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EXECUTIVE SUMMARY OF THE
NATIONAL COMMUNICATION OF

HUNGARY

submitted under Articles 4 and 12 of the
United Nations Framework Convention on Climate Change

In accordance with decision 9/2 of the Intergovernmental Negotiating Committee for a Framework Convention on Climate Change, the interim secretariat is to make available, in the official languages of the United Nations, the executive summaries of the national communications submitted by Annex I Parties.

Note: Executive summaries of national communications issued prior to the first session of the Conference of the Parties bear the symbol A/AC.237/NC/___.

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Special conditions in terms of the Convention

1. Though the greenhouse gas contribution of Hungary to the overall emissions in absolute values is insignificant, it is quite high in proportion to its population or its gross domestic product. Considering the historical and contemporary emissions in Hungary, the proportionate responsibility for the global environmental problem of the increasing greenhouse gas concentrations was recognised. In 1991, the Government declared that the annual specific carbon dioxide emissions deriving from domestic economic activities will not exceed the averaged annual emission level of the base period accepted for comparison, by 2000. In the light of characteristic features of the process of economic transition, the period of 1985-1987 which precedes the current economic recession is considered as the base period for comparison of the carbon dioxide emissions.

Understanding of the flexibility term

2. The Parliament decision on the ratification in December 1993, took note of this opportunity and considered it reasonable and unavoidable to apply the provision of Article 4.6 of the Convention. Accordingly, the statement submitted with the deposition of the ratification instrument reiterated this claim at least in relation to the carbon-dioxide emissions. As is seen from the assessments, the deep recession which started in the second half of the 1980s reached most of the sectors which are generally the basic sources of the greenhouse gases. For this reason and also for practical purposes we will use the unique base period of 1985-1987 for the base level calculations in the future for all these gases (by deriving mean annual base levels from this period), whilst providing estimates for 1990 for the international comparisons and synthesis.

3. Our understanding of the flexibility term of the Convention in the context of the first national communication is summarised as follows:

- The flexibility term is necessary to set realistic base levels for greenhouse gas emissions, corresponding to a period prior to the beginning of the transition processes. Hungary has chosen the three year period of 1985-1987 to develop an average base year emissions level.

- Due to the lack of research experiences in the subject of greenhouse gas emissions and according to the lack of information and data, the recommended methodology was used for the inventories of carbon dioxide and methane only. The combustion sources and the emission from cement productions are considered in the case of carbon dioxide (CO_2). The calculation of methane (CH_4) emission refers to the fugitive sources, emission from enteric fermentation and rice cultivation.

- At present, economic activities can only be projected for the short-term because of the deep uncertainties related to the transition period. Regarding our commitments under the Convention to stabilise the CO_2 emissions at a level of 1985-1987 by the year of 2000, projections of future greenhouse gas emissions presented in this communication are not extended beyond 2000.

- Although the chapter on policies and measures includes description of several programmes that could lead to reduction of greenhouse gas emissions, the quantitative projections of future emissions are only presented for the energy savings programme as "with measure" and "without measure" scenarios.

National circumstances

4. Hungary is located in the Carpathian Basin in the heart of Europe, its territory amounts to 93030 km^2. Hungary is a typical low-lying country: 73 per cent of its territory is flatland which is less than 200 meters above the sea level. The country belongs to the catchment area of Danube and Tisza and their affluents. The country is located at the shifting frontier between the temperate continental (with hot summer and relatively cold winter) and the Mediterranean (with hot, dry summer and rainy winter) climate zones with complementary effects of the temperate oceanic climate. Southeast part of Hungary belongs entirely to the semi-arid and dry sub-humid climatic belts. The significance of the insufficient precipitation has increased for the last 15 years which might be a dangerous indicator of the increasing drought frequencies for this area.

Transition to market economy

5. The country is in process of substantial socio-economic transition and it became evident that the lasting grave crisis symptoms in the Hungarian economy are basically of a structural origin. These structural changes substantially affect the contemporary and the future emissions of the greenhouse gases and offer a peculiar opportunity to take into account environmental considerations to a better extent during the transition and in the future. The considerable fall in production has not left the industrial structure untouched: half to two thirds of the capacity of industry of several years ago has become superfluous and has been written off for the recent years. In a sectoral analysis, the changes are more obvious. A considerable proportion of the metallurgy, mining and agriculture cooperatives, as well as the electronic and telecommunications industry, and of the artificial fertiliser industry has disappeared. Undoubtedly, new activities have also appeared (e.g. passenger car production).

Recent transition in the energy sector

6. The trend of energy use in Hungary changed in the 1980's after a long period of growth. Rate of growth slowed down in the first half of this decade, and after some years of fluctuation the trend became decreasing from 1987. The decreasing trend of energy demand stopped in 1992. Total energy consumption was 1.5 per cent higher in 1993 than in the

previous year; within that electricity consumption increased by 0.5 per cent. Both the total energy consumption and electricity consumption were again lower in the first half of 1994 in comparison with the identical period of 1993. Domestic primary energy production has been decreasing since 1989 and in 1993 it fell back underneath the level of 1970 with 568.3 PJ. Net energy import -- not including the electricity produced by the single nuclear power plant which used imported nuclear fuel -- is maintained at about 45-49 per cent. Dependency on primary energy import decreased slightly from 53.1 per cent to 51.6 per cent calculated on the ratio of import within total sources. The total energy consumption of the industry was 40 per cent lower in 1993 than in 1987. Electricity demand of 34.9 TWh for 1993 was mostly covered by domestic power plants -- with the share of 13.79 TWh generated by the Paks Nuclear Power Plant and, 17.97 TWh provided by fossil fuelled plants. The share of hydrocarbons in the total energy import amounting to 576.4 PJ in 1993 and consisting of 4.8 Mt (318 PJ) of crude oil and 5.8 billion m^3 (200 PJ) of natural gas, is a slight reduction compared to 1990. The largest reduction took place in the electricity import: net import of 11.1 TWh in 1990 fell to 2.5 TWh in 1993.

International cooperation

7. The Netherlands-Hungary bilateral cooperation in the field of environment is based on a memorandum of understanding between our two environment ministries. The objectives of the project were to elaborate on a possible Hungarian position on climate change, including its consequences for energy production, energy efficiency and related issues. During the last six months (and the remainder of 1994) cooperation mainly focused on the preparation of national communication for the Convention.

8. Another project was initiated by the Norwegian Institute CICERO from the Norwegian Government which focuses on some long-term response policies options for the Hungarian climate-energy strategy. This project started in the first half of 1994 in the framework of Norwegian-Hungarian bilateral environmental cooperation and its emphasis is on determining some (cost-effective) measures for reducing greenhouse gas (GHG) emissions.

9. Under the United States Country Study Programme, a research project was launched in September 1994. The main objectives are the improvement and detailization of an inventory of sources and sinks with prime focus on the sectoral assessments and the development of scenarios and concrete long-term sector-based response policies to assist the national policy planning with particular attention on the energy-savings/efficiency aspects.

Inventories of greenhouse gas emissions and removals

10. One of the principal purposes of greenhouse gas inventories is the identification of main sectors, subsectors and technologies that contribute to the national level anthropogenic greenhouse gas balance either by emission or by removal. A comprehensive and reliable inventory can be a starting point for projection of mitigation policies and measures and their effects. Although certain first-guess preliminary assessments of greenhouse gas emissions

were derived to form the preliminary position regarding the Convention, Hungary has not yet elaborated an emission inventory either by IPCC/OECD or CORINAIR methodology. In view of the lack of appropriate data, the recommended methodology was successively followed in the cases of inventories of carbon dioxide and methane emissions only. Nevertheless, certain simplified estimation for emissions of nitrous oxide (N_2O), nitrogen oxides (NO_x) and non-methane volatile organic compounds (NMVOCs) are also included in present inventory.

11. Energy data have already been collected in Hungary for more than fifty years and national energy balances have been compiled since the beginning of the 1950's. The energy statistical system changed considerably during the past decades. Two simultaneous energy statistical systems were maintained for a considerable period in Hungary. The first system functioned in the Central Statistical Office, the other one was under the auspices of the Ministry of Industry and Trade. As a consequence of the above mentioned parallelism data of different years supplied for international organisations were sometimes presented by different Hungarian institutions and were differing to some extent so that some of them had to be adjusted later. The determination of greenhouse gas emissions is based on the official Hungarian national energy balance produced and published in particular for the International Energy Agency (IEA) review process.

CO_2 emissions

12. The greatest part of CO_2 emissions is generated by fuel combustion. In the base period it was about 83 Mt/year, but it dropped to 71 Mt by 1990. The result is in accordance with previous estimations although these estimations showed the actual CO_2 emission a little bit higher. The difference can be explained by the fact that the IPCC default emission factors were used for the development of the present inventory. The actual factors may be slightly higher. Regarding the sectoral structure of CO_2 emission concerns, in case of fuel combustion, almost half of the total emission stems from the transformation processes. The share of the residential sector reaches almost 25 per cent of the total CO_2 emission.

13. Uncertainty of CO_2 emission depends not only on reliability of energy consumption data but it is also influenced by the uncertainties in the emission factors. As different emissions have to be taken into account for different types of energy consumption it is important to determine the emission factors for the particular technologies and equipment as precisely as possible. At present the uncertainties of these factors are greater than those of energy consumption or of other energy data.

Greenhouse gas emissions calculated by the recommended IPCC/OECD methodology

	1985-1987 (base period)		1990 (reference year)	
Emission Sources	CO_2[1]	CH_4[1]	CO_2[1]	CH_4[1]
Fuel combustion	80089	7.7	68105	5.6
Fugitive fuel		448.3		366.0
Industrial processes	3587		3568	
Solvent use				
Agriculture		208.4		173.0
Wastes				
Total Emission	**83586**	**664.4**	**71673**	**544.6**
Land use and forestry (removal)	3097		4467	

Greenhouse gas emissions calculated by simplified methods (ktonnes or Gg/year)

	1985-1987 (base period)				1990 (reference year)			
Emission Sources	**N_2O[2]**	**NO_x[2]**	**CO_2**	**VOC[3]**	**N_2O[2]**	**NO_x[2]**	**CO_2**	**VOC[3]**
Fuel combustion[4]	8.36	231.4	743.1	91.5	7.25	199.6	733.6	73.5
Fugitive fuel				35.0				25.0
Industrial processes								
Solvent use				78.5				44.5
Agriculture	4.56				4.10			
Wastes								
Total Emission	**12.92**	**231.4**	**743.1**	**205.0**	**11.35**	**199.6**	**733.6**	**143.0**

[1] Calculated by IPCC/OECD methodology

[2] Estimation methodology based on Tajthy (1993) except for N_2O from agricultural soils which has been calculated by the recommended methodology

[3] The base year and reference year for VOC emission calculations is 1988 and 1991, respectively. The estimation methodology was developed by the Institute of Environmental Protection, Hungary

[4] Including transport related energy use

Removal of CO_2

14. In Hungary the amount of burning aboveground biomass is negligible. The decrease of forest area (caused by occasional burning, road construction etc.) is fully compensated by reproduction and afforestation. The annual carbon release was 2419 Gg and 3276 Gg in the base period and in 1990, respectively. The carbon uptake was estimated at 845 Gg and 1218 Gg in the same years. In Hungary the net carbon uptake of forests is typically positive. This uptake was also calculated according to the IPCC methodology. The annual value of CO_2 removal was 3097 Gg in the base period and 4467 Gg in 1990.

CH_4 emissions

15. In the present inventory the fugitive fuel emissions, enteric fermentation and rice cultivation as sources of CH_4 emission are taken into account. Such important sources like landfills, wastewater treatment and incineration are omitted due to lack of appropriate data. The fugitive fuel emission from coal mining is considered which gives around 75 per cent of the total methane emissions. This contribution decreased by 20 per cent from the reference year to 1990. In Hungary, coal is produced from both underground and surface mines. It should be mentioned that in Hungary a considerable decrease of coal mining activity is expected in the next decades. Methane emissions from enteric fermentation and rice cultivation are also taken into account. The decrease in methane emission from enteric fermentation is mainly caused by the fall of livestock of cattle and sheep. The emission from rice cultivation is regarded as insignificant compared with other sources.

Description of policies and measures

National Energy Efficiency Improvement and Energy Conservation Programme (NEEIECP)

16. The basic idea of the Programme (NEEIECP) is to set up an operational capability for energy conservation. The main goals of the energy saving programme can be summarised as follows:

- environment protection,
- reducing the dependency on imports,
- saving domestic energy resources,
- postpone the construction and installation of a new basic electric power plants,
- increasing the competitiveness of the economy,
- adjustment to the energy policy of European Union, Organisation for Economic Co-operation and Development /International Energy Agency recommendations.

Targets and key assumptions

17. Two targets for medium-range (5 to 10 years) and an other two for long-term (15-20 years) have been set up. The minimum target supposes that the annual growth rate is expected to decrease up to 1995. Beyond 1995 the annual growth rate would increase by 1-2 per cent/year. It is also assumed that the price system of energy carriers shall reflect the realistic expenditure in the years of 1995 and 1996 and the cross-financing to be ceased. The total potential energy saving capacity is estimated of 200-300 PJ relative to the projected amount for the respective medium and long term periods provided several energy conservation possibilities are fully utilized.

Target	**Saved energy**	**Saved energy cost**	**Total investment**	**Relative investment**
	PJ	**M USD**	**M USD**	**M USD/PJ**
medium term minimum	63.7	373.0	422.0	6.6
medium term maximum	124.4	708.0	1250.0	10.0
long term minimum	193.4	1120.0	2148.0	11.1
long term maximum	309.3	1739.0	4036.0	13.0

Projections of energy conservation for various sectors

18. As mentioned before, the sectoral savings below are also relative to the respective business-as-usual projections.

19. The total fuel-related consumption in the energy sector might be reduced by 2.3 per cent. The most significant contribution is projected from the efficiency improvement of energy transportation (2.5 PJ) and from the cogeneration (2.7 PJ). The improvement of energy awareness in the production side might lead to an energy conservation of 1 PJ.

20. The industrial energy demand might be reduced by 13 PJ. About half of those might be reached by improving the energy awareness. Other important sources of energy conservation would be the updating the energy technologies in industrial production and the improvement of thermal insulation by 2 PJ and 1.5 PJ, respectively.

21. The agriculture sector has a significant potential in energy conservation of 12 per cent related to the overall sectoral consumption (30 PJ). The primary source of savings would also be the improvement of energy awareness.

22. Energy conservation in the transport sector is estimated to be about 13 PJ. This amount consists of improvement of energy awareness, optimising the public transport cooperation and reduction of energy consumption of vehicles. The savings in the transport sector might amount to about the 25 per cent of the total energy conservation.

23. Overall energy savings in the communal sector (trade, services, governmental institutions and municipalities) are expected to be 9.2 PJ. The main contribution of the conservation is also the improvement of energy awareness by 7 PJ.

24. The energy savings in the residential sector (17 PJ) are the most significant part of total conservation. The primary sources of the efficient use of energy in the households might be the improvement of energy awareness (81 per cent) and the efficiency improvement of consumer's appliances (11 per cent).

Raising public awareness aimed at efficient use of energy

25. In the past ten years there have been three major nationwide energy-saving campaigns in Hungary. The objectives of the last series supported by PHARE were to spread awareness of the facts that:

- there is a direct connection between the consumption of energy and environmental impact (environmental damage),

- it is possible to save energy and at the same time maintain or increase standards of living,

- saving energy is a sign of efficiency and is a positive and straightforward concept; it is possible for each individual to do something and that the actions of each individual matter.

Content and goal of the programme

26. The media campaign made use of television, cinema and press advertising. These were the central elements in the campaign. Television was given an extremely strong weight in order to maximise the reach and the frequency of giving the message to the target audience.

27. The slogan of the campaign was "you pay twice", that is, once for the wasted energy and once for the environmental damage. Press advertising in four national newspapers was used to put over information on energy use and environmental damage. In support of the media campaign, a leaflet was prepared and printed in many copies. A public relations campaign was used to support the media campaign. The campaign was launched and closed with a press conference. A weekly press release was issued each on a different theme -- energy-saving at home, how to save energy in cooking, water use, etc.

28. A schools campaign aimed at children aged 10-14 years was also developed and implemented. In this programme, a leaflet was prepared and disseminated in large number in all elementary schools in Budapest. It gave information on energy use, the environment and energy saving in a simple question and answer format. An integral part of the schools programme was a competition for the children which asked questions about energy use and energy saving.

Conclusions of the campaign

29. There are both positive and negative lessons which can be learned from the project and which should be noted for future energy conservation campaigns:

- Publicity campaigns can succeed in changing attitudes to energy use and the environment in Hungary and such campaigns can even succeed in changing deeply held attitudes.

- The campaign was successful because of the accurate targeting of the message and because the advertisement was creative and had a strong impact.

- The most effective way to influence attitudes in Hungary is through television advertising. This was by far the most important media in the campaign and was responsible for the results achieved.

- Press advertising is useful as a support to television advertising. Cinema advertising appeared to be ineffective.

VOC emission reduction programme

30. Hungary signed the Economic Commission for Europe (ECE) Protocol for the reduction of VOC emissions, in Geneva in November 1991. The participating countries have undertaken to reduce emission levels by at least approximately 30 per cent up to 1999. In several countries including Hungary the “standstill principle“ applies. The base year for Hungary is 1988. According to this international agreement, a National VOC Emission Reduction Programme will be implemented in Hungary which is based on the obligations and recommendations of the ECE Protocol.

The Hungarian VOC-emission (Gg)

Source category	1988	1991
Energy production	1.0	1.0
Oil industry (mining, storage, refineries, primary distribution)	35.0	25.0
Transport (incl. refuelling)	90.5	72.5
Solvent use	78.5	44.5
Total	**205.0**	**143.0**

31. The main aim of the VOC Programme is to prepare a strategy consisting of a reduction plan and an implementation plan for the VOC emissions in Hungary. Phase 1 of the project was completed in 1993. The result is a survey of the emission of selected industries in Hungary. Phase 2 of the project should result in a reduction plan for the selected industries such as the graphic industry, metal surface industry, textile printing industry, painting processes, storage of chemical and oil products and the rubber and plastic industry.

32. The following list gives a general outline of measures available which are evaluated for implementation individually or in combination:

- Substitution of VOCs, for example, the use of water-based degreasing baths and paints, inks, glues or adhesives which contain low or no amount of VOCs.

- Reduction by best management practices such as good housekeeping, preventive maintenance programmes or by changes in processes such as closed systems during utilisation, storage and distribution of low-boiling organic liquids.

- Recycling and/or recovery of efficiently collected VOCs by control techniques such as absorption condensation and membrane processes ideally organic compounds can be re-used on site.

- Destruction of efficiently collected VOCs by control techniques such as thermal recatalytic incineration or biological treatment.

33. The estimation of the future VOC emission is calculated on the basis of gross domestic product (GDP) change scenarios. The projected VOC emission outlook for 1995 supposing the successful implementation of the reduction programme ("with measures scenario") is 125 kt while the “business as usual scenario” gives 145 kt with an uncertainty level of 15 per cent. Some percent of the annual growth of GDP is assumed in the period 1995-2000. Therefore, after having ratified the VOC Protocol, several reduction measures

will have to be in force already for that period. So VOC emission outlook for 2000 in the case of "with measure" scenario is 110 kt while in the case of “business as usual” is 170 kt. The estimated uncertainty is 20 per cent.

Enhancement of sink capacities: the forest policy

34. As a result of the large scale, still ongoing national afforestation programme, the forested area of the country has been increased by 600,000 hectare and reached the present rate of 18.2 per cent. or 1.7 million hectare. Various studies on future agriculture in Hungary suggest that about 500,000-1,000,000 ha of currently agricultural land has to be converted to other land use, and the bulk of the non-profitable agricultural land should be afforested. Beside its apparent economical and environmental impacts, this extensive afforestation is expected to solve many problems of rural population and to help in managing unemployment to some extent, which is one of the major actual concerns in Hungary. Unlike in most countries in Europe, an overwhelming majority of the forests is covered by broad-leaved species in Hungary. Conifers are considered mainly as introduced species, but a fairly high proportion of the broad-leaved forests also consists of introduced species, such as black locust and improved poplars. The most characteristic feature of the Hungarian forests is the big variety of mixed, sometimes multistoried stands of broad-leaved species. Nearly all forests in Hungary could be considered as even-aged and artificially established stands.

35. The total growing stock of the productive forests is 237 million m^3, and the majority of the current increment, 9,851 thousand m^3, is also being produced in these forests. The net specific current increment is quite high as compared to the European average. It amounts to 6.2 m^3/ha, whereas the European average is only 4.3 m^3/ha (as of 1990). This is attributable partly to the relatively favourable site and climatic conditions and partly to the relatively high proportion of tree-species of short rotation period. About 27 per cent of the forests, that is, 430 thousand ha, are covered with fast growing species providing 30 per cent of the total current increment.

36. The forestry law currently in force was enacted in 1961. The main objective of this law is to increase forest resources, to maintain and intensify special forest functions and to develop harmonised wildlife management. The forestry law regulates stocked forests, clearings, roads, alleys, nurseries, open lands embraced by forests, that is, all lands under forest management, but it ignores ownership.

37. The increasing public concern over the health of forests, air pollution effects, and the threat of possible climate change focused the public attention on forestry issues. The main emphasis is shifting towards the non-wood benefits of forests, while wood production is controlled by market conditions rather than central decisions. These, as well as the changing ownership structure call for adjustment in forestry policy, which finally should result in a new forestry law.

38. The key issues of the new forest policy to be implemented in the new forestry law, of which certain elements are already in effect in lower level regulations, are as follows:

- to define forest in a complex way with the priority of long term interest for human health, nature conservation and the maintenance of forest resources;
- to define the role of forest in nature conservation, protection, welfare-oriented use and recreation;
- to define the role of forest in wood supply, and the necessary economic and institutional background;
- to define the prerequisites of sustainable management under changing ownership structure, and to develop the system of guaranties of maintaining forest heritage;
- to define the desired ownership structure (the share of state forest is expected to exceed 50-55 per cent on the long run);
- to define the co-ordinating and controlling role of the state in ensuring sustainable management;
- to define the role of foresters, their education and training, and the conditions of their employment;
- to define the role of public relations; finally,
- to define the role of international relationships.

The degree of conformity with international agreements is intended to be as high as possible. Some coincidental contradiction might exist, and imperfect implementation may occur. If any, they will be revised and corrected during the legislation procedure ahead.

Country programme for ODS reduction

39. The use of chlorofluorocarbons (CFCs) in Hungary has reduced dramatically since 1986 due to a great extent to the decline in domestic and local foreign markets. Some manufactures have already ceased to use ozone depletion substances (ODS) as dictated by export markets where destination countries have banned import of equipment containing ODS in line with the Montreal Protocol. This factor continues to be a major influence for companies using CFCs along with the phaseout policy which is now legislated.

40. Hungary is not a producer of regulated substances. There are no ODS production facilities for the substances regulated under the Montreal Protocol nor for the transitional hydrochlorofluorocarbons (HCFC) substances and hydrofluorocarbons (HFC) substitutes. ODS are imported mainly from the European Union and the Russian Federation by Hungarian distributors.

Use of ODS by the end-users in Hungary (metric tonnes)

SUBSTANCES	**1986**	**1989**	**1991**	**1992**	**1993**	**1994 plan**
All CFCs	5360	4750	2660	1880	1668	1120
All Halons	455	440	275	170	65	
CTC (carbon-tetrachloride)	700	630	320	200	124	70
MCF (methyl-chloroform)	570	780	580	447	290	250

Content and goals of the programme

The objectives of the Country Programme for the phaseout of ozone depleting substances are as follows:

- Summarise the usage of ODS including CFCs, halons, 111-trichloroethane or MCF, carbon-tetrachloride and HCFCs in Hungary;
- Present a breakdown of ODS usage by substances for the refrigeration, aerosols, solvents, foams and fire extinguishing sectors and detail the regional distribution of usage;
- Assess the factors that effect ODS demand;
- Identify possible alternative substances and technologies for ODS phaseout;
- Quantify phaseout time scales, incremental costs and environmental benefits;
- Describe the institutional and policy framework of the Country Programme.

41. The foreign trade of ODS (regulated materials) is subject to license in Hungary. The product charges on refrigerators, used oil and refrigerants are in phase of elaboration. The authoritative regulation is set in laws. In order to realise the obligations accepted by the signing of the international agreements, the modification of the customs regulation is a viable tool. The limitation in foreign trade of environmentally harmful materials by the modification of customs regulations is acceptable for the authorities of the General Agreement on Tariffs and Trade (GATT) and of EU with proper reasons. It is important to emphasise that because of the treaty between Hungary and the EU the modifications in the customs regulation must

be in line with the EU. The use of contingents is the most common tool of trade preferences. There is a possibility for suspending the customs for a given period or given goods. In the cases of important economic policy targets through the so-called licensing procedure, the customs on imported goods are to be suspended or reduced. These regulators serve as tools of import limitations but they can promote the preferential import of materials substituting the ODS and machines for processing the substitutes.

Results

42. According to the experiences of the countries initiating the phasing out of ODS, it is most simple to phase out their use as propellants in aerosols: this sector accounted for 50 per cent of the whole national ODS consumption in Hungary in 1986 and consumption dropped to one tenth by 1993. It can be said that firms are aware of the regulations of the Montreal Protocol. They are acquainted with the different technical forms of phasing out and substitution and they use the experiences of other countries but they can not perform similar measures or introduce new ODS technologies because of the declining economic situation. According to the regulation, only 25 per cent of CFCs can be used in 1994 and 1995 compared to the base year and 15 per cent of CTC and 50 per cent of MCF are allowed for use in 1995.

Projection of future greenhouse gas emissions

43. The implementation of the National Energy Efficiency Improvement and Energy Conservation Programme (NEEIECP) is analysed. Due to the prolonged recession of Hungarian economy, the original scenarios made in 1991 during the preparation of NEEIECP had lost their reliability and therefore could not serve as a useful variants for the analysis of future greenhouse gas emission projections. Two updated scenarios are being investigated: a business-as-usual (BAU) scenario and an energy saving scenario (S). The energy saving scenario (S) based on the medium-term targets of NEEIECP. It is assumed that in the year 2000 the effective implementation of NEEIECP would lead to an energy saving of about 60 PJ compared to the BAU-scenario (As mentioned the energy conservation target is about 50-100 PJ up to 2000). The calculations of emission values both for the reference year (1990) and the scenarios are completed using simple macroeconomic method different from the IPCC/OECD methodology.

Projection of CO_2 emission

44. Taking into consideration the scenarios for energy consumption, the future fossil fuel demand should be determined. In the case of the BAU-scenario, the fossil fuel consumption increases in the year 2000 to about 950 PJ while with significant energy savings and conservation it might increase to only 890 PJ. Both in the BAU 2000 and S2000 scenarios the annual fuel-related CO_2 emission does not exceed the base period level. Nevertheless the BAU scenario is higher by 7 per cent compared to the S scenario.

Projection of fuel-related CO_2 emission (Gg) by sectors

SECTORS	**1995**	**2000BAU**	**2000S**
household	15768	17960	16493
service	3858	4144	3 947
transportation	7906	9949	9361
public power plants	19893	22715	21095
district heating	2895	3154	2983
industry	13818	13608	13181
agriculture	1737	1921	1681
Total	**65875**	**73451**	**68741**

Projection of CH_4 emission

45. In determining the methane emissions connected with domesticated and undomesticated animals the default emission factors presented in the IPCC/OECD methodology have been used. The domesticated animal population decreased dramatically in the recent years mainly because of the collapse of the eastern markets. The increase of the export is very uncertain but it might recover in medium-term. There are no generally accepted scenarios for animal livestock, therefore a stock is estimated on expert judgement basis.

Methane emission (Gg) from enteric fermentation and animal wastes

	1990	**1992**	**1995**	**2000**
cattle	115.6	84.6	77.0	99.6
swine	40.8	26.5	25.8	34.0
horse	1.1	1.1	1.1	1.1
sheep	9.4	8.4	8.4	9.4
poultry	3.5	3.0	2.9	3.4
Total	**170.4**	**123.6**	**115.2**	**147.5**

46. It is supposed that in year 2000 the domesticated animal population will be approximately the mean value of the present and the earlier peak stocks. The ratio of cultivated land and forest areas is not expected to modify significantly the “first guess approximation“ of the methane emissions and the emissions produced by the different type of lands might be regarded as constant.

47. The future emissions of N_2O, NO_x and CO are also analysed in the communication.

Fulfilment of the CO_2 stabilisation target

48. The Government of Hungary has declared that -- in the light of characteristic features of processes of its economic transition -- the period of 1985-1987 which precedes the current economic recession is considered as the base period for comparison of the greenhouse gas emissions. It is also stated that the carbon-dioxide emission should be returned to the base period level by the year 2000. It should be emphasised that the greenhouse gas emission reduction target therefore refers to stabilisation of carbon-dioxide emission at a level of 1985-1987.

The fulfilment of CO_2 reduction target

	CO_2[1] (Gg/year)	**CH_4[2] (Gg/year)**
base period (1985-1987)	81534	604.9
reference year (1990)	69116	491.6
1995	65875	310.1
2000BAU	73451	232.2
2000S	68741	

[1] The recent fuel-related CO_2 emission calculated by the recommended methodology and the future projection of fuel-related CO_2 emissions estimated by simplified method are compared. The projection is presented as “with measures” (2000S) and “without measures” (2000BAU) scenarios regarding the implementation of the National Energy Efficiency and Energy Improvement Programme. (The net emissions including the non-combustion sources and removals are not calculated in the projections. The difference between the net CO_2 emission and fuel-related ones is less than 5 per cent)

[2] Accordingly, the methane emissions from fugitive sources and enteric fermentation for the base period and the reference year are derived from the IPCC/OECD methodology. The future projection of methane emission from same sources is based on the referred macroeconomic method. (The net emissions including the fuel related methane sources are not calculated in the projections. The difference between the net CH_4 emission and emission from fugitive and enteric fermentation is less than 2 per cent).

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