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SLOVAKIA

REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY SUBMITTED IN THE YEAR 2003¹

(Centralized review)

I. OVERVIEW

A. Introduction

1. In accordance with decision 19/CP.8 of the Conference of the Parties, the United Nations Framework Convention on Climate Change (UNFCCC) secretariat coordinated a centralized review of the 2003 greenhouse gases (GHG) inventory submission of Slovakia. The review took place from 8 to 12 September 2003 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Mr. Paul Filliger (Switzerland) and Ms. Helen Plume (New Zealand); Energy – Mr. Riad Chedid (Lebanon), Mr. Dario Gomez (Argentina) and Ms. Chia Ha (Canada); Industrial Processes – Ms. Kristina Saarinen (Finland) and Ms. Kristine Zommere (Latvia); Agriculture – Mr. Sergio González (Chile) and Mr. Vlad Trusca (Romania); Land-use Change and Forestry – Mr. Wojciech Galinski (Poland) and Mr. Goran Stahl (Sweden); Waste – Mr. Philip Acquah (Ghana) and Mr. Takashi Morimoto (Japan). Mr. Sergio González and Ms. Helen Plume were the lead reviewers of this review. The review was coordinated by Mr. Javier Hanna (UNFCCC secretariat).

2. In accordance with the UNFCCC “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, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Inventory submission and other sources of information

3. In its 2003 submission, Slovakia submitted the common reporting format (CRF) tables for the years 2000 and 2001 and a national inventory report (NIR). Where needed the expert review team (ERT) also used previous years’ submissions, additional information provided during the review and other information. The full list of materials used during the review is provided in annex 1 to this report.

C. Emission profiles and trends

4. In the year 2001, the most important GHG in Slovakia was carbon dioxide (CO₂), contributing 84 per cent to total² national GHG emissions expressed in CO₂ equivalent, followed by methane (CH₄) – 9 per cent, and nitrous oxide (N₂O) – 7 per cent. Perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF₆) taken together contributed less than 1 per cent of overall GHG emissions in the country. The Energy sector accounted for 81 per cent of total GHG emissions, followed by

¹ In the symbol for this document, 2003 refers to the year in which the inventory was submitted, and not to the year of publication. The number (3) indicates that this is a centralized review report.

² In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO₂ equivalent excluding Land-use Change and Forestry, unless otherwise specified.

Agriculture (8 per cent), Industrial Processes (7 per cent) and Waste (4 per cent). Total GHG emissions (excluding Land-use Change and Forestry (LUCF)) amounted to 50,128 Gg CO₂ equivalent and decreased by 31 per cent from 1990 to 2001. These trends are well explained in the NIR.

D. Key sources

5. Slovakia has not reported a key source analysis as part of its 2003 submission. The secretariat³ performed a level assessment key source analysis indicating that CO₂ from stationary combustion – gas, coal and other fuels – and CO₂ from road vehicles are the most significant key sources, accounting for 73.3 per cent of total national emissions. Direct N₂O emissions from agricultural soils, CO₂ emissions from cement production and CH₄ emissions from solid waste disposal sites (SWDS) are the most important key sources from the other sectors. Slovakia does not indicate that a key source analysis is being used to prioritize the development of the GHG inventory, and the ERT encourages it to do this.

E. Main findings

6. In Slovakia, greenhouse gas inventories are granted and supervised by the Department of Air Protection (Ministry of Environment) and compiled by the Slovak Hydrometeorological Institute (SHMU) on a contractual basis, in cooperation with external consultants, non-governmental organizations, scientific institutes and universities. Slovakia submitted inventory in CRF tables for years 1998 and 1999 in 2000 and 2001 respectively, emissions from 1990 to 1997 were submitted in the Intergovernmental Panel on Climate Change (IPCC) software. Only CRF tables for 2000 and 2001 were included in the 2003 submission, with aggregated values in the NIR for the period 1990–1999, so that the ERT was unable to look closely at trends for the whole time series. The ERT recommends that making available a full set of CRF files should be of priority for Slovakia, with special attention being given to the base year, 1990. More detailed documentation of methods in an extended NIR would be very helpful for the review process, as it would clarify the underlying assumptions. The 2003 submission has not produced evidence of any quality assurance/quality control (QA/QC) being performed, although a qualitative description is provided which indicates that this issue is being taken care of. The ERT encourages Slovakia to improve the NIR and the inventory submission by completing the CRF time series, elaborating its own key source analysis, documenting performed QA/QC formal procedures, implementing uncertainty analysis, and improving documentation of the sources of activity data (AD) and methods used.

