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**Consistency of World  
Bank country  
assistance with client  
country commitments  
under FCCC**

A Czech Republic, Poland  
and Hungary case study

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Janne H. Matlary and Erik S. Sørensen*

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A Czech Republic, Poland, and Hungary Case Study**

by

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## FOREWORD

This report evaluates the consistency of World Bank country assistance with client country commitments under the United Nations Framework Convention on Climate Change (FCCC). Three separate chapters examine the cases of the Czech Republic, Poland and Hungary. Each chapter consists of four parts.

Part One evaluates the national communication submitted by the country to the interim secretariat of the FCCC by Autumn 1994. The national communication is reviewed and the principal policy directions in essential sectors are highlighted. Part Two analyzes the principal World Bank policy and country assistance strategies for the country. The analysis is based on available information on relevant World Bank operations. Part Three is a comparison of the national communication and the principal World Bank policy and country assistance strategy for the country. Part Four comments on the usefulness and relevance of the national communication as inputs to the World Bank's country assistance strategy formulation.

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## EXECUTIVE SUMMARY

### THE CZECH REPUBLIC

The National Communication from the Czech Republic can be an important background document for the World Bank when formulating its assistance strategy for the country. The National Communication clearly shows that the Czech authorities intend to pursue efforts to reduce greenhouse gas emissions. When developing the assistance strategy for the Czech Republic, the World Bank should take into account that the Czech government intends to use market mechanisms such as price structures as important tools in its climate strategy.

The World Bank takes an optimistic view of the reform program in the Czech Republic which it has supported with a considerable Structural Adjustment Loan in the amount of US\$ 300 million. Among the loan's comprehensive release conditions were price and trade liberalization, including elimination of price controls and reductions in subsidies. This is consistent with the National Communication stating that energy subsidization policies will be eliminated, together with other price deformations.

The Power and Environmental Improvement Loan, one of the largest environmental projects in the history of the World Bank, will lead to reduced carbon dioxide emissions at least in the short-term. However, the long-term consequences of carbon dioxide emissions are uncertain. One outcome of this project is that the power plants using lignite as an energy source will increase their competitiveness and thereby prolong their lifetime. As a result, as part of a climate strategy, the project might make it politically difficult at a later stage to invest in power plants using other energy sources with less greenhouse gas emissions.

The World Bank is also considering supporting railroad investments and improvements in waste management. Most interesting in a global warming context is perhaps that the World Bank considers supporting the restructuring of the Czech railroads. The National Communication states that preference for railways is a part

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of the country's climate strategy. The World Bank's plan to support investments in railways will therefore be consistent with the National Communication. However, the current Czech government is presently not interested in additional World Bank loans.

### POLAND

Poland has had a surprisingly fast adjustment in their economy. After a period of hyper inflation, which lasted about one-and-a-half-years, in 1992 Poland became the first of the European countries in transition to experience positive economic growth. The private sector has been leading in economic growth, but progress on the structural side has been mixed. One of the most challenging problems is to continue restructuring public sector companies. This has proved difficult to complete because of various social consequences.

Poland uses two to three times more energy to produce one unit of GDP compared to OECD Europe. Furthermore, Poland's energy use is dominated by domestically-produced coal. All of Poland's major power plants burn hard coal or lignite; the district heating system is based mainly on coal and there is also significant coal use in industry, the commercial sectors and households. The key sectors for reducing energy use through higher efficiency and for substituting coal with other fuels, such as natural gas, are the electricity sector, district heating and the large energy intensive industries. Progress in improving energy efficiency and reducing greenhouse gas emissions and other air pollutants depends on the restructuring of these sectors and on the implicit restructuring of the public sector companies to which they belong.

The Polish National Communication that the main political objectives are the country's modernization and restructuring. The reforms planned to be implemented in the next decades will result in lower energy and raw material use. Consequently, these policies will help in the implementation of sustainable development policies. Polish climate policies as such do not exist.

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The World Bank's lending policies for Poland have been, and still are, to support the restructuring of the economy in general and the restructuring of the energy sector and heavy industry in particular. Of importance for greenhouse gas emission are projects directed at improving efficiency in energy use and production. Funds for the oil and gas industry and for the district heating sector have been committed, but a widening of the scope of the Bank's activities to include the coal and electricity sectors requires that the Polish government undertakes important reforms in these areas. World Bank assistance is thus conditional on the implementation of an appropriate pricing policy for energy. The policy outlined in the Communication is in broad terms consistent with the assistance strategy of the World Bank. It will be important to make an analysis of action which could combine the structural policies with an optimal greenhouse gas emission control policy.

#### HUNGARY

The Hungarian Communication is a thorough study of GHG-emissions and abatement strategies and contains detailed analyses of policy in some areas such as energy. It shows that the Hungarian authorities have a good grasp of the problem and of Hungarian obligations, and also that they are interested in using market instruments in climate policy to an increasing extent. Economic restructuring has been far-reaching, especially with regard to heavy industry, and in the energy sector uneconomical coal mines have been phased out quickly.

The World Bank's strategy in Hungary is to support policies and investments encouraging market-based growth and social development in the context of macroeconomic stability. The World Bank emphasizes optimum resource allocation and increased efficiency. In addition to the Energy and Environment Project, which supports higher efficiency in energy production and substitution of gas for coal as an energy source in Hungary, the World Bank will concentrate on four investment projects; the Budapest urban transport, the project on water

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cleaning in the Lake Balaton, municipal sewerage, and a project on railways in Hungary. The Energy and Environment Project is an important contribution to the reduction of greenhouse gas emissions in Hungary, and is consistent with Hungary's climate policy. Of the planned World Bank operations in Hungary, both the railway and the Budapest urban transport projects will reinforce the national climate policy.

The Communication mentions that it seemingly is more difficult to attract international funding for railroad projects than for e.g. motorways (p.68). This is a significant issue as the availability of such funding is a necessity for developing a future public transport policy in Hungary. It is therefore positive that a railroad development project is currently being considered for support by the World Bank. This policy area is of great importance for future climate policy in Hungary.



## CHAPTER 1

### PART 1. NATIONAL COMMUNICATION BY THE CZECH REPUBLIC

#### INTRODUCTION

The Czech Republic acceded to the United Nations Framework Convention on Climate Change on 7 October 1993, on the basis of Czech Government Decree No. 323 of 16 June 1993.

The document *'The Czech Republic's First Communication on the National Process to Comply with the Commitments under the UN Framework Convention on Climate Change'* was prepared in 1994 by the Ministry of the Environment and the Ministry of Industry and Trade. It followed a study by SEVEN, The Energy Efficiency Centre, entitled *'Emissions of Greenhouse Gases, Scenario of Future Development and Methods for Limiting Emissions'*. The First Communication underlines that current transformation of legislative, administrative and taxation systems makes it very difficult to assess future trends of GHG emissions.

The First Communication contains no specific national targets for stabilizing or reducing greenhouse gas emissions. It deals with the commitments of the Czech Republic, under Articles 4 and 12, and from their being included among the developed countries listed in Annex I of the Climate Convention.

1990 has been accepted as a preliminary base year for the emission inventory by the Czech Republic.

## THE CZECH ECONOMY AND ENERGY CONSUMPTION

Since 1990, the economy of the Czech Republic has been experiencing radical transformation and is no longer a centrally planned economy. In 1993, the pace of reform in the Czech Republic matched that of Poland. The transformation process resulted in a reduction in GDP by 14.7 percent in 1991, 7.1 percent in 1992, and 0.3 percent in 1993. The initial reduction in GDP was due to the discontinuation of uneconomic production and decreased exports to the former communist countries. In addition to the costs of splitting the Czech and Slovak Federal Republic, the Czech economy has also incurred the costs of adapting to its new economic situation. While underlining that transformation of legislative, administrative and taxation systems make it very difficult to assess future trends of GHG emissions, the First Communication also underlines that Czech industrial production has decreased, the structure of energy consumption has changed, and CO<sub>2</sub> emissions have been proportionally reduced.

More than 90 percent of Czech energy consumption has been met by combustion of fossil fuels. Compared to other European countries, emissions (per capita, per 1 sq. km, etc.) from the Czech Republic are high. The main energy source in the Czech Republic is brown coal.

*Table 1. Generation of 1 peta-joule (PJ) of thermal energy has, on average, produced the following emissions (metric tons).*

Solid particles	400
SO <sub>2</sub>	1,800
NO <sub>x</sub>	550
CO <sub>2</sub>	115,000

## GHG RELEVANT ECONOMIC SECTORS

The Czech national communication provides information on several relevant economic sectors for assessing Czech national climate policy.

Industry is the largest energy consumer. In 1990, industry accounted for 48 percent of total energy consumption. In the same year, approximately 48 percent of the 'economically active population' was employed in 'industry and building construction'. Energy generation, production of iron and steel, machine industry, production of glass and ceramics, production of cement and construction materials and chemical, textile and food industries are among the most important industry sectors.

The transportation network of the Czech Republic is relatively dense. The length of the railway network is 9,545 km and the total length of the roads is 55,896 km. Since 1990, the transportation volume has dropped, in particular on railways and public transportation. Individual transportation and long-distance road haul transport have increased in a relative sense. The same seems true with respect to cargo transport in smaller lorries.

Agriculture's share of GDP was 6.5 percent in 1990, 4.9 percent in 1991, 5.0 percent in 1992, and 5.0 percent in 1993. The area of arable land and the number of farm animals declined in this period, and so did the consumption of pesticides and fertilizers.

Forests take up approximately 33 percent of the total area of the Czech Republic. Intensive exploitation of monocultures for wood production - spruce comprises 55 percent of all trees - has resulted in adverse species composition in forests in the Czech Republic. This has adversely affected the stability of forest ecosystems. In addition, forests in the Czech Republic have been heavily affected by sulphur dioxide (SO<sub>2</sub>) and nitrogen oxide (NO<sub>x</sub>) emissions.

Households are the second largest energy consumers. In 1990, the energy consumption in this sector was 26 percent of total energy consumption.

The national communication shows coal as being the most important primary source of energy and oil being of less importance. Since the mid-1980s,

coal, and to a lesser extent, oil have been less dominant, while gas and nuclear power have become more important. Since the mid-1980, overall consumption has decreased somewhat, especially oil consumption. Until the late 1980s, the industry and construction sector was the biggest energy consumer, but its consumption has since been reduced considerably. In contrast, the residential sector increased its consumption, while consumption by the agricultural, service and transport sectors has not changed significantly since the early 1980s.

Table 2 presents data on the estimate of emissions of CO<sub>2</sub> per capita in 1990 through 1993, the index of industrial production, coal production, relative energy consumption, energy demand to produce the GDP, and the level of motorization.

*Table 2. Preliminary estimates of carbon dioxide emissions per capita and other indicators.*

Indicator/Year	1990	1991	1992	1993
CO <sub>2</sub> emissions (tons per capita)	16.4	15.3	14.0	13.8
GDP (per cent, interannual)	-1.6	-14.7	-7.1	-0.3
Index of industrial production	100	78	68	63
Coal production (1988=100%) <sup>a)</sup>	85/86	82/87	74/69	73/67
Total energy consumption (interannual increase %)		-3.5	-7.3	-7.7
Energy demand to produce the GDP (PJ/Hc 1000 million)	4.12	4.48	4.47	<sup>b)</sup>
Number of vehicles/100 inhabitants	26.2	26.9	27.9	29.0

<sup>a)</sup> Coal production (brown coal/black coal)

<sup>b)</sup> Data for 1993 not available

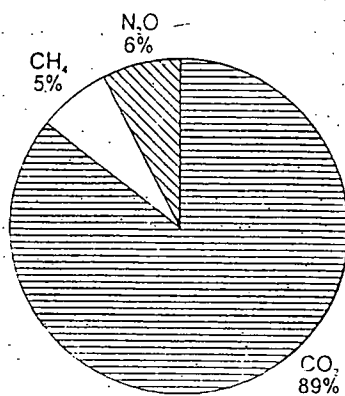
## EMISSION INVENTORY

The Czech Republic's emission inventory for 1990 has been calculated according to the IPCC/OECD methodology. In the Czech national communication, the emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) are summarized in Table 3:

Table 3. GHG sources and sinks.

