COMPLIANCE COMMITTEE

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16 October 2007

Report of the review of the initial report of the Czech Republic

Note by the secretariat

The report of the review of the initial report of the Czech Republic was published on 15 October 2007. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2), the report is considered received by the secretariat on the same date. This report, FCCC/IRR/2007/CZE, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the review of the initial report of the Czech Republic

According to decision 13/CMP.1, each Annex I Party with a commitment inscribed in Annex B to the Kyoto Protocol shall submit to the secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, a report (the 'initial report') to facilitate the calculation of the Party's assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, and to demonstrate its capacity to account for emissions and the assigned amount. This report reflects the results of the review of the initial report of the Czech Republic conducted by an expert review team in accordance with Article 8 of the Kyoto Protocol.

Contents

I. Introduction and summary

A. Introduction

1. This report covers the in-country review of the initial report of the Czech Republic, 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 26 February to 3 March 2007 in Prague, the Czech Republic, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. Klaus Radunsky (Austria); energy – Ms. Sumana Bhattacharya (India); industrial processes – Ms. Amaia Uriarte (Spain); agriculture – Mr. Chang Liang (Canada); land use, land-use change and forestry (LULUCF) – Mr. Nagmeldin Elhassan (Sudan); waste – Ms. Maria Paz Cigaran (Peru). Mr. Nagmeldin Elhassan and Mr. Klaus Radunsky were the lead reviewers. In addition, the expert review team (ERT) reviewed the national system, the national registry, and the calculations of Party's assigned amount and commitment period reserve (CPR), and took note of the LULUCF parameters and of the LULUCF activities elected under Article 3, paragraph 4, of the Kyoto Protocol. The review was coordinated by Mr. Sergey Kononov and Mr. Matthew Dudley (UNFCCC secretariat).

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

B. Summary

1. Timeliness

3. Decision 13/CMP.1 requests Parties to submit their initial report prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later. The Czech Republic submitted its initial report on 24 October 2006, which is in compliance with decision 13/CMP.1. In conjunction with the initial report, the Czech Republic used the greenhouse gas (GHG) inventory submitted to the UNFCCC secretariat on 13 April 2006. The Czech Republic also submitted revised emission estimates on 13 April 2007 in response to questions raised by the ERT during the in-country visit.

2. Completeness

4. Table 1 below shows which of the mandatory elements have been included in the initial report and reflects revised values for the assigned amount and the commitment period reserve, based on a revised estimate for the base year emissions. These revised values are based on revisions of emissions of CO_2 emissions from combustion of solid fossil fuels; CH_4 emissions from fuel combustion; N_2O emissions from fuel combustion; and CH_4 emissions from solid waste disposal sites (see para. 22), which resulted in revisions of the total GHG emissions, including the base year emissions from 196,280,576 tonnes carbon dioxide (CO_2) equivalent as reported originally by the Party to 194,248,218 tonnes CO_2 equivalent (see para. 116).

5. During the review process the Czech Republic provided all the information on the national registry system as required by decision 13/CMP.1, section I of decision 15/CMP.1, and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (CMP).

Table 1. Summary of the reporting on mandatory elements in the initial report

Item	Provided	Value/year/comment
Complete GHG inventory from the base year (1990) to the most recent year available (2004)	Yes	Base year (for CO_2, CH_4 and N_2O): 1990
Base year for HFCs, PFCs and SF_6	Yes	1995
Agreement under Article 4	NA	Quantified emission limitation or reduction commitment as per Annex B to the Kyoto Protocol: 92% of base year emissions
LULUCF parameters	Yes	Minimum tree crown cover: 30% Minimum land area: 0.05 hectares Minimum tree height: 2 m
Election of and accounting period for Article 3, paragraphs 3 and 4, activities	Yes	Elected activities: forest management only Elected accounting: for the entire commitment period
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8, reported estimate	Yes	902,890,649 tonnes CO_2 eq.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8, revised estimate	Yes	893,541,801 tonnes CO_2 eq.
Calculation of the commitment period reserve, reported estimate	Yes	735,719,710 tonnes CO_2 eq.
Calculation of the commitment period reserve, revised estimate	Yes	732,161,864 tonnes CO_2 eq.
Description of national system in accordance with the guidelines for national systems under Article 5, paragraph 1	Yes	The ERT identified some areas for further improvement
Description of national registry in accordance with the requirements contained in the annex to decision 13/CMP.1, the annex to decision 15/CMP.1 and the technical standards for data exchange between registry systems adopted by the CMP	Yes	

3. Transparency

6. The initial report is generally transparent, but this is somewhat hampered by the limited transparency of the inventory information contained in the common reporting format (CRF) tables and the national inventory report (NIR). During the review the ERT identified the following areas where transparency needs to be enhanced further: references to the sources of data and methodologies for estimating emissions; the need for more comprehensive and precise methodological descriptions in the NIR; and the use of the notation keys. During the in-country visit the Party provided very useful additional information, including information on the transparency issues (see part B of annex I to this report).

4. Emission profile in the base year, trends and emission reduction target

7. The Czech Republic has defined its base year under the Kyoto Protocol as 1990 for carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), and 1995 for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6). In the base year, the most important GHG in the Czech Republic was CO_2, contributing 84.4 per cent to total[1] national GHG emissions expressed in CO_2 equivalent, followed by CH_4 (9.5 per cent) and N_2O (6.1 per cent): see figure 1. HFCs, PFCs and SF_6 taken together contributed 0.04 per cent of the overall GHG emissions in the base year. The energy sector accounted for 80.4 per cent of total GHG emissions in the base year, followed by industrial processes (9.8 per cent), agriculture (8.0 per cent) and waste (1.4 per cent): see figure 2. Total GHG

[1] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding LULUCF, unless otherwise specified.

emissions (excluding LULUCF) in the base year amounted to 194,248.2 Gg CO_2 equivalent and they decreased by 24.6 per cent between the base year and 2004. Tables 2 and 3 show GHG emissions by gas and by sector, respectively.