F. Cross-cutting topics

Completeness

7. The ERT noted that the data submitted by Slovakia cover all source/sink categories and all gases. A complete time series of CRFs was not submitted in 2003⁴, and the NIR is very brief. The ERT did note that additional sector-specific annexes are listed in the NIR, but these were not included⁵. The NIR presents time series for all gases back to 1990. The trends seem to be reasonable but could not be reviewed because of the lack of CRF tables and detailed documentation. The ERT recommends that Slovakia include all the CRF tables from 1990 onwards in its next submission and extend the NIR by

³ The secretariat had identified, for each individual Party, those source categories which are key sources in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance. Key sources according to the tier 1 trend assessment were also identified for those Parties providing a full CRF for the year 1990. Where the Party has performed a key source analysis, the key sources presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key source assessment conducted by the secretariat.

⁴ Country regularly submitted all inventories covering the complete time series since 1990, however emissions from 1990–1997 are reported in the IPCC software. Emissions for 1998 and 1999 were submitted in CRF tables, in 2000 and 2001 respectively.

⁵ Country provided explanation that detailed sectoral reports are at this stage available only in Slovak. Sectoral chapters will be stepwise elaborated also in English.

including chapters on each sector, following the NIR layout recommended in the new UNFCCC reporting guidelines.

Transparency

8. The NIR is not transparent as detailed information on methodological approaches and calculations is not included. The NIR does contain brief summaries of the approaches taken in each sector, but these are not sufficient to make it possible to assess fully the underlying assumptions and rationale for the choices of data, methods and other inventory parameters. Slovakia is strongly encouraged to provide the annexes to its NIR and provide in English all information attached to it (e.g., annex on details of recalculations) so that they can be taken into account in the review process. The NIR itself should contain chapters for each sector as recommended in the UNFCCC reporting guidelines.

Recalculations and time-series consistency

9. The ERT noted that recalculations are reported by the Party for the year 2000, undertaken to take into account: revised AD on cement and lime production, and lime and dolomite use; revision of $Frac_{LEACH}$ for agricultural soils; and a change to a more detailed methodology for manure management. The rationale for these recalculations is provided in the NIR and table 8(b) of the CRF. The ERT noted that comparison of the summary emissions trend data reported in table 10 of the CRF in submissions made in 2002 and 2003 revealed that other recalculations seem to have occurred which have not been reported in table 8 of the CRF. The 2003 submission gives lower values for and a larger reduction in emissions from the Industrial Processes sector than the 2002 submission. Minor changes are noted in the Agricultural and the Waste sectors as well. The effect of these recalculations on the trend in total emissions is small. The NIR notes that other revisions have occurred to the time series, which involve revision of methodologies and data, but these recalculations are not reflected in the CRF. The ERT recommends more complete and transparent reporting of recalculations in Slovakia's future CRFs and NIRs.

Uncertainties

10. Some summary-level information on uncertainties is provided in the NIR. The NIR also makes reference to uncertainty assumptions presented in annexes to the NIR, which were not included. This summary information provides limited quantitative information, and table 7 of the CRF provides a qualitative assessment across all sectors. The ERT also noted that Slovakia states in the NIR that because of limited resources it is unable to apply national emission factors (EFs) in all sectors or to estimate uncertainty according to the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). However, the ERT encourages Slovakia to estimate uncertainties and use its uncertainty analysis to prioritize further improvements to the GHG inventory.

