (table 6B).

15. Additional minimum tables recommended by the IPCC were made available to the review team during the visit. In general, the GHG inventory was carried out using a top-down methodological approach, that is, by using IPCC default emission factors and aggregate activity levels to estimate emission levels from individual subsectors. A bottom-up approach was not chosen due to a general lack of detailed 1990 data on activity levels of most GHG emission sources. Specifically in the case of data on fuel consumption in the energy sector, data was drawn from the country's energy balance.

16. The national communication included emission estimates using GWPs according to IPCC 1992 data (for a 100-year horizon). These estimates use values 11 and 270 to convert CH₄ and N₂O emissions, respectively, into CO₂ equivalent figures. There has been no attempt yet to use updated 1994 IPCC data for GWPs. The in-depth review also revealed the following:

- . Energy balance data has an error margin of 10 per cent;
- . Emission levels of CO₂ and CO have an error margin not exceeding 15 per cent;

- . Emission factors of CH₄ and NMVOC have an error margin of less than 25 per cent;
- . Emission factors of N₂O and NO_x have an error margin of less than 35 per cent.

² CORINAIR is the component dealing with air emissions inventories of the European Economic Community CORINE (Coordination d'Information Environnementale).

17. Since the submission of the communication, additional estimates and corrections have been prepared for three categories: fuel combustion (1.A) for all GHGs, including NMVOCs; enteric fermentation (4.A) and animal wastes (4.B) for CH₄; and agricultural soils (4.D) for N₂O (only for fertilizers). The review team was provided with new estimates and these were clearly explained wherever figures differed from those presented in the text of the communication. The team considered the differences to be minor since they did not change the basic elements of the national GHG inventories.

18. Although a register of emissions and air pollutant sources (REZZO) has been conducted in the Czech Republic for several years, it does not include all GHGs, though it does include methane. The CORINAIR inventory has been used to complement information for several emission factors, particularly for CO₂ and N₂O in the energy sector. The process of preparation of the first communication indicated the need for improvements in the monitoring of GHG emissions, for clearer source classification and standardization, and the development of emission coefficients specific to local conditions.

19. The review team was informed that future updating of national inventories would be entrusted to the Ministry of the Environment, which would coordinate data collection and processing in cooperation with non-governmental organizations and research centres. Concurrently, the SEVEN Energy Efficiency Center would continue to cooperate with the Government in the development of national inventory methodology and emission projections, particularly by conducting research using bottom-up methods to estimate emission levels from each source category. It was felt that much still needed to be done regarding data on activity levels and emission factors for some sectors, such as transport and agriculture. In general, the team found that progress achieved thus far, particularly that related to the development of national GHG inventories (undertaken by SEVEN), was of excellent quality. In this regard, the team suggested that this work could serve as a model to other Parties with economies in transition. The inter-ministerial committee has undertaken to revise and further develop the national GHG inventories with a view to submitting a new inventory by 1996 and a second communication by 1997. Improved inventories are also expected to improve the development and implementation of mitigation strategies.

III. POLICIES AND MEASURES

20. The Czech Republic is meeting its commitments as an Annex I Party by reporting in detail on its policies and measures to reduce GHG emissions. Twenty-seven mitigation measures were reported as being in various stages of implementation. Most of these are still in the planning stage. A few have already been implemented with limited information available on their specific mitigation effects. One measure has been launched to enhance CO₂ sinks. Most of the mitigation measures target the residential sector which accounts for approximately 11 per cent of total CO₂ emissions from fuel combustion. The *Clean Air Act* and its amendments is the sole measure aimed at the energy generation and transformation sector, responsible for 59 per cent of total CO₂ emissions from fuel combustion. All policies and measures reported address CO₂ emissions, which, in 1990, represented 89 per cent of total

GHG emissions (using 1992 GWP figures) in the Czech Republic.

21. The review team was provided with detailed information on the status of implementation of all the measures described in the national communication. Owing to the fact that some measures are still in a planning or early stage of implementation, effects of specific measures have not yet been calculated. More information will be required on the effects of specific measures in the event that the Government decides to go beyond the adoption of no-regrets measures. There is limited information on how measures interact with one another and on how measures are expected to function over time. The costs associated with the implementation of the three major measures were made available during the visit. The Government has not identified any of its measures as particularly innovative or as promising to be replicated in other countries. However, the review team found that the planned "energy labelling" programme has considerable potential and further information on its achievements could be useful to other Parties. By introducing energy-consumption labels in a series of electrical appliances, the programme is expected to influence energy consumption at the household level. The launching of a nation-wide programme is pending its review by the Czech National Council and further assessment of its compliance with the provisions of the General Agreement on Tariffs and Trade (GATT).

22. Among the measures described in the national communication, and discussed in detail during the visit, the review team found the following no-regrets measures as being the most significant and indicative of the efforts being made by the Party.

1. *The Clean Air Act*

23. Enacted as early as 1991, the Act establishes strict emission limits for fly-ash, sulphur dioxide (SO₂), nitrogen oxides (NO_x) and carbon monoxide (CO). There is no limit set for CO₂ emissions. However, in promoting the gradual phasing-out of obsolete coal-fired electric power plants and the introduction of natural gas, the Act is expected to result in significant reductions in CO₂ emissions. The Act promotes "end-of-the-pipe" actions (dust removal, denitrification and desulphurization), the replacement of brown coal with natural gas and liquid fuels in combustion processes, the use of alternative sources of energy and the application of the best available technologies.

24. The main producer of electric power in the Czech Republic, CEZ, responsible for 77 per cent of total power output, has published the time schedule for shutting down its inefficient or highly-polluting thermal power plants. Coal-fired plants enjoy a grace period until 1998 with relatively low pollution charges during which they have to introduce measures to comply with emission limits. The Act stipulates that after 1998 Government authorities shall, by law, ensure that the strict emission limits are met. In case of non-compliance, polluting thermal plants would be closed down.

25. The anticipated reduction in the existing energy generation capacity is expected to be offset by the Temelin nuclear power plant, planned to enter into operation by 1996. The

provisions of the *Clean Air Act* should also be met in heat energy production, in large and medium sources. It is estimated that by 1998, the implementation of this Act will generate a reduction of 11,300 Gg of CO₂, about 7 per cent in CO₂ emissions compared to the 1990 level.

2. Compulsory metering of energy consumption

26. Since 1991, building owners and managers have been required by law to install meters for the measurement of heating and hot water consumption of every consumer in their buildings. While this is expected to lead to energy savings, as the consumers will be charged per unit consumed, consumption beyond a certain level is subsidized. The team found that this subsidy defeats somewhat the effort of installing meters, since it is not accompanied by any incentive to restrict consumption. While social concerns are admittedly the motivation for the subsidy, those consumers being subsidized are likely to waste heat energy, resulting in unnecessary GHG emissions. By September 1995, the measure will be under legal enforcement by the Ministry of Industry and Trade.

3. Preferential value added tax rates

27. According to an act of the Czech National Council, a value added tax (VAT) of 23 per cent (recently reduced to 22 per cent) is levied on energy sources and appliances considered "environmentally unfriendly", while those appliances and equipment using "environmentally friendly technology", have a preferential VAT of 5 per cent. This is aimed at inducing the use of "environmentally friendly energy sources and equipment". Other fiscal incentives have been introduced, such as income tax exemption for small hydropower plants, wind power, biogas and solar equipment, as well as property tax exemption for buildings used for wind-powered and biogas generators.

28. The review team was informed that in the early stages of this new VAT scheme consumers of cheap energy sources, such as brown coal, also paid a reduced VAT of 5 per cent. The team found this surprising, but was informed that the preferential rate was meant to induce consumers of brown coal, primarily small local ones, to switch gradually to natural gas.

4. Strict technical standards for heat insulation in buildings

29. In 1992, new technical insulation standards were introduced for new and reconstructed buildings. It is estimated that with the application of new heat leakage coefficients, up to 30 per cent of heating energy can be saved. The full implementation of this measure indicates that GHG emissions associated with the production of heating energy can be reduced by 1 per cent by the year 2000.

30. The review team was informed that new buildings being erected have to comply with the new national technical standards. The cost of installation in new buildings is passed on by the landlord to the tenants in the case of rented buildings. The landlord is expected to recover

this cost-element in eight years. Owners of old buildings are not under any obligation to install additional insulation to comply with the national technical standards. The cost of installing additional insulation in old buildings is too high for current tenants who, as in the case of new buildings, have to meet this cost within eight years. The landlord has therefore to negotiate with the tenants. The introduction of the new insulation standards has proved to be more difficult than originally expected.

5. "National Programme for Air Recovery"

31. The aim of this programme is to replace brown coal, briquettes and coal sludge with natural gas, electric power or with energy from other alternative sources in local heating of residential areas and in heat and power sources of up to 50 MW. It promotes co-generation and the building of new gas distribution and connection systems. While funds have been allocated by the National Property Fund to a special State Environment Fund to support this initiative, the level of funding falls short of needs for its full implementation. The team was informed that the programme was also designed to create public awareness of the adverse effects of climate change and their relation to inefficient and highly polluting sources of energy.

6. Programme of Energy-Saving Lighting

32. This demonstration project started in 1993 with the sale of 156,500 fluorescent compact bulbs, in an attempt to convince the public of the energy efficiency of these bulbs in comparison with ordinary light bulbs. The bulbs were sold at half their cost price; the other half being financed by the CEZ, the main electric power company in the Czech Republic, at a total cost of US\$640,000. It was estimated that the use of these bulbs, with a lifetime assumed to be eight years, would result in CO₂ emission reductions of about 9,000 tonnes a year. Although the national communication describes this project as a one time activity, the review team was informed by CEZ that the project was continuing. The team learned that public response had been modest because of the price difference between the ordinary bulb (approximately US\$0.50) and the subsidized fluorescent bulb (approximately US\$7-20). Further, the price of electricity was much lower than the price of bulbs. The demand for energy-efficient bulbs was therefore not likely to increase until electricity prices were liberalized.

7. Maintenance of forests

33. Forests in the Czech Republic cover approximately 33 per cent of the land area of the country. This represents a large reservoir for carbon dioxide. The Ministry of Agriculture has introduced an afforestation programme to increase forest area at the rate of 2000 hectares per year at a cost of US\$6 million. In the light of commitments under Article 4.1(d) of the Convention, the Party is making a commendable effort in enhancing its already significant sink capacity. The afforestation effort is expected to increase the CO₂ absorption capacity of forests by 343,000 tonnes per year by the year 2010.

8. Bio-fuel oil

34. The team was informed that this programme, which is subsidized by the Ministry of Agriculture, was introduced as a result of a slump in agricultural activity in the country. As a result of the programme, rape seed plantations have expanded from 3 per cent in 1990 to 6 per cent of total arable land in 1995. The team was informed that up to 80 per cent of the bio-fuel produced is exported. This information was not outlined in the communication. While 50,000 tonnes of bio-fuel oil are expected to be produced annually, the current domestic price of bio-fuel is still not competitive with that of diesel fuel, rendering uneconomical the wider use of bio-fuel as a motor fuel.

9. Measures under preparation

35. Of the seven measures described as under preparation, the price liberalization of fuels and energy sources has been partially implemented (the prices of diesel, gasoline and black coal are already freely set by the markets). The price of brown coal is still being subsidized, primarily for social reasons. The team found that these developments will provide incentives to the efficient use of energy and to future limitations in GHG emissions.

10. Policies and measures under consideration or requiring international cooperation

36. The Czech Republic established a national tax system in early 1993. Several improvements are under way in the levying, collecting and adjusting of taxes at the various levels. A major effort is being made to seek consistency with fiscal practices in the European Community. To date, there has been no discussion of what the Czech Republic's strategy would be in the event of a CO₂ tax being adopted throughout the European Community.

IV. PROJECTIONS AND EFFECTS OF POLICIES AND MEASURES

37. The Czech Republic expects to achieve stabilization of GHG emissions at 1990 levels by the year 2000. Indeed, a reduction of approximately 17 per cent of 1990 GHG emission levels is expected (using 1994 GWP figures). Most of the reductions will result from the economic restructuring currently under way. This process has led to the phasing-out of inefficiencies in energy production, transformation and distribution, as well as to the introduction of advanced technologies aimed at greater economic efficiency. The achievement of further emission reductions is expected with the gradual introduction of a number of no-regrets measures.

38. Although the national communication only partially documented results of projections of GHG emissions in 2000, the team was provided during the review with extensive information on how projections were conducted.

39. Notwithstanding the major difficulties in making assumptions on key economic variables in a country experiencing such a profound restructuring process, the team found that assumptions were to a large extent realistic. The basic scenario chosen for the GHG projections does not include the implementation of any new measures other than those few energy efficiency measures being gradually introduced since 1991. The basic scenario assumes that, as components of the gross domestic product (GDP), the services sector will continue its expansion, reaching 42 per cent of GDP in 2000 from 27 per cent in 1990, while the industry sector would shrink from 57 per cent in 1990 to 45 per cent in 2000. It also assumes that the agricultural and forestry, transport and construction sectors will not increase as components of GDP. No major technological advances are expected in the industry sector, and a gradual switching from coal to natural gas and nuclear as major sources of energy is assumed. The share of gaseous fuels in the composition of primary energy resources is expected to increase from 11 per cent to 14 per cent while nuclear energy will double from 7 per cent in 1990 to 14 per cent in 2000. Annual GDP growth is taken as constant at between 5 and 5.5 per cent from 1995 to 2000, aided primarily by the inflow of foreign investment and the increase in exports of low value added goods. A fairly successful and slow energy price liberalization, as well as slightly higher world crude oil prices (US\$20 per barrel) are assumed, resulting in small increases in domestic energy prices by the year 2000.

40. Based on the assumptions above, an energy demand structure is projected for 2000. Using emission factors consistent with those applied in the inventories, emissions in 2000 from the combustion of fossil fuels is expected to drop 12.3 per cent compared to 1990. The major decrease in CO₂ emissions is likely to occur in the industry sector, while the only sector which projects an increase in CO₂ emissions is transportation, at 14 per cent higher than in 1990. Other than combustion processes, the production of coke and cement also show a marked decrease in CO₂ emissions by 2000, mainly as a result of the decline in industrial production and construction.

41. Projections of CO₂ absorption in forests are based on an expected annual increase in forest surface by 2000 hectares and amount to a total annual absorption of 2,300 Gg of CO₂. Regarding methane emissions, a drop of 18 per cent by 2000 is projected, mainly as a result of the decline in coal use and in agricultural activity. GHG emission projections did not include projections of N₂O due to the high level of uncertainty associated with the collection of data.

42. Projected anthropogenic emissions and removals of GHG in the Czech Republic indicate a decrease of 17 per cent by the year 2000 compared to 1990. The team found, however, that achievement of the national stabilization target may require the introduction of additional measures if some of the current conditions and assumptions do not prevail. These could include a much faster than expected growth rate in the second part of the 1990s based on

highly energy intensive industries, difficulties in the liberalization of energy prices resulting in electricity surplus, and a postponement in the chronogram of the Temelin nuclear power plant.

V. PROJECTED PROGRESS IN GREENHOUSE GAS MITIGATION

43. Significant reductions in CO₂ emissions are expected by 1998 as a result of the partial implementation of the *Clean Air Act* and the expected coming into operation of the Temelin nuclear power plant, due in 1996 or soon thereafter.

VI. EXPECTED IMPACTS OF CLIMATE CHANGE

44. During the in-depth review, substantial additional information was provided on studies that have been carried out since 1992 on possible climate change impacts on the Czech Republic. The team was also informed about the Government series of studies *Strategy of Risk Reduction of Climate Change*, published in 1993. Studies are continuing in the context of a country study sponsored by the Environmental Protection Agency of the United States on the vulnerability of the Czech Republic to climate change, particularly in the agricultural, forestry, hydrology and water resources and health sectors. The country study is being elaborated within the framework of the National Climate Programme (NCP) which was established as a response to the World Climate Programme (WCP) of the World Meteorological Organization. The NCP is a non-governmental association of the country's academic and scientific institutions, and represents a wide range of disciplines. Using selected global climate scenarios, NCP has identified a number of interesting preliminary results, such as the following.

Agriculture

45. In the Czech Republic, it is expected that increased CO₂ concentrations are likely to favour grasslands with consequent benefits to animal grazing and other activities. Such benefits may, however, be tempered by higher temperatures and changing precipitation patterns which would result in both increased and decreased yields, depending on the crops, as well as on the quality of production. Impacts would also be evident in patterns of seeding, growth and harvesting, as well as in pest and disease control methods. New crops more suited to the changing climate regime may have to be introduced as well as new farming techniques and irrigation systems.

Forestry

46. Forests cover some 2.6 million hectares, or some 33 per cent of the land area of the Czech Republic. The forests comprise approximately 80 per cent conifer trees, of which 55 per cent are Norwegian spruce, and 20 per cent deciduous trees, half of which are oak and beech. The Government plans to plant an additional 2000 hectares per year at an annual cost of US\$ 6 million. The tendency is to increase the proportion of deciduous forest. This trend would be reinforced with increasing CO₂ concentrations and rising temperatures. On the other hand, with higher concentrations forests would be increasingly vulnerable to chemical pollution and disease as well as to water shortages.

Hydrology and water resources

47. A comprehensive assessment of the country's water resources system, including supply, demand and management, has been carried out as part of a country programme. Supply assessment involves a complex mix of river runoff and water resources management whereas demand assessment is aggregated on a national basis as a factor of socio-economic forces involving population projections, agricultural and industrial production, and energy use. Studies into the impact of climate change involving increasing temperature and changing precipitation patterns indicate a possible reduction of up to 35 per cent in river runoff with serious implications regarding water quality and availability.

Health

48. Current studies of the impact of climate change on human health in the Czech Republic are still inconclusive. No major impacts are foreseen.

VII. ADAPTATION MEASURES

49. Under Article 4.1(e) of the Convention, all Parties are required to cooperate in preparing for adaptation to the impacts of climate change, and should develop and elaborate appropriate and integrated plans. The general policy of the Government of the Czech Republic appears to favour non-structural, no-regrets measures. In the agricultural sector, these include changing to crops that are more adaptable or are suitable to a changing climate; altering crop rotation patterns and harvesting dates; and applying fertilizers or additional irrigation practices. As far as forestry is concerned, attention will focus on the introduction of new species, careful disease and pest monitoring and more efficient forest management. The water resources sector will benefit from better water resources management and more effective water saving policies. The team felt that at least in the area of water resources more structural and capital investment measures such as reservoirs might be necessary.

VIII. TECHNOLOGY TRANSFER

50. As a Party with an economy in transition, the Czech Republic may be described as a receiver rather than a provider of technology which could affect positively the intensity and level of GHG emissions. In this regard, much interest was expressed during the visit in improving access to energy-saving technologies in the household sector and in technologies for the use of renewable sources of energy.

51. The Party has also expressed wide support for early launching of activities implemented jointly under the pilot phase. The inter-ministerial committee is expected to be closely involved in the assessment and approval of the pilot phase project proposals, as long as these are consistent with national development objectives.

IX. RESEARCH AND SYSTEMATIC OBSERVATION

52. The review team had very useful discussions with the members of the NCP (see paragraph 44 above) on its research activities. In briefing the team, the scientist responsible for coordinating the activities of the NCP said that the programme generally followed the guidelines of the WCP (see paragraph 44 above). However, it included chemical aspects of the atmosphere and ozone in its research activities. The team was briefed on the progress of the United States Country Study Programme by the scientists in charge of each area of the NCP (see sections VI and VII above). The NCP has issued a series of publications focusing on aspects of climate change in relation to the natural resources and environmental conditions of the Czech Republic. The team was informed that there was considerable scientific research being conducted at universities and other institutions within the country. These research activities cover a wide variety of fields, including palaeoclimatology, climate change in the past and its relation to future change, climate change and forestry, and so forth.

53. The network of hydrometeorological stations includes 38 synoptic stations, 800 precipitation stations, and 98 fully automatic stations measuring air pollutants. Some 180 additional voluntary stations make measurements of various climate related elements. Regarding systematic observation, the team was informed that the Czech Republic had no plans to increase the number of observation stations in the country. However, there were plans to extend equipment at existing synoptic stations to measure additional elements relevant to climate change.

X. EDUCATION, TRAINING AND PUBLIC AWARENESS

Environmental education in schools

54. The team was informed that the non-governmental organization, TEREZA, is closely involved in environmental education in schools and universities under the GLOBE Programme which is funded by the Ministry of the Environment and the Ministry of Education. Each ministry contributes approximately US\$40,000 yearly. The educational activities are not confined to climate change, but cover the broad field of environmental protection. The Ministry of the Environment, on behalf of the Ministry of Education, has worked out general principles of environmental education which have been discussed with interested institutions and non-governmental organizations, who have been asked for their comments. After incorporating the comments received, and after the revised principles have been approved by

the Minister of the Environment, detailed teaching materials for schools will be prepared. Environmental education in schools was not elaborated upon in the first national communication.

Public awareness

55. The team was provided with additional information on public awareness activities in the Czech Republic. It was informed, for example, that the Czech Union for Nature Conservation and the Brontosaurus Organization have been involved in public environmental education for some 10 to 20 years and that the scout movement has existed for almost 90 years, with relevant involvement in environmental education. In every district, there is a department dealing with environmental protection with one person responsible for public education and awareness. The Czech Ecological Institute is also involved in public education and awareness. It is reported that non-governmental organizations in the Czech Republic receive about US\$440,000 yearly for environmental projects and that a part of this money is ear-marked for public environmental education.