Figure 1. Shares of gases in total GHG emissions, base year

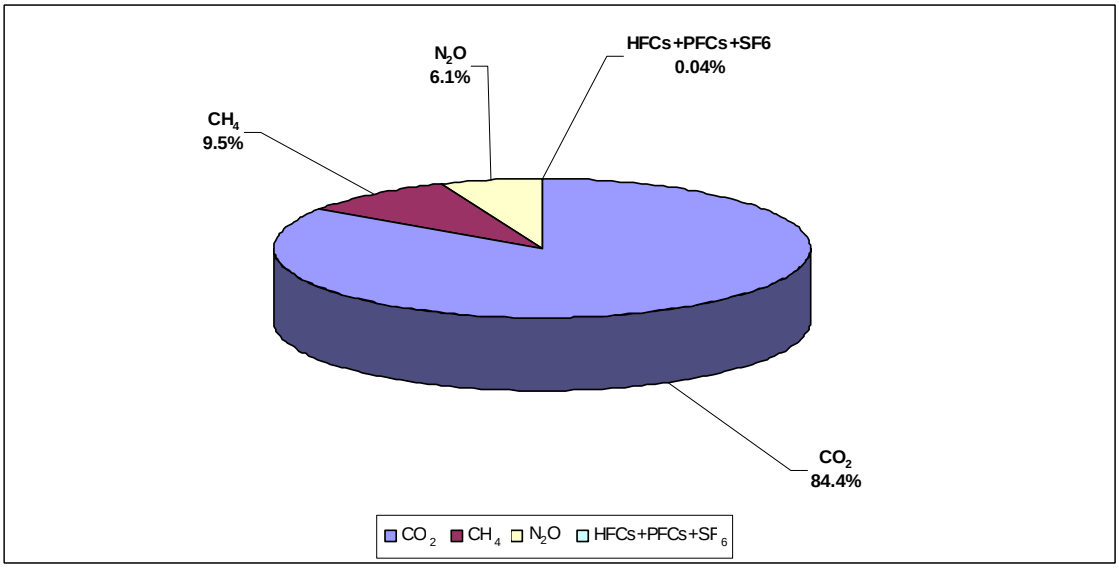
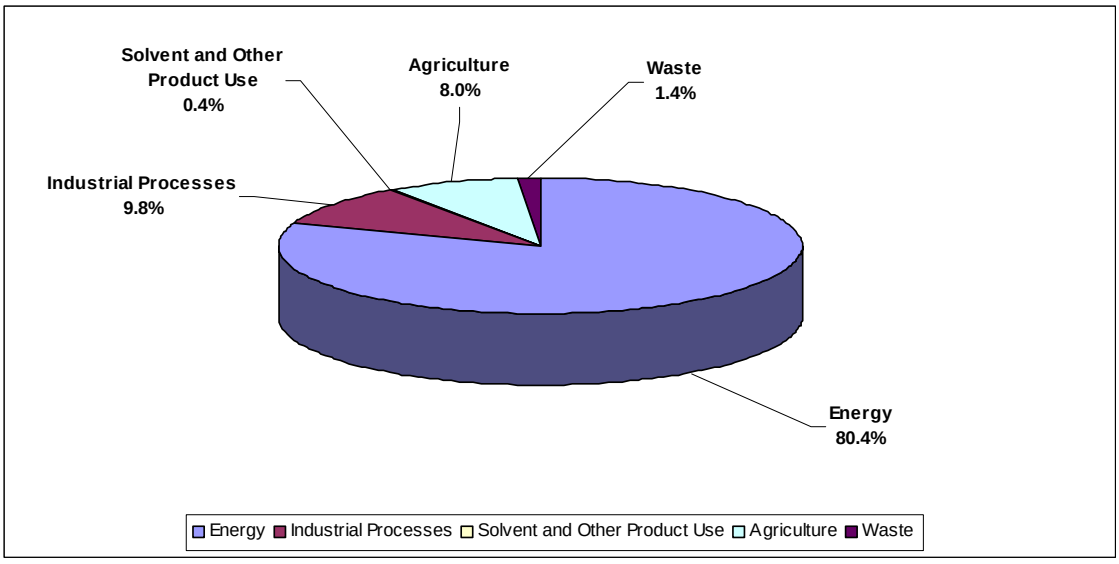


Figure 2. Shares of sectors in total GHG emissions, base year



8. The Czech Republic's quantified emission limitation is 92 per cent of base year emissions as stipulated by Annex B to the Kyoto Protocol.

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

GHG emissions (without LULUCF)	Gg CO_2 equivalent								Change from BY (Kyoto Protocol) to 2004 (%)
	Base year (Kyoto Protocol)	1990	1995	2000	2001	2002	2003	2004	
CO_2	163 864.2	163 864.2	131 157.0	128 136.5	128 132.0	123 181.5	127 199.3	126 444.2	–22.8
CH_4	18 462.0	18 462.0	13 648.8	12 147.1	12 237.7	12 088.8	11 700.5	11 534.9	–37.5
N_2O	11 846.0	11 846.0	8 094.1	7 654.3	7 915.2	7 657.5	7 194.8	7 786.1	–34.3
HFCs	0.7	–	0.7	262.5	393.4	391.3	590.1	600.3	81 628.7
PFCs	0.1	–	0.1	8.8	12.3	13.7	24.5	17.3	14 044.3
SF_6	75.2	–	75.2	141.4	167.8	66.8	99.8	49.6	–34.1

LULUCF = Land use, land-use change and forestry; BY = Base year.

Note 1: The base year under the Kyoto Protocol excludes emissions from the LULUCF sector for all gases.

Note 2: Table 1 reflects the revised estimates submitted by the Czech Republic in the course of the initial review on 13 April 2007. These estimates differ from the Czech Republic's GHG inventory submitted in 2006. More information is provided in this report.

Table 3. Greenhouse gas emissions by sector, 1990–2004

Sectors	Gg CO_2 equivalent								Change from BY (Kyoto Protocol) to 2004 (%)
	Base year (Kyoto Protocol)	1990	1995	2000	2001	2002	2003	2004	
Energy	156 233.5	156 233.5	125 573.0	122 875.7	123 876.3	118 899.5	121 710.1	121 585.5	–22.2
Industrial processes	19 126.3	19 050.2	14 027.8	13 305.4	12 563.2	12 257.5	13 467.2	12 946.2	–32.3
Solvent and other product use	764.8	764.8	596.3	568.6	550.0	539.6	525.2	519.3	–32.1
Agriculture	15 474.0	15 474.0	9 586.3	8 393.7	8 593.7	8 358.6	7 778.4	8 044.1	–48.0
LULUCF[b]	NA	–1 730.1	–7 769.0	–6 828.0	–7 014.7	–6 105.6	–5 688.8	–4 804.4	NA
Waste	2 649.6	2 649.6	3 192.5	3 250.3	3 275.3	3 344.3	3 328.3	3 337.3	26.0
Total (with LULUCF)	NA	192 442.1	145 207.0	141 565.7	141 843.8	137 294.0	141 120.3	141 628.0	NA
Total (without LULUCF)	194 248.2	194 172.2	152 976.0	148 393.7	148 858.4	143 399.6	146 809.1	146 432.4	–24.6

LULUCF = Land use, land-use change and forestry; NA = Not applicable; BY = Base year.

