COMPLIANCE COMMITTEE

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Report of the centralized in-depth review of the fourth national communication of Hungary

Note by the secretariat

The report of the centralized in-depth review of the fourth national communication of Hungary is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of decision 27/CMP.1

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Report of the centralized in-depth review of the fourth national communication of Hungary

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I. Introduction and summary

A. Introduction

1. Hungary has been a Party to the UNFCCC since 1994 and its Kyoto Protocol since 2002. Under the Kyoto Protocol, Hungary committed itself to reducing its greenhouse gas (GHG) emissions by 6 per cent compared to the average for the period 1985–1987 (base year or base period) during the first commitment period from 2008 to 2012.

2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Hungary, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 5 to 10 June 2006 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Didier Goetghebuer (Belgium), Mr. David Lesolle (Botswana), Ms. Thelma Krug (Brazil), Mr. Ismael Concha[1] (Colombia), Mr. Naoki Matsuo (Japan) and Ms. Natalya Parasyuk (Ukraine). Ms. Krug and Mr. Matsuo were the lead reviewers. The review was coordinated by Mr. Sergey Kononov (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each part of the NC4. The ERT also evaluated the information contained in Hungary's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Hungary under Article 7, paragraph 2, of the Kyoto Protocol.

4. In accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), a draft version of this report was communicated to the Government of Hungary, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The ERT found that Hungary's NC4 was prepared in accordance with the UNFCCC reporting guidelines.[2] As required by decision 22/CP.8, the RDP provides information on the progress made by Hungary in achieving its commitments under the Kyoto Protocol. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol[3] is provided in both the NC4 and the RDP. The ERT commended Hungary for its coherent and consistent reporting.

1. Completeness

6. The ERT noted that the NC4 covers all sections required by the reporting guidelines, except for a section on financial resources and transfer of technology.[4] The ERT also noted that Hungary's RDP contains all parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, the ERT noted that Hungary has provided the supplementary information required under Article 7, paragraph 2, except for four reporting elements (see section III.B).

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[1] Mr. Concha was not able to take part in the review visit to Bonn but supported the review from his office.

[2] "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications." Document FCCC/CP/1999/7, pages 80–100.

[3] Decision 15/CMP.1, annex, chapter II (FCCC/KP/CMP/2005/8/Add.2).

[4] According to the UNFCCC reporting guidelines (document FCCC/CP/1999/7, page 91, paragraph 50), reporting on financial resources and technology transfer is required for Parties included in Annex II to the Convention (Annex II Parties). Hungary is not an Annex II Party.

2. Timeliness

7. The NC4 was submitted on 10 March 2006, and the RDP was submitted on 17 January 2006. Decision 4/CP.8 requested the submission of the NC4 by 1 January 2006. Decision 22/CP.7 set the same date for Parties to submit their RDPs.

3. Transparency

8. The ERT acknowledged that Hungary's NC4 is comprehensive and transparent. In the course of the review, the ERT formulated a number of recommendations that could help Hungary to further increase the transparency of its reporting, such as a recommendation to present, for all sectors, projected GHG emissions relative to the actual inventory data for the base year and the period 1990–2003.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Hungary has provided a description of its national circumstances affecting GHG emissions and removals. This description covers political profile, population, geography, climate profile, economic profile, energy, transport, industry, waste, agriculture, and land-use change and forestry. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

10. In accordance with Article 4, paragraph 6, of the Convention and decision 9/CP.2, Hungary, as a Party with an economy in transition (EIT), is allowed to use the average of the years 1985–1987 as its base year.

Table 1. Indicators relevant to greenhouse gas emissions and removals for Hungary

	1990[a]	1995	2000	2003	Change[a] 1990–2000 (%)	Change 2000–2003 (%)	Change[a] 1990–2003 (%)
Population (million)	10.4	10.3	10.2	10.1	–1.5	–0.8	–2.3
GDP (billion USD 2000 PPP)	114	101	123	136	8.0	10.8	19.6
TPES (Mtoe)	28.6	25.6	25.0	26.3	–12.4	5.3	–7.7
GDP per capita (thousand USD 2000 PPP)	11.0	9.8	12.0	13.4	9.6	11.6	22.3
TPES per capita (toe)	2.8	2.5	2.4	2.6	–11.1	6.1	–5.6
GHG emissions without LULUCF (Tg CO_2 eq.)	122.2	83.5	81.0	83.2	–33.7	2.7	–31.9
GHG emissions with LULUCF (Tg CO_2 eq.)	120.9	78.2	76.7	79.3	–36.6	3.4	–34.4
CO_2 emissions per capita (Mg)	8.2	5.9	5.7	6.0	–30.8	5.4	–27.0
CO_2 emissions per GDP unit (kg per USD 2000 PPP)	0.75	0.60	0.47	0.44	–36.8	–5.6	–40.4
GHG emissions per capita (Mg CO_2 eq.)	11.8	8.1	7.9	8.2	–32.7	3.5	–30.3
GHG emissions per GDP unit (kg CO_2 eq. per USD 2000 PPP)	1.08	0.83	0.66	0.61	–38.6	–7.3	–43.1

Sources: GHG emissions data are from Hungary's 2005 inventory submission; population, GDP and TPES data are from the IEA.
Note 1: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.
Note 2: For the abbreviations used, see annex II.
[a] For emissions, base year data are used instead of 1990 data, whereas GDP, TPES and population data are for 1990, which leads to some inconsistency in the calculation of GHG emissions per capita and per GDP unit.