Verification and quality assurance/quality control approaches

11. Some general information on QA/QC procedures is presented in the NIR, including internal checking of estimates prepared by consultants, comparing AD with national statistics, various procedures in the Energy sector, and the use of external reviewers. Slovakia did not report on a QA/QC plan in accordance with the IPCC good practice guidance. The Party explained in the comments to the draft review report that a QA/QC plan would be available but not yet documented. The Party is encouraged to report on such a plan.

Follow-up to previous reviews

12. The most significant improvements in Slovakia's inventory since the last submission are the provision of the NIR and the submission of two years of CRF data. A complete set of CRF files and a more complete and transparent NIR are the major issues still pending.

G. Areas for further improvement

Identified by the Party

13. There is only very limited information in the NIR on further improvements planned by the Party. A general statement about continuously developing QA/QC procedures is mentioned. In its response to the previous 2003 review activities, Slovakia indicates that it is working to improve the EFs for fugitive emissions.

Identified by the ERT

14. For the ERT the submission of a complete time series of CRFs and an extended NIR should be of the highest priority and would greatly enhance the transparency and completeness of the inventory. The NIR should include a key source analysis and sector-specific chapters according to the layout recommended in the new UNFCCC reporting guidelines. As a second step improvements to uncertainty estimates and QA/QC procedures are recommended.

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

II. ENERGY

A. Sector overview

16. The Energy sector accounted for 81 per cent of total GHG emissions in Slovakia in 2001. The combustion of fossil fuels (68 per cent stationary combustion and 10 per cent transport) is considered the most important source of GHG emissions in general and CO₂ emissions in particular (it accounts for 92 per cent of CO₂ emissions). Although the sectoral approach has been used in the 2001 CRF, a full sectoral breakdown of AD is still not complete. There has been a significant increase (5.4 per cent) in CO₂ emissions across all subsectors of the Energy sector in 2001 compared with 2000. This increase is due to the intensive fuel combustion in the energy industries, manufacturing industries and construction, and transport.

17. Special attention should be given to the documentation of QA/QC and uncertainty estimates, mainly because the uncertainty of statistical data on fuel consumption. Slovakia indicates in its NIR that its calculations using the sectoral approach are based on a system of data collection that is totally independent from those used for the reference approach. Slovakia has also not submitted the annexes to its NIR for 2001, making it difficult for the ERT to check the transparency of reported data.

18. Emissions from the Energy sector were recalculated most recently for the year 2000, using the recommendations of the IPCC good practice guidance. It should be noted that the recalculations for the base year were not reported, and when the secretariat compared the emissions trend data contained in table 10 of the CRF as submitted in 2003 with the corresponding data submitted in 2002 the two did not correspond. It should also be noted that the recalculation tables submitted in 2003 are incomplete, especially with regard to the Energy sector, where all entries were left empty. The ERT therefore recommends that Slovakia provide full details about the purpose of its recalculations and the discrepancy found in the secretariat's comparison, as well as the reasons for not filling in the recalculations table completely.

19. Emissions and fuel consumption trend information are not available since a full sectoral breakdown of AD is not complete in the same format. In the 2003 submission the Party has not provided a complete time series for its fuel consumption: information is only provided for the years 2000–2001. Fuel consumption from 1990 to 1999 is provided in previous submissions. Consistent data series from

1990 to 2001 exist only for the reference approach⁶. Slovakia is encouraged to provide the required data in order to enable trend analysis.

B. Reference and sectoral approaches

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

20. Slovakia relies on the application of the IPCC reference approach to calculate CO₂ emissions and uses the sectoral approach as a means for verification of the estimates. Detailed sectoral approach is performed since 2000 only. The calculations using the sectoral approach are based on a system of data collection that is totally independent from that used for the reference approach. The difference in fuel consumption between these two approaches is attributed, according to the NIR, to (a) the use of average net calorific values (NCVs) in the reference approach and fuel-specific NCVs in the sectoral approach, and (b) incomplete coverage of fuel consumption in the sectoral approach (the result of inappropriate reporting by sources).