Note 1: The base year under the Kyoto Protocol excludes emissions from the LULUCF sector for all gases.

Note 2: Table 2 reflects the revised estimates submitted by the Czech Republic in the course of the initial review on 13 April 2007. These estimates differ from the Czech Republic's GHG inventory submitted in 2006. More information is provided in this report.

II. Technical assessment of the elements reviewed

A. National system for the estimation of anthropogenic GHG emissions by sources and sinks

9. The Czech Republic's national system is, in general, in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). However, the ERT identified the following areas where further improvements are encouraged: greater transparency in reporting the GHG inventories; further development of quality assurance/quality control (QA/QC) and archiving; an increase in the financial resources allocated and in the numbers of staff who support inventory preparation; and better documentation and transparency of the decision-making processes.

10. Table 4 shows what specific functions of the national system are described in the initial report.

Table 4. Summary of reporting on specific functions of the national system

Reporting element	Provided	Comments
Inventory planning		
Designated single national entity*	Yes	See section II.A.1
Defined/allocated specific responsibilities for inventory development process*	Yes	See section II.A.1
Established process for approving the inventory*	Yes	See section II.A.1
Quality assurance/quality control plan*	Yes	See section II.A.2
Ways to improve inventory quality	Yes	See section II.B.3
Inventory preparation		
Key category analysis*	Yes	See section II.B.1
Estimates prepared in line with IPCC guidelines and IPCC good practice guidance*	Yes	See section II.B.2
Sufficient activity data and emission factors collected to support methodology*	Yes	See section II.B
Quantitative uncertainty analysis*	Yes	See section II.B.2
Recalculations*	Yes	See section II.B.2
General QC (tier 1) procedures implemented*	Yes	See section II.A.2
Source/sink category-specific QC (tier 2) procedures implemented	No	See section II.A.2
Basic review by experts not involved in inventory	Yes	See section II.A.2
Extensive review for key categories	Yes	See section II.A.2
Periodic internal review of inventory preparation	Yes	See section II.A.2
Inventory management		
Archive inventory information*	Yes	See section II.A.3
Archive at single location	No	See section II.A.3
Provide ERT with access to archived information*	Yes	See section II.A.3
Respond to requests for clarifying inventory information during review process*	Yes	See section II.A.1

* Mandatory elements of the national system.

1. Institutional, legal and procedural arrangements

11. The Czech Hydrometeorological Institute (CHMI) is the designated single national entity for preparation of the inventory. The tasks of the CHMI are described in a decree under Decision 3/04 of the Ministry of the Environment (MoE) of the Czech Republic; this decree is dated 29 July 2005 and will expire on 31 December 2008. Other agencies and organizations as well as private institutes and individual experts are also involved in the preparation of the inventory and they have specific responsibilities for the inventory development process. The overall responsibility for the inventory as well as issues related to reporting, QA/QC and general issues and, in addition, responsibility for the

industrial processes and solvent and other product use sectors belongs to the CHMI. Responsibility for the energy sector (stationary sources and fugitive emissions) belongs to Koneko (a consultancy firm), responsibility for mobile sources to the Transport Research Centre, Brno, that for agriculture and LULUCF belongs to the Institute for Forest Ecosystem Research (IFER), and responsibility for the waste sector lies with the Environment Centre of Charles University. Many activity data (AD) are either provided by or based on data from the Czech Statistical Office (CSO), for example, energy supply balances, energy demand structure and agricultural statistics (size of animal populations, annual harvest of cereals and pulses, annual fertilizer consumption, milk production).

12. The CHMI has a long-term agreement with the MoE on the responsibility for inventory preparation but its agreements with the main subcontractors (such as Koneco, the IFER, and others) are annual. For the time being it is difficult for the Czech Republic to provide the necessary resources to fully implement all requirements under the UNFCCC and to ensure that its inventory complies fully with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), for example, with regard to the transparency of the NIR, archiving, and QA/QC.

13. In the Czech Republic there is an established process for the official consideration and approval of the inventory prior to its submission. The ERT noted with interest that with the introduction of a QA/QC system at the CHMI under ISO 9001 (the ERT was informed that ISO 9001 certification had been received by the CHMI in April 2007) a more formalized approach will be taken to managing the inventory preparation process and considering a follow-up to any issues raised by inventory reviews. The ERT encourages the Czech Republic to include the MoE in this process, especially with respect to any resource implications.

2. Quality assurance/quality control

14. The Czech Republic is still elaborating a QA/QC plan that would be in accordance with the IPCC good practice guidance. This will include general QC procedures (tier 1) as well as source/sink category-specific procedures (tier 2) for key categories and for those individual categories in which significant methodological and/or data revisions have occurred. The ERT feels that the introduction of a QA/QC system at the CHMI under ISO 9001 will also be very helpful for meeting all requirements for the national system, and it welcomed the ISO 9001 certification of this QA/QC. The ERT recommends that the Czech Republic define and document all the responsibilities of the different institutions/experts with regard to their contribution to the national GHG inventory in the agreements with those institutions/experts, and also recommends that such agreements should address QA/QC.

15. The CHMI is partly using the emissions data under the European Union emissions trading scheme (EU ETS) for verification purposes. Such independent assessment of emissions data contributes considerably to the quality of the data, and the ERT therefore suggests that the Czech Republic use independent assessment for all data that are not yet covered by such verification, consistent with the IPCC good practice guidance.

16. The draft inventory data are usually checked by CHMI experts before they are forwarded to the UNFCCC, and an additional review is carried out by the MoE, but these reviews are not well documented. The ERT suggests that the Party introduce better documentation of its quality control at all stages of inventory preparation, within the CHMI as well as for the other institutions/experts that contribute to inventory preparation.

3. Inventory management

17. The Czech Republic does not have a centralized archiving system. Although some documentation (such as calculation spreadsheets and all final inventory data) is archived at the CHMI, most of the relevant background material is archived at those institutions that are in charge for a given

sector (see para. 12). The ERT suggests that the Czech Republic strengthen the archiving function of the CHMI in order to create a more centralized archiving system, so that not only final data in the CRF format but also all underlying calculation sheets, as well as all the literature cited, are archived at the CHMI.