Source/sink	Emissions of GHG [Mt]		
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Energy production	162.5	0.47	0.02
Industrial processes	6.8	>0.01	>0.01
Agriculture	>0.05	0.17	>0.01
Forestry	-2.3	0.09	0.02
Wastes	0.2	0.15	>0.01
<b>Total</b>	<b>167.25</b>	<b>0.88</b>	<b>0.06</b>

According to the national communication, in 1990, CO<sub>2</sub> emissions represented 89 percent of total anthropogenic emissions expressed in the CO<sub>2</sub> equivalent (methane 5 percent, nitrous oxide 6 percent). Energy production by combustion of fossil fuels emitted 89 percent of this equivalent.

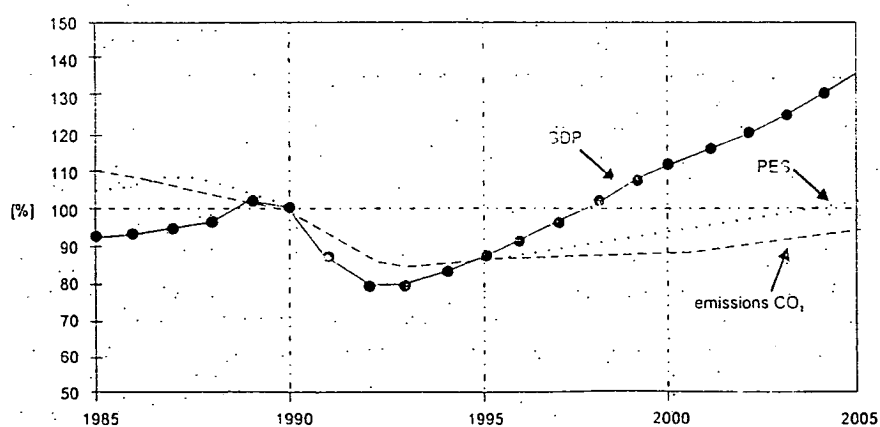
Figure 1. Total emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, 1990 (CO<sub>2</sub> equivalent).

## TRENDS OF EMISSIONS BY 2000

The Czech national communication predicts the trends of GHG emissions by 2000. The communication bases its emissions scenario on the following set of assumptions: (i) the economic transformation will continue and positive growth begins in 1994, (ii) the economic development will result in considerably increased energy consumption, (iii) there will be modest developments in energy efficient technology and energy savings, (iv) there will be insignificant population growth and, (v) slow or no implementation of the measures described in the national communication (measures listed below). The national communication does not explicitly explain the reasons for the slow or non-existent implementation.

With regard to CO<sub>2</sub> emissions, it is predicted that emissions in 2000 will not exceed the 1990 emissions level (see Figure 2). Perhaps they might be reduced by approximately 12 percent, despite a moderate increase in 1995-2000.<sup>1</sup> A temporary reduction in emissions in 1990-1994 is expected to be followed by a moderate rise in 1995-2000, due to economic growth.

Figure 2. Prediction of GDP development, consumption of PES (primary energy source) and CO<sub>2</sub> emissions by 2000 (1990=100%).



<sup>1</sup> The exact wording of the Czech national communication is: 'Nevertheless, it appears that even in this scenario the carbon dioxide emissions in 2000 (CO<sub>2</sub> emissions in 1990 formed 89 percent of GHG emissions) will not exceed their amounts of 1990, or will be lower by 12.3 percent, in spite of a moderate increase in 1995-2000.' (pp. 13-14)

With regard to CH<sub>4</sub> emissions, it is predicted that total emissions in 2000 will be reduced by 18 percent, compared to the base year 1990. The Czech national communication states that the biggest reductions will be made in the area of black coal mining and decreases in agricultural production. However, it provides no additional information on these issues.

### PRINCIPAL POLICY DIRECTIONS

Principal sector policy directions in the Czech Republic must be understood against the background of the on-going economic transformation. The Czech national communication predicts that GDP will be reduced by approximately 10 percent from 1990 to 1995, compared to 1990, while GDP will return to the 1990 level in 1996-97 and, in addition, will increase by 10 to 15 percent by the year 2000. The Czech national communication provides no information on the sector-specific developments beyond 1992. However, the national communication's positive outlook on the economic development in the future, which is shared by both the OECD (OECD 1994) and the World Bank (World Bank, 1993), underlines the need for medium and long-term planning of a Czech climate policy. Therefore, while near-term climate policy planning may not be imminent, national decisions on future economic developments should address the issue of a medium and long-term climate change policy for the Czech Republic.

### DECISIONS AND MEASURES TO STABILIZE AND REDUCE GHG EMISSIONS

The Czech national communication lists a number of initiatives that, according to the communication, might result in reductions of greenhouse gas emissions. The measures generally do not address climate issues in a narrow sense, but instead

are aimed at broader environmental objectives. The Czech national communication describes the measures as 'low-cost' or 'no-cost' in nature.

The Czech Air Protection Act of 1991, amended in 1992, established emission limits for fly-ash, SO<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub> as well as for other air pollutants. The Act emphasizes 'end-of-pipe' solutions (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. The Czech Republic intends to close a number of thermal power plants in the coming years, and the Temelin nuclear power plant (2 x 1.000 MW) will go on line in 1996.

Decree No 186/1991 S.B., issued by the Ministry of Industry and Trade, makes it mandatory for building owners to measure heat and hot water service from all sources; buildings and consumers. It will be gradually implemented beginning 1 September 1995.

The Program of Heat Savings in Residential Buildings, which runs from 1991 to 1996, focusses especially on housing and the public sector and is intended to achieve fuel and energy savings in buildings and apartments, to establish energy saving demonstration projects, and to utilize non-conventional and renewable energy sources. The Energy Agency of the Czech Republic (EACR) has supported reduction of fuel and energy consumption. It supports (i) promotion of technical measures reducing fuel and energy consumption in buildings and flats, (ii) coordination, information, and consulting services in the field of energy consumption, (iii) demonstration projects for verification of technically progressive applications providing fuel and energy savings in buildings, flats and public facilities, and in the field of renewable and non-conventional energy sources, and (iv) utilization of renewable and non-conventional energy sources.

The Act of the Czech National Council No. 588/1992 S.B., introduced a value-added-tax (VAT). The Act stimulates energy savings and utilization of renewable sources by imposing a low tax (5 percent) on biogas, absorption heat pumps, solar devices, thermostatic valves of heating elements, economical light sources and electromobiles.



Due to Act of the Czech National Council No. 586/1992 S.B., no income tax for the year they start operating and the next five years has to be paid by operators of small water power plants, wind power plants, solar devices, devices for biogas generation, and devices utilizing geothermal energy.

Following the National Technical Standard (CSN 73 0540), coefficients of heat penetration for walls and roofs have been upgraded. These coefficients are binding for newly built or reconstructed buildings. The National Program for Air Recovery and the Program of Heat Savings in Residential Buildings, among others, will partially contribute to the replacement or reconstruction of at least 10 percent of existing residential areas by 2000.

The National Program for Air Recovery was established by Act No.388/1991 S.B. in 1991. The program aims to replace brown coal, briquettes and coal sludges with natural gas, electric power or with energy from other alternative sources in local heating of residential areas, and in the heat and power sources of up to 50 MW. The priority fields are (i) gasification and electrification of small sources with respect to effective utilization of energy, including the promotion of co-generation, (ii) construction of gas distribution and connections systems, (iii) replacement of existing sources of air pollution with alternative environmentally friendly energy sources, and (iv) additional heat insulation in buildings, conditioned by a purchase of environmentally friendly and energy saving appliances, with simultaneous gasification or electrification. The first projects for support will be selected by the end of 1994, and the program will continue until at least 1997. It is estimated that CO<sub>2</sub> emissions from central heating plants will be reduced by approximately 25 percent, compared to 1990. The individual small sources' energy demands for heating are expected to decrease by 30 to 50 percent, which in the housing sector will result in 10 percent reduction in CO<sub>2</sub> emissions in 2000, compared to 1990. It is predicted that the Program on Energy Saving Lighting, a program intended to raise public awareness, will be able to save 9,000 tonnes CO<sub>2</sub> annually.

With respect to CO<sub>2</sub> sinks, the Czech national communication states that the Cohesion and Guarantee Forestry Fund, which supports afforestation projects, has been established by the Ministry of Agriculture. This ministry also supports the

use of biomass as well as bio-fuel oil production and production of biodegradable lubricants.

With respect to future measures, the Ministry of Transportation in the Czech Republic is preparing (i) preference of electrical tractions on railways, (ii) support of integrated systems in passenger transport, (iii) support of construction of transfer stations and centers for combining cargo transport, and (iv) conclusion of bilateral international agreements to regulate road traffic. The application of measures under preparation should stabilize the CO<sub>2</sub> emissions in the period 1998-2000 at the level of 1990. An Act on Economical Use of Energy is also being prepared.

The Program for Stimulation of Savings in the Industry of the Czech Republic is intended to be implemented by the Ministry of Industry and Trade. Price liberalization and elimination of state subsidies are also planned for implementation in the fields of fuels and energy. By including the external costs, prices will favor environmental protection. These price adjustments should be effective by 1998 at the latest. The Ministry of the Environment will support the preparation of pilot projects for the utilization of biogas arising from landfills and wastewater treatment plants. Regarding joint implementation, the Czech Republic has expressed interest in participating as a host country in appropriate projects.

#### ASSESSMENT OF THE EFFECTIVENESS OF ADOPTED MEASURES

In addition to the scenario and its five assumptions described above, the Czech national communication estimates that measures implemented in the Czech Republic for reduction and stabilization of GHG emissions would result in reductions of CO<sub>2</sub> emissions as follows:

Table 4. Estimated impact of measures for reduction of CO<sub>2</sub> emissions (Mt).

Generation of energy and heat	5
Housing	2
Industry	1
Agriculture and forestry	0.5
<b>Total</b>	<b>8.5</b>

According to the basic (least favorable) scenario, in which CO<sub>2</sub> emissions should amount to 143.5 Mt CO<sub>2</sub>, the adopted measures described above would significantly assist in the stabilization of GHG emissions at 1995 levels, i.e. 'at the level of 85-90 percent of the emissions of 1990.'<sup>2</sup> Without providing details, the Czech national communication further predicts that methane emissions would be reduced by the adopted measures. However, due to the uncertainties in determining the emissions, no attempt is made to predict the future trend of nitrous oxide (N<sub>2</sub>O) emissions.

## PART 2. WORLD BANK ASSISTANCE TO THE CZECH REPUBLIC

### INTRODUCTION

This section reviews and analyzes the principal World Bank policy and country assistance strategy for the Czech Republic. It uses the most recent Country Assistance Strategy document (CAS) as the key source of information, cf. World Bank (1993). A CAS document defines the World Bank's strategy in a particular country based on an assessment of priorities in the country as well as the level and composition of assistance to be provided.

The World Bank (1993) has summarized the economic development of the

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<sup>2</sup> *Ibid*, p. 27.

seventy-four years during which the Czech Republic was a part of a Federation with Slovakia. From 1919, and up to World War II, Bohemia and Moravia (the two provinces of today's Czech Republic) were among the most advanced industrial regions in the world. At the outbreak of World War II, the per capita income in Bohemia and Moravia was approximately 70 percent of Germany's. Nonetheless, after 40 years of communism the Czech Republic emerged with most of the problems characteristic of the economies of Eastern Europe. The per capita income in Bohemia and Moravia in 1990 was approximately at the pre-World War II level.