International bunker fuels

20. Emissions from aviation have been calculated using the EFs available for the landing/take off (LTO) cycles of individual aircraft types. There are no available statistical data about the distribution of fuel sales between domestic and international flights. Slovakia suggested that the figure in the International Energy Agency (IEA) entry – 1,382 TJ of jet kerosene reported as domestic consumption – is not accurate as it is twice as high as the global sales of jet kerosene by Slovak companies. As a result, the Party is encouraged to make further efforts to provide country-specific data on aviation bunkers.

Feedstocks and non-energy use of fuels

21. Feedstocks have been considered under the Energy sector only. The ERT recommends that Slovakia provide an explanation of why no AD on feedstocks are provided under Industrial Processes.

C. Key sources

Energy industries: coal, oil, gas, other fuels – CO₂

22. The trend of CO₂ emissions from energy industries was decreasing during the period 1990–1994, and has fluctuated since then. The CO₂ emissions from energy industries for the year 2001 reported in table 1.A(a) are 10,553 Gg, whereas the reported figure in table 10 (sheet 1) for the same year is 34,112 Gg. Slovakia, in its response to the draft version of this report, pointed out that in trend table 10 the country use the Reference Approach to be consistent with previous years since the sectoral approach has been used only from 1998 onwards. As a consequence, all fuel combustion emissions except from transport are included under energy industries in table 10.

Manufacturing industries and construction: coal, oil, gas, other fuels – CO₂

23. The trend for CO₂ emissions from the Manufacturing Industries and Construction sector is not provided separately in table 10. The ERT was therefore not able to make any judgement with regard to emission trends. However, the ERT observes that emissions from all fuel categories in 2001 were 4.3 per cent higher than in 2000. The ERT recommends that Slovakia make its submissions more transparent, provide an explanation of this matter in its future submissions and provide the required data in order to enable trend analysis.

⁶ Country provided explanation that national database of sources (REZZO) operated at SHMU from 1985 to 1999 does not allow detailed fuel split according the IPCC categories. Slovakia has to develop system how to link national source/fuel categories to IPCC before applying sectoral approach for years 1990–1999.

Other sectors: coal, oil, gas, other fuels – CO₂

24. The trend for CO₂ emissions from other sectors is not provided in table 10 of the CRF. The ERT can therefore make no judgement with regard to emission trends. The Party is requested to make more effort to provide the required data in order to enable trend analysis.

Civil aviation – CO₂

25. There are no available statistical data about the distribution of fuel sales between domestic and international flights. Slovakia indicates that the IEA entry of 1,382 TJ for jet kerosene reported as domestic consumption is twice as high as the value of the global sales of jet kerosene by Slovak companies. CO₂ emissions were reported based on LTO cycles for aviation gasoline (IPCC Tier 2 method). However, according to the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) this method is only applicable for jet kerosene. Jet kerosene emissions are not reported. Slovakia is encouraged to make further efforts to provide the corresponding AD. Slovakia, in its response to the draft version of this report, commented that being the source very small, it is difficult for the Party to give it high priority.

Coal mining and handling – CH₄

26. The trend in CH₄ emissions from coal mining and handling has fluctuated since 1990. However, the 2001 emissions are lower by 6 per cent than those for 2000. In its response to the draft version of this report, Slovakia explained that the emissions and trends are related to the amount of extracted coal.

Oil and gas operations – CH₄

27. Emissions due to distribution of oil and gas are not reported. Only CH₄ emissions related to their production and transmission have been reported. CH₄ emissions from the production and distribution of gas are significant in comparison to those from oil. Emissions occurring by production are negligible comparing to the ones related to the transport and consumption of gas and oil. The reported CH₄ emissions arising from both oil and gas operations for 2001 are 4.8 per cent less than those for 2000. AD and emissions for venting and flaring are not reported. The ERT encourages Slovakia to provide these data as well as to provide explanations on the reduction in CH₄ emission in 2001.

D. Non-key sources

Civil aviation – CH₄ and N₂O

28. No CH₄ or N₂O emissions were reported from jet kerosene and aviation gasoline. Slovakia should initiate activities to ensure that statistical data on the distribution of fuel sales between domestic and international flights are available and to estimate emissions from this source category.

Railways – N₂O

29. The value of the N₂O implied emission factor (IEF) for liquid fuels (diesel oil) (32.23 kg/TJ) was obtained from the EMEP/CORINAIR *Emission Inventory Guidebook*. Slovakia is aware that this value is the highest among reporting Parties and is encouraged to provide an explanation of it in its future submissions.

Navigation – N₂O

30. The value of the N₂O IEF for liquid fuels (diesel oil) (32.22 kg/TJ) was obtained from the EMEP/CORINAIR *Emission Inventory Guidebook*. The Party is aware that this value is the highest among reporting Parties and is encouraged to provide an explanation of it in its future submissions.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

31. The Industrial Processes sector accounted for 7 per cent of total GHG emissions in Slovakia in 2001. GHG emissions from the sector have decreased from 4,202.09 Gg CO₂ equivalent in 1990 to 3,265.19 Gg CO₂ equivalent in 2001 (a 22.3 per cent decrease). The sector's key sources of CO₂ include cement production and lime production, as well as limestone and dolomite use. CO₂ emissions occurring from coke and aluminium production, crude oil processing and metallurgy are included in the total balance of CO₂ emissions from fossil fuel combustion (reference approach). Because of this, the share of the Industrial Processes sector in GHG emissions seems to be low.

32. Estimates of both actual and potential emissions of PFCs, HFCs and SF₆ are reported for the period 1990–2001, but HFC emissions are not reported for the entire time series⁷.

33. The AD and EFs have been revised since 1990. According to the NIR, all emissions were recalculated using the methodologies from the IPCC Guidelines. However, CRF table 8 provides no information on recalculations in the Industrial Processes sector. In the 2001 submission emissions from magnesite production and limestone and dolomite use have been separated to improve the accuracy of the inventory.

34. In some cases (e.g., ammonia, ferroalloys and aluminium production) the emissions and AD are reported as included elsewhere (IE), in the NIR is explanation that these emissions are reported under Energy sector. The ERT recommends that Slovakia provide clear explanations in the NIR in order to facilitate the review of the inventory and make it more transparent. For transparency, more information about the use of feedstocks is also needed.

35. Neither sector-specific QA/QC procedures nor uncertainty analysis is presented in the NIR. No information regarding future improvements of the Industrial Processes inventory is provided.

36. The ERT was not able to assess the transparency of the inventory in the Industrial Processes sector fully because essential support material is not available. This missing information includes the background data in the NIR and completed CRF tables covering recalculations (tables 8(a) and 8(b)), sectoral background data for industrial processes (table 2(II)F) and completeness (table 9).

37. In the Solvent and Other Product Use sector, CO₂ and N₂O emissions are indicated as zero. No AD are reported.

B. Key sources

Cement production – CO₂

38. CO₂ emissions are calculated on the basis of the actual clinker production data submitted by the plants, which give more accurate results than calculation from cement statistics. However, no documentation is available in the NIR on the calculations for this key source. The ERT recommends Slovakia to provide information on the background data and to document the methods used.

Lime production – CO₂

39. There is no description of the methodology used to calculate this key source. The ERT recommends that Slovakia provide information on the background data and document the methods used so that the calculations can be reviewed.

⁷ Country explained that HFC emissions are assumed to be zero before 1993.

Limestone and dolomite use – CO₂

40. There is no description of the methodology used to calculate this key source. The ERT recommends that Slovakia provide information on the background data and document the methods used so that the calculations can be reviewed.

C. Non-key sources

Nitric acid production – N₂O

41. The IEF for N₂O (0.0012 t/t) is the lowest among the reporting Parties and lower than the IPCC default value (0.002–0.009 t/t). In the NIR it is explained that the reduction in N₂O emissions since 1996 is the result of modernization of production. However, the methodological choices are not indicated in the NIR.

Aluminium production – CO₂

42. CO₂ emissions from aluminium production are reported as “IE” under Industrial Processes sector and were included under Energy sector.

Consumption of halocarbons and SF₆ – HFCs, PFCs and SF₆

43. Fluorinated gases (F-gases) are not produced in Slovakia. HFC emissions are occurring only since 1994 and the trend is sharply increasing, from 2.91 Gg CO₂ equivalent in 1994 to 83.23 Gg CO₂ equivalent in 2001. SF₆ emissions increased from 0.03 Gg in 1990 to 13.48 Gg in 2001. The NIR states that since 1995 consumption of HFCs and SF₆ has tripled. PFC emissions are estimated for the whole time series 1990–2001 and decreased by 95.45 per cent over that period (from 271.94 Gg in 1990 to 22.43 Gg in 2001). The NIR indicates that since 1996 the emissions have decreased on average as a result of modernization of technologies. The ERT recommends that Slovakia provide more information and improve the transparency of its reporting.

Solvent and other product use – CO₂ and N₂O

44. No AD or data on CO₂ and N₂O emissions are reported for this source category; however, non-methane volatile organic compound (NMVOC) emissions are reported. No additional information is provided in the documentation box of CRF table 3. The ERT recommends that Slovakia provide this information.

IV. AGRICULTURE

A. Sector overview

45. In terms of CO₂ equivalent and excluding LUCF, emissions from Agriculture accounted for 8 per cent of total emissions. During the period 1990 to 2001, emissions from Agriculture decreased by 48.3 per cent. No key source analysis is reported by Slovakia; however, according to the secretariat’s analysis, this sector includes three key source categories, namely CH₄ from enteric fermentation, N₂O from manure management, and N₂O (direct emissions) from agricultural soils.

46. The submission only covers the CRF tables for 2000 and 2001, and aggregated tables for the period 1990–1999 were provided in the appendix (chapter 3) of the Third National Communication of Slovakia. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues are reported as not occurring (“NO”) in the background data tables of the CRF. Not enough information was provided in the NIR to permit a full understanding of the methodological approaches used and the quality of the AD. Recalculation of N₂O emissions from manure management and agricultural soils is included in the 2001 CRF tables and a brief explanation is provided for both sources.

47. No QA/QC procedures for agriculture are reported, but Slovakia shows in its NIR that it is aware of the need to develop such procedures and build them in to the national system. The quality of estimates is reported in CRF table 7. However, no information is provided as to how they are estimated. No information on uncertainty analysis is given in the NIR. A brief reference to sectoral institutional arrangements is included in the NIR and a list of references is given at the end of the NIR. The ERT encourages Slovakia to improve the transparency of the sectoral inventory submission by including information on institutional arrangements, cross-cutting issues and methodological approaches, and to incorporate detailed information on the quality of the AD as well as the national circumstances that explain trends.

B. Key sources

Enteric fermentation – CH₄

48. Slovakia reports the use of the IPCC tier 1 and tier 2 methodological approaches, medium quality for the estimates for 2000 and high quality for those for 2001. The ERT found that, according to the CRF tables, IPCC tier 1 is generally applied, which is not in line with the IPCC good practice guidance. Slovakia reports the use of default and country-specific EFs but only defaults (the IPCC defaults for Western and Eastern Europe) were found in the CRF tables. No information is provided on the AD used, although Slovakia informs that sources of AD were reported in previous submissions. Some inconsistencies regarding the data provided for poultry and buffalo in the CRF tables for the year 2000 were found. The ERT encourages Slovakia to resolve these minor inconsistencies between tables 4.A and 4.B(b) and to improve the information on methods applied.

Manure management – N₂O

49. For the 2000 inventory, Slovakia reports the use of CORINAIR method, but the use of default method for the 2001 inventory. Very limited information on methods, sources of EFs and quality of AD is provided, and the ERT encourages Slovakia to provide this information in order to make it easier to assess the appropriateness of their use and make the inventory more transparent. The quality of estimates is reported as medium for the years 2000 and 2001. The Party is encouraged to improve the use of the notation keys in CRF table 4.B(b).

Agricultural soils – N₂O

50. Slovakia reports the use of CORINAIR method for the 2000 inventory but CORINAIR and country specific methods for the 2001 inventory. No information is provided on AD quality. Slovakia reports the quality of estimates as medium for both years. The ERT encourages Slovakia to improve the information on the methodological approach to clarify the underlying assumptions.

51. Cultivation of histosols is reported as “IE” for N₂O emissions but it was not reported under the Agriculture sector, or under the LUCF sector. No information is provided to allow the ERT to determine the origin of the values for the partitioning fractions: the values for Frac_{GRAZ} and Frac_{LEACH} are different from the IPCC default values and no information is provided to indicate which partitioning fractions are IPCC default, CORINAIR or country-specific values.

C. Non-key sources

Manure management – CH₄ emissions

52. Slovakia reports the use of default methods and default and country-specific EFs. The ERT found that some values are the same as the defaults for Western Europe and other values are identical with the defaults for Eastern Europe. No information is provided in the NIR for this source category, so that the ERT was unable to understand the underlying assumptions. The ERT encourages Slovakia to improve the transparency of its submission by including this information.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

53. For Slovakia, net removals from the LUCF sector in 2001 amounted to 5,247 Gg CO₂ equivalent. The net removals were almost 10.5 per cent of total emissions and the LUCF sector clearly has a significant impact on the GHG balance for Slovakia.

54. The trend in net removals shows a net increase (of 217.8 per cent) between 1990 and 2001 but great fluctuations between consecutive years, with annual changes up to 48.3 per cent (between 1999 and 2000). In the 2003 submission CRF tables are provided only for the years 2000 and 2001, no explanation was available to enable the ERT to understand this trend.

55. Considering the importance of the LUCF sector for Slovakia, the transparency of the methods used needs to be considerably improved. Only very general statements regarding the role of the LUCF sector and the methods applied are given in the NIR. The ERT has not had the opportunity to review the information in the specific appendix on LUCF, which is mentioned in the NIR but is not included. Thus, the review is based only on the data provided in the CRF tables and the answers provided by Slovakia to the issues raised by the previous 2003 review activities.

56. The reported LUCF figures sometimes vary dramatically between individual years. In some cases this appears to be due to real variation, for example, to wind throw events that cause harvest levels to vary between years. However, in other cases Slovakia claims that there are inconsistencies in the database. The ERT recommends Slovakia to ensure that any inconsistencies in the data are identified and resolved as far as possible. It also recommends that Slovakia consider the need for recalculations in this sector.

57. The ERT recommends that Slovakia submit detailed information regarding the methodology that has been applied in the LUCF sector in order to facilitate future reviews.

B. Sink and source categories

Changes in forest and other woody biomass stocks – CO₂

58. Figures on growth are obtained by separating all individual tree species and providing total areas and per area growth figures for these species. This is a very detailed approach, which Slovakia should be commended for. However, it also leaves some questions unanswered regarding the treatment of mixed forests. Because of the lack of detailed information regarding methods, the ERT was unable to assess how the breakdown of species by area has been performed. In addition, no information on biomass conversion factors was available to the ERT. The ERT encourages Slovakia to improve the information it provides on these supporting data in order to clarify these matters.

Forest and grassland conversion – all gases

59. Forest conversion areas are not reported, although figures for emissions due to conversion are reported. Slovakia thus appears to have used some country-specific method where information on areas is not needed. The ERT encourages Slovakia to explain the method used in its NIR.

CO₂ emissions and removals from soils

60. CO₂ emissions from soils in 2001 were only about 50 per cent of those reported in 2000. Slovakia indicates that inconsistencies in databases may have led to this result. The ERT recommends that Slovakia check whether the inconsistencies can be resolved and, if needed, recalculate the data.

VI. WASTE

A. Sector overview

61. Emissions from the Waste sector contributed approximately 4 per cent to total greenhouse gas emissions in 2001. Emissions from the sector decreased by 11.1 per cent from 1990 to 2001. Two source categories, namely CH₄ emissions from solid waste disposal on land and CH₄ emissions from waste-water handling, are identified as key sources in the level assessment.

62. The methodologies used for estimating emissions from the Waste sector are briefly explained in the NIR. Emission factors and AD are not indicated. Some additional information, such as total population, waste generation rate, and the fractions of waste-water treated by different handling systems, among others, is provided in the CRF. The ERT notes that an adequate summary of methodologies, EFs and AD should be provided in order to improve the transparency of the Slovakian inventory.

B. Key sources

Solid waste disposal on land – CH₄

63. CH₄ emissions from solid waste disposal on land in 2001 were 953.6 Gg CO₂ equivalent, representing 1.9 per cent of total national emissions. Emissions from this source decreased by 9.7 per cent between 1990 and 2001.

64. Summary table 3 of the CRF indicates that the emissions are estimated by using the IPCC default method. However, the NIR states that CH₄ emissions are determined by a country-specific study. The ERT recommends that detailed information on the methodologies used should be provided in the NIR.

65. The amount of waste has been systematically monitored since 1995. However, information on the methodology for estimating the amount of waste from 1990 to 1994 is not indicated in the NIR. Slovakia is encouraged to provide this information.

Waste-water handling – CH₄

66. CH₄ emissions from waste-water handling in 2001 contributed 743.9 Gg CO₂ equivalent, representing 1.5 per cent of total national emissions. Emissions from this source decreased by 26.5 per cent between 1990 and 2001. The ERT recommends that an explanation of the trend be provided in the NIR. It notes that the methane correction factors (MCFs) for individual types of waste-water handling systems used for estimating CH₄ emissions from domestic and commercial waste water should be provided in the NIR. A country-specific degradable organic component should also be used (instead of the default value) if at all possible.

C. Non-key sources

Waste-water handling – N₂O

67. N₂O emissions from waste-water handling are estimated using the ISI (Fraunhofer Institute for Systems and Innovation Research) methodology, which is regarded as most appropriate of three possible methodologies (IPCC, ISI, CORINAIR). The ERT recommends that detailed information on the ISI methodology be provided in the NIR.

Waste incineration – CO₂

68. CO₂ emissions from waste incineration in 2000 and 2001 are reported, while emissions from 1990 to 1999 are indicated as “IE” in table 10 of the CRF. Further explanation should be provided for the differences in reporting.

69. CO₂ emissions from waste incineration reported in 2000 include municipal solid waste (98.15 Gg) and other waste (58.69 Gg). However, Slovakia reported 98.15 Gg as the total for this source. This may be an error, which should be checked and corrected.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2002 and 2003 Inventory submissions of Slovakia. 2003 submission including CRF for years 2000 and 2001 and an NIR.

UNFCCC secretariat. "2003 Status report for Slovakia" (available at http://ghg.unfccc.int/download/reviews2003/Slovakia_SR2003.zip).

UNFCCC secretariat. "Synthesis and assessment report of the greenhouse gas inventories submitted in 2003. Part I." FCCC/WEB/SAI/2003 (available at http://unfccc.int/program/mis/ghg/s_a2003.html) and Part II – the section on Slovakia (unpublished).

UNFCCC secretariat. "Review findings for Slovakia" (unpublished).

Slovakia's comments on the Draft synthesis and assessment report of the greenhouse gas inventories submitted in 2003 (unpublished).

UNFCCC secretariat. "Handbook for review of national GHG inventories." Draft 2003 (unpublished).

UNFCCC secretariat. "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories."

FCCC/CP/1999/7 (available at <http://www.unfccc.int/resource/docs/cop5/07.pdf>).

UNFCCC secretariat. "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/2002/8 (available at <http://unfccc.int/resource/docs/cop8/08.pdf>).

UNFCCC secretariat. Database search tool – *Locator* (unpublished).

IPCC. *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000* (available at <http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm>).

IPCC/OECD/IEA. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, volumes 1–3, 1997* (available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>).

B. Additional materials

Responses to questions during the review were received from Dr. Janka Szemesová of the Slovak Hydrometeorological Institute.