B. Greenhouse gas inventory

18. In conjunction with its initial report, the Czech Republic has submitted an almost complete set of CRF tables for the years 1990–2004. It has not submitted CRF tables 7 (key categories) and 9(b) (completeness), or explanations for the large (above 2 per cent) differences between the reference and the sectoral approaches in table 1.A(c). There are also reporting gaps in some of the sectoral tables (e.g., in the energy sector) and in table 8(b) (recalculations).

19. During the review the Czech Republic provided the ERT with additional documents and other useful information (see the annex to this report, part B). These documents are not part of the initial report submission but are in some cases referenced in the NIR. The Czech Republic also submitted revised emission estimates on 13 April 2007 in response to questions raised by the ERT during the in-country visit; these revised estimates are reflected in this report.

1. Key categories

20. The Czech Republic has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2006 submission. It has not included the LULUCF sector in its key category analysis. The key category analyses performed by the Party and the secretariat[2] produced different results. The Czech Republic has identified 15 key categories for 2004, whereas the secretariat has identified 24 key categories in 1990 and 25 in 2004. The key reasons for the differences are the non-inclusion of the LULUCF sector and a different level of aggregation in the key category analysis of the Czech Republic. The Czech Republic has not submitted a key category analysis for the year 1990 and the base year. The ERT encourages the Czech Republic to follow the relevant IPCC good practice guidance more closely and in particular to use a more detailed aggregation level of categories and to include the LULUCF sector in the analysis of key categories.

21. The ERT acknowledges that the Czech Republic has used the key category analysis as a tool to support and guide the improvement of its inventory.

2. Cross-cutting topics

22. 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 good practice guidance and the *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). However, during the in-country visit the ERT found that the calculation of emissions in the base year was not consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for the following categories: CO_2 emissions from combustion of solid fossil fuels; CH_4 emissions from fuel combustion; N_2O emissions from fuel combustion; and CH_4 emissions from solid waste disposal sites.[3] During the in-country visit the ERT encouraged the Czech Republic to reconsider the calculations of emissions for these categories. The ERT appreciated very much that the Czech Republic submitted recalculations for

[2] 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 LULUCF. Key categories according to the tier 1 trend assessment were also identified for those Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

[3] These problems are explained in the corresponding sectoral sections of this report.

all four categories identified above in due time and that these recalculations followed the recommendations from the ERT. This report is based on these revised estimates, and the ERT therefore concludes that the figures as reflected in this review report are consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

Completeness

23. The inventory submitted with the initial report covers all years from 1990 to 2004, and all sectors and gases including actual emissions of HFCs, PFCs and SF_6 (the fluorinated gases (F-gases)). The ERT noted several categories for which GHG emissions occur in the Czech Republic but for which no emissions have been estimated. The Party explained that in such cases either not enough information was available to calculate emissions or the emissions were only minor. Moreover, the Czech Republic has not submitted CRF tables 7 (key categories) and 9(b) (completeness), or explanations for the large (over 2 per cent) differences between the reference and the sectoral approach. There are reporting gaps in some sectoral tables (e.g., in the energy sector) and in table 8(b) (recalculations). The ERT encourages the Party to provide estimates for all categories where emissions occur in the country, even if they are minor, by using simple but reasonable approaches, utilizing expert judgement as necessary.

Transparency

24. The ERT encourages the Czech Republic to improve the transparency of the inventory by including additional information in the NIR with regard to the annexes on key category analysis and the assessment of completeness, the identification of emission factors used, improved descriptions of individual sectors,[4] explanations as to the selection of methodologies, and information on the sources of AD. The most relevant background material that is only available in the Czech language should be included in the NIR in English. The methodologies used for estimating emissions should be appropriately referenced, any country-specific data should be identified and referenced in the NIR, and rationales should be provided for the selection of specific default EFs. The methodological descriptions in the NIR should be more detailed and consistent with the actual data used.

25. The ERT found that in table 9(a) only limited information is provided to explain the use of the notation keys. Furthermore, the use of the notation keys is not consistent across all the CRF tables. The ERT encourages the Party to provide some explanation of the use of all the notation keys and to use them in a manner that is consistent with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines).

Consistency

26. The ERT noted that the Party's recalculations of its base year emissions between the second national communication (1998) and the 2006 submission resulted in an increase in the estimates of total GHG emissions by 2.2 per cent. During the in-country visit the Party provided a transparent overview of all quantitative changes at the level of source categories. The biggest change relates to a recalculation of N_2O emissions from agricultural soils. These recalculations, which resulted in a significant improvement of the inventory, are also explained in the NIR.

27. The ERT further noted that the consistency of the time series needs further improvement, because the Czech Republic has not recalculated the emissions data for the years 1998–2004: these are still based on preliminary energy data, although the CSO usually makes the final energy balance available about 12 months after 31 December of a given year. The ERT encouraged the Czech Republic

[4] For example, a description of expert judgement on insignificant land-use changes and a description of the linking of land-use categories under CORINE and the Czech Office for Survey, Mapping and Cadastre (COSMC), including definitions of land-use categories, are needed for the LULUCF sector.

to update regularly the data for the most recent year on the basis of the final energy balance. The ERT also noted the use of low-tier methods for some key categories, for example, for iron and steel production (category 2.C.1); the eventual use of higher-tier methods in such cases could result later on in an inconsistency of the time series.

Comparability

28. The ERT appreciated that the Czech Republic has made significant progress in increasing the comparability of its inventory with those of other Parties by submitting for the first time a complete time series of CRF tables covering the period since 1990; by estimating actual emissions of F-gases for the first time; by providing recalculations in the industrial processes sector, including a complete reallocation of emissions from some source categories (between the energy sector and industrial processes); and by significant improvements in the LULUCF sector, in particular with respect to using the revised reporting format. The ERT noted that comparability should be further improved, especially by using methodologies that are more consistent with the IPCC good practice guidance for the categories identified in paragraph 30 below.

