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Report of the individual review of the greenhouse gas inventory of Slovakia submitted in 2006*

* In the symbol for this document, 2006 refers to the year in which the inventory was submitted, and not to the year of publication.

CONTENTS

I. Overview

A. Introduction

1. This report covers the in-country review of the 2006 greenhouse gas (GHG) inventory submission of Slovakia, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 19 to 24 March 2007 in Bratislava, Slovakia, and was conducted by the following team of nominated experts from the roster of experts: generalist – Ms. Riitta Pipatti (Finland); energy – Mr. Takeshi Enoki (Japan); industrial processes –Mr. Stanford Mwakasonda (South Africa); agriculture –Mr. Mahmoud Medany (Egypt); land use, land-use change and forestry (LULUCF) – Ms. Kimberly Robertson (New Zealand); waste – Ms. Irina Yesserkepova (Kazakhstan). Mr. Stanford Mwakasonda and Ms. Riitta Pipatti were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone and Mr. Matthew Dudley (UNFCCC secretariat).

2. In accordance with the "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", a draft version of this report was communicated to the Government of Slovakia, for comment prior to its publication.

B. Inventory submission and other sources of information

3. In its 2006 submission, Slovakia has submitted CRF tables for the years 1990–2004 and a national inventory report (NIR). The data include information on total emissions by sector and gas for all inventory years, but the expert review team (ERT) noted that for some individual categories data have been aggregated to higher category levels, or the notation key "not estimated" ("NE") has been used in the CRF tables and in the NIR. Instances were identified in the inventory years 1991–1999 (see the sector sections of this report below).

4. Slovakia provided the ERT with additional information sources during the in-country review. This additional information was provided in the form of presentations, the calculation sheets used during inventory preparation, and specific reports on methods, activity data (AD) and emission factors (EFs). In addition, Slovakia provided written and oral responses to questions and requests raised by the ERT. The full list of materials used during the review is provided in the annex to this report.

C. Emission profiles and trends

5. In 2004, the most important GHG in Slovakia was carbon dioxide (CO_2), contributing 82.8 per cent to total national GHG emissions expressed in CO_2 equivalent, followed by methane (CH_4), 9.0 per cent, and nitrous oxide (N_2O), 7.8 per cent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6) taken together contributed 0.4 per cent of the overall GHG emissions in the country. The energy sector accounted for 77.8 per cent of the total GHG emissions followed by industrial processes, 10.9 per cent, agriculture, 6.6 per cent, and waste, 4.5 per cent. Total GHG emissions amounted to 48,595.0 Gg CO_2 equivalent in 2004 and decreased by 32.6 per cent from the base year (1990) to 2004.

6. Tables 1 and 2 show the greenhouse gas emissions by gas and by sector, respectively.

Table 1. Greenhouse gas emissions by gas, 1990–2004

GHG emissions	Gg CO_2 equivalent								Change BY–2004 (%)
	Base year Convention[a]	1990	1995	2000	2001	2002	2003	2004[a]	
CO_2 (with LULUCF)	57 815.1	57 815.1	41 019.6	36 979.0	37 068.6	35 104.7	35 812.0	35 992.8	–37.7
CO_2 (without LULUCF)	60 221.7	60 221.7	43 715.6	39 382.3	42 293.8	40 347.6	40 645.1	40 243.7	–33.2
CH_4	5 407.4	5 407.4	4 629.9	4 478.0	4 547.2	4 605.0	4 575.1	4 368.7	–19.2
N_2O	6 168.4	6 168.4	4 068.1	3 503.9	3 709.6	3 673.6	3 709.9	3 813.0	–38.2
HFCs	NA, NO	NA ,NO	22.2	75.8	82.8	103.1	133.2	154.4	NA
PFCs	271.4	271.4	114.3	11.6	15.6	13.7	21.7	19.9	–92.7
SF_6	0.0	0.0	9.9	13.3	13.8	14.8	15.4	15.9	51 834.4

Note: BY = Base year; LULUCF = Land use, land-use change and forestry; NO = Not occurring; NA = Not applicable.

[a] Slovakia submitted revised estimates for the years 1990–2004 in the course of the initial review on 21 June 2007. These estimates differ from Slovakia's GHG inventory submitted in 2006.

Table 2. Greenhouse gas emissions by sector, 1990–2004

Sectors	Gg CO_2 equivalent								Change BY–2004 (%)
	Base year Convention[a]	1990	1995	2000	2001	2002	2003	2004[a]	
Energy	58 590.6	58 590.6	42 601.1	37 815.7	40 640.8	38 551.1	39 026.5	37 808.4	–35.5
Industrial processes	4 922.8	4 922.8	4 050.8	4 235.1	4 478.0	4 427.4	4 364.9	5 285.9	7.4
Solvent and other product use	NE, NO	NE, NO	NE, NO	10.6	29.5	56.9	58.8	79.9	NA
Agriculture	7 035.5	7 035.5	4 388.6	3 482.1	3 530.2	3 547.3	3 411.5	3 226.8	–54.1
LULUCF	–2 388.5	–2 388.5	–2 684.1	–2 386.2	–5 207.8	–5 225.9	–4 814.7	–4 230.2	77.1
Waste	1 501.8	1 501.8	1 507.7	1 904.2	1 966.9	2 158.1	2 220.2	2 194.1	46.1
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	69 662.3	69 662.3	49 864.1	45 061.6	45 437.6	43 514.9	44 267.2	44 364.8	–36.3
Total (without LULUCF)	72 050.8	72 050.8	52 548.2	47 447.8	50 645.4	48 740.8	49 081.9	48 595.0	–32.6

Note: BY = Base year; LULUCF = Land use, land-use change and forestry; NE = Not estimated; NO = Not occurring; NA = Not applicable.

[a] Slovakia submitted revised estimates for the years 1990–2004 in the course of the initial review on 21 June 2007. These estimates differ from Estonia's GHG inventory submitted in 2006.

D. Key categories

7. Slovakia has reported a tier 1 key category analysis, both level and trend assessment, for the inventory year 2004. The NIR does not state whether Slovakia has also applied a qualitative approach in determining its key categories. In its 2006 inventory submission, Slovakia has included the LULUCF sector in its key category analysis, but emissions/removals from cropland and grassland are not included in the analysis because of a misunderstanding related to methodology. During the in-country review, Slovakia provided a key category analysis not including the LULUCF sector. In accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), key category analyses both with and without LULUCF should be included in the inventory submission. The ERT noted that neither a description of the methodology used for identifying the key categories nor information on the level of aggregation is provided in the NIR. The ERT recommends that Slovakia perform the key category analyses in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC good practice guidance for LULUCF, both including and not including the LULUCF sector, and complement the numerical analyses, as necessary, using the qualitative criteria given by the IPCC. Slovakia should also include a description of the key category analyses in the NIR, in accordance with Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories (hereinafter referred to as the UNFCCC reporting guidelines).