The most relevant World Bank loans in the context of climate change are the following:

*Table 5. Present World Bank/GEF operations in the Czech Republic.\**

Borrower	Project	Date of approval	US\$ Million
Czech Republic	Structural Adjustment Loan	1991	300.00
CEZ a.s.	Power and Environmental Improvement	1992	246.00
SPT Telecom <sup>3</sup>	Telecommunications	1993	80.00
Czech Republic	Biodiversity Protection Project (GEF)	1994	2.75

\* IFC (International Finance Cooperation) investments are not included.

The World Bank takes an optimistic view of the reform program in the former Czechoslovakia and the Czech Republic. About one year after the Velvet Revolution (November 1989), the Government in Czechoslovakia introduced one of the most comprehensive and radical adjustment programs in the region.

<sup>3</sup> SPT Telecom is the main operating telecommunications company in the Czech Republic. SPT is an abbreviation for Sprava Post a Telekomunikaci, which was the former name of the operating company.

### Structural Adjustment Loan

The World Bank supported the adjustment program with a Structural Adjustment Loan (SAL) of US\$ 450 million, co-financed by US\$ 200 million from the Export-Import Bank of Japan. In June 1991, the loan was approved by the World Bank's Board. After the dissolution of the Federation, the loan was apportioned between the two Republics on the basis of their respective population shares (2:1).<sup>4</sup> A further Standby support of the Government's reform program was approved in April 1992.

Among the comprehensive release conditions of this loan were:

1. satisfactory execution of stabilization policies; in particular, adherence to an agreed on budget deficit ceiling and current account deficit; a reduction in subsidies and submission to Parliament of new tax laws;
2. price and trade liberalization, including elimination of price controls on all but a few items in the course of 1991; reduction in export licenses, and phaseout of temporary import surcharges;
3. adoption of regulations to facilitate large privatization and preparation of medium and large scale state enterprises for privatization; finalization of a regulatory framework, and implementation of a voucher privatization program;
4. adoption of financial sector legislation providing a regulatory framework for the licensing and operation of banks and supervision by the central bank; adoption of prudential regulations and privatization of several state-owned banks.
5. development of a least-cost energy sector study for the power sector, a 70 percent nominal increase in households' power tariffs; a regulatory framework for public utilities; and introduction of environmental impact assessments;

Points 1, 2, and 5 are of considerable relevance for the Czech Republic's climate policy. Today the industrial sector is dominated by heavy industry using energy-inefficient technology. In the past, energy prices were heavily subsidized and there was little incentive to economize. An important step in creating a reasonable climate policy today is to make sure that energy prices reach the price level of the world energy market. Points 1, 2 and 5 will, to some extent, assure that such a step

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<sup>4</sup> The Czech Republic received US\$ 300.000 million, and Slovakia received US\$ 150.000 million.

is taken, and the loan conditions as such will reinforce the national climate strategy.

The release conditions came in three separate memos<sup>5</sup>. The first and second tranches were released to Czechoslovakia, which complied fully with the loan conditions. The third tranche was released to each Republic separately. Both Republics complied in full with the conditions.

### Power and Environmental Improvement Loan

The Power and Environmental Improvement Loan, amounting to US\$ 246 million, was the next World Bank investment in the Czech and Slovak Federation. This is one of the largest environmental projects in the history of the World Bank. At the time of approval, the Federation had not been split. Since the borrower is CEZ (Czech Power Enterprise-Ceske Energeticka Zavody), the operation is considered a loan given to the Czech Republic.

Although the Staff Appraisal Report No. 10071-CS does not explicitly discuss climate policy objectives there are reasons to believe that these are part of the project design. The project will significantly contribute to reducing greenhouse gas emissions, both carbon dioxide and methane, in the Czech Republic. The objectives of the project were to improve power plant efficiency, to reduce air pollution in northern Bohemia and thereby improve the environment and health of the local population, to modernize the transmission system, and to facilitate interconnection of the CEZ and German power grids. The World Bank hopes that the project will:

1. reduce total consumption of pollution-causing lignite through power plant efficiency improvements. This includes installation of equipment and operational improvements at Prunerov II power station and other large CEZ power plants,
2. curtail power plant SO<sub>2</sub> emissions by means of flue gas desulfurization at Prunerov II,
3. reduce dust and fly-ash pollution from power plants by installing equipment for dust collection, i.e. electrostatic precipitators at the most polluting CEZ power

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<sup>5</sup> The memos were dated 6 June, 1991; 8 May, 1992; and 6 December, 1992.

plants,

4. increase the reliability, efficiency, and economy of the CEZ transmission system by the modernization of five substations and construction of a short transmission line,
5. assist in improving investment planning and corporate management and organization by consulting services and staff training.

This project will undoubtedly accelerate reductions in the consumption of lignite as well as emissions of SO<sub>2</sub> and dust by the means described above. The Staff Appraisal Report on the project was completed in February 1992. While not explicitly addressed in the report, the consequences for the emissions of greenhouse gases were considered. As is well known, lignite is perhaps the most harmful energy source from a climate perspective because the burning of lignite produces large emissions of carbon dioxide and thereby forces the global warming. The emissions of carbon dioxide from the burning of lignite are approximately 80 percent higher compared to the emissions from the burning of natural gas.

Reduced CO<sub>2</sub> emissions will be one direct effect of the implementation of the Power and Environmental Improvement Project. However, the long-term consequences from carbon dioxide emissions are uncertain. One effect of this project is that the power plants using lignite as an energy source increase their competitiveness and thereby prolong their lifetime. Consequently, as part of a climate strategy, the project might make it politically more difficult at a later stage to invest in power plants using other energy sources with less greenhouse gas emissions. A climate strategy may require that additional energy demand is met by non-lignite fuels at a later date.

### The Telecommunications Project

After the separation of the Federation, the first World Bank operation in the Czech Republic was a loan amounting to US\$ 80 million given to SPT Telecom. Its

objectives were:

1. to support expansion and strengthening of the international and national long-distance networks together with necessary local extensions to relieve the most congested telecommunications services and provide modern telecommunications services to business
2. to support institutional strengthening of SPT Telecom in order to transform it into an efficient commercial company
3. to support the development of policies and mechanisms for sector liberalization according to the guidelines adopted by the European Community.

Closely related to the project is a program of institutional improvements in the Ministry of Economy, which is in charge of telecommunications and the development of a regulatory framework for liberalizing the telecommunications sector.

The direct consequences of this project are very limited in a climate and environmental context. However, the possibilities of substitution from transport to telecommunications should be considered. An improved system of telecommunications might to some extent reduce the demand for transport and thereby be consistent with a reasonable Czech climate policy.

#### The Country Assistance Strategy document for Czech and World Bank operations in the pipeline

The World Bank is also considering supporting some railroad investments, a motorway project, and improvements in waste management. These projects should be understood in the context of the World Bank's Country Assistance Strategy for the Czech Republic. The strategy is based on two main assumptions:

1. Compared to elsewhere in Eastern Europe, the private sector is expected to quickly become the driving force in affecting the structural change and productivity gains and thus become the dominant force of growth in the Czech



economy. The World Bank assumes that direct foreign investments and commercial banks will provide the bulk of financing for private sector development, thereby limiting the country's borrowing needs from official sources. The reliance on commercial creditors and foreign investors for financing is made possible by the low debt and good creditworthiness of the Czech Republic.

2. The Czech Government continues to pursue a very prudent external borrowing strategy and is not ready to relax its restrictive government guarantee policy.

The World Bank assumes that its operations in the Czech Republic will reflect these limited needs and the Government's very cautious borrowing objectives. Moreover, the World Bank finds it likely that if the Czech authorities request support from the World Bank, it will be in the form of financial assistance for infrastructure projects that are not well-suited for commercial financing, but which among other things are essential in order to remove bottlenecks that prevent a more dynamic development of the private sector. In the World Bank (1993), the total support program over the subsequent three years was expected to be in the order of US \$600 million and was assumed to constitute no more than three percent of the country's total convertible debt. However, the current Czech government has indicated that it presently is not interested in further World Bank loans.

#### Railroads project and hazardous waste

The World Bank has some projects under consideration. Most interesting in a global warming context is perhaps that the World Bank is considering supporting the restructuring of the Czech railroads once the emerging trade and traffic patterns, which followed the break-up of the Federation and the reorientation of trade, have established themselves more firmly. Of less importance from a climate policy perspective is that an environmental project is under consideration that will address problems of hazardous waste management and municipal water treatment.

### **PART 3. EVALUATION OF THE CONSISTENCY OF THE NATIONAL COMMUNICATION OF THE CZECH REPUBLIC WITH THE WORLD BANK ASSISTANCE STRATEGY**

The National Communication from the Czech Republic underlines that carbon dioxide from power plants using lignite as energy source is the main source of greenhouse gas emissions in the Republic. The statement (p.16) that CEZ has published a time schedule to shut down its thermal power plants is therefore important. At the same time, the World Bank supports large investments in the Prunerov II Power Station and other large CEZ power plants which might prolong their lifetime. While an environmental objective of this support is to reduce local air pollution, there will also be benefits from reduced greenhouse gas emissions, at least in the short term. However, it appears that future energy demand will have to be met increasingly by non-lignite fuels in order to avoid a reliance on carbon intensive fuel sources.

According to the Czech National Communication, state subsidies on energy will be gradually eliminated, together with other price deformations so that the prices of fuels and energy will include external costs (externalities) for environmental protection. It is unclear what is meant by the phrase 'include external costs' (p.26). Nevertheless, it is relatively evident that the authorities in the Czech Republic emphasize the use of high energy prices as a part of the implementation of a climate policy. At the same time it is noteworthy that one of the conditions in the World Bank's Structural Adjustment Loan to the Czech Republic was to increase energy prices.

The National Communication states that preference for railways is a part of the country's climate strategy. The World Bank's support for investments in railways is therefore fully consistent with the National Communication.

The GEF project for biodiversity protection in the Czech Republic will increase the diversity and stability of the forests in the Republic. The National Communication draws attention to the fact that the high portion of monocultures adversely affects the stability of forest ecosystems. The forests are important sinks of greenhouse gases. A secondary benefit of the biodiversity project will therefore be to reinforce the Czech's national climate strategy.

#### **PART 4. VALUE OF THE NATIONAL COMMUNICATION FOR WORLD BANK DECISION MAKING**

The national communication from the Czech Republic can be an important background document for the World Bank when formulating its assistance strategy for the country. Although the national communication does not present specific or detailed information of direct relevance for further formulation of the World Bank's country strategy, the national communication clearly shows that the Czech authorities intend to pursue their efforts to reduce greenhouse gas emissions. Furthermore, when developing the assistance strategy for the Czech Republic, the World Bank should take into account that the Czech government intends to use the market mechanism and price structures as important tools in its climate strategy, cf. the discussion in part 3 of this chapter.

As with other formerly centrally planned economies, the economic transformation taking place in the Czech Republic may be beneficial from an environmental point of view. Price liberalization and elimination of state subsidies might result in higher energy prices, increased energy efficiency and, accordingly, reduction of energy consumption. However, difficulties in implementing market-based measures, unanticipated or undesirable consequences of measures, as well

as other complications may result in too little or even a lack of environmental protection. In addition, it is important to find effective ways to address environmental problems - most significant are acid rain and human health problems - that should be dealt with in the near term. The World Bank might consider this when formulating its lending strategy for the Czech Republic. Furthermore, as already described, prior to the period of planned economy, Czechoslovakia experienced considerable economic growth. Once the transformation to a market economy is complete, the Czech Republic might again experience high economic growth. This issue should also be considered when formulating a medium and longer-term climate change policy for the Czech Republic.