Accuracy

29. During the in-country visit the ERT noted that the inventory might overestimate emissions in the base year due to: (a) the use of a tier 1 methodology for CH_4 emissions from managed solid waste disposal sites (category 6.A.1) instead of a higher tier 2 methodology; (b) the use of country-specific emission factors for N_2O emissions from the use of solid fuels in the energy industries (1.A.1), manufacturing industries and construction (1.A.2) and other sectors (1.A.4) without providing relevant background material and explanations for those EFs; (c) the use of default EFs for CO_2 emissions from solid fuel use in stationary combustion (1.A) (although more accurate country-specific EFs could be calculated on the basis of information available in the country); and (d) the use of country-specific EFs for CH_4 from energy industries, liquid and solid fuels (1.A.1) and manufacturing industries, liquid fuels (1.A.2) without providing relevant background material and explanations for the use of those emission factors. These estimates are not in line with the IPCC good practice guidance. The ERT requested the Party to provide additional information and/or revised estimates. In response, the Czech Republic revised the estimates and submitted them to the ERT in a timely manner, so that these revised estimates could be used in this report. The ERT therefore concludes that the figures reflected in this review report are consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

30. The ERT also noted that the inventory might underestimate emissions because of the gaps in some categories, such as CO_2 and CH_4 emissions from 1.B.2(c) (venting and flaring for oil and natural gas); CH_4 and N_2O emissions from 1.A.3(a) (transport, civil aviation, aviation gasoline); N_2O emissions from 1.A.3(b) (transport, road transportation, liquefied petroleum gas (LPG)); CO_2 emissions from 1.B.1(a) (fugitive emissions from coal mining and handling); N_2O emissions from several industrial processes (e.g., glass production, bricks and ceramics, ammonia production, ethylene production); CO_2 emissions from road paving with asphalt and asphalt roofing; GHG emissions from ferroalloys production; several categories in the LULUCF sector (e.g., cropland remaining cropland, grassland remaining grassland); and N_2O emissions from industrial wastewater and sludge. The ERT encourages the Party to prepare and report estimates for all the missing categories.

Recalculations

31. In its 2006 inventory submission, the Czech Republic has provided a complete time series for the CRF tables (1990–2004) for the first time; earlier submissions contained only CRF tables for a few years. The information on recalculations available until now has therefore been very limited and more qualitative than quantitative in nature. The ERT acknowledges that during the in-country visit the Party provided a sector-by-sector comparison of emissions data for the base year between the second national communication (submitted in 1998) and the 2006 inventory submission.

32. The ERT expects that in the future the Party will report recalculations in a more transparent manner in the NIR and the CRF tables. The ERT emphasizes the need to establish a transparent and well-documented process with regard to recalculations, and to report the recalculations comprehensively in the NIR.

Uncertainties

33. The Czech Republic has provided a tier 1 uncertainty analysis for 25 source categories and for the inventory in total, following the IPCC good practice guidance. However, the analysis is based to a great extent on the default uncertainties included in the IPCC good practice guidance and on expert judgement. The Party recognized that more reliable results could be obtained by gathering data on the uncertainties of AD and emission factors (EFs), but did not indicate by when this could be achieved. The ERT encourages the Party to use more country-specific information and to request the institutions providing activity data or the institutions in charge of estimating emissions to estimate the relevant uncertainty data as well. Such estimates should cover not only key categories but all categories in order to provide an appropriate basis for the management of inventory improvements.

34. The information on uncertainties is not yet fully consistent with the requirements of the UNFCCC reporting guidelines. The ERT suggests that the Czech Republic estimate uncertainties for non-key categories as well as key categories and use more country-specific information on the uncertainties in activity data and emission factors. Due to poor documentation and reporting of uncertainties in the past, the overall improvement in the inventory does not include improvements in the overall uncertainty.

3. Areas for further improvement

Identified by the Party

35. The NIR identifies several areas for improvement. These relate in particular to:

(a) Use of higher-tier methods in some sectors following recommendations of former ERTs (e.g., for CO_2 emissions from waste incineration);

(b) Improving the completeness of the CRF tables;

(c) The updating of country-specific parameters used in the inventory;

(d) Improvement of the uncertainty estimates.

36. In its response to the issues raised during the review, the Czech Republic revised its estimates of

(a) CO_2 emissions from combustion of solid fossil fuels;

(b) CH_4 emissions from fuel combustion;

(c) N_2O emissions from fuel combustion;

(d) CH_4 emissions from solid waste disposal sites.

37. The ERT welcomed the fact that the Czech Republic provided revised estimates in due time and noted that these revisions should be fully incorporated in the next inventory submission.

Identified by the ERT

38. The ERT identifies the following cross-cutting issues for improvement. The Party should:

(a) Improve transparency by

(i) Providing a complete explanation of the use of the notation keys and using them in a more consistent manner;

(ii) Providing better information on all data sources used;

(iii) Integrating relevant information requested by the ERT during the in-country visit into its future NIRs;

(b) Providing more precise descriptions of those methodologies that differ from from those of the IPCC, including information in English related to background material that is only available in Czech;

(c) Improving the key category analysis by using the sector split recommended by the IPCC and by addressing the LULUCF categories as well;

(d) Improving the QA/QC system in line with the requirements of ISO 9001;

(e) Improving the documentation of quality control at all stages of inventory preparation as well as with regard to the improvement of the inventory;

(f) Improving record-keeping by archiving the underlying calculation sheets and background material at the CHMI;

(g) Recalculating the time series since 1998 using the final energy data, including proper documentation in the NIR;

(h) Providing the necessary resources in order to speed up further improvements in the national GHG inventory.

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

4. Energy

Sector overview

40. In the base year, total GHG emissions from the energy sector amounted to 156,233.5 Gg CO_2 equivalent, or 80.4 per cent of total national GHG emissions. A sharp decline in GHG emissions (of 24.8 per cent) occurred between 1990 and 1994, but thereafter until 2004 the emissions fluctuate without any distinctive trend. In 2004, GHG emissions from energy were 22.2 per cent lower than in 1990. In 1990 about 94.6 per cent of emissions from the energy sector originated from fossil fuel combustion and the remaining 5.4 per cent were from fugitive emissions. The dominance of the emissions from fossil fuel combustion has continued after 1990; in 2004, the energy sector accounted for 83.0 per cent of total national GHG emissions, with fuel combustion contributing 95.7 per cent of these emissions.

41. CO_2 emissions from the energy sector constituted 88.9 per cent of total CO_2 emissions in 1990. In absolute terms, 145,612.4 Gg CO_2 were emitted from this sector, mainly due to fossil fuel combustion in energy industries, which contributed 39.6 per cent of the total CO_2 released from the energy sector. Manufacturing industries and construction contributed 32.0 per cent to total CO_2 emissions, the other sectors (mostly residential and commercial) category contributed 22.2 per cent, and transport contributed 5.0 per cent. From 1990 to 2004, the share of energy industries in total CO_2 emissions from the energy

sector increased to 49.8 per cent, and the share of the transport sector was 13.3 per cent. The shares of all other subsectors went down significantly over the period 1990–2004.