11. The NC4 contains summary information on GHG emission trends for the base year and the period 1990–2003. This information is consistent with the 2005 national GHG inventory submission. Summary tables, including trend tables for emissions in CO_2 equivalent, are provided in an annex to the NC4. Descriptions and diagrams on emission trends are available but the ERT noted that emission trends for the energy sector are explained only generally for the sector, and the trends within the energy subsectors (such as transport) could be discussed more comprehensively.

12. Total GHG emissions excluding GHG emissions/removals from land use, land-use change and forestry (LULUCF) decreased by 31.9 per cent between the base year and 2003, whereas total GHG

emissions including net emissions/removals from LULUCF decreased by 34.4 per cent (see table 2). From the base year to 2003, CO_2 emissions (without LULUCF) decreased by 28.7 per cent, CH_4 emissions decreased by 28.3 per cent and N_2O emissions decreased by 47.8 per cent. Emissions of fluorinated gases (HFCs, PFCs and SF_6 taken together) increased by 137.4 per cent over the same period, although they accounted for only approximately 1.0 per cent of total GHG emissions in 2003 (0.3 per cent in the base year).[5] Table 2 provides an overview of GHG emissions by sector from the base year to 2003.

Table 2. Greenhouse gas emissions by sector for Hungary, 1990–2003

	GHG emissions (Tg CO_2 eq.)					Change (%)		Shares[a] (%)	
	Base year	1995	2000	2002	2003	Base year –2003	2002–2003	Base year	2003
1. Energy	86.3	63.5	60.0	60.3	63.2	–26.7	4.8	70.6	76.0
A1. Energy industries	25.8	22.6	22.0	20.4	21.2	–17.7	4.2	21.1	25.5
A2. Manufacturing industries and construction	23.2	13.5	10.8	10.3	10.8	–53.4	4.3	18.9	13.0
A3. Transport	8.0	7.1	9.0	9.8	10.2	27.5	3.3	6.5	12.2
A4–5. Other	26.7	18.1	16.0	17.7	19.1	–28.5	7.9	21.8	22.9
B. Fugitive emissions	2.71	2.26	2.16	2.12	1.99	–26.5	–6.2	2.2	2.4
2. Industrial processes	10.1	4.5	5.4	4.7	4.9	–52.2	3.6	8.3	5.8
3. Solvent and other product use	0.4	0.3	0.2	0.2	0.3	–28.6	31.8	0.3	0.3
4. Agriculture	20.0	10.4	10.3	10.7	10.1	–49.4	–5.2	16.4	12.2
5. LULUCF	–1.34	–5.30	–4.35	–2.34	–3.94	193.8	68.4	–1.1	–4.7
6. Waste	5.4	4.8	5.1	4.9	4.7	–12.1	–2.8	4.4	5.7
GHG total with LULUCF	120.9	78.2	76.7	78.4	79.3	–34.4	1.1	–	–
GHG total without LULUCF	122.2	83.5	81.0	80.8	83.2	–31.9	3.0	–	–

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions which was offset by GHG removals through LULUCF.
Note 1: The changes in emissions and the shares by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.
Note 2: For the abbreviations used, see annex II.

13. In the process of the transition to a market economy, Hungary's gross domestic product (GDP) declined from 1989 to 1993, but the economy has been growing steadily since 1993. Despite economic growth, CO_2 and GHG emissions have been almost stable from 1992 thanks to a notable decrease in the CO_2- and GHG-intensity of GDP (i.e. in CO_2 and GHG emissions per GDP unit; see table 1).

B. Policies and measures

14. As required by the UNFCCC reporting guidelines, Hungary has provided in its NC4 comprehensive and well-organized information on its package of policies and measures implemented, adopted and planned in order to fulfil its commitments under the UNFCCC and the Kyoto Protocol. Table 3 provides an overview of the major policies and measures, as reported in the NC4.

1. Policy framework and cross-sectoral measures

15. The Hungarian Ministry of Environment and Water is responsible for the national environmental policy, including the issue of climate change. An Inter-Ministerial Committee has been set up to ensure a coordinated approach for Hungary to meet its commitments under the Kyoto Protocol. In addition, the Energy Efficiency, Environment and Energy Information Agency (Energy Centre) has been set up to create an institutional framework for implementing the Energy Saving and Energy Efficiency Action Programme (ESEEAP), focusing mainly on demand-side measures. The Inter-Ministerial Committee for Energy Efficiency has also been established and is responsible for financial support to energy efficiency projects.

[5] There were no HFC emissions prior to 1992. The combined growth in the emissions of fluorinated gases is therefore composed of the growth of HFCs from 1992 to 2003 and the growth of PFCs and SF_6 from the base year to 2003. The increase in PFCs and SF_6 from the base year to 2003 was only 0.6 per cent – from 349.5 Gg CO_2 equivalent in the base year to 351.5 Gg CO_2 equivalent in 2003.