That global warming is not a high-priority concern of many formerly centrally planned economies should also be acknowledged. For example, problems with regard to acid rain and human health have much higher priority in the Czech Republic. Coupling climate change policies to environmental policies addressing local and national environmental problems could solve this problem. It will therefore be important that the World Bank supports environmental policies and measures that simultaneously address several, as opposed to just one, environmental problems. Equally significant, to create successful environmental projects and policies receiving local support it is essential that local social, economic, and institutional benefits are provided in addition to environmental benefits.

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## CHAPTER 2

### PART 1. NATIONAL COMMUNICATION BY POLAND

#### INTRODUCTION

The '*National Report to the First Conference of the Parties to the United Nation's Framework Convention on Climate Change*' (in the following referred to as the National Report) has been prepared by the Ministry of Environment Protection, Natural Resources and Forestry with the financial sponsorship of the National Fund for Environment Protection and Water Management. The report was made public in September 1994.

The National Report states Poland's commitment to the stabilization of GHG emissions by the year 2000. There are no indications for possible reductions in GHG emissions for the period after 2000. Referring to the status of Poland as a country in transition, the National Report pledges to use 1988 as the base year for the stabilization target, instead of 1990. It also pledges an only partial fulfillment of the obligation to present the social and economic strategy for the implementation of the Convention's resolutions regarding GHG emission stabilization.

#### THE ECONOMIC BACKGROUND

Poland was the first country in Central and Eastern Europe to re-establish democracy and also to implement decisive economic transformation policies. Consequently, the successive Polish post-1989 governments have come a long way

in their efforts to stabilize the economy. Poland has experienced substantial economic growth and a higher rate of economic growth than the other countries of the region.

In the first phases, the Economic Transformation Program led to excess demand and hyper-inflation. By October 1989, the annual rate of inflation exceeded 16,000 percent. Although wages also increased significantly, they did not follow inflation and both 1989 and 1990 saw decreases in real wages. GDP declined by about 12 percent from 1989 to 1990, dragged down by a fall of 25 percent in industrial production. Officially registered unemployment, which had been negligible until the start of 1990, rose to about 6 percent at the end of 1990. Some regions and some population groups fared relatively well in the first turbulent years, whereas others, for example the population in north-eastern Poland, women and the young in the labor market, suffered from lay-offs. Real consumption declined, although less than real wages.

One surprising facet of the Polish experience after 1989 was the speed of adaptation of the economy. The situation of hyper-inflation lasted less than one-and-a-half-years, and, after only two years of declines in the GDP, in 1992 Poland became the first of the European economies in transition to achieve positive economic growth. In 1992, GDP increased by an estimated 2.6 percent and the economy gathered strength in 1993, with a growth of 3.8 percent, and continued with an estimated 4 percent growth in 1994.

Important factors behind the rapid control of inflation was fiscal discipline, economic restructuring and reduction in state subsidies and a general liberalization of the economy. Fiscal discipline was an integral part of the agreement between the Polish government and the IMF in 1990 and early 1991, when the government reached the first of a series of several agreements on Poland's foreign debt. The Paris Club member countries accepted writing down their claims on Poland - at that time about US\$ 32 billion - by 50 percent on the condition that Poland stayed on good terms with the IMF. Since then, the Polish government has managed to

complete the debt restructuring. In March 1994, the country concluded a deal with the London Club bank creditors giving it a 42.5 percent reduction in its US\$ 13.2 billion bank debt and stretching repayments over 30 years.

The policy of fiscal discipline has continued during 1993 and 1994, mainly by strengthening the income side of the public budgets. For example, in 1993 a surcharge on imports of 6 percent was introduced and the narrowly based turnover tax was replaced with a general value added tax system.

The foreign trade performance has been impressive. Exports increased by about 20 percent, against an increase of 8 percent in imports, in the first half of 1994, and the current account deficit was reduced substantially. Poland has been able to re-orient its trade flows towards Western markets, particularly the European Union. The results have been dramatic, with the share of trade with the EU market growing from about one-fifth in the late 1980s to over 50 percent in the early 1990s. Until recently, the inflow of private investments has been rather limited, particularly compared with some of the other countries of the region. Inflation has only decreased a little over the last few years and, in 1994, was running at a rate of 30 percent.

There has been progress both in the macro economic adjustment policies and in the adjustments of the structural policies. Progress on the structural side has, however, been mixed. Explicit subsidies, which accounted for more than 15 percent of GDP in 1988, have been reduced to about 2 percent of GDP.

The private sector has been leading in economic growth. The economic recovery has been broad based and important gains in productivity have been registered across sectors, but the most important gains have been in the private sector. Industrial production, led by a strong growth in manufacturing and continued decline in mining activity, has been expanding for two years as have construction and services.

The social costs of the transformation process have been considerable.



Unemployment in 1994 was almost 17 percent and Polish authorities are under heavy political and social pressure to increase expenditures.

One of the most challenging problems is to continue the restructuring of the public sector enterprises, which have proved much more difficult to complete because of the social consequences. A number of state owned enterprises, including some of the core state enterprises in the energy sector, have been turned into incorporated enterprises, but so far they have remained state owned. The intention is to sell parts of the state holdings in these companies to the public at a later stage. Only a few of them have actually been transferred to the private sector so far.

## THE ENERGY STRUCTURE

### Energy demand

Poland's energy use has always been dominated by coal, which is domestically produced. In the early 1970s the share of solid fuels - coal and lignite - in total primary energy use was between 80 and 82 percent, in 1988 it was about 79 percent and in 1993 an estimated 76.5 percent. All of Poland's major power plants burn hard coal or lignite, the district heating system is based mainly on coal, and there is an extended direct use of coal in industry, service, enterprises and households. The remainder of the energy needs are covered by oil (15 percent in 1993) and natural gas (8.6 percent).

Industrial energy use declined more than 30 percent from 1989 to 1992, mainly because of the decline in the output of energy-intensive industries, such as chemicals and the iron and steel industry. It appears that there has been little investment in more energy-efficient technology, as managers have been occupied by more immediate questions of survival and product marketing.

Poland consumes approximately two to three times more energy to produce one unit of GDP compared with OECD Europe. There are many complications in such a comparison, but the legacy of the centrally planned economy with its artificially low energy prices, lack of metering of heat, lack of market discipline which would induce cost effective investments for reducing energy use, pre-eminent focus on meeting quantitative production goals in industry, monopolistic supply structures for electricity, natural gas and district heating, have produced an economy that is notably lacking in incentives for improving energy efficiency.

In industry, the relatively high concentration of energy-intensive sectors (including ferrous and non-ferrous metals, pulp and paper, chemicals and building materials) as well as the relatively poor energy efficiency in the industrial processes result in an industrial energy intensity which is several times higher than that of most OECD countries. The low efficiency is in part due to an ageing capital stock and the lack of adequate attention to sound management practices which is driven by a lack of financial incentives. For example, in 1988 over 80 percent of the Polish industrial capital stock was more than five years old, a rate double that of Germany's.

The combined residential/services/other sector accounts for 45 percent of total final energy use (1993). Space and water heating are heavily dominated by coal and district heat is also based on coal which is consumed inefficiently. For example, heating requirements of Polish dwellings during the late 1980s are estimated at 220-260 kJ/sq.m./degree day. This measure, which takes into account differences in climate, indicates an energy use for heating which is about double the OECD European countries during the same period.

The use of electricity in the residential sector is relatively low compared with OECD Europe. There is a low penetration of electricity-using appliances. As appliances increase in penetration, it is expected that electricity demand in this sector will increase relatively fast.

Even though energy prices have not yet reached their cost based levels for residential users, the price increases have significantly outpaced incomes to the point where the domestic energy bill represents close to 10 percent of the average household income (and is much higher for low income households). This is about two to three times the share in OECD Europe and has resulted in a substantial level of non-payment of energy bills; estimated at up to 25 percent for electricity and heat.

Transportation fuel demand is of much less importance than in OECD countries, primarily because private car ownership is less common. The car park increased by an average of 7.2 percent annually in the period from 1985 to 1989. Despite the decline in real incomes, the growth in the car park increased to 8.6 percent in 1990 and 16.2 percent in 1991. The zloty's depreciation against the OECD countries' currencies and changes in custom duties and tax rates dampened the rush for new - mainly imported - cars, and the growth in the car park fell off to 6.4 percent in 1992 and about 4 percent in 1993. The car park will probably never again increase as fast as it did in 1991. A huge pent-up demand for private cars was released in 1990-91 when the government liberalized import rules.

Driving distances are increasing and will probably continue to increase. The government has approved an ambitious road construction program including the construction of 2600 km of highways and 3600 km of expressways over a 15-year period. Oil demand for private driving will probably continue to increase, supported by the demand for bigger and more powerful cars, if real incomes continue to grow.

Road transportation of goods accounts for much a smaller share of total goods transportation in Poland than in OECD Europe, and a continued shift from rail to road transportation is expected.

## Energy supplies

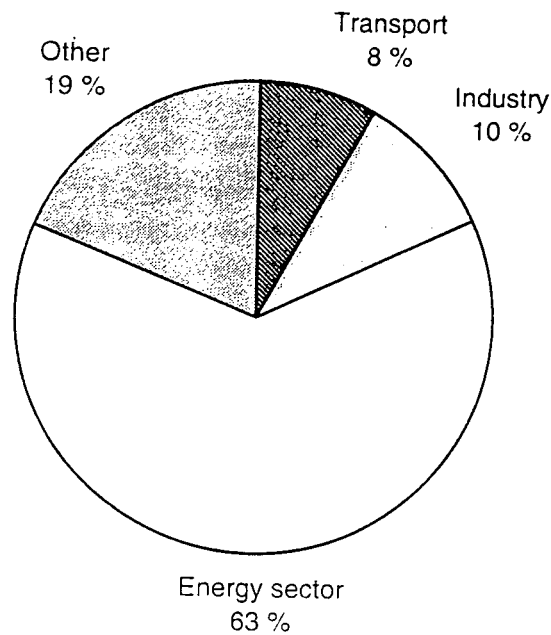
Poland has considerable coal reserves, and production of hard coal grew steadily from 1950 until 1979, when a peak of 201 million tonnes was reached. In the 1990s, production started to decline sharply due to the contraction of economic activity. Coal mining was one of the key sectors in the development of the economy under the centrally planned system. Productivity is low, however, partly because of the geological conditions, partly because of excessive employment in the mines and also partly because of inadequate investments.

A re-structuring of the coal mines was started in 1989, when the former monolithic structure was abolished. The individual mines became established in 1990 as independent enterprises with the right to market their production. In 1993, a further reorganization took place. The majority of the mines were grouped into six joint stock companies and one holding company. A similar process for the lignite mines was started, but it stalled in 1994 partly because of opposition from the trade unions. The plan was to form three joint stock companies which owned the mines and the adjacent electricity plants. Practically all of the lignite production is fed directly into the power plants.

The biggest obstacle to a further restructuring and rationalization of the coal mines, including mine closures, is the social implications of further job losses in this sector. Employment in the hard coal mines has decreased by about 100,000 from 415,000 in 1989, but the State Hard Coal Agency is of the view that the current level of production of 130-135 million tonnes could be sustained with only half of the working force.

Coal prices have increased to a level close, but not entirely identical, to world market prices. Direct state subsidies are no longer paid to mining, but the mines have an overhang of debt and their cost-ineffectiveness implies that they have not yet arrived at a financially viable situation. Mine closures are needed to allow the remaining mines to survive financially.

Figure 1. CO<sub>2</sub> emissions by sector in Poland, 1992.



The electricity sector is intimately linked to coal and lignite mining. Poland relies to an extreme degree on hard coal and lignite for power generation. About 98 percent of the country's electricity is produced from solid fuels. This results in the electricity sector being one of the most important sources of air pollution and also one of the important sources of CO<sub>2</sub> emissions. The abundant reserves of hard coal and of lignite have made solid fuels a key factor in the country's development. Furthermore, in the centrally planned economies the emphasis was on using indigenous resources to the greatest extent possible.

The country has no hydro power resources of any importance; more than two thirds of the country is flat terrain. Natural gas contributes virtually nothing to power generation, and, as the country possesses limited gas reserves, any increase in demand has to be covered from imports. In the past, limited import possibilities resulted in gas being reserved for industrial uses. Also, the use of oil for power generation has remained of marginal importance. There have been plans to introduce nuclear power, and the construction of a Soviet-type light water reactor was started in the early 1980s. However, public opposition against nuclear power

following the Chernobyl accident and the fact, apparent since the early 1980s, that there is no imminent need for new generation capacity led the government to abandon the work in 1991. The plant was by then between 40 and 50 percent complete.

The Polish power plants are relatively old. The average age is 18 years and there is a need for rehabilitation of a major part of the capacity, including an environmental upgrading of the plants. New environmental standards for SO<sub>2</sub>, NO<sub>x</sub> and dust emissions have been decided and should be implemented over the coming years. This will add to the financial requirements of the electricity sector. A first series of flue gas desulphurisation units are under construction or have been ordered.

A process of restructuring in the electricity sector has been started. One of the first steps in the reform process has been to transform the state-owned enterprises into joint stock companies with the state as the sole shareholder. The purpose is to create a basis for financial and managerial independence, cost transparency and improvements in the efficiency of the sector. So far, the transmission activities have been separated into one joint stock company, and the central, combined heat and power plants (CHPs) have also been reorganized. The organizational structure of the power sector has been a subject of debate within the government and within the industry itself. Several questions remain to be settled, amongst other the levels of concentration in power generation and distribution.

Electricity prices were raised sharply at the start of the reform process in 1990. In that year, prices for households increased about four times in real terms and prices to industrial users were increased about three times in real terms. The effects of this shock therapy were quickly eroded as the then high inflation rate brought the real prices back to their pre-1990 levels. The real prices were again increased sharply in 1991 for household users, but not prices to industry. Since 1991, prices, for both the industrial and residential markets have just kept pace with general inflation. There is a long way to go before electricity prices approach economic

costs. It is estimated that industry pays prices which are about 60 percent of supply costs, and for household users prices are less than 50 percent of supply costs.

The under-pricing of electricity has two effects. On the one hand, it could give rise to inefficient use of electricity, and on the other - and in the current situation perhaps the most important - it starves the electricity companies of revenues which are needed for rehabilitation of the power generation park. Under-pricing impedes investments in efficient and environmentally friendly power generation facilities, such as combined heat and power plants fired with gas. Therefore under-pricing also has effects on the environmental impact of electricity generation.

District heating is a key sector in the supply of energy and a major source of pollution. About 70 percent of the country's urban area households are supplied with district heat and it covers 53 percent of the total residential heating needs. The electricity sector is the main producer of heat supplied to the district heating network. The heat is supplied from CHPs and heat-only boilers fired with coal. In addition, the district heating enterprises produce about 29 percent of their heating requirements in relatively small heat-only boilers. Most of these supply satellite district heating networks in small towns. Large urban areas are mainly supplied from the CHP plants and there are also groups of buildings which are supplied with heat through local networks.

Inadequate heat pricing policies, in conjunction with investment policies favoring new and large projects, in the past led to disinvestment in energy conservation and efficiency measures. This phenomenon is particularly strong in the district heating sector. The resulting problems are poor physical system conditions caused by poor water quality and treatment, leaking network components and the absence of adequate insulation of pipes all leading to high water and energy losses. These factors result in high maintenance costs, excessive fuel consumption and rapid deterioration of the system through corrosion and poor operation of the system with a predominance of constant flow/variable temperature operation instead of the reverse, poor or no dispatch ability of load

due to a lack of central instrumentation and control systems, un-integrated operation. This implies excessive use of inefficient heat-only boilers in isolated areas rather than the use of more efficient and economical CHP supplies. Low tariff levels also did not justify consumer metering, which, in return, resulted in further low efficiency in use.

Heat prices are currently controlled at a level below the economic costs of supplying the heat. Real heat prices were, as was the case for electricity prices, increased sharply in 1990 and 1991, whereas the real price increases were more moderate in 1992 and 1993. In addition, public subsidies to heat prices have been cut back and consumers are paying a significantly increased portion of their heat bills (currently on average 90 percent compared to 20 percent in 1991).

Since 1990, the district heating companies have been in a process of reorganization. The former large enterprises have been split up according to their service areas.

Gas plays a relatively small part in Poland's energy supplies. In 1993, gas had a share of only about 8 percent of total primary energy supplies. Gas also has a narrow range of use; primarily industrial processes and residential cooking. There is so far only little gas used for residential heating or for district heating and gas is not yet used for power generation.

Gas demand has declined in recent years, reflecting a substantial fall in demand from industry whereas there has been a relative stability in the demand in the residential and commercial sectors. Industrial gas demand is concentrated in a few energy intensive sectors; fertilizer production, glass and iron and steel.

Current supplies are made up of 40 percent indigenous production and 60 percent imports, all from Russia. The most likely main source of future, as well as present, imports is Russia. Supply possibilities from the North Sea are considered, but are likely to be more expensive than an increase in imports from Russia.



## GHG EMISSIONS

### Inventory of GHG emissions and trends to 2000

Table 1 presents the results of three inventories of GHG emissions. The methodology used in the inventory for 1990 is different from those of 1988 and 1992. The differences in particular concern emissions of NO<sub>x</sub>, CO and NMVCO. For 1988 and 1992, the methodology used is the same (IPCC).

Table 1. *Three inventories of GHG emissions for Poland, Gg.*

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	NO <sub>x</sub>	CO	NMVOC
1988	483700	6060	73	600	2730	352
1990	414930	6107	156	1445	7388	1294
1992	359439	2474	50	1283	1610	640

Source: The National Report

According to the National Report, CH<sub>4</sub> emissions in 1988 were evaluated at a too high level, but no re-estimation has been presented. The growth from 1988 to 1990 in emissions of N<sub>2</sub>O, NO<sub>x</sub> and NMVOC is the result of using different methodologies and probably does not reflect any underlying real trends in emissions.

Table 2 shows alternative scenarios for CO<sub>2</sub> emissions by the year 2000 derived from one of two studies presented in the National Report. It concerns only CO<sub>2</sub> emission from energy use and thus provides an incomplete picture of the development in GHG emissions.

Table 2. Forecast of CO<sub>2</sub> emissions from energy use, Gg.

Scenario	1988	2000	
		Low economic growth	High economic growth
Reference	458 000	405 000	455 000
Base	458 000	404 000	454 000
EKO	458 000	394 000	448 000

'Low economic growth' has an assumed GDP average annual growth of 1.2 percent for the 1990-2000 period. 'High economic growth' has an assumed GDP growth of 4.4 percent for the same period.

The 'Reference scenario' assumes no limitations on SO<sub>2</sub>, NO<sub>x</sub> and dust emissions, and is a scenario reflecting the pre-1989 situation. The 'Base' scenario assumes existing environmental standards and, finally, the 'EKO' scenario assumes environmental standards like those to be put in place later in the 1990s (according to the environmental strategy of the government).

Another scenario analysis, which goes into a more detailed analysis of the developments within individual sectors, has a projection of CO<sub>2</sub> emissions from energy use by the year 2000 of 338,000 Gg, i.e. significantly lower than the result of the scenarios presented in Table 2. The description of this scenario is, however, incomplete and it is not possible from the National Report to judge the realism of the projected CO<sub>2</sub> emissions.

## CLIMATE CHANGE POLICIES

For the policy actions taken since 1988, the Polish government presents an incomplete list of investment projects in the energy sector which have resulted in reductions of CO<sub>2</sub> emissions. Projects leading to a reduction of emissions of 6567 Gg CO<sub>2</sub>/year are listed, of which the most important contributors are conversion from individual coal heating to gas heating, connections of district heating systems with closures of coal boilers and coal stoves, general boiler modernization and technology improvements in manufacturing. This list represents a calculation of the effects on CO<sub>2</sub> emissions of a series of projects which have been undertaken for various reasons. They are not the result of GHG abatement policies, but the result of the general restructuring and modernization policies implemented for the electricity sector and for district heating.

Among the actions taken since 1988, the National Report also mentions the afforestation program, which has led to an increase in the forest area of about 60000 hectares. There is no calculation of the absorbing effects of this increase.

The National Report stresses that the political priorities are mainly the country's modernization and restructuring, with emphasis on issues such as privatization, unemployment, and social protection for the impoverished groups of the society. It is stated that the main aim for the Polish economy for the next decades is to implement 'complex reforms' in all sectors of the economy to lower energy and raw materials use, 'which would help in the implementation of the sustainable development policies' (p.7). 'For this reason it is understandable that the problem of GHG emission reduction taken separately is not a priority goal' (p.17).

Polish GHG policies as such therefore do not exist. An assessment of the National Report and of the Polish policies is therefore an assessment of other policies, such as restructuring and modernization of the economy, which have an effect on GHG emissions.

Other policies linked to the restructuring and modernization of the economy will have a strong bearing on GHG emissions, and in particular on CO<sub>2</sub> emissions. The restructuring and modernization of the economy should lead to a reduction in the energy intensity of the economy. Granted that many of the actions planned have an effect on total energy use and the composition of energy use, the adequacy or inadequacy of these policies has to be measured against the overall objectives of energy efficiency and economic efficiency, rather than against CO<sub>2</sub> emission efficiency.

Poland asks the Conference of the Parties to the Convention to accept the 1988 level of GHG emissions in the implementation of the stabilization target. The government also asks for the recognition of a partial completion of the commitment to communicate the detailed description of policies aiming at limiting emissions.

The latter part of this request follows from the absence of a clearly specified Polish strategy for limiting GHG emissions. It is a fact, as is clearly stated in the National Report, that such a policy does not exist. Consequently, a consistent evaluation of the Polish GHG policies is not possible.

1988 was the last year of relatively undisturbed economic development before the process of transition started. In a sense, the Polish government asks to compare the GHG emissions of the previously existing economic system with the GHG emissions of an emerging new economic structure of the society. The dramatic changes that have taken place since 1988 in the economic structure and the partial collapse of the traditional industries have had sharp effects on energy use and in particular on the use of solid fuels.

From a GHG policy point of view, it appears to be more coherent that Poland, instead of arguing for 1988 as the base year, first of all should argue for an acceptance of the fact that the economic situation and constraints could lead to delays in implementing a GHG policy consistent with the commitments undertaken by the countries that are signatories to the Climate Convention and listed in Annex 1 of the Convention. Arguing both for an acceptance of an earlier base year and

for not including a detailed implementation of GHG policies appears to be aimed at relieving Poland of any real commitments.

Future strategies for greenhouse gas emission reduction

The GHG emission strategy consists of a compilation of changes that will be the result of a series of general economic strategies and sector reform strategies implemented in line with what is in the cards today. Not all of these plans have actually received full political support, some of them are in the stage of preparation. The complexity of the tasks facing the Polish government raises doubts about the realism of important parts of these strategies. Furthermore, there is apparently no coordination of the various strategies with respect to their impacts on GHG emissions.

The general strategies are included in the 'Strategy for Poland 1995-97', which is a medium-term economic framework, and the 'State Environmental Policy', which outlines the major actions to be taken, in particular in combating air pollution from stationary sources. Both these strategies have been adopted by the Parliament.

The sector strategies for industry, the energy sector, transportation, and agriculture, and the policy for housing and the municipal sector are in various stages of preparation, and, although included in the National Report, have not been settled fully in the political system.

For this part of the strategy, the National Report stresses the beneficial effects on GHG emissions stemming from:

- continued industrial re-structuring and less emphasis on heavy energy intensive industries;
- improved production technologies and higher energy efficiency in industry;
- improved management in industry and organization;

- improved efficiency in electricity generation and district heating;
- conversion from coal to natural gas in electricity generation (combined heat and power);
- improved efficiency in space heating.

The reform programs focus on solving some of the pressing problems of the Polish economy. They do not include any policy for renewable energy, although there is a mention that biomass could be an option at a later stage.

The National Report does not elaborate on the numerous political obstacles to implementing the various sector policies. For example, in the energy field a new Energy Law has been under discussion for more than a year and the originally planned submission of the Law to the Parliament in 1994 is now postponed to 1995. This law will set the framework for regulating and pricing of the energy industries and constitutes an important element for a continuation of the restructuring and modernization process for the energy sector, in particular for electricity companies and district heating companies.

Another issue of importance is the pricing policy for energy, and in particular for electricity, where prices still are, as mentioned above, significantly lower than their economic levels. Correct pricing signals will not only give the appropriate incentives for energy efficiency in end uses but will also provide the energy companies with funds needed for investments in modernization and upgrading of their plants in pollution control equipment. There has so far been no agreement within the government on a consistent policy for approaching prices to their economic levels over time. The pricing issue is also of importance for the lending policies of the World Bank, as discussed later in this section.

For the *transportation* sector, the road building program, on the one hand, will increase the efficiency of transportation both in energy and economic terms. But, on the other hand, improvements in road connections will also give an incentive to more driving and road transportation of goods.

For *agriculture*, the program, which is not yet finalized, assumes an increase in farm production of 1.7-1.8 percent per year for the period to the year 2000. The use of nitrogen fertilizers has been reduced significantly since 1988/89; from 1520 to 619 thousand tonnes of pure nitrogen in 1991/92. The plan foresees an increase in fertilizer use to 900-1050 thousand tonnes by the year 2000 because of the increase in agricultural production. There are no plans for reducing methane emissions from agriculture.

When it comes to *forestry*, the National Report notes the alarming deterioration of the health of the forests due to both natural and manmade conditions. The latter includes inadequate forest management, deforestation and air pollution. The forest policy foresees an increase in forestation from the current level of about 28 percent to 'at least 30 percent' over the coming 20 to 25 years, together with an improvement in the general health of the forests. The efficiency improvements in agriculture, together with a forestation policy for the areas of the country damaged by earlier industrial and mining activities, should allow a faster rate of forestation than foreseen in the National Report.

## **PART 2. WORLD BANK ASSISTANCE TO POLAND**

### Introduction

The Bank's overall strategy in Poland is to support the Polish government's long-term objectives of improving the efficiency and productivity of the economy, promoting growth, improving socio-economic conditions and implementing reforms towards a market economy (World Bank, ref. 5). In the early stages of Poland's transformation, the Bank launched a major program of lending and economic work. A Structural Adjustment Loan, in tandem with the IMF program, helped at a critical time when macro economic stabilization policies had to cope with hyper inflation. Loans in the energy, agriculture and transport sectors have

been granted with the aim of speeding up sector reforms. Table 3 gives an overview of the Bank's lending by sector from FY91 to FY94. Already in FY90, the Bank provided a US\$ 250 million loan to develop the Polish oil and gas resources plus US\$ 60 million in European Investment Bank cofinancing.

Restructuring of the energy sector is included in the Bank's assistance strategy for Poland. Solving the serious problems in this sector would also contribute to reducing GHG emissions.

Table 3. World Bank lending to Poland, FY91 to FY94.

	FY91	FY92	FY93	FY94
Commitments, US\$m	1385.0	390.0	900.0	146.0
Sector shares, %				
- Agriculture	7.2		33.3	100.0
- Industry and finance	34.7	15.4	50.0	
- Energy	20.6			
- Public sector management				
- Infrastructure and urban development	8.6	51.3	16.7	
- Human resources	7.2	33.3		
- Mining and other extractive activities				
- Multisector	21.7			
Total	100.0	100.0	100.0	100.0

Source: World Bank, ref. 1

### Bank projects with impacts on GHG emissions

Of particular relevance for GHG emissions are the Bank's programs for the oil and gas sector, district heating and transportation. In addition, elements of the energy pricing reforms were supported by the Bank's Structural Adjustment Loan, the Energy Sector Adjustment Loan and the Energy Resource Development Loan (World Bank, ref. 1).

The relevant Bank projects are the following:



Under the first Structural Adjustment Loan, coal prices were substantially decontrolled and the first steps taken to approach other energy prices to their economic levels and to eliminate state subsidies and cross subsidization in favor of households.

For the oil and gas sector, the Energy Resource Development Loan supports gas pricing reform, increased production of gas, private sector participation in developing petroleum reserves and the implementation of sector restructuring studies.

Under the Heat Supply Restructuring and Conservation Project, the Bank offers co-financing of investments in equipment for modernization and upgrading of district heating systems. It also offers technical assistance to optimize system development and to enhance management and staff efficiency in the district heating sector (World Bank, ref. 5).

The Coal-to-Gas Conversion Project offers grants to convert from coal-to-gas in small and medium sized boilers and to induce higher energy efficiency in new residential buildings. The emphasis is on replaceable technological and institutional changes by demonstrating the potential for inter-fuel substitution as a means of reducing CO<sub>2</sub> emissions. The project is financed by the Global Environment Facility (GEF) with additional co-financing from Norway. The Bank is implementing the project on behalf of GEF (World Bank, ref. 2).

The Bank's Environmental Management Loan is financing technical assistance to the Ministry of Environmental Protection and to local administrations with the aim of improving the management of air quality in Poland.

### World Bank projects in the pipeline

The Bank's latest Country Assistance Strategy (CAS) paper on Poland (World Bank, ref. 1) outlines a three-pronged approach:

- The Bank will make a concerted effort to assist the government in three key areas where further progress is critical for sustainability of economic growth: public finance reform, with special emphasis on social security expenditures; down sizing of large loss-making sectors; and financial sector reform.
- The Bank will also focus on private sector development and will try to catalyze, as much as possible, private sector financing for and participation in projects through direct lending or by provision of contractual compliance guarantees.
- The Bank will continue to work on a relatively diversified program of medium-sized investment projects in social and economic infrastructures, and will put more emphasis on work at the local government level.

Of particular interest in a GHG policy context are the following elements of the Bank's program:

As part of the operations to *downsize the large loss-making sectors*, the Bank is considering a sector adjustment loan to help mitigate the social costs of restructuring the hard coal sector. Triggers for this would include up-front actions by the government with respect to closure of un-economic mines, appropriate pricing arrangements for coal, and steps to strengthen competition in the sector. The Bank's involvement in the restructuring of the steel sector and the railways will depend on further progress in design and implementation of viable restructuring programs. Projects in other sectors (for example heavy chemicals and pharmaceuticals) undergoing major restructuring could be financed under existing credit lines.

For *private sector participation*, the Bank's work program includes several projects in infrastructure and the energy sector. For motor ways, the approval of the Motorway Law setting out the basic principles and policies that will govern the national motorway development strategy, including private participation, would trigger possible Bank involvement. In the energy sector, the projects would support the privatization of a co-generation plant and the

private financing of investments in the restructured hard coal sector. The preparation of the latter operation would be triggered by agreement on the Coal Sector Adjustment Loan (see above).

For the *financing of medium sized projects*, the Bank's work program includes possible projects in ports and roads. For roads, the project would be a follow-up on the one which is now under implementation. It would finance rehabilitation and the construction of 'missing links', such as beltways around cities. The project would be triggered by an agreement on the overall roads sector investment program. For the energy sector, the projects would primarily support rehabilitation in district heating and the power sector that enhances energy conservation and efficiency and reduces pollution. The government's plans for price adjustments for electricity envisage a relatively slow convergence to economic levels which may limit the Bank's involvement in the electricity sector.

As stressed in the Bank's CAS, major risks do not involve the threats of macro economic instability or a return to central planning in Poland. Rather, lack of progress in the implementation of the reform strategies of the government could jeopardize the needed restructuring and would also prevent the Bank from implementing the planned assistance strategy. Of particular importance in regard to GHG emissions are the Bank projects directed at improving efficiency in energy production and use, in particular for coal production, electricity production and transmission, and the important district heating sector. Funds for the district heating sector have been committed, but a widening of the scope of the Bank's activities covering projects in the coal sector as well as the electricity sector requires that the Polish government undertakes important reforms in these areas. The events over the last years indicate that the structural reforms touching the large state-owned industries are difficult to implement because of resistance against plans involving lay-offs, although the long-term economic viability of the enterprises is dependent on arriving at efficiency improvements. Furthermore, a major obstacle to a coherent energy and environmental policy is the apparent

political opposition against a rapid alignment of, in particular, electricity prices to the economic costs of supply. Without creating sufficient incomes for the enterprises, private sector capital will probably not be invested in these sectors on a large scale. World Bank assistance is also conditional on the implementation of an appropriate pricing policy.

### **PART 3. NATIONAL POLICY DIRECTIONS AND THE WORLD BANK ACTIVITIES**

The National Report states that the political priorities are in areas such as restructuring and modernization of the economy in general and of the energy sector in particular. In this sense, the policy outlined in the National Report in broad terms is consistent with the assistance strategy of the Bank.

A reduction of CO<sub>2</sub> and methane emissions will be achieved by market mechanisms, such as price changes to world market levels, cessation of subsidies for the majority of the sectors, implementation of mechanisms such as integrated resource planning, financial support for the technological modernization in industry, and similar measures. If these reforms and policies are implemented at a slower speed than planned because of the political obstacles, which is a risk, then the reductions of CO<sub>2</sub> and methane emissions could be less important, compared to what follows from the National Report. Of particular importance in this respect are the difficulties in deciding on a restructuring of coal mining and the electricity sector.

#### **PART 4. VALUE OF THE POLISH NATIONAL REPORT FOR WORLD BANK DECISION MAKING**

The National Report confirms the need for continued structural reforms in the Polish economy. The government policy priority is to modernize the economy and simultaneously to solve the problems posed by privatization, unemployment and social protection of the impoverished groups of the society. Restructuring and modernization of the economy will result in increased efficiency improvements in energy production and use, and the reduction of raw material consumption by industry in general. This policy will result in reductions of GHG emissions, in particular emissions of CO<sub>2</sub> and methane. A successful implementation of the government's structural policies will therefore make an important contribution to fulfilling Poland's commitments under the climate convention.

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## CHAPTER 3

### PART 1. NATIONAL COMMUNICATION BY HUNGARY

#### INTRODUCTION

Hungary acceded to the UN Framework Convention on Climate Change (FCCC) in December 1993, and submitted its national communication on the implementation of Commitments under the FCCC in October 1994. The national communication (henceforth 'the Communication'), entitled '*Hungary: Stabilization of the Greenhouse Gas Emissions*', is published under the auspices of the Hungarian Commission on Sustainable Development and is edited by dr. Tibor Farago and dr. Tamas Palvolgyi. It contains analyses of the economy in transition, national circumstances, emissions inventory as well as policies and measures to abate GHG emissions.

Instead of choosing 1990 as the emission base year, Hungary has chosen average emissions between 1985 and 1987 as the reference point. The reason for this is that the economic recession after the regime change in 1990 led to a steep decline in CO<sub>2</sub> emissions. In the emissions forecast Hungary provides data for this reference point as well as for 1990 for the sake of international comparisons.

The Hungarian climate policy goal is that emissions of GHGs will not exceed the base period level by the year 2000.

#### THE HUNGARIAN ECONOMY AND ENERGY CONSUMPTION

The Communication emphasizes that Hungary is in a state of economic transition and that the present economic recession is likely to continue for some time. The recession is basically due to the transition to a market economy.

A major part of heavy industry was subsidized under the system of central

planning, and has now disappeared. By the end of 1994, one-half to two-thirds of industrial capacity has been shut down. Substantial parts of the metallurgy, mining, agricultural cooperatives, electronic, telecommunications, and artificial fertilizer industry have disappeared.

The Communication provides indicators for economic change. Industry's contribution to GDP declined from 1988 to 1992 by 5 percent (from 43 percent to 38 percent), agriculture's contribution declined by 1 percent (from 18 percent to 17 percent), but there has been a growth in the services' contribution from 39 percent to 45 percent in the same period. Per capita GDP (USD) declined from 2,736 in 1988 to 2,364 in 1992. These indicators are however highly uncertain.

Massive privatization represents the major change in the industrial sector. However, in the Communication it is pointed out that privatization has not occurred as quickly as envisaged. Foreign investment has been moderate, and limited domestic purchasing power has slowed the process. Nevertheless, the government has incorporated national and international environmental goals into the restructuring process.

### GHG RELEVANT ECONOMIC SECTORS

Historically, energy use has increased in the post-war period until the 1980s. Growth rates slowed down in the first part of the 80s and fell steeply in the latter half of this decade. While there was an up-turn again in 1993, the numbers for 1994 indicate a further decline. This is due to the economic restructuring discussed above and to changes in the pricing of energy. There are some important structural changes since about 1987; while the energy use in the industrial and manufacturing sector has decreased, the residential-commercial sector uses more energy. Energy consumption in the former sector decreased by as much as 35



percent between 1987 and 1992, basically in heavy industry. In the residential-commercial sector, however, there has been a substantial increase in the number of SMBs (small and medium-sized businesses), especially in the service sectors.

Hungary has few indigenous energy reserves, and is dependent on imports of oil and gas from basically one source, Russia. There is a strong desire to diversify in terms of sources for commercial reasons, but this is difficult due to the lack of appropriate infrastructure. Hungarian energy policy is thus concerned with the supply security question. Domestic electricity production is largely carried out by the Paks nuclear plant and coal. Deep coal mining is subject to extensive restructuring as it is largely uneconomical. However, the role of domestic energy sources on the whole is very important in view of the supply security question. Net energy imports make up about 45-49 percent of total energy consumption.

*Table 1. Hungarian energy production and imports.*

Year	1988	1992
Supply (PJ)	1440	1118
Domestic production (%)	48%	50%
Imports	51%	48%
Stocks	-1%	2%

The Communication provides information on several sectors that are relevant to the assessment of Hungarian national climate policy:

Energy consumption in the industrial sector was 40 percent lower in 1993 than in 1987. In this period production in terms of output fell by 51 percent in metallurgy, in the building industry by 33 percent, in the chemical industry by 40 percent, in the textile and shoe manufacturing by 35 percent, and in the food industry by 23 percent. This change was due to economic recession and industrial

restructuring.

In the transport sector there was an annual increase in energy consumption of 1.9 percent in the period 1985-1990, but since 1990 there has been an annual decrease of between 5 and 10 percent. There has been an increase in the number of cars but also substantial increases in gasoline prices.

The residential-commercial sector represents 37 percent of final energy consumption, and this sector represents an important increase from 1987, when the share was 29.5 percent. This is due to an increased number of electrical appliances in homes as well as to the growth in SMBs.

The forestry sector represents a sink, and may in the future become more important as forestry policy probably will be revised. This is dealt with in the discussion of policy directions later.

Domestic energy production has decreased since 1989. In fact, in 1993 it fell below the 1970 level. The import share remains considerable:

The domestic energy production of coal has experienced a steep decline. It was reduced to 14.6 Mt in 1993 over 17.5 Mt in 1990. This reduction took place in deep pits, while open pit lignite mining increased by 30 percent during the same period. There are some oil reserves, but output in 1993 was only 1.7 Mt. These reserves are being depleted. There is also a depletion of the modest domestic gas reserves at present. Production in 1993 was about 5 billion cubic meters (BCM).

Domestic production of electricity comes from the burning of fossil fuels and nuclear capacity: The Paks nuclear plant, the only one in Hungary, produced 13.8 TWh and fossil fuelled plants 18 TWh in 1993. As Hungary imports more than 50 percent of its energy, it intends to diversify its one-sided import dependence on Russian oil and gas. However, the lack of west-bound infrastructure is a major problem. There is an oil pipeline between Rieka and Budapest, which is not in operation due to the war on the Balkans. A recently constructed gas pipeline between Győr and Baumgarten in Austria is insufficient to ensure adequate

imports of Western gas.

*Table 2. Changes in fuel composition, in percentages.*

	1988	1992
Coal, other solids	24	20
Oil	31	34
Gas	28	30
Electricity	17	16

In the period of central planning, *energy prices* were artificially low in Hungary. They were determined by the State Office of Prices and were constant over a long period of time. Thus, there were no incentives to save energy or modernize equipment to this end. This resulted in much waste of energy. Oil product prices were liberalized as of January 1991, followed by coal, coal products, and gas in March 1992. Local authorities determine the fees for district heating and hot water supply. However, for all energy carriers supplied by the Hungarian Power Co. (MVM Rt.), prices are regulated by the Ministry of Industry and Trade. The price of electricity is set according to three types of consumer groups, and differs for day and night-time consumption. Also, the price for natural gas varies with consumption type: there is a supply fee category, a general consumption category, and a household consumption category. A special price category for the chemical industry was abolished by the end of 1993. Consumers pay a 10 percent VAT on energy prices in general, but for gasoline and diesel oil the percentage is 25 percent.

Energy prices will be further deregulated, and there is a recent institutional and regulatory change in Hungary. In July 1994, the new Law on Gas Supply entered into force, and the so-called Hungarian Energy Office was established. This office is now responsible for energy pricing policy. The regulation of prices is the subject of a specific legal provision; the 1990 Law on Establishment of Prices, which will be in force until the end of 1996. By that time, the cross-financing contained

in the various price categories will be abolished. The Communication contains no information on how the various fuel prices in Hungary compare with world market prices.

### EMISSION INVENTORY

Due to the lack of appropriate data, the Hungarian emission inventory has not been calculated according to the IPPC/OECD methodology. However, the suggested methodology was followed in the cases of CO<sub>2</sub> emissions and CH<sub>4</sub> emissions.

Based on the incomplete information provided in the Communication, the emissions for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O are summarized as follows:

*Table 3. GHG sources and sinks, base period 1985-87 (Gg).*

Source/sinks	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Fuel combustion	80089	7.7	8,36
Fugitive fuel		448.3	
Industrial processes	3587		
Agriculture		208.4	4,56
Forestry	-3097		

### TRENDS OF EMISSIONS BY 2000

The Hungarian Communication predicts the trends of GHG emissions by the year 2000. Two scenarios, Business as Usual (BAU) and Energy Saving (S) both show emissions in the year 2000 which are lower than the base year. This is true for both CO<sub>2</sub> and CH<sub>4</sub>. Hungary therefore has no problem in fulfilling the national goal of emission stabilization at the level of the base period 1985-87 by 2000.

The assumptions of the two scenarios are as follows: In the BAU-scenario there is no energy saving or other environmental policy measures. The comprehensive policy for energy saving (NEEIECP) is presented below. It is the basis for the energy saving scenario (S), which assumes that it will be possible to save about 60PJ by the year 2000. It is further assumed that overall economic growth will occur only after the years 1995-96. Earlier scenarios have been revised, as they have assumed earlier economic recovery.

*Table 4. Meeting the GHG target (Gg).*

	CO <sub>2</sub>	CH <sub>4</sub>
1985-87	81534	604.9
1990	69116	491.6
2000 BAU	73451	232.2
2000 S	68741	(no data)

However, although Hungary does not need to design a climate policy for the immediate future, it is clear that such a policy needs to be developed for the medium and longer term. In the national communication the work on policy development has started, especially in the energy sector, but also with a discussion of future policy needs in sectors such as forestry, transport, and industry.

#### PRINCIPAL POLICY DIRECTIONS

The Communication reports that Hungary has started to formulate policy within several areas that have implications for air pollution and climate. In this Communication, however, only those areas that directly affect future emissions of GHG are discussed. The most important areas are energy, industry, forestry, and transport. Of these, there are already important policies in the energy sector. Below

is an overview of the policies planned to be implemented and those already in place.

### Energy policy

The Hungarian Communication lists a number of measures and initiatives which may lead to energy saving and efficiency and thus reduce GHG emissions. These are not primarily aimed at GHG emission abatement, but both at energy saving and general environmental needs. A principal driving force in this work is the need on the part of Hungary for reducing import dependence of energy.

The Communication states that there have been several energy campaigns and programs to increase savings and efficiency in Hungary. Over the last 10 years, there have been three major national energy saving campaigns; a five-year campaign from 1985, an awareness-building campaign in 1992, and a PHARE energy saving campaign in 1993. The two first campaigns were effective, but suffered from lack of sufficient funding. The third campaign was funded by PHARE's energy saving program and a joint effort by the EC Energy Centre in Budapest and the Hungarian Ministry of Industry and Trade. It stressed the direct connection between energy and the environment, highlighting the importance of internalizing environmental costs. An evaluation of the campaign by an independent consultant was favorable. These campaigns used TV commercials, advertising, and the distribution of leaflets as means of raising public awareness.

The EC Energy Centre is supported by the EC Commission and three EC programs (PHARE, THERMIE, and SYNERGY) and it cooperates closely with the Hungarian energy authorities.

### NEEIECP

The Communication states that the most important energy policy is in the form of the energy saving program NEEIECP (National Energy Efficiency Improvement and Energy Conservation Program), which was developed in 1991 and adopted in April 1994. The goals of the program are to reduce import dependence for energy, make energy use environmentally friendly, save energy, postpone the construction and installation of a new base load power plant, increase the competitiveness of the economy, and adjust to EU and IEA/OECD energy policy and recommendations.

These goals are all important to Hungary. It is advantageous if one at least can postpone the decision on building a new power plant, which will either be coal-fired or nuclear-based. (The choice of fuel type here will have many consequences, some of the most important ones being environmental. It will also require large investments.) This may be accomplished, the Communication states, if energy saving and efficiency can be achieved. Likewise, it is very important to reduce import dependency as well as to diversify. Energy savings will also contribute to this end.

The NEEIECP targets are given for the medium term (5-10 years) and long term (10-20 years) as minima and maxima. The saving potential for the medium term is 63.7PJ (min) and 124.4PJ (max), and for the long term 193.4PJ (min) and 309.3PJ (max). In Annex E of the Communication it is stated that the saving potential of, for instance, 63.7 PJ (medium term, minimum), can be reached by inter alia intensifying energy awareness (34.5 PJ), energy efficiency (4.5 PJ), improvement of insulation (2.8 PJ), optimizing public transport cooperation (5.1 PJ), and modernization (4.5 PJ). The total savings are 63.7 PJ out of a total consumption of 1046.5 PJ. The major savings in the medium term thus come from the transport, residential and industrial sectors. In order to achieve this, however, one needs full political support as well as financial resources for a planned energy conservation fund, according to the Communication.

For example, it will be necessary to revise legislation to promote energy saving investments, and other existing barriers in this areas will have to be removed. There is no in-depth analysis of what these are.

Also, the institutional support for the program must be developed. A new Hungarian Energy Office was established in April 1994, and an Energy Saving Department is part of this new governmental body. Implementation of the energy saving measures of the programme is the responsibility of this office. There is also cooperation between the EC Energy Office in Budapest and the State Authority for Energy Management and Energy Safety. Currently there is a revision of the institutional sharing of responsibility between these institutions under way.

The energy saving potential of the NEEIECP can be broken down as follows:

In the energy sector total fuel-related consumption may be reduced by 2.3 percent; the most significant saving will come from efficiency improvement in energy transportation (2.5PJ) and from co-generation (2.7PJ). However, no details are provided on exactly how this will be achieved. This is also true for the estimation of the energy saving potential in the other sectors.

In industry, energy demand may be reduced by 13PJ, half of which may be accomplished by increasing awareness of the energy savings potential. About 2PJ may be saved by modernization of technology, and 1.5PJ from improvement of thermal insulation.

In agriculture there is a significant saving potential, and energy awareness raising is here considered vital.

In the transportation sector the saving potential is assumed to be 13PJ. This may be achieved by awareness raising, optimization of public transport cooperation, and so on. The saving potential in this sector makes up 25 percent of the program, and its realization will depend on the future policy development for public transportation.



In the residential sector the energy saving potential in households is considerable, making up an estimated 17PJ. Improvements in consumers' equipment is here estimated to make up about 11 percent, while the main bulk of saving, 81 percent, may come from increased energy awareness in the general population, according to the Communication. There is no information on the role that energy substitution may come to play here.

### Industrial policy

The Communication does not mention any specific policies aimed at the environment in the industry sector, but the NEEIECP is planned to have a direct impact here. Privatization is the major political project in this sector, and many traditional sub-sectors of heavy industry are phased out as a consequence of privatization, and along with it the modernization of equipment. The environmental impact of privatization is basically positive, as it entails the phasing out of heavy industry.

### Forest policy

Hungary has historically been wood-covered, but much of the forest area has been converted into agricultural land. However, after 1990, collective farms were abolished and much land has been handed back to previous owners, not in the pre-1945 form, but in smaller lots. There are today about 250,000 forest owners of 700,000 ha forests, which typically means that the owners have small plots.

Studies show that between 500,000 and 1,000,000 ha of current agricultural land will have to be converted to other uses, as it is unprofitable. The Communication adds that a large proportion of this should be afforested in the future.

The forest law dates from 1961, but forestry has been a well-developed sector

in Hungary for more than 200 years. The current law is outdated, and a new forest law is planned which should place major emphasis on environmental aspects of forest policy. In Hungary there is a growing environmental awareness of these factors, as the detrimental effects of air emissions on the woods is an increasing and visible problem. The climate change issue starts to become an object of concern, too, in terms of discussions of forest policy. Afforestation will provide an enhancement of sinks.

### Methane abatement

For methane, emissions from livestock are uncertain. Domestic animal stock decreased much in recent years due to the collapse of Eastern markets. In the case of horse, sheep, and poultry the stock will again reach the 1990-level by the year 2000. Swine and cattle have decreased significantly. In the calculations of CH<sub>4</sub>, sources like landfills, wastewater treatment and incineration are omitted due to lack of data. There are currently no policies aimed at abatement of methane.

### ODS reduction policies

Hungary is not a producer of ODS (ozone depleting substances), and the use of chlorofluorocarbons (CFCs) in Hungary has been reduced dramatically since 1986. Some producers have ceased to use ODS since their products aim at markets where this is illegal. Hungary has a policy program to phase out ODS. It will impose product charges on refrigerators and used oil and refrigerants, modify customs regulations (in accordance with the so-called Europe-agreement between the EU and Hungary), and use other economic regulations.

## ASSESSMENT OF THE EFFECTIVENESS OF ADOPTED MEASURES

Given the predicted emissions, Hungary does not need a climate policy until after

the turn of the century. Emission abatement will happen as a consequence of the general economic recession. However, the Communication reports that one has started to develop policy that may form elements of a future climate policy, notably in terms of energy saving and efficiency. These policies are not primarily aimed at climate, but will have the effect of stabilizing or reducing CO<sub>2</sub> emissions.

As stated previously, the most important policy program is the NEEIECP, which was adopted recently. Its success will depend on many factors, but it is promising that close cooperation has been established between Hungarian authorities and the EC Energy Centre, and also that a special unit on energy saving and efficiency has been created in connection with a ministry restructuring in 1994. Hopefully, the saving and efficiency aspects of energy policy will be emphasized as a result of this. It should be noted that the saving of energy is very central to other important energy policy goals, notably the need to diminish the import dependence. This is the foremost energy policy goal given difficulties in procuring sufficient oil and gas imports. As the import dependence is one-sided, diversification and fuel substitution become important goals too. Saving is the only 'no regrets' energy policy in this situation.

Also, the significant decrease in domestic coal mining will have important impacts on future emissions from energy use. Here, restructuring has gone faster than in most West-European countries.

A future climate policy will come about only if the successful integration of environmental policy criteria into sectoral policies such as energy, transport, and so on can be accomplished. As Hungary adapts to EU developments in this regard, through the very specific agreement on how this work shall proceed which was adopted at the Essen summit of the European Council in 1994 and in the Europe agreements, the conditions for climate policy beyond the year 2000 are good. The work underway is a very promising start, and this national communication signals that the Hungarian authorities are aware of the complexity and interconnected nature of climate policy development.

## PART 2. WORLD BANK ASSISTANCE TO HUNGARY

In the case of Hungary a Country Assistance Strategy document is presently under preparation in the Country Department for Central Europe. A Country Assistance Strategy for Hungary is therefore not available. However, the World Bank Staff Appraisal Report on the Energy and Environment Project (Report No. 11582-HU) contains some information. The World Bank's strategy is to support policies and investments encouraging market-based growth and social development in the context of macroeconomic stability. The World Bank emphasizes optimum resource allocation and increased efficiency. The present World Bank operations in Hungary are as follows:

*Table 5. World Bank loans to Hungary. Million US\$.*

	Closing Year	Loan Amount
Power I	1995	64
Industrial Restructuring II	1995	140
Energy Development Conservation	1995	110
Transport II	1995	95
Financial System Modernization	1995	66
Integrated Agricultural Export	1995	100
Telecommunications II	1996	150
Human Resources	1996	150
Product Market Development	1998	100
Roads	1997	90
Pension Administration and Health	1998	132
Health Services and Management	2000	91
Tax Administration Computer	1997	29
Energy and Environment	1999	100

In addition to the projects listed in Table 5, the World Bank plans to concentrate on four investment projects: the Budapest urban transport, Lake Balaton, municipal sewerage, and a project on railways in Hungary.

### The Energy and Environment Project

Among the largest air polluters in Hungary are coal/lignite fired power plants,

which of course also give rise to large greenhouse gas emissions, especially carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>). In a climate policy context the 'Energy and Environment' Project, a loan of US\$ 100 million to Hungarian Power Companies Ltd, is of interest. The main elements of the project are support for the construction of a gas-fired combined cycle co-generation unit at the Dunamenti Power Plant and an upgrade of MVM Rt's existing Energy Management System. Because this means higher efficiency in energy production and substitution from coal to gas as an energy source in Hungary, the project also has benefits from a climate policy perspective.<sup>6</sup> In the context of this report it is also of interest that the project will give assistance to the development of an Environmental Master Plan for MVM Rt. The Plan will consist of the following elements:

1. establishing a sound data base on environmental performance and impacts of MVM Rt's existing energy/power generation system;
2. estimating potential environmental issues for MVM Rt's future energy/power generating system;
3. preparing and beginning to implement a priority-based, cost-effective remediation program to address the most critical environmental aspects of MVM Rt's existing heat/power generation system.

### World Bank Loans in the Pipeline

The World Bank is planning to give loans to make investments in the Budapest urban transport network, to clean up Lake Balaton, to support a restructuring program for the Hungarian railways, and, finally, to support some investments in municipal sewerage.

Due to limited information available on the project, it is difficult to assess to what extent the support for investments in municipal sewerage is of importance in a climate context. Municipal sewerage is the source of some emissions of the greenhouse gas methane (CH<sub>4</sub>) and under specific conditions also the greenhouse

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<sup>6</sup> The emission of carbon dioxide is reduced about 45 percent when switching from brown coal to natural gas as an energy source.

gas N<sub>2</sub>O. However, the quantities are relatively small. Whether or not the planned investments in the municipal sewerage will reduce the emissions of methane are therefore probably of minor interest.

Similar to other formerly centrally planned economies in Eastern Europe, Hungary has inherited an infrastructure for public transport with a considerable capacity. However, parallel to the transformation to a market economy, transport by private cars has increased at the expense of the demand for public transport. Transport by private cars is much more energy consuming than public transport. As part of a climate strategy it is therefore of great importance that these countries modernize their infrastructure for public transport in order to make it an attractive alternative to private transport. The two planned World Bank projects in public transportation are of special importance in this report.

The objectives of the loan to the urban transport in Budapest are both to improve the management of the traffic companies as well as to improve traffic planning in Budapest. An important objective of the loan is also to help the traffic company make the public transport network more attractive and to improve the traffic companies marketing of their services. But it has also been considered, as a part of the project, to give support to investments in new transport equipment.

The loan for investment in the Hungarian railways will, among other things, support investments in new trains and upgrading of the existing transport capital. This is intended to speed up the trains and make them more comfortable. But the World Bank will probably put equal or more emphasis on supporting a reform program to improve management of the railway company, to increase the standard of the transport services, to improve marketing, and to support a program for increasing the staffs' qualifications.

The Lake Balaton project will support improvement of the natural environment of the Lake Balaton, but is not intended to reduce greenhouse gas emissions.

### **PART 3. EVALUATION OF CONSISTENCY OF THE NATIONAL COMMUNICATION OF HUNGARY WITH THE WORLD BANK ASSISTANCE STRATEGY**

As outlined above, the World Bank's Energy and Environment Project in Hungary will give significant contributions for reducing greenhouse gas emissions, because burning of natural gas gives less emissions of carbon dioxide compared to the use of lignite. The national communication from Hungary also underlines that it is necessary to reduce the greenhouse gas emissions in the power generation sector, but does not give details about the planned measures. Consequently, there is full consistency between the World Bank's assistance and the Communication in this sector.

In the light of the World Bank's railway project, there is an important statement in the Communication (p.68): 'The capital exports of international organization financial institutions is also a great problem since today it is much easier to attract capital for road construction with concessions than railway development of combined transportation system.' The railways' services in Hungary are of low standard and therefore has an important disadvantage in competing with private car transport. In a long-term climate strategy the investments in infrastructure for transport are crucial, and the World Bank's planned support for investments in the Hungarian railways have therefore a potential for reinforcing the country's climate strategy.

The World Bank's Lake Balaton project will give important environmental improvements, but will probably not in any way reinforce measures mentioned in the National Communication. There are nonetheless no inconsistencies between this project and the country's climate strategy. That should also be the conclusion about the World Bank's planned support for investments in municipal sewerage.

#### **PART 4. VALUE OF THE HUNGARIAN NATIONAL COMMUNICATION FOR WORLD BANK DECISION-MAKING**

Hungary has submitted a thorough analysis in its national communication. The emission inventories are as complete as it is possible to make them, given the lack of relevant data in some cases. This work is based on input from several experts. There is also a thorough analysis of the energy sector, future demand, expected growth sectors, as well as energy use broken down on sectors. As this communication evidences, there has been an extensive cooperation between international expert teams and Hungarian researchers and policy makers on the issues pertaining to air emissions and energy policy. There is also a valuable discussion of the policy on ozone depleting substances and the reduction of volatile organic compounds (VOCs).

In the transportation sector, climate policy goals present a great challenge. Here energy substitution is the most difficult, and energy use in this sector is poised to grow substantially in the years ahead in Central Europe. Public transportation systems may alleviate this growth, however. As stated, in the Communication it is mentioned (p.68) that it is harder to attract international funding for railroad development than for motorways. If so, this is a very important issue. Hungary was the first country in Europe to build an underground metro system, located in Budapest, and has a well-developed, yet old railway system. However, with Western standard equipment the railway would compete well with the private car. In this area there seems to be a great potential for policy development with profound implications for GHG emissions as well as for other air emissions.

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