42. About 9,956.6 Gg CO_2 equivalent of CH_4 were emitted from the energy sector in 1990, which constituted 6.4 per cent of the total GHGs released from this sector. CH_4 emissions have since decreased, to 5,747.0 Gg CO_2 equivalent in 2004, and their share in emissions from the energy sector is now 4.7 per cent. The decrease in CH_4 emissions was mainly due to the closure of coal mines in the Czech Republic. N_2O emissions from the energy sector in 1990 amounted to 664.5 Gg CO_2 equivalent, or 0.4 per cent of the emissions from energy. In 2004, N_2O emissions from the energy sector rose to 1,074.9 Gg CO_2 equivalent, contributing 0.8 per cent to the emissions from the sector in 2004. This is mainly due to increases in N_2O emissions from the continuously rising population of vehicles equipped with three-way catalytic converters.

43. The CRF tables are complete except for a few categories, such as fugitive CH_4 emissions from venting and flaring of oil and natural gas (category 1.B.2(c)), CH_4 and N_2O emissions from gasoline combustion in aviation (1.A.3(a)), and N_2O emissions from LPG consumption in road transport (1A.3(b)). The ERT recommends that, for completeness of reporting, GHG emissions from all sources in the country should be estimated, regardless of how small their contribution to total emissions might be or how uncertain those values are.

44. Key category analysis has been carried out using both level and trend assessments. This is in line with the IPCC good practice guidance. However, the justification for merging CO_2 emissions from off-road and water transport together as a key category at the level assessment is not clear. The ERT encourages the Party in future not to merge off-road transport and navigation when conducting key category analysis, but to have navigation as a separate category for CO_2, N_2O and CH_4 emissions. Both the level and the trend analysis done by the Party identify CO_2 emissions from solid, liquid and gaseous fuel combustion in stationary sources, and fugitive CH_4 emissions from solid fuel extraction, as key categories.

45. The recalculations presented by the Party in its 2006 submission, especially for 1990, include the reallocation of emissions from non-energy use of fuels (production of iron and steel, production of ammonia) from category 1.A.2 (manufacturing industries and construction) to category 2 (industrial processes, specifically 2.C.1. and 2.B.1). Furthermore, CO_2 emissions from sulphur removal from coal combustion from category 1.B.1(c) (other) have been reallocated to category 2.A.3 (limestone and dolomite use). Also, the CH_4 data for fugitive emissions – natural gas (1.B.2(b)) for 1990–2004 have been revised and recalculated because new data were obtained on the technical discharge of natural gas at compressor stations in the transit system for the transport of natural gas across the territory of the country.

46. The activity data used for estimating emissions from the energy sector mostly come from the CSO. QA/QC procedures are applied to the AD by means of checks with the data providers. For example, fuel extraction data were checked with the Czech Mining Authority, the Employers Federation of the Mining and Petroleum Industry, and the Miner's Association, and liquid fuel consumption data were verified using data produced by the Czech Association of the Petroleum Industry and Trade. Random checks are carried out by the CHMI to verify the correctness and completeness of the data entered in the CRF tables.

47. The ERT recommends that the NIR describe in more detail the methodologies and emission factors used. This would make it possible to reconstruct the inventory from the underlying data. This relates, for example, to the method/model used to estimate CO_2 emissions from fossil fuel combustion in the residential sector (an MAED-type[5] model has been used but no description is provided), and to the methodologies/models used for estimating GHG emissions from transport.

[5] MAED = Model for the Analysis of Energy Demand.

Reference and sectoral approaches

48. CRF table 1.A(c) reports a difference of 10.9 per cent between the reference and sectoral approaches in 1990. However, in the NIR the same difference is given as about 1.7 per cent (table 3.1). A similar situation is observed for other years. The NIR explains (table 3.1) that the principal reason for the different values in the CRF and the NIR is that the values in the CRF table include the energy content of fuel used as feedstock for non-energy purposes; when this factor is taken into account, the difference decreases considerably. The ERT recommends that the Czech Republic, in its next submission, report apparent consumption excluding non-energy use and feedstock in CRF table 1.A(c). This approach is likely to make the difference in CO_2 emissions between the two approaches, reported in CRF table 1.A(c), much lower.

International bunker fuels

49. The Czech Republic estimates emissions from domestic and international aviation separately. The allocation is based on fuel deliveries for international aviation as recorded in a 2004 report of the CSO entitled "Supply of basic final refinery products". The methodology used for estimating emissions is not described in the NIR and no description was provided to the ERT during the review. The ERT recommends that the Party include further methodological information in its future inventory submissions and encourages it to consider applying higher-tier methods based on landing and take-off data.

Feedstocks and non-energy use of fuels

50. CO_2 emissions from masout (heavy fuel oil) used for ammonia production have been included in category 2.B.1 (ammonia production) and CO_2 emissions from the whole amount of coke used in metallurgy have been reported under 2.C.1 (iron and steel production). An explanation is needed as to whether all fossil fuel products used for non-energy purposes are included in the estimates (for example, the petrochemical feedstock which stores about 80 per cent of carbon).

Key categories[6]

Stationary combustion: solid fuels – CO_2

51. CO_2 emissions from the combustion of solid fuels are the most important key category, identified as key by both level and trend assessments. In 1990, emissions from this category accounted for 55.0 per cent of total national GHG emissions. According to the IPCC good practice guidance, country-specific emission factors, if available, should be used for a key category. However, the Czech Republic has consistently used the default IPCC CO_2 EFs for estimating CO_2 emissions from combustion of coal for the period 1990–2004. This approach has been retained in the 2006 submission, despite the fact that net and gross calorific values (NCVs/GCVs) for different types of Czech coals are available (as shown in a study by Fott (1999)) and could be used to develop country-specific CO_2 EFs. The reason given in the NIR for using the IPCC values is that the differences between the IPCC CO_2 default EFs for different types of coal and the country-specific EFs for the same coals were not significant in the context of the overall uncertainty. The ERT did not agree with this judgment and stated that, to be in line with the IPCC good practice guidance, the estimates should be the best estimates possible, neither underestimating nor overestimating the emissions regardless of how wide the uncertainty range is. The ERT also emphasized that non-utilization of country-specific CO_2 EFs gives rise to overestimation of CO_2 emissions from this category. During the 2006 in-country review, therefore, the ERT advised the Party to recalculate the entire time series using country-specific EFs.

[6] This section and similar sections for the other sectors are structured according to those categories that were key categories in 1990, except for the F-gases, for which the categories which were identified as key categories in 2004 are included.