8. Most of the key categories in Slovakia are in the energy sector. Slovakia has generally used country-specific values and/or methods for key categories. The ERT noted that the NIR does not provide information on how the results of the key category analyses are used in the development of the inventory. The ERT recommends that Slovakia use the results of the key category analyses to set the priorities for the further development of its GHG inventory.

9. The key category analyses performed by the Party and the secretariat[1] produced different results. The ERT noted that they are difficult to compare because Slovakia used emissions by gas and category as the basis for stationary combustion in the energy sector, whereas the secretariat used emissions by fuel in this category. In addition, the ERT identified some errors in the key category analyses undertaken by Slovakia that resulted from misinterpretation of the IPCC good practice guidance for LULUCF in the key category analysis for LULUCF (removals have been included as negative values in the analysis). The ERT recommends that Slovakia follow the IPCC good practice guidance for LULUCF more closely and include absolute values of removals related to LULUCF in its analysis.

10. The key category analysis by the secretariat for 2004 produced results similar to those of the analysis for the base year. However, the number of key sources had increased; for example, according to the level assessment, CO_2 from limestone and dolomite use, and from iron and steel production had become key sources.

E. Main findings

11. The inventory is generally in line with the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC

[1] The secretariat identified, for each Party, those source categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year or base year period as well as the latest inventory year. Key categories according to the tier 1 trend assessment were also identified. Because Slovakia had not submitted a key category analysis for the base year, the key categories identified by the secretariat have been used in this report.

good practice guidance and the IPCC good practice guidance for LULUCF, although the following gaps and options for improvement were identified:

(a) A lack of transparency in the NIR: the descriptions of methodologies should be improved;

(b) A quality assurance/ quality control (QA/QC) plan should be developed and implemented at all levels;

(c) The errors in the key category analysis should be corrected in Slovakia's next NIR.

12. The inventory has been compiled largely in accordance with Article 7, paragraph 1, of the Kyoto Protocol and decision 15/CMP.1.

13. Some specific deviations from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance are addressed below in the sector sections of this report.

F. Cross-cutting topics

1. Completeness

14. Slovakia provided a QA/QC plan only during the review process as part of its revised description of its institutional arrangements, including the national system (see para. 26).

15. Slovakia has provided a full set of CRF tables for the years 1990–2004. However, the ERT noted that the CRF tables for the years 1991–1999 did not provide complete disaggregated emission estimates and background tables for the energy sector. The data gaps in the CRF tables, in particular in the background tables, vary from sector to sector and are described in more detail below in the sector sections of this report. Furthermore, the ERT noted that the structure and content of the NIR are not fully consistent with the UNFCCC reporting guidelines. In particular, the information on cross-cutting issues such as source-specific QA/QC, verification, recalculations and planned improvements, as well as information on the basis for the uncertainty estimates and key categories, is insufficient. The ERT recommends that Slovakia complete the CRF tables with the missing data, and revise the structure and content of its NIR in line with the UNFCCC reporting guidelines.

2. Transparency

16. The ERT noted that the NIR was not sufficiently transparent. During the review the ERT identified the following areas where transparency should be further enhanced:

(a) The description of methodologies needs to be more detailed and, particularly for country-specific methods, should include all the elements stipulated by the IPCC good practice guidance and the UNFCCC reporting guidelines;

(b) The NIR should include the QA/QC plan and information on the QA/QC measures implemented in all sectors;

(c) The rationale and justification for all recalculations should be provided;

(d) The NIR should be structured in accordance with the UNFCCC reporting guidelines.

17. During the in-country review, national experts involved in the inventory preparation presented the ERT with further information on the methodologies used for estimating GHG emissions and removals in Slovakia. They also provided the ERT with additional information on the collection of AD and the choice of EFs. The presentations, the material received and the bilateral discussions with the experts helped to clarify most instances where transparency is lacking in the NIR. Reiterating the recommendations from previous inventory reviews, the ERT urges Slovakia to improve and expand the

descriptions of methodologies in the NIR in accordance with the UNFCCC reporting guidelines in its next inventory submission. In particular, the country-specific methodologies used for key categories should be explained in detail, and when models are used in the calculation of the estimates, key assumptions and parameters should be described in the NIR. The significant decreases in annual emissions since the base year (1990), especially in the energy and agriculture sectors, require explanation. The collection of AD should be described and the time series for AD should be given in the NIR. The sector sections of this report below give additional examples of areas where transparency needs to be improved.

18. For some source categories Slovakia uses methodologies and models originally developed under the Convention on Long-range Transboundary Air Pollution (CORINAIR and COPERT III). Neither the key assumptions of these models nor the country-specific data inputs into them are included in the NIR. The ERT recommends that Slovakia include these elements in its next NIR.

19. For the first time Slovakia has used the CRF Reporter software to produce the CRF tables. The ERT commends Slovakia for this improvement and found the CRF tables generally transparent. However, some gaps and inconsistencies in the use of the notation keys were identified. Moreover, some background tables and general tables have not been completed and country-specific approaches are not always explained. The ERT recommends that Slovakia further improve the completeness of its CRF tables and include all relevant information, and that it provide explanations in the documentation boxes in accordance with the UNFCCC reporting guidelines.

3. Recalculations and time-series consistency

20. In general, the institutional arrangements in Slovakia can ensure that recalculations of previously submitted estimates of emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. The recalculations are initiated by the sectoral experts during the inventory preparation and are reviewed by the Slovak Hydrometeorological Institute (SHMI) and endorsed by the Ministry of the Environment. As a rule, they are applied to the entire time series. Slovakia provided a separate CRF file for the base year (1990) for the first time in its 2006 submission. Recalculations are therefore reported only at the sector level for the base year. Although major recalculations are described in the NIR, the ERT noted that in most cases the reasons for them, their impact on the level and trend assessment, and justifications in terms of accuracy, transparency and/or completeness are not given. In CRF table 8, no explanatory information is provided on the recalculations. The ERT recommends Slovakia to provide documentation on recalculations in accordance with the guidance on documentation in the IPCC good practice guidance on recalculations.

21. The ERT noted that recalculations in the 2006 submission resulted in an increase in the estimate of total GHG emissions in the base year, by 1.8 per cent, and a reduction in the estimate of total GHG emissions in 2003, by 1.0 per cent, compared to the estimates reported in the 2005 submission. The major changes by sector include energy (+2.2 per cent in the base year, –1.6 per cent in 2003) and industrial processes (+1.4 per cent in 2003).