16. Hungary, as a member of the European Union (EU), has a common/coordinated policy package under the EU climate and energy policies which are supplementary to domestic policies and measures. The cross-sectoral policy framework includes the Act on Electricity, the National Development Plan and National Rural Development Plan, the ESEEAP, and the second National Environmental Protection Programme (NEP-II), which are multi-purpose programmes that include measures contributing to GHG emission reductions. In addition, an energy tax – on sales/imports of electricity (HUF 186 per MWh) and on natural gas (HUF 56 per GJ) – and environmental levies (which are air/water/soil pollutant-specific but do not apply to residential heating facilities) have contributed to climate change mitigation. Under the EU Emissions Trading Scheme (EU ETS), which started in 2005, an emissions cap for large stationary sources has been set up within the framework of the National Allocation Plan (NAP).

Table 3. Summary information on policies and measures

Major policies and measures	Examples / comments
Framework policies and cross-sectoral measures	
Integrated climate programme	Energy Saving and Energy Efficiency Action Programme (ESEEAP), NEP-II
Energy/electricity/emissions taxation	Energy tax and environmental levies (not climate-issue specific)
Emissions trading	EU ETS (from 2005)
Support of research and development	National Research and Development Programme
Other	National Development Plan and National Rural Development Plan
Energy sector	
Environmentally friendly power generation	Act on Electricity, SO_2 emission reduction measures (0.98 Tg)
Combined heat and power generation	Cogeneration support by mandatory purchase of power by CHP and financial support for CHP plants (0.72 Tg)
Renewable energy sources	Renewables support by mandatory purchase of power from renewables and financial support for renewables plants (1.03 Tg)
Energy efficiency improvements	Part of SO_2 reduction measures
Nuclear power	Life extension of the Paks nuclear plant (1.5 Tg)
Transport	
Vehicle and fuel taxes	Vehicle excise duty
Integrated transport planning	Action Programme of Urban Environmental Quality
Industry	
Pollution prevention and control	IPPC Directive of the EC
Economic incentives	Several measures such as energy efficiency loans
Agriculture	Modernization of animal husbandry and promotion of natural farming methods
Waste management	National Waste Management Plan
Forestry	Afforestation

Note 1: The GHG reduction estimates, given for some measures (in parentheses), are reductions in CO_2 or CO_2 equivalent for the year 2010.
Note 2: For the abbreviations used, see annex II.

17. The ERT noted that the NC4 does not specify the projected effect of the implementation of the EU ETS on GHG emissions. It may be important to estimate this effect, in particular because the EU guidelines for national action plans do not allow EU member States to allocate more than the emissions under the "business-as-usual" scenario, even though Hungary's emissions are projected to remain below its target under the Kyoto Protocol. During the review, the Party clarified that the effect of the implementation of the EU ETS on GHG emissions is not presented in the NC4 because 2005 was the first year of implementation of the scheme in Hungary, and a verified emissions report will be available only in 2006. The ERT recommended that Hungary should present such information in future national communications.

18. Hungary has stated that all measures and policies to mitigate climate change are based on legislation or programmes supported by a legal and/or financial framework. Almost no voluntary approach is utilized. Very often, climate change mitigation is not the primary objective for a policy or measure, but rather a secondary benefit, which is, nevertheless, expected and assessed. Hungary is in the process of strengthening its climate-related policies and measures, including the encouragement of foreign investment to support climate-related projects, particularly those in the area of joint implementation (JI).

2. Policies and measures in the energy sector

19. Emissions from the energy sector amounted to 76 per cent of Hungary's total GHG emissions in 2003 (see table 2). These emissions include emissions from the energy supply sector (26 per cent in 2003), manufacturing industries and construction (13 per cent), transport (12 per cent), and other sectors (23 per cent), which are mostly emissions from the residential and commercial/institutional sectors.

20. Most of the emission reductions are expected to occur in energy supply. The limitation of SO_2 emissions from power plants is expected to contribute savings of 0.98 Tg CO_2 per year in 2010 as a result of retrofitting and fuel-switching to biomass and natural gas.[6] Support for co-generation has been expanding: its effect is estimated as 0.719 Tg CO_2 per year in 2010. Support for renewables-based power generation will contribute to a reduction in emissions by 1.033 Tg CO_2 per year in 2010, which is necessary in order to meet the relevant EU targets. In addition, an extension of the life of the Paks nuclear power plant, which generates approximately 40 per cent of Hungary's electricity, may provide a reduction by 1.477 Tg CO_2 per year in 2015 (beyond the first commitment period under the Kyoto Protocol).

21. Measures to reduce CO_2 emissions in transport are also important. The measures already adopted to reduce urban environmental pollution from traffic are expected to result in reductions of 0.925 Tg CO_2 per year in 2010 and these reductions would more than double by 2015 (to 2.118 Tg CO_2 per year).

22. On the demand side, the scope for emission reductions appears to be limited. The measures include new legislation on the energy efficiency of buildings (savings of 0.97 Tg CO_2 per year in 2010), the modernization of district heating systems (savings of 0.114 Tg CO_2 per year), support for the improvement of residential/communal energy efficiency (savings of 0.097 Tg CO_2 per year), and support for the improvement of industrial energy efficiency (savings of 0.063 Tg CO_2 per year). On the other hand, the Hungarian government has set the overall goals of the ESEEAP at: (a) a 3.5 per cent/year reduction in energy intensity; (b) savings of 75 PJ per year in primary energy use; and (c) a reduction in emissions of 5 Tg CO_2 per year by means of 15 specific policy measures that have been already implemented or adopted. Two-thirds of these measures are linked to renewable energy sources.