52. The Czech Republic agreed with the ERT's judgment and recalculated CO_2 emissions from stationary combustion of solid fuels during the 2006 review process. The revised estimates were provided to the ERT and they are reflected in this report. The ERT appreciated very much that the Czech Republic submitted the revised estimates for CO_2 emissions from combustion of coal in due time and that the recalculations followed the recommendations of the ERT. For 1990, the revision resulted in a decrease in CO_2 emissions from stationary combustion by 1,195.4 Gg CO_2. The ERT recommends that the Czech Republic provide recalculation tables for the years 1990–2004 applying the country-specific EFs in its next submission, using the same values as those submitted to the ERT during the 2006 review.[7] It also recommends the Party to provide in the NIR a description of the method used, the assumptions made, a table of the most important parameters, and references to the sources of data.

Stationary combustion: solid fuels – CH_4

53. Over the period 1990–2001, CH_4 emissions from stationary sources were calculated as a fraction of C_xH_y emissions, determined within the framework of REZZO (the national emissions register for traditional pollutants). These emissions represent the sum of CH_4 and non-methane volatile organic compounds (NMVOCs). The fraction of CH_4 was assumed to equal 35–50 per cent. However, this assumption could not be verified for individual fuels. Since 2003, all CH_4 emissions have been determined on the basis of default emission factors taken from the Revised 1996 IPCC Guidelines. The Party has not checked whether these two methodologies are consistent. In the ERT's opinion, the EF used in the REZZO method is too high when compared to the IPCC default values, which may result in an overestimate of emissions in the earlier years, including 1990. During the review process, therefore, the ERT recommended, in accordance with the IPCC good practice guidance, that the Czech Republic follow the same methodology across the whole time period.

54. The Czech Republic agreed with the ERT's judgment and recalculated CH_4 emissions from stationary combustion of solid fuels during the 2006 review process; the ERT appreciated this very much. The revised estimates were provided to the ERT in timely fashion and are reflected in this report. For 1990, the revision resulted in an increase in CH_4 emissions from stationary combustion by 10.05 Gg CH_4. The ERT recommends that the Czech Republic provide recalculation tables for the years 1990–2004 applying the revised EFs in its next submission, using the same values as those submitted to the ERT during the 2006 review.[8] It also recommends that the Party provide in the NIR a description of the method used and the assumptions made, a table of the most important parameters, and references to the sources of data.

Stationary combustion: solid fuels – N_2O

55. The Party explained during the in-country visit that the implied emission factors used for estimating N_2O emissions from energy industries – solid fuels (1.A.1), manufacturing industries and construction – solid fuels (1.A.2), and other sectors – solid fuels (1.A.4) are country-specific and are within the range of the IPCC default EFs. However, comparison of the two showed major discrepancies: the default factors used are in fact about three times higher than the IPCC default factor of 1.4 kg N_2O/TJ. The ERT also noted that the Party has used different EFs for the different sectors for the same fuel, which is not consistent with the approach of the IPCC. The ERT recommended during the review process that the Party recalculate the estimate of N_2O emissions from combustion of solid fuels in stationary sources for the period 1990–2004 using the IPCC default EF.

[7] As formulated by the Czech Republic in "Response of the Czech Republic to questions from the expert review Team (ERT) formulated in the course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006" (see part B of the annex).

[8] As formulated by the Czech Republic in "Response of the Czech Republic to questions from the expert review Team (ERT) formulated in the course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006" (see part B of the annex).

56. The ERT appreciated very much that the Czech Republic agreed to this recommendation and submitted recalculations for N_2O emissions from combustion of solid fuels in stationary sources in good time; these recalculations followed the ERT's recommendation and they are reflected in this report. For 1990, the revision resulted in a decrease in N_2O emissions from stationary combustion by 2.43 Gg N_2O. The ERT recommends that the Czech Republic provide recalculation tables for the years 1990–2004, applying the revised EFs, in its next submission.[9] It also recommends the Party to provide in the NIR a description of the method used and the assumptions made, a table of the most important parameters, and references to the sources of data.

Road transportation – CO_2

57. CO_2 emissions from road transportation amounted to 5,995.4 Gg in 1990, and increased by more than 140 per cent by 2004, to 14,538.6 Gg. The ERT recommends that the Party provide, in the next NIR, a detailed description of the methodology used to estimate CO_2 emissions from road transport including the values for the EF, their reference and the explanation for that choice.

Coal mining and handling – CH_4

58. Currently the IPCC default EFs are used to estimate CH_4 emissions from surface mining and post-mining activities. The Party considers it useful to carry out a study that would determine the ratio between the methane released and the brown coal produced by surface mining, in order to choose an EF that would correspond to the country-specific characteristics. The ERT supports this intention because emissions from this source in the base year amounted to 18.3 per cent of fugitive emissions from solid fuels.

Non-key categories

Road transportation – N_2O

59. N_2O emissions from the road transportation were estimated with a CDV[10] approach. The CDV approach is based on a combination of measurements performed for some cars typically used in the Czech Republic with widely used EFs taken from literature (see Dufek (2005)). The Party is encouraged to provide more details (e.g. identification of the EFs taken from literature, values for the EF estimated, identification of cars for which measurements have been performed, share of the fleet of those cars) of this approach in the next NIR.

Oil and natural gas – CH_4

60. CH_4 emissions from oil and natural gas operations are estimated using tier 3 methodologies and country-specific emission factors. These factors differ from the default values reported in the Revised 1996 IPCC Guidelines, but the differences are discussed and explained in the NIR.

5. Industrial processes and solvent and other product use

Sector overview

61. In accordance with Article 3, paragraph 8, of the Kyoto Protocol, the Czech Republic has chosen to use 1995 as its base year for HFCs, PFCs and SF_6 (the F-gases). The base year emissions from the industrial processes and solvent and other product use sectors (taken together)[11] amounted to 19,891.1 Gg

[9] The recalculations should use the same values as those in "Response of the Czech Republic to questions from the expert review Team (ERT) formulated in the course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006" (see part B of the annex).

[10] CDV = Transport Research Centre, Brno.

[11] In the base year, GHG emissions from industrial processes amounted to 19,126.3 Gg and GHG emissions from solvent and other product use to 764.8 Gg.

CO_2 equivalent, and represented 9.8 per cent and 0.4 per cent, respectively, of total national GHG emissions. CO_2 accounted for 91.8 per cent of sectoral emissions, N_2O for 7.2 per cent (mainly from nitric acid), CH_4 for 0.7 per cent, and actual emissions of the F-gases for 0.4 per cent.