22. During the in-country review and later on during the review process, the ERT received recalculated estimates for several subcategories in the energy, industrial processes, agriculture and waste sectors, which resulted in reduced estimates for total GHG emissions in the base year and in 2003, by 0.08 per cent and 4.96 per cent, respectively, compared to the estimates reported in the 2005 submission. The recalculations involve the entire time series and are addressed in the sector sections below.

23. The inventory is largely consistent over time. The ERT identified some specific inconsistencies in the use of AD and EFs, including the following: (a) the method used for splitting fuel used in aviation and navigation between domestic and international transport is inconsistent with the IPCC good practice guidance (see paras. 40 and 41); and (b) the times series for the CO_2 EFs used for natural gas combustion was estimated using two different sets of data, leading to a potential overestimation of base year

emissions (see para. 44). These and other inconsistencies identified by the ERT are addressed in detail below in the sector sections of this report.

4. Uncertainties

24. Slovakia has provided uncertainty analyses for most categories (not including cropland and grassland) and for the inventory in total, following the IPCC good practice guidance. Slovakia mostly uses IPCC default uncertainties, and has also applied these in some cases to categories for which it uses country-specific EFs and parameters. The ERT noted that country-specific uncertainty estimates are generally not explained in the NIR. It also identified some inconsistencies between the uncertainty estimates provided in the NIR and the uncertainty estimates provided separately as part of the submission. The ERT encourages Slovakia to improve the description of the general uncertainty assessment in the NIR, and to include sections on uncertainty estimation in all the sectoral chapters of the NIR.

25. During the in-country review, the ERT was informed by host country officials that a project to develop uncertainty estimates for the inventory has been initiated. Preliminary results from the project were presented on uncertainty estimation in the waste sector using the Monte Carlo approach. The ERT took note of these preliminary results with appreciation, and encourages Slovakia to use and document the results in its next inventory submission.

5. Verification and quality assurance/quality control approaches

26. Slovakia has not yet elaborated a QA/QC plan as part of its annual inventory planning. During the in-country review, the ERT was informed that a QA/QC plan was under preparation, and the revised description of the national system as part of the institutional arrangements in Slovakia included a description of the QA/QC plan in Slovakia. The ERT found this plan vague and recommends that Slovakia develop it further, and implement QA/QC measures in accordance with the UNFCCC guidelines for national systems and the IPCC good practice guidance and describe the progress it has made in its next NIR.

27. Slovakia and the Czech Republic collaborate continuously in reviewing each other's GHG emission inventories. However, the details of this collaboration are not described in the NIR. The ERT recommends that Slovakia provide in its next NIR more information on how this external review is carried out and how the results are used in the inventory preparation.

28. The inventory submissions and material related to the preparation of the annual inventory are archived at the SHMI. The archiving includes inventory submissions and reports produced by the participating organizations on the annual inventory preparation, as well as some calculation sheets and results of model runs done during the preparation of the inventory. The material is archived electronically on the mobile computer of the inventory compiler. Some parts of the material (submission, reports by the participating organizations) are also archived as paper copies. The ERT recommended that Slovakia improve the archiving system to ensure a more comprehensive (including the sectoral calculations and metadata) and secure system. During the review process Slovakia reported that is has developed a new software tool to archive all relevant documents and calculation files directly in an electronic database. Also, official reported inventory data and GHG emission projections are published on the web at <http://www.ghg-inventory.gov.sk> using this tool. The ERT recommended that Slovakia provide a description of the new system in its next NIR.

6. Follow-up to previous reviews

29. The ERT found insufficient transparency in the description of the methodologies used to prepare the inventory, especially in relation to country-specific methods and models. However, during the in-country review most of the issues related to the transparency of the 2006 NIR were clarified. The

transparency issue was raised in previous reviews. The ERT urges Slovakia to put more resources into compiling the NIR, and to improve the structure and content of the NIR, taking into account the guidance in the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

G. Areas for further improvement

1. Identified by the Party

30. The NIR identifies improvement of the consistency of the times series data and increased transparency in choosing methodologies and AD as focus areas for improvement.

2. Identified by the ERT

31. The ERT identified the following cross-cutting issues for improvement:

Descriptions of methodologies used, including information on the collection of AD and on the choice of method and EFs, should be included in the NIR in order to increase transparency in the reporting;

(a) The key assumptions and parameters used in models to calculate the estimates should be provided in the NIR, including those internationally verified methods;

(b) The completeness of the inventory should be improved by filling the reporting gaps, that is, providing more disaggregated data for the estimates in the CRF tables for the years 1990–1999;

(c) The structure of the NIR should be improved so that it follows more closely the UNFCCC reporting guidelines, including at subheading level. All the sectoral chapters should also address cross-cutting issues;

(d) The QA/QC plan should be improved and implemented in all sectors.

32. Recommended improvements relating to specific source/sink categories are presented in the relevant sector sections of this report.

II. Energy

A. Sector overview

33. In 2004, the energy sector contributed 77.8 per cent of total national GHG emissions, excluding LULUCF. Fuel consumption accounted for 97.0 per cent of emissions from the sector and the remaining 3.0 per cent came from fugitive emissions. Emissions of CO_2 accounted for 96.1 per cent of sectoral GHG emissions, with CH_4 and N_2O emissions contributing 3.3 per cent and 0.6 per cent, respectively. Within the sector, the major source categories are manufacturing industries and construction (1.A.2), energy industries (1.A.1) and transport (1.A3), contributing 33.1 per cent, 32.5per cent and 14.4 per cent, respectively.

34. GHG emissions from the energy sector decreased sharply, by approximately 29.5 per cent, from 1990 to 1994, and then showed a relatively stable trend with some fluctuation from 1995. During the in-country review, the Party explained that the sharp decrease was due to the economic transition, new legislation on air pollutants, a major change in the country's industrial profile, technological advances and a change of fuel mix (a shift from coal to gas).

1. Completeness

35. Slovakia has completed the CRF tables for all sources and gases in the energy sector for the years 1990 and 2000–2004. The CRF tables for the years 1991–1999, however, do not include estimates or AD for the subcategories manufacturing industries and construction (1.A.2), other sectors (1.A.4) or other (1.A.5). Instead, AD and emissions from all stationary sources have been aggregated and reported under public electricity and heat production (1.A.1.a). The Party informed the ERT that the system for collecting AD changed in 2000 and that the data for the years 1990–1999 could not be disaggregated automatically. Instead, data for 1990 were input manually using the plant-specific REZZO (Register of Emissions and Sources of Air Pollution) fuel consumption database, and data for the years 1991–1999 are expected to be ready in time for the 2008 submission. The ERT recommends that Slovakia finalize and verify the work and complete the relevant parts of the CRF tables with emission estimates or the appropriate notation keys in time for its next inventory submission.

2. Transparency

36. The ERT found the NIR's description of the energy sector to lack transparency, for example, the descriptions of the methods, AD and EFs used for estimating fuel combustion and the explanation of country-specific issues. The ERT recommends that the Party include more complete documentation on country-specific methodologies, EFs and net calorific values (NCVs). The Party should also describe in detail any country-specific circumstances that may result in values that are not comparable with those of other countries, for example, the EFs for the different types of coal. The ERT recommends the Party to include in its next NIR information describing the national energy balance, the NEIS and the REZZO database, including any information on changes to the methodologies used for these databases.

37. The ERT noted that there is no explanation of how emissions are allocated between the energy sector and the industrial processes sector. During the in-country review, the Party informed the ERT that all process emissions from non-energy use of fuels are accounted for in the energy sector. Emissions from waste incineration with energy recovery from 1990 to 1999 are accounted for in the energy sector, but are recorded in the waste sector for years after 2000. The ERT encourages the Party to follow the Revised 1996 IPCC Guidelines more closely and to allocate these emissions appropriately or provide explanations in the next NIR for why such emissions are included in the energy sector

38. The Party has aggregated all fuel consumption and corresponding emission estimates from other manufacturing industries and construction (1.A.2f.) in one category for 2004. To improve the transparency of the reporting, the ERT encourages the Party to specify the types of industry that are included in this category and to disaggregate the AD and the emission estimates accordingly.

B. Reference and sectoral approaches

1. Comparison of the reference approach with the sectoral approach and international statistics

39. Slovakia has reported its CO_2 emissions from energy using the reference approach for all years. In 2004, total CO_2 emissions according to the sectoral approach are higher than they are using the reference approach. The NIR explains that the differences in fuel consumption between these two approaches could be caused by the fact that a weighted average of NCVs was used in the reference approach and fuel-specific NCVs were used in the sectoral approach, and that the sectoral approach is more reliable than the reference approach. The ERT noted that the discrepancy between the sectoral and the reference approach is more significant for some years than for others. The ERT recommends the Party to work with the Statistical Office to examine the discrepancies and provide an adequate explanation. It also recommends the Party to work with the relevant institutions to examine apparent discrepancies in the consumption for Slovakia reported to the UNFCCC and that reported to the International Energy Agency (IEA).

40. The difference between the reference and the sectoral approach in 2004 was approximately 4.23 per cent. The differences for liquid, solid, gas, and other fuels are +9.67, +74.08, +10.19, and –100 per cent, respectively. The ERT noted that other fuels contribute a significant share of emissions from the energy sector in the sectoral approach, but are not included in the reference approach. During the in-country review, Slovakia's experts explained that many fuels – such as coke oven gas, blast furnace gas, refinery gas, waste, and other gases – are included in other fuels under the sectoral approach but are separated into liquid, solid, or gas in the reference approach. The ERT recommends the Party either to classify other fuels by their appropriate states and document them in CRF table 1.A.c or to describe them in the NIR.

2. International bunker fuels

41. In its 2006 submission, Slovakia included the landing and take-off (LTO) emissions of both domestic and international charter flights in the national total. However, the IPCC good practice guidance requires Parties to exclude all emissions from international bunker fuels from national totals, and to report them separately. During the in-country review the ERT recommended the Party to estimate the emissions from domestic flights following the IPCC good practice guidance and to report all emissions from international flights under 1.C (international bunker fuels). Slovakia provided revised estimates for this category during the review process. As fuel consumption data from air statistics were available only from 1994 onwards, the data for the four years 1990–1993 were based on expert judgements taking into account the actual LTO cycles in the period as well as international to domestic fuel consumption ratios of 90:10 for jet kerosene and 10:90 for aviation gasoline. The ERT welcomes the revised estimates, but at the same time encourages Slovakia to provide more detailed reasoning to support these expert judgements in its next NIR.

42. Emissions from international marine vessels that pass through Slovakia on the Danube River are included in 1.A.3(d) in the 2006 submission. However, IPCC good practice guidance requires that all such emissions be excluded from national totals, and be reported separately. Because including emissions from international marine transport could lead to national emissions being overestimated, the ERT recommended to the Party to report emissions from international marine transport passing through Slovakia under international bunkers, based on the amount of fuel sold. Slovakia provided revised estimates for this category during the review process. All navigation emissions were included in the international bunkers, and data on fuel sales were obtained from the State Shipping Administration for 1994 onwards (data for 1990 to 1993 were based on expert estimates).

3. Feedstocks and non-energy use of fuels

43. Information on feedstocks and non-energy use of fuels is provided in CRF table 1.A.d for all years. However, in CRF table 1.A.c apparent energy consumption excluding non-energy use and feedstocks is reported as "not occurring" ("NO"). The Party explained that apparent energy consumption already excludes non-energy use. The ERT recommends the Party to make appropriate calculations for this table.

C. Key categories

1. Stationary combustion: solid fuels – CO_2

44. The 1990 and 2000–2004 values for the CO_2 EFs for solid fuels (93.2–93.4 t/TJ) are outside the IPCC default range (94.6–106.7 t/TJ). During the in-country review, the Party explained that there are several types of coal in Slovakia, all of which have different NCVs and EFs which are estimated by laboratories accredited by the Ministry of the Environment. For example, some types of black coal imported from the Czech Republic and Poland have EFs ranging from 90 to 93 t CO_2/TJ. The ERT recommends the Party to properly reference and document the studies on which the EFs are based and to provide a summary in the NIR.

2. Stationary combustion: gaseous fuels – CO_2

45. The time series for the CO_2 EF for combustion of natural gas is inconsistent in the 2006 submission. The IPCC default EF (56.1 tonnes of CO_2 per TJ) was used to estimate CO_2 emissions from natural gas combustion for the years 1990 to 1999. This default EF is higher than the country-specific EFs used by the Party for the years 2000–2004 (54.85 t CO_2/TJ to 55 t CO_2/TJ). During the review, the Party explained that it did not have sufficient information to be able to estimate country-specific EFs for these years. However, the natural gas consumed during this time period was mostly imported from Russia, as was the natural gas consumed during the five years 2000–2004. The ERT recommended the Party to collect information on the EF for natural gas combusted from 1990 to 1999, or to consider extrapolation using the country-specific EF from 2000 to 2004. In response, Slovakia revised the EFs for 1990 to 1999 (revised value: 55.47 t CO_2/TJ), using extrapolation based on the national data on the EFs since the year 2000. The ERT welcomes the revised estimates.

3. Stationary combustion: other fuels – CO_2

46. Emissions from other fuels are high in the petroleum refining, iron and steel and chemicals subsectors. The Party informed the ERT that many fuels are included as other fuels, such as coke oven gas, blast furnace gas, refinery gas, waste and other gases. The ERT recommends Slovakia to allocate these fuels appropriately in order to improve comparability.

4. Stationary combustion: liquid fuels – CO_2

47. The following inter-annual changes in the CO_2 implied emission factor (IEF) for other – liquid fuels have been identified as outliers: 2000/2001 (–0.9 per cent), 2001/2002 (–1.0 per cent), 2002/2003 (+1.3 per cent) and 2003/2004 (–0.7 per cent). During the in-country review, the ERT was informed by Slovakia's experts that EFs for liquid fuels are based on a paper entitled "Technical Standard for Air Protection, Monitoring of Emissions of Air Pollutants from Stationary Sources", which is in the Slovak language. The ERT recommends the Party to properly reference and document the studies on which the EFs are based and to provide a summary in the NIR.

5. Transport: road transportation – CO_2

48. CO_2 emissions from mobile combustion are calculated using the COPERT III model, which calculates emissions using a tier 2 method. During the review, the Party explained that total fuel consumption, the composition of the vehicle fleet, driving mode, EFs and other statistics are used as input data. The ERT recommends Slovakia to provide documentation in the next NIR on the methods, AD and EFs used.

6. Fugitive emissions: coal mining and handling – CH_4

49. The NIR provides emission estimates using three different EFs – those of the IPCC, the IEA, and Hornonitrianske bane Prievidza, a.s. (the main coal producer in Slovakia). Slovakia has chosen to use the IEA EFs, but the reason for doing so is not described in the NIR. During the review, the Party explained that the EFs used by the IEA are derived from detailed parameters such as the depth of mines and their location. Country-specific values were not used because they are derived not from the constant measurement of mines but from measurements taken only when the concentration of CH_4 in mines is within a specific range. The ERT recommends Slovakia to describe the reason for its choice of the IEA EFs in its next NIR.

D. Non-key categories

Fugitive emissions: oil and natural gas – CO_2 and N_2O

50. AD and CH_4 emissions are reported for fugitive emissions (1.B.), but CO_2 and N_2O emissions are reported as "NO" in the 2006 submission. The Party has estimated CH_4 emissions for the categories coal mining and handling; oil (production, transport, refining/storage); natural gas (production/processing, transmission, distribution at industrial plants and power stations, in residential and commercial sectors); venting and flaring (oil and gas); and other (CRF 1.B.2(d), non-specified). According to the IPCC good practice guidance, however, minor CO_2 and N_2O emissions may also occur from these sources. The ERT recommends Slovakia to use appropriate notation keys or to estimate emissions of CO_2 and N_2O based on default IPCC EFs. During the review, Slovakia provided CO_2 estimates for fugitive emissions from oil and natural gas; whereby the EF was derived from measured data on the composition of natural gas. N_2O emissions were estimated to be negligible, also on the basis of measured data. The ERT welcomes the recalculations and encourages Slovakia to provide a description of the methodologies and the EF calculations in its next NIR.

III. Industrial processes and solvent and other product use

A. Sector overview

51. Total industrial processes and solvent and other product use emissions in 2004 were reported to be 5,365.8 Gg CO_2 equivalent which was 11.0 percent of the total emissions reported in the year (without LULUCF emissions). Of these emissions, 5,285.9 Gg were industrial processes emissions (10.9 per cent) and 79.9 Gg were solvent and other product use emissions (0.2 per cent). Reported greenhouse gases from solvent and other product use were from food and medical sources.

52. The ERT noted that CO_2 emissions from glass production, ammonia production, ferroalloy production and aluminium production are reported in the energy sector ("included elsewhere", "IE"). The ERT recommends the Party to follow the Revised 1996 IPCC Guidelines and the IPCC good practice guidance more closely and to allocate industrial process emissions from these activities to the industrial processes sector.

53. Slovakia identified the following key categories (using level and trend analyses) for the 2004 inventory: CO_2 emissions from cement production, lime production, limestone and dolomite use, iron and steel production, aluminium production and magnezite use; N_2O emissions from nitric acid production; and emissions of HFCs from the consumption of halocarbons and SF_6.

54. The secretariat identified the following key categories (using level and trend assessment) in the industrial processes sector: CO_2 emissions from cement production, limestone and dolomite use, iron and steel production, and other; N_2O emissions from nitric acid production; emissions of PFCs from aluminium production and emissions of HFCs from consumption of halocarbons and SF_6.

55. The ERT noted that Slovakia has provided a general discussion of uncertainties in the different source categories in the industrial processes sector, but no specific planned improvement measures are mentioned, and nor is there any sector-specific discussion of QA/QC measures. The ERT recommends the Party to describe the planned improvement measures and to discuss the sector-specific QA/QC measures in its next NIR.

B. Key categories

1. Cement production – CO_2

56. Slovakia used two different methods for calculating these emissions. A tier 1 method was used to calculate estimates for the period 1990–1995, and a tier 2 method was used for the period 1996–2004.

The ERT noted that the NIR provides uncertainty values, but does not describe how emissions are estimated or the QA/QC procedures in sufficient detail. The ERT recommends Slovakia to provide more detailed information on the method used to estimate CO_2 emissions from cement production and on QA/QC measures in its future submissions.

57. During the in-country review, the ERT was informed by host country experts that data on clinker production were available only for the inventory years since 1996. The clinker data estimates for the period 1990–1995 were therefore based on official cement production statistics and on plant-specific estimates of the fraction of clinker in cement. The ERT noted that no explanation is provided as to whether in the period 1990–1995 there were any imports or exports of clinker from Slovakia, as the IPCC good practice guidance requires. The exclusion of clinker imports or exports can lead to either an overestimation or an underestimation of CO_2 emissions. The ERT therefore recommended Slovakia to investigate data on clinker imports or exports in the period 1990–1995 and to subtract imported and add exported clinker to the amount of clinker inferred from the volume of cement production. In response, during the review, Slovakia provided information based on contacts with the cement industry that no clinker was imported to or exported from Slovakia during the entire inventory period.

2. Lime production – CO_2

58. The ERT noted that Slovakia has taken the recommendations of previous reviews into consideration and incorporated lime purity aspects when computing its estimates of emissions from lime production. This has resulted in the recalculation of CO_2 emissions for the entire time series.

3. Limestone and dolomite use – CO_2

59. The ERT noted that Slovakia has recalculated the estimates of CO_2 emissions from limestone and dolomite use in 2006, based on more accurate data from production units. Emissions have been estimated for limestone and dolomite use in the production of calcium carbide, glass, and iron and steel. The ERT further noted that no details were provided on QA/QC in this category, and recommends that Slovakia include this detail in its future submissions.

4. Nitric acid production – N_2O

60. The NIR reports that IPCC default EFs were used. While this is a good practice approach for new production plants, the ERT noted that some plants in Slovakia were more than 20 years old at the point when the estimates of N_2O emissions from nitric acid production were made. This being the case, if the same EFs are used for both old and new plants, emissions from old nitric acid plants are likely to be underestimated. The ERT recommended Slovakia to use more accurate EFs for plants that are more than 20 years old, in accordance with the IPCC good practice guidance, and to revise the 1990 emission estimates accordingly. During the review Slovakia revised its estimates based on measurement data from one nitric acid producer in Slovakia. The EFs by plant type, derived from the measurements, were also used for nitric acid plants not covered by the measurements. The ERT noted that the revised estimates are an improvement on the previous estimates, but encouraged Slovakia to document the measurements in more detail and explain the reasoning for their use for plants where such measurements have not been made.

5. Iron and steel production – CO_2

61. The ERT noted that Slovakia's approach to estimating these emissions is slightly different from the one recommended in the IPCC good practice guidance. The NIR presentation of this deviation from the method recommended in the IPCC good practice guidance was not transparent, which prompted comments in previous reviews. During the in-country review, national experts clarified the reason for the deviation to the ERT. The ERT encourages Slovakia to improve its the explanation of the method used

in the NIR, and recommends an approach based on separating, if possible, the consumption of reducing agent used in the production of iron from that used in the production of steel.

C. Non-key categories

1. Ammonia production – CO_2

62. The ERT noted that Slovakia does not separate the use of natural gas as feedstock from its energy use. Consequently, CO_2 emissions from the production of ammonia are reported as included in the energy sector. The ERT encourages Slovakia to separate the use of natural gas as feedstock from its use as an energy source and to use appropriate EFs for CO_2 emissions from energy production and ammonia production, or to provide in its next NIR an explanation of why it reports the process emissions in the energy sector (see also paragraph 42).

2. Ferroalloys production – CO_2

63. The ERT noted that CO_2 emissions from ferroalloy production are reported as included in the energy sector. The ERT encourages Slovakia to allocate emissions from ferroalloy production in the industrial processes sector, if possible, in its future submissions (see also paragraph 36).

3. HFC emissions – HFCs

64. The NIR provides detailed explanations of emissions of HFCs (as well as PFCs and SF_6), indicating that the emission estimates are based on a structured survey of the potential users of HFCs. The HFC emissions are mainly from the use of coolants.

IV. Agriculture

A. Sector overview

65. In 2004, total emissions from agriculture amounted to 3,226.8 Gg CO_2 equivalent, or 6.6 per cent of total GHG emissions (without LULUCF). N_2O contributed 66.1 per cent and CH_4 accounted for 33.9 per cent of sectoral emissions. During the period 1990–2004, emissions from agriculture declined 54.1 per cent.

66. The ERT noted that reporting on the agriculture sector is complete in terms of both gases and time series. During the in-country visit, host-country experts clarified that emissions from the burning of field residues (this procedure is prohibited by law in Slovakia), and histosols (this type of soil is not cultivated for landscape protection reasons) is not reported in the national GHG inventory. The ERT recommends Slovakia to document the reasons for not reporting the emissions from field burning of residuals and histosols in their next NIR.

67. The ERT noted that the structure of the section of the NIR on agriculture is not clear and that some elements of reporting are missing. For example, the sub-subtitles "methodology and activity data" and "emissions factors and emissions" are repeated four times under section 6.3.2 direct N_2O emissions from cultivated soils and there is no section on source-specific QA/QC, recalculations or in planned improvements. The ERT recommends Slovakia to follow the guidance on the structure of the NIR given in the UNFCCC Reporting Guidelines, and to include all relevant information in the NIR.

68. The ERT noted that the NIR does not provide sufficient information on whether tier 1 or tier 2 methods were used. Furthermore, there is insufficient description and discussion of AD, for example, with regard to data sources, population numbers for different animals groups, the characterization of animal types, amounts and types of fertilizers used, and animal waste management systems. Also, information on data types from the listed data sources is missing. The ERT recommends Slovakia to

clearly describe and provide sufficient information regarding all AD utilized as well as a description of the methods of estimation in their next NIR

69. Recalculations of the 1990 inventory have been performed for all the sources in the agriculture sector, as presented in CRF table 8(a). However, no explanatory information is included in the CRF tables or in the NIR regarding the recalculations. The ERT recommends Slovakia to give an explanation of the recalculations in their next submission.

70. Slovakia has reported a tier 1 key category analysis, for both level and trend assessment, for the base year (1990) and 2004 as part of its 2006 submission. All categories from the sector were reported as key sources under trend, and N_2O from agricultural soil and CH_4 from enteric fermentation were reported under level assessment.

B. Key categories

1. Agricultural soils – N_2O

71. Slovakia identifies N_2O from agricultural soils as a key source in both its level and trend analyses for 1990 and the 2004. Emissions from this category as amounted to 1,691.4 Gg CO_2 eq., 52.4 per cent of the sectoral and 3.5 per cent of the total emissions in 2004. During the period 1990–2004, N_2O emissions from agricultural soils declined by 52.8 per cent. There is no clear description of the methodology or of the verification of the data on N-content in either crops or N-fixing crops.

72. According to the CRF table summary 3, the party used a tier 2 method to calculate emissions from agricultural soil, but the method is not named and details are not explained clearly in the NIR.

73. Tables 6.6 and 6.7 (page 51 and 52 of the NIR) show higher values for the percentage of N per kg biomass than the IPCC default values (table 4.16 of the good practice guidance), probably because of the incorrect use of units or a misinterpretation of the biomass dry weight. Slovakia revised its estimates for the category during the review and the recalculated values of N content are reasonable.

74. The party reports high ranges of uncertainties for EFs for direct soil N_2O emissions (20–200 per cent), N_2O from animal waste management system (25–150 per cent), indirect N_2O emissions from ammonia (NH_3) volatilization (20–200 per cent), and for indirect N_2O emissions from leaching (10–500 per cent). The ERT encourages the Party to report the uncertainties as described in the IPCC good practice guidance, taking into account the country-specific data used in the inventory, and to describe how the uncertainties have been estimated in its next NIR submission.

2. Enteric fermentation – CH_4

75. Slovakia identified CH_4 from enteric fermentation as a key source under both level and trend analysis in 2004, producing 928.6 Gg CO_2 equivalent and representing 28.8 per cent of 2004 emissions from the sector and 1.9 per cent of total emissions. During the period 1990–2004, CH_4 emissions from enteric fermentation declined by 53.3 per cent.

76. According to CRF table summary 3, the Party used a tier 1 method with default EFs. The ERT recommended the Party to follow the revised 1996 IPCC guidelines and the IPCC good practice guidance more closely and use higher-tier methods for estimating emissions from key categories. In response, Slovakia revised its estimate during the review process using the IPCC tier 2 methodology for cattle. As detailed input data were available only from 1997 onward, the emission factors for the earlier years were estimated using linear interpolation.

3. Manure management – N_2O

77. N_2O from manure management represents 13.7 per cent of sectoral emissions. The NIR provides country-specific data on animal waste management systems. However, the ERT noted inconsistencies in

these data. For example, in table 6.5 the pasture value for non-dairy cattle is only 10 per cent, while for dairy cattle it is 20 per cent (non-dairy cattle usually pasture for longer than dairy cattle). The ERT reiterates the recommendation from previous reviews that the Party verify these data in order to increase transparency.

78. The ERT identified a possible inconsistency between CRF tables 4.B(b) and 4.D. Nitrogen excreted in pasture range and paddock as a percentage of total nitrogen excretion calculated from the data in table 4.B(b) equals 13.3 per cent, while FracGRAZ reports 5.7 per cent. The ERT noted that these two values should be equal. The ERT reiterates the recommendation from previous reviews that Slovakia should check the consistency of and verify these data in order to increase transparency.

4. Manure management – CH_4

79. For 2004, CH_4 from manure management is identified as a key category using the trend analysis, but not under the level analysis. CH_4 emissions from enteric fermentation declined by 55.3 per cent during the period 1990–2004, at the end of which they accounted for 5.1 per cent of sectoral emissions. The ERT noted that the NIR does not provide an adequate description of the calculation methodology applied. According to CRF table summary 3, the Party used a tier 2 method with IPCC default EFs, whereas according to the NIR some of these EFs are country-specific. The ERT recommends Slovakia to provide sufficient description of the methodology to calculate CH_4 from manure management in the NIR.

V. Land use, land-use change and forestry

A. Sector overview

80. Slovakia provided a complete inventory submission of CRF tables and an NIR in accordance with decision 13/CP.9 and the IPCC good practice guidance for LULUCF. In 2004 the LULUCF sector was a net sink of 4,230.2 Gg CO_2 equivalent or 8.7 per cent of total national emissions (excluding LULUCF). The size of the net sink increased by 77.1 per cent between 1990 and 2004, increasing sharply in 2001. It has fluctuated from year to year and is higher in the most recent years (2001–2004), in the range of 4,200–5,200 Gg CO_2 equivalent, compared to 1,600 Gg CO_2 equivalent for the year 1999 or 2,400 Gg CO_2 equivalent for 1990. An explanation is required in the NIR for this reported fluctuation.

81. Land converted to cropland is reported as "NE". During the review visit, host country experts explained that such land conversions are not currently happening in Slovakia. The ERT recommends that the notation key be changed to "NO" if this is the case. Optional categories not reported include wetlands converted to cropland and wetlands and settlements converted to other land.

82. Other land is reported to be converted to forest land, cropland and grassland. The ERT recommends that the reasons for this be investigated and documented in the NIR, as it is unusual for other land to be changing to these land uses.

83. The Party's land-use definitions are not provided, and the ERT noted that they may not comply with the IPCC good practice guidance for LULUCF because wetlands and settlements are included under other land. The ERT recommends the Party to use the IPCC good practice guidance land-use category definitions and to provide these definitions in its next NIR. If it is not possible to use the IPCC land-use definitions, the justification for the choice of land-use definitions should be documented in the NIR. A land-use change matrix, as is suggested in the IPCC good practice guidance for LULUCF (section 2.3.2.2) and in previous reviews, would be very useful.

84. The ERT noted that the NIR does not provide transparent information on the methodology used to estimate emissions and removals due to LULUCF. The party did not provide feedback on the synthesis and assessment report, part II, prior to the review. Additional methodological information was

provided during the review, which was very useful, but receiving such information at this late stage makes the review more difficult. CRF table 9 is now almost complete and there are explanations for not including some land-use categories or carbon pools. However, there is no explanation for why N_2O emissions from land converted to cropland are not estimated. The ERT suggests that information provided by the sector experts on methodology, EFs and calculations be included the NIR.

85. QA/QC procedures are not described for LULUCF. Uncertainty estimates are not provided in the NIR, although the host country experts provided such information to the ERT during the review. The ERT recommends that QA/QC procedures and uncertainty analysis for LULUCF should be detailed in the NIR.

86. Key category and uncertainty analyses were carried out for the first time in 2006, including for some LULUCF categories but excluding cropland and grassland. The good practice guidance provides a methodology for including these even though they changed from a source to a sink between 1990 and 2004. The ERT recommends the Party to include all the LULUCF categories in its future key category and uncertainty analyses.

B. Key categories

1. Forest land remaining forest land – CO_2

87. The ERT noted that, generally, the methodology used is in accordance with the IPCC good practice guidance for LULUCF. However, the methodology is not documented in the NIR. Country-specific EFs are used, but there is a lack of documentation on how these were derived. The ERT recommends that dead organic matter be estimated in future. The ERT recommends that information on country-specific EFs be included in the NIR.

2. Cropland remaining cropland – CO_2

88. The ERT noted that, generally, the methodology used is in accordance with the IPCC good practice guidance for LULUCF. However, there is a lack of transparency as well as a lack of documentation in the NIR. The ERT recommends that more detailed information on the methodology be provided in the NIR.

3. Other land – CO_2

89. A large area, of 662 kha, is reported under the category other land in CRF table 5.F and in the NIR. Furthermore, net emissions of 131 Gg are reported from other land in CRF table 10, but clarification is needed as to what is included under this category. The ERT noted that the methodology used is not in accordance with the IPCC good practice guidance for LULUCF, as the latter defines other land as including "bare soil, rock, ice, and all other unmanaged land," from which CO_2 emissions and removals need not be reported under other land remaining other land. However, if conversion occurs, for example, if forest land or grassland is converted to other land, then emissions and removals must be reported. The ERT recommends that the Party use the IPCC good practice guidance for LULUCF definition of other land.

4. Grassland remaining grassland – CO_2

90. The ERT noted that, generally, the methodology used is in accordance with the IPCC good practice guidance for LULUCF. However, there is a lack of transparency in the description of the methodology, and the methodology is not adequately documented in the NIR. The ERT recommends that more detailed information on the methodology be provided in the NIR.

VI. Waste

A. Sector overview

91. According to the 2006 submission, in 2004, GHG emissions from the waste sector accounted for 4.5 per cent of the national total. Between 1990 and 2004, sectoral emissions increased by 46.1 per cent.

92. Slovakia reports data on emissions for the waste sector for all subcategories and all gases: CH_4 from SWDS, CH_4 and N_2O from wastewater handling and CO_2 and N_2O from waste incineration. Emissions from waste incineration are reported only for the period 2000–2004. AD, EFs and other parameters are presented.

93. During the review process, the estimates for CH_4 emissions from solid waste disposal sites (SWDS) were recalculated following a recommendation from previous reviews and the ERT. These revised estimates are calculated using the first order decay (FOD) method and based on local parameters which reflect waste management practices in Slovakia. QA/QC procedures include comparison of different approaches in the choice of methodology, as well as involving waste management experts in the inventory preparation. The uncertainty analysis is provided using tier 1 methods from the IPCC good practice guidance and also tier 2 methods for CH_4 emissions for SWDS. Slovakia is planning improvements in the SWDS and waste incineration subcategories. The ERT also recommends the Party to recalculate its estimates for emissions from the wastewater handling subcategories (see paras. 95 to 96).

B. Key categories

1. Solid waste disposal sites – CH_4

94. The ERT noted that the EFs and local parameters used are appropriate in that they reflect existing waste management practice. The AD were received from the Statistical Office. In previous stages of the current review process and previous review reports there were comments about inappropriate trends in the emissions data. The ERT noted that this problem has been resolved as a result of the use of the FOD model (tier 2) and reconsideration of the local parameters. The value of the methane correction factor (MCF) was set as 0.6 for the years before 1993 because it is not known how many landfills were managed and unmanaged. For the period 1993–2003, the MCF was gradually changed from 0.6 to 1.0 because by the year 2003 all landfills had become managed. The ERT noted that this change in the MCF is the main cause of the difference in CH_4 emissions in the base year between the tier 1 and tier 2 estimations. As a result of the recalculations, the estimate for CH_4 emissions from SWDS in the base year has been reduced from 50.27 Gg to 22.37 Gg. At the same time, the estimates for emissions in the year 2004 increased from 58.72 Gg to 63.99 Gg. The ERT considers the recalculations to be a significant improvement.

2. Wastewater handling – CH_4

95. CH_4 emissions from wastewater handling are based on methods which are appropriate and in line with the IPCC good practice guidance. For CH_4 emissions, the tier 1 method has been used and the EFs are country-specific. The AD are taken from the database on waste water at the SHMI. The ERT noted that the trend in CH_4 emissions for wastewater handling fluctuates considerably, and the following inter-annual changes have been identified as outliers: 1992/1993 (–8.4 per cent), 1999/2000 (–11.5 per cent) and 2002/2003 (–9.6 per cent). The 2004 value is 33.5 per cent lower than the 1990 value. The change in the CH_4 IEF for industrial waste water between 1999 and 2000 has been identified as an outlier. The 2000 value is 55.0 per cent lower than the 1999 value. During the in-country review, host country experts explained that the SHMI provided the data on wastewater quantity and that these fluctuations derive from the changes in the AD from year to year. The ERT recommends Slovakia to check the consistency of its AD.

C. Non-key categories

1. Wastewater handling – N_2O

96. The NIR states that Slovakia used the methodology developed by the Fraunhofer Institut für Systemtechnik und Innovationsforschung Institut für Systemtechnik und Innovationsforschung (ISI) in Karlsruhe and IPCC EFs. The ERT noted that no description of the ISI methodology is provided in the NIR and recommends the Party to include a detailed description in its next NIR.

97. The ERT noted that N_2O emissions from domestic and commercial waste water decreased between 1990 and 2000, and increased sharply between 2000 and 2002. The reason for this is that Slovakia has only taken commercial and domestic waste water into account since 2001. The ERT recommends the Party to provide a complete and consistent time series for waste water AD.

2. Waste incineration – CO_2

98. The ERT noted that CO_2 emissions from waste incineration have been reported only since 2000. During the in-country review, the ERT was informed that AD on the quantity of waste incinerated are taken from waste incineration plants, and that, for 1990–1999, emissions from incinerated waste are reported in the energy sector under other fuels. Host country experts explained that this allocation does not affect the national totals. The ERT noted that, according to the IPCC good practice guidance, only emissions from waste incineration without energy recovery are to be reported in the waste sector. Emissions from incineration with energy recovery are to be reported in the energy sector as other fuels. The ERT recommends the Party to split emissions from waste incineration with and without energy recovery based on AD from incineration plants (see also paragraph 39).

VII. Conclusions and recommendations

99. Slovakia's institutional arrangements, including its national system for the estimation of greenhouse gas emissions, are based on the system for estimating air pollutants. At present the national system is dependant largely on the expertise and capacity of one person. Moreover, the QA/QC plan is still vague and needs to be formulated and implemented in a more vigorous way.

100. Slovakia's greenhouse gas inventory is largely complete and is compiled in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. It has a robust data collection system, building mainly on national statistics, and plant-specific data for the energy and industrial processes sectors. Country-specific AD and EFs are used for most key categories. In spite of this, the 2006 submission contained several deficiencies, many of which were corrected in the resubmission of the 2006 GHG inventory in June 2007. Most significantly, the descriptions in the NIR need to be made more transparent and the data gaps in the CRF tables, mainly for the period 1990–1999, in particular in the energy sector, need to be addressed in future submissions.

101. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of the information presented in the inventory submission. Recommendations were also made relating to the choice of methods, AD and EFs in the GHG inventory. Many of the recommendations were implemented during the review process. For example, all the identified potential problems that could have led to an overestimation of base year emissions were resolved. The remaining key recommendations are that Slovakia:

(a) Increase the resources for the coordination and compilation of the national inventory and involve sectoral experts in this process as appropriate;

(b) Further develop its QA/QC plan and implement it in accordance with the IPCC good practice guidance;

(c) Enhance the transparency of the methodology descriptions, especially for country-specific methods, in its next NIR: the structure should be improved to follow the guidance given in the UNFCCC reporting guidelines; and the sectoral chapters should include time series of AD and give the reasoning behind the choice of methods and EFs as well as descriptions of how cross-cutting issues are handled at the sectoral level;

(d) Complete the relevant parts of the CRF tables for the years 1991to 1999 with emission estimates, in particular in the energy sector, and provide information in all background data tables in the CRF in its next inventory submission;

(e) Improve the uncertainty estimates so that they correspond to the methods and data used in the inventory;

(f) Improve the archiving system to ensure a more comprehensive (including the sectoral calculations and metadata) and secure system. The ERT also recommends that Slovakia provide a description of the system in its next NIR.

102. Future reviews should focus on whether:

(a) The structure of the NIR and the transparency of the methodology description have been improved; this issue has been raised in several previous reviews;

(b) The QA/QC plan has been developed and how it is implemented, especially at the sectoral level;

(c) Emission estimates have been provided for all years in the CRF tables, in particular for the energy sector.

Annex

Documents and information used during the review

A. Reference documents

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