23. The ERT noted that the effects of measures targeting the industry and residential/commercial sectors have been relatively small (approximately 10 per cent of total energy-related measures), although the share of these sectors in total GHG emissions is relatively high – 46 per cent in 2003. It noted that there is a huge gap (single-order difference) between the goal set in the ESEEAP and the projected effects. The Party clarified during the review that it is unlikely that Hungary would be able to introduce internal mechanisms to achieve the ESEEAP goal, and that external funding may be required. The ERT recommends that Hungary include an assessment of the reasons for this huge gap and possible solutions in its future national communications. Economic incentives are mostly applied for these sectors (e.g. the Energy Saving Loan Fund, the National Energy Saving Programme, and the Hungarian Energy Efficiency Co-Financing Programme); no voluntary measures are used. Support for studies in energy efficiency and for voluntary measures, setting energy efficiency standards, and/or institutional energy management systems (in collaboration with the existing energy audit system) in industry might help Hungary in promoting demand-side efficiency.

3. Policies and measures in other sectors

24. Between the base year and 2003, GHG emissions from all non-energy sectors[7] taken together decreased by 44.4 per cent (by 15.9 Tg CO_2 equivalent), mainly driven by the decreases in GHG

[6] The same annual effect (0.98 Tg CO_2 per year) is estimated for both 2005 and 2015.

[7] This includes industrial processes (7.6 per cent of total GHG emissions in 2003), agriculture (6.9 per cent), solvent and other product use (0.1 per cent) and waste (3.2 per cent).

emissions from agriculture and industrial processes. GHG emissions from agriculture decreased by 49.4 per cent, or 9.9 Tg CO_2 equivalent, and GHG emissions from industrial processes decreased by 52.2 per cent (by 5.2 Tg CO_2 equivalent).

25. ***Industrial processes***. Without further measures, the emissions of fluorinated gases (HFCs, PFCs and SF_6) would increase in the future. However, Hungary will implement a new EU directive on F-gases as a key measure to limit these emissions.

26. ***Agriculture***. The key GHG-related measures in agriculture are: the application of foddering technologies to reduce the products of enteric fermentation; management of manure to reduce emissions; and the promotion of "natural farming" by different programmes (the Entry Level Scheme, the Organic Farming Scheme and the Integrated Crop Management System). These programmes will have a mitigating effect on GHG emissions, although they are not part of a specific GHG mitigation policy. Nevertheless, annual GHG emissions from agriculture[8] are projected to increase by 11 per cent in the period 2008–2012 relative to the average for the period 1999–2003.

27. ***Forestry***. Quantitative afforestation targets in this sector are based on the National Afforestation Programme. The potential CO_2 sequestration from afforestation activities is presented for the period 2008–2012 and until 2050 for the three scenarios given in the NC4: (a) a baseline scenario with an average afforestation of 4,000 ha/year, with projected carbon removals of 1 Mt of carbon during the first commitment period; (b) a "with measures" scenario with afforestation of 8,000 ha/year and projected carbon removals of 2.1 Mt of carbon during the first commitment period; and (c) a "with additional measures" scenario, based on technical potential, that involves afforesting 773,000 ha of former agricultural land over the next 50 years, with projected carbon removals of 4 Mt of carbon during the first commitment period. Annual wood-felling is expected to be stable at around 8 million m^3 of harvested wood.

28. ***Waste***. The National Waste Management Plan (NWMP) and Act XLIII of 2000 put emphasis on preventing the production of waste, as well as on recycling, the environmentally friendly treatment of waste, and the "polluter pays" principle. The major quantitative targets of the NWMP are as follows: (a) by 2008 the quantity of waste produced should not exceed the level in 2000; (b) by 2007 the share of organic matter within the landfilled waste should be reduced to 50 per cent of the 1995 level; (c) by 2008 all landfilling of organic waste shall be terminated; (d) by 2008 one-half of non-biomass type waste should be reused as raw material or in energy generation; and (e) by 2008 the utilization of effluent sludge should be increased to 55 per cent. The results of these ambitious measures are already included in the baseline scenario. The ERT noted that close monitoring might be essential to ensure that these measures are implemented.

C. Projections and the total effect of policies and measures

1. Projections

29. The GHG projections provided by Hungary in the NC4 include "with measures", "with additional measures" and "without measures" (baseline) scenarios, which are presented in annual steps for the period 2005–2020. For most sectors the projections are not presented relative to actual inventory data for the base year period (1985–1987) and 1990–2003, with the exception of agriculture. However, the projections seem to be consistent with the inventory data provided in the NC4. The projections are presented on a sectoral basis – for energy, transport, industrial processes, waste, agriculture and LULUCF – using the same sectoral categories as are used in the section of the NC4 on policies and measures, and by gas for CO_2, CH_4 and N_2O. The projections are provided in an aggregated format for each sector as well as for a national total, using global warming potential (GWP) values. Emission projections related to fuel sold for use by ships and aircraft engaged in international transport have not

[8] See table 6.14 on page 84 of the NC4.

been reported. The projections do not cover PFCs, HFCs or SF_6, and emissions from solvent and other product use have also not been reported. Table 4 and figure 1 provide a summary of the GHG emission projections provided by Hungary in its NC4.

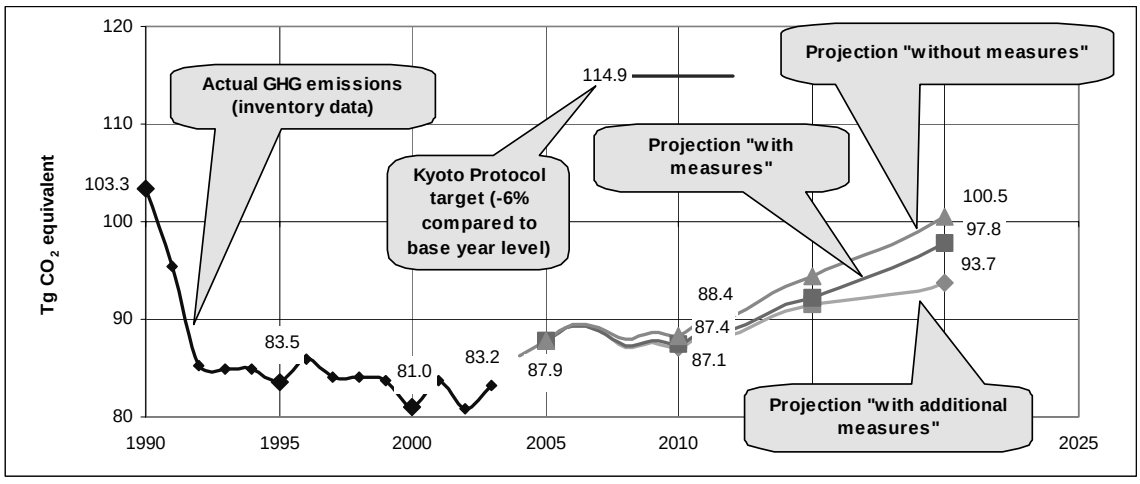
30. The methodology used is briefly described and references to the research project on which the national GHG emissions forecast is based are given in the NC4. This research (conducted in 2004–2005) also dealt with estimates of the effects of policies and measures. The sectoral projections are based almost exclusively on official statistical data and statistical models. The only exception is the electricity production capacity model, which was developed by the Hungarian electricity system operator. The official macroeconomic projections of the Ministry of Finance were applied. The assumptions for each scenario are presented clearly and transparently in the NC4.

Table 4. Summary of greenhouse gas emission projections for Hungary

	GHG emissions (Tg CO_2 eq per year)	Change compared to base year level (%)
Inventory data 1990[a]	103.3[a]	not applicable
Inventory data 2003[a]	83.2[a]	–31.9
Kyoto Protocol base year[b]	122.2	not applicable
Kyoto Protocol target	114.9	–6
"Without measures" projection for 2010[b]	88.4 (average 2008–2012: 89.0)	–27.7 (–27.1)
"With measures" projection for 2010[b]	87.4 (average 2008–2012: 88.1)	–28.5 (–28.0)
"With additional measures" projection for 2010[b]	87.1 (average 2008–2012: 87.8)	–28.7 (–28.2)

[a] *Source*: Hungary 's 2005 GHG inventory submission; the emissions are without LULUCF.
[b] *Source*: Hungary's NC4; the projections are for GHG emissions without LULUCF.
Note: For the abbreviations used, see annex II.

Figure 1. Greenhouse gas emission projections for Hungary



Source: Hungary's NC4; the projections are for GHG emissions without LULUCF.
Note: The ERT noted that the sum of sectoral projections, given in annex 2 to the NC4, differs slightly from the national totals given in that annex. In the graph above, the ERT used the sums of sectoral projections calculated based on annex 2.

31. The ERT understood that, at present, energy demand is projected mostly on the basis of fuel use, or at the so-called level of "final energy". The quality of the projections could be enhanced by estimating demand on the basis of the amount of energy actually needed to provide specific services and integrating these estimates into the projections. Despite the uncertainties involved, this method (the level of "useful energy") can lead to important insights into the factors influencing the actual demand for energy and the associated losses.

32. The ERT recommends that Hungary prepare GHG emission projections relating to: fuel sold for use by ships and aircraft engaged in international transport; PFCs, HFCs and SF_6; and the solvent and other product use sector. The ERT also recommends that Hungary present projections relative to actual inventory data for the base year and 1990–2003 for all sectors.[9]

2. Total effect of policies and measures

33. The NC4 contains estimates of the total effects of implemented and adopted policies and measures, as well as of additional (planned) measures (see table 5).

34. Table 5 shows that the major effects from implemented and adopted measures fall mainly in two sectors – transport and LULUCF – followed by agriculture. The effect from planned measures falls in the agriculture and LULUCF sectors. In total, the measures lead to a reduction in emissions of 1.3 per cent and of approximately 0.5 per cent by 2010 compared to the base year level for the "with measures" and "with additional measures" scenarios, respectively.

Table 5. Projected effects of planned, implemented and adopted policies and measures in 2010

	Effect of implemented and adopted measures (Tg CO_2 eq.)	Relative value (% of base year emissions)	Effect of planned measures (Tg CO_2 eq.)	Relative value (% of base year emissions)
Energy (without transport)	0	0	0	0
Transport	0.925	0.757	0	0
Industrial processes	0	0	0	0
Agriculture	0.057	0.047	0.296	0.242
Land-use change and forestry	0.630	0.515	0.315	0.258
Waste	0	0	0	0
Total	**1.612**	**1.319**	**0.611**	**0.500**

Source: Hungary's NC4.
Note: The total effect of implemented and adopted policies and measures is defined as the difference between the "without measures" and "with measures" scenarios; the total effect of planned policies and measures is defined as the difference between the "with measures" and "with additional measures" scenarios.

D. Vulnerability assessment, climate change impacts and adaptation measures

35. In the NC4, Hungary provides the required information on expected impacts of climate change in the country and on adaptation actions. Increases in summer temperatures of approximately 1° C and in autumn temperatures of 0.4–0.5° C have been observed in the past 30 years. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC4.

36. Hungary is resolved to address the risks associated with climate change. A national climate policy is in place. The Ministry of Environment and Water and the Hungarian Academy of Sciences have launched the VAHAVA Research Programme, a three-year initiative (2003-2006), which is expected to provide a framework for a national climate change strategy for emissions control and climate change adaptation, as well as a national drought strategy.

37. Under the UNFCCC and as an EIT Party, Hungary does not have an obligation to provide resources to Parties not included in Annex I to the Convention (non-Annex I Parties) in the area of vulnerability assessments and adaptation to climate change.

[9] During the review, the Party indicated that the contribution of these emissions to total GHG emissions in Hungary is not significant, and that the general level of uncertainty in projections is greater than these emissions.

Table 6. Summary information on vulnerability and adaptation to climate change

Vulnerability area	Examples / comments / adaptation measures reported
Human health	***Vulnerability***: change in the frequency of extreme climate events ***Adaptation***: increased understanding of public health responses to heat waves; increased understanding of acute health effects of extreme weather
Water resources and hydrology	***Vulnerability***: decrease in rainfall; increased run-off; increase in the numbers of extreme climate events; reduction in the yield of the Tisza River; drying up of small lakes; river floods ***Adaptation***: national climate change strategy; national drought strategy
Agrohydrology	***Vulnerability***: water stress on plant species; shift in forest/tree line ***Adaptation***: national climate change strategy; national drought strategy
Biodiversity and habitat	***Vulnerability***: loss of wetland habitat; increase in salinity and eutrophication ***Adaptation***: national climate change strategy; national drought strategy
Agriculture and forestry	***Vulnerability***: increase in extreme drought events within the Tisza River catchment area; loss of agricultural land; increase in bush fires; shift in forest/tree line; flooded agricultural areas ***Adaptation***: national climate change strategy; national drought strategy

E. Research and systematic observation

38. Hungary provides information on its actions relating to research and systematic observation. It is an EU member State and, in line with the sixth Environmental Action Plan (EAP) of the European Community (EC), participates in a number of international research and monitoring programmes. In the NC4, Hungary addresses both domestic and international activities, including the World Climate Programme (WCP), the International Geosphere–Biosphere Programme (IGBP), the Global Climate Observing System (GCOS), and the Intergovernmental Panel on Climate Change (IPCC). Hungary participates in the Global Atmospheric Watch programme of the World Meteorological Organization (WMO) and relevant observation systems established under the World Climate Research Programme (WCRP) and the IGBP. Hungary has reported on its participation in the GCOS and is cooperating actively with national and international organizations, climate networks and research centres in other countries.

39. Cooperation with developing countries in capacity-building is not reported. As an EIT country, Hungary does not have an obligation to provide resources for non-Annex I Parties in the area of research and systematic observation.

40. Hungary has a research and development policy and specific activities relating to climate change research. The main activities include research on impacts (on ecosystems, agriculture and forestry, water and soil, and human life and socio-economic dimensions), climate change mitigation and adaptation. Systematic observations are mainly meteorological, atmospheric and terrestrial. Research programmes address global warming and climate change concerns.

41. In the NC4, Hungary has not provided information on the number of meteorological and other observatories taking part in GCOS, IGBP and WCP activities, or on its participation in the IPCC. The ERT recommends that such information be included in Hungary's next national communication.

F. Education, training and public awareness

42. In the NC4, Hungary provides information on its actions relating to education, training and public awareness, as required by the UNFCCC reporting guidelines.

43. In 2004, a Eurobarometer study found that 42 per cent of Hungarians thought that raising public awareness would be one of the best ways to combat environmental problems. The general public in Hungary is aware of the climate change problem but the level of awareness is still considered to be low. Nevertheless, another Eurobarometer survey (2002) showed that 32 per cent of respondents chose climate change as one of the five (among 15) most important environmental problems. According to a 2002 survey, 88 per cent of Hungarians associate fossil fuel burning with climate impacts.

44. The Climate Change Action Programme developed by the Hungarian government in 2000 highlights the importance of awareness-raising, education, and the flow and dissemination of

information. In 2004 the Ministry of Environment and Water and the Ministry of Informatics and Communication launched a "eEnvironment Program"[10] which aims to communicate and spread specific ecological values on a large scale; the Ministry of Environment and Water allocated EUR 176,000 to the programme. The Regional Climate Change database for the Carpathian Basin is to be developed under the Hungarian Information Society Strategy.

45. An amendment to the 1993 Public Education Act adopted in 2003 obliges every school to incorporate environmental education into its programme. In universities and colleges there are no programmes relating directly to climate change. However, research methods in climatology and meteorology are taught at six universities at Master's level. Educational and research work is in progress to improve the understanding of the relationships between forestry and climate change.

III. Evaluation of information contained in the report demonstrating progress and of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

A. Information contained in the report demonstrating progress

46. Hungary's RDP includes five chapters which contain the information required by decisions 22/CP.7 and 25/CP.8. The ERT found this information to be consistent with that provided in the NC4.

47. Because of the basic restructuring of the Hungarian economy triggered by the political changes in 1989–1990 and the subsequent decline in production, a considerable reduction in GHG emissions was experienced over the period to 1993. The low level of emissions achieved at that time has been maintained, despite increasing production and GDP, thanks to a general transition to a less energy-intensive and more energy-efficient economy and, to some extent, to the implementation of policies and measures designed to meet the Kyoto Protocol target.

48. Hungary is committed to reduce its GHG emissions by 6 per cent compared to the average emissions in the period 1985–1987 (base period). In its RDP, Hungary lists several legislative measures that have been implemented, not necessarily targeting the reduction of GHG emissions as a primary objective but which have effects to that end. An example is the legislation limiting emissions from stationary sources, the primary aim of which was to significantly reduce air pollution from stationary sources, particularly SO_2 emissions. The present regulation has had an impact on the energy industry, in particular those power stations that used low quality coal. The secondary objective of this legislation was to reduce GHG emissions by fuel switching and technology improvements. At present, legislation is being prepared (to be effective from 2006) on the energy efficiency of buildings, aiming to reduce GHG emissions through energy efficiency measures. Additional measures include approving an extension of the life and increasing the capacity of the Paks nuclear power plant, which will help to avoid GHG emissions beyond the expected end of life of the power plant over the period 2012–2017.[11] The GHG emission projections presented in the RDP indicate that Hungary can meet its Kyoto target, even under the baseline scenario. It is expected that its GHG emissions will not exceed the Kyoto commitment even up to 2020.

49. Hungary indicates that a number of methods have been introduced to facilitate the implementation of JI projects (procedures for evaluating and approving JI projects; the setting up and maintenance of a website with updated general information on JI projects; and the production of calculation manuals). Until now, 14 JI projects have been approved, totalling reductions of 8,697,000 tonnes CO_2 in the first commitment period. As regards emissions trading, the Hungarian

[10] One of the 19 "ePrograms" launched.
[11] The end-of-life dates are spread over the period 2012–2017 because they are different for the four nuclear units at the Paks plant.

Parliament has approved legislation regulating the participation of Hungary in the EU ETS, after extensive preparation of the relevant documentation and procedures. The system is operative for the period 2005–2007 and under preparation for the second period (2008–2012). The short-term and long-term effects of the EU ETS on GHG emission reductions in the country have not yet been estimated.

50. The estimates provided in the RDP and NC4 indicate that Hungary anticipates considerable scope for increasing its sink potential, both by enhancing the carbon removal potential of trees and by enlarging its forest land area through afforestation activities (while benefiting from the available labour).

51. Hungary has presented three afforestation scenarios differing in the assumed afforestation rate (see paragraph 27). Annual wood felling is expected to stagnate at approximately 8 million m^3 of harvested wood. Under all scenarios, the activities under Article 3, paragraph 3, of the Kyoto Protocol result in an increasing carbon sink. Under the legislative framework for the protection of forests, Hungary has implemented several schemes to ensure that forests are sustainable: (a) protection of the soil of the afforested area; (b) protection of the afforested areas against grazing animals; and (c) protection of afforested areas against fire. However, the RDP does not make it clear if these actions have any relation to activities under Article 3, paragraph 4, of the Kyoto Protocol. According to the information provided by Hungary during the IDR, the approach to using activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is under discussion and will be finalized later in 2006.

B. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

52. Hungary has provided most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol in its NC4 and RDP. This information reflects the steps taken by Hungary to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC4 and RDP. Table 7 provides references to the RDP and NC4 chapters in which supplementary information is provided.

Table 7. Overview on supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	Reference
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	NC4 p. 38; p. 44 (JI); p. 48 (ET); RDP p. 25 (JI); p. 24 (ET)
Policies and measures in accordance with Article 2	NC4 pp. 37–70; RDP pp. 7–14
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	RDP pp. 23, 24
Information under Article 10	RDP pp. 35-36
Financial resources	not applicable[a]

[a] As an EIT country, Hungary does not have to report on the implementation of Article 11 of the Kyoto Protocol, including on the provision of new and additional resources.
Note: For the abbreviations used, see annex II.

53. Hungary has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: (a) a description of the national inventory system; (b) a description of the national registry; (c) information on what efforts Hungary is making to implement policies and measures to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; and (d) a description of national legislative arrangements and administrative procedures relating to the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT recommends that Hungary include these reporting elements in its next national communication. During the review, Hungary clarified that it will report on its national inventory system, the national registry and the arrangements and procedures regarding activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol within the framework of Hungary's report establishing its assigned amount.

IV. Conclusions and recommendations

54. In the process of transition to a market economy, Hungary's GDP declined between 1989 and 1993, but it has been rising ever since. Despite this growth, Hungary has kept its emissions relatively stable, mostly as a result of policies and measures implemented in the country. In 2003, national GHG emissions (without LULUCF) were 31.9 per cent below the base year level. Policies and measures in the energy supply sector have contributed most to this reduction in emissions.

55. In its NC4 and RDP, Hungary presents GHG projections for the period from 2005 to 2020 (in five-year intervals). Three scenarios are included: (a) baseline ("without measures") scenario; (b) "with measures" (including the effect of currently implemented and adopted policies and measures); and (c) "with additional measures" (assuming increased energy efficiency and renewable use, changes in transport and traffic redesign). The projected reductions in GHG emissions under the baseline scenario, compared to the base year, and under the "with measures" and "with additional measures" scenarios, are 14.5, 15.8 and 17.2 per cent, respectively. Thus, the projections indicate that Hungary can meet its Kyoto Protocol target (which is a 6 per cent reduction), even under the baseline scenario, and GHG emissions are not expected to exceed the Kyoto Protocol target even by 2020.

56. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Hungary's reporting under the UNFCCC and the Kyoto Protocol. The key recommendations[12] are that Hungary:

- Present, in its next national communication, a more comprehensive account of its efforts to improve the quality of its reporting on GHG data (the development of country-specific emission factors; and changed and improved approaches to estimating emissions) as activities relating to Article 10 of the Kyoto Protocol;

- Prepare GHG emission projections relating to fuel sold for use by ships and aircraft engaged in international transport; projections for PFC, HFC and SF_6 emissions; and emission projections for the solvent and other product use sector;

- Present GHG projections relative to actual inventory data for the base year and 1990–2003 for all sectors;

- Include the following elements of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its next national communication: (a) a description of the national inventory system; (b) a description of the national registry; (c) information on what efforts Hungary is making to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; and (d) a description of national legislative arrangements and administrative procedures relating to the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

57. The ERT noted that Hungary's NC4 does not include the effect of the implementation of the EU ETS on GHG emission reductions in the country. Estimating this effect may be important, in particular because the relevant EU guidelines do not allow member States to allocate more than the emissions under the "business-as-usual scenario", even though Hungary's emissions are projected to remain below the Kyoto Protocol target.

58. The ERT believes that the quality of emission projections could be enhanced by estimating demand at the level of "useful energy" and integrating these estimates into the projections, rather than projecting energy demand on the basis of fuel use.

[12] For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex I

Documents and information used during the review

A. Reference documents

UNFCCC. Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications. FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

UNFCCC. Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, decision 15/CMP.1. FCCC/KP/CMP/2005/8/Add.2. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

UNFCCC. Guidelines for review under Article 8 of the Kyoto Protocol, decision 22/CMP.1. FCCC/KP/CMP/2005/8/Add.3. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

UNFCCC. Report on the in-depth review of the third national communication of Hungary. FCCC/IDR.3/HUN. Available at <http://unfccc.int/resource/docs/idr/hun03.pdf>.

UNFCCC. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. FCCC/SBI/2006/INF.2. Available at <http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>.

UNFCCC. Report of the individual review of the greenhouse gas inventory of Hungary submitted in 2005. FCCC/ARR/2005/HUN. Available at <http://unfccc.int/resource/docs/2006/arr/hun.pdf>.

Hungarian Ministry of Environment and Water. The Fourth National Communication of the Republic of Hungary on Climate Change 2005. Available at <http://unfccc.int/resource/docs/natc/hunnc4.pdf>.

Hungarian Ministry of Environment and Water. Hungary's Report on Demonstrable Progress. Available at <http://unfccc.int/resource/docs/dpr/hun1.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. József Feiler, Ministry of Environment and Water, Hungary.

Annex II

Acronyms and abbreviations

CH_4	methane
CHP	combined heat and power
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EAP	Environmental Action Plan
EC	European Community
EIT	economy in transition
ERT	expert review team
ESEEAP	Energy Saving and Energy Efficiency Action Programme
ET	emissions trading
ETS	emissions trading scheme
EU	European Union
EUR	euro
F-gas	fluorinated gas
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 10^9 joule)
GSN	Global (GCOS) surface network
GUAN	Global (GCOS) upper-air network of stations
GWP	global warming potential
HFCs	hydrofluorocarbons
HUF	Hungarian florin
IDR	in-depth review
IEA	International Energy Agency
IGBP	International Geosphere–Biosphere Programme
IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention and Control
kg	kilogram (1 kg = 1 thousand grams)
kgoe	kilograms of oil equivalent
JI	joint implementation
LULUCF	land use, land-use change and forestry
m^3	cubic metre
Mg	megagram (1 Mg = 1 tonne)
Mt	million tonnes
Mtoe	millions of tonnes of oil equivalent
MWh	megawatt-hours
N_2O	nitrous oxide
NAP	National Allocation Plan
NC4	fourth national communication
NEP	National Environmental Protection Programme
NIR	national inventory report
NWMP	National Waste Management Plan
ODA	official development assistance
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
PPP	purchasing power parities
R&D	research and development
RDP	Report demonstrating progress under the Kyoto Protocol
SF_6	sulphur hexafluoride
SO_2	sulphur dioxide
Tg	teragram (1 Tg = 1 million tonnes)
TPES	total primary energy supply
UNFCCC	United Nations Framework Convention on Climate Change
WCP	World Climate Programme
WCRP	World Climate Research Programme
WMO	World Meteorological Organization

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