62. Emissions from the industrial processes sector decreased by 32.3 per cent from the base year to 2004. The main driving forces for this change were reductions in CO_2 emissions from iron and steel production (by 5,807.1 Gg) and cement production (by 828.0 Gg). On the other hand, HFC emissions from ozone-depleting substance (ODS) substitutes and CO_2 emissions from limestone and dolomite use increased, by 600.0 Gg CO_2 equivalent and 367.3 Gg CO_2, respectively.

63. For CO_2, CH_4 and N_2O, detailed data are provided for the whole period 1990–2004, but for HFCs, PFCs and SF_6 data are only provided for the years 1995–2004. The Czech Republic is encouraged to estimate and report data for the F-gases for the years 1990–1994; to provide estimates for the sources that are currently missing (asphalt roofing, road paving with asphalt, calcium carbide, carbon black, dichloroethylene, styrene, methanol, ferroalloys production); to complete CRF table 9 (completeness) consistently with the data in the CRF tables; and to use the notation keys correctly and appropriately.

Key categories

Cement production – CO_2

64. CO_2 emissions from cement production have been identified as a key category on the level assessment for both 1990 (when they amounted to 2,489.2 Gg) and 2004 (when they were 1,661.2 Gg). Since its previous (2005) inventory submission the Czech Republic has changed from a method of calculation based on cement production to a method based on clinker production. Emission factors are based on data from individual installations. The values of the implied emission factors (IEFs) change noticeably between 1990 and 1999 – from 0.527 (1990) to 0.553 (1999) t CO_2/t clinker – and remain about 0.550 t CO_2/t clinker from 2000 to 2004, but the changes are known to be due to changes in the types of cement produced and the use of clinker substitutes. The NIR provides data on the recalculations made from the 2005 submission and describes data collection and QA/QC procedures.

Nitric acid production – N_2O

65. N_2O emissions from nitric acid (HNO_3) production have been identified as a key category on the level assessment for both 1990 (when they were 3.634 Gg N_2O) and 2004 (when they were 3.456 Gg). The IEF varies from 6.857 kg N_2O/t HNO_3 in 1990 to 6.476 kg N_2O/t HNO_3 in 2004 due to technology changes, as the NIR explains. The NIR also explains the origin of the AD and gives an analysis of the EFs. To enhance the transparency of its N_2O estimates, the Czech Republic is encouraged to provide further information in the NIR on the development of EFs from a technical study by Markvart and Bernauer (2005).

Iron and steel production – CO_2

66. CO_2 emissions from iron and steel production have been identified as a key category on the level assessment for both 1990 (when they amounted to 12,532.7 Gg) and 2004 (when they were 6,725.5 Gg), and they are also a key category according to the trend assessment in 2004. For the whole time series, a portion of emissions from the energy sector has been reallocated to this category in the 2006 submission; and the ERT appreciated the Party's completing the reallocation process which was recommended by previous reviews. Emissions have been calculated based on the coke consumption in blast furnaces (a tier 1 method) and reported under the category steel instead of coke. In the NIR, it is explained that actual emissions of coke occur not in the blast furnace but in the subsequent combustion of blast furnace gas in energy production. There are some inconsistencies as between the AD given in the NIR and those given in the CRF regarding coke consumption in the 1990–2003 time series. For 1990, the CRF shows 7,285 kt while the NIR shows 4,222 kt; for 1991 the corresponding figures are 6,435 kt and 2,959 kt; and

so on. Because this is a key category, the ERT encourages the Czech Republic to estimate these emissions using a higher-tier method according to the IPCC good practice guidance and to improve transparency by reporting the number of plants and describing the prevailing technologies.

ODS substitutes – HFCs

67. HFC emissions from ODS substitutes have been identified as a key category in 2004, on both level and trend assessment. These emissions increased from 0.735 Gg CO_2 equivalent in 1995 to 600.3 Gg equivalent in 2004. In its 2006 submission, the Czech Republic has estimated both actual and potential emissions, which is a notable improvement compared to earlier submissions, where only potential emissions were estimated. All emissions from stationary refrigeration are reported under "domestic refrigeration", and these emissions increased from 0.72 Gg CO_2 equivalent in 1995 to 76.41 Gg CO_2 in 1996, and up to 525.2 Gg CO_2 in 2004. The reason given for the sharp increase of emissions between 1995 and 1996 is the increase in imports of ODS substitutes for servicing purposes. No uncertainty analysis has been made: QC for this category is reported to be under development. The ERT encourages the Czech Republic to further disaggregate emissions from stationary refrigeration into subcategories; to consider the emissions from ODS substitutes contained in products; and to provide better documentation of the estimation method in order to improve transparency.

Non-key categories

Lime production – CO_2

68. CO_2 emissions from lime production decreased by 343.1 Gg from 1990 to 2004 (by 39.5 per cent). The main decrease took place from 1990 to 1991, when production dropped sharply because of economic restructuring. The NIR describes AD collection and QA/QC. In the Party's 2005 submission, emissions were equal to removals, and therefore no emissions were reported under this category. For the 2006 submission, the Czech Republic has developed an EF that is based on raw material consumption at plants and on the assumption that the hydrated lime, which accounted for 35 per cent of the production, recarbonates; this process removes CO_2 from the atmosphere. This is an important assumption, and the Czech Republic is recommended to provide in its next NIR the underpinning study that supports it, and to consider the emissions and removals separately.

Limestone and dolomite use – CO_2

69. Although they were not a key category in 1990, CO_2 emissions from limestone and dolomite use have been identified as a key category in 2004, on both level and trend assessment. These emissions increased from 677.5 Gg in 1990 to 1,044.8 Gg in 2004 (an increase of 54.2 per cent). The estimate is based on the limestone and dolomite used in power stations' sulphur removal units and in sintering plants. The emissions have increased sharply since 1996 due to new air quality regulations which required the installation of sulphur removal equipment at power plants. For the sake of completeness of the estimates, the ERT recommends that the Czech Republic also consider other uses of limestone and dolomite.

6. Agriculture

Sector overview

70. In 1990, emissions from the agriculture sector in the Czech Republic amounted to 15,474.1 Gg CO_2 equivalent, as compared to 8,044.1 Gg CO_2 equivalent in 2004 – a decrease of 48.0 per cent. The sector's contribution to total national emissions (excluding LULUCF) fell from 8.0 per cent in 1990 to 5.5 per cent in 2004. The main drivers for this decrease were reductions in the cattle population (by about 60 per cent) and in the consumption of synthetic fertilizers (by about 48 per cent).

71. The inventory for the agriculture sector is complete and includes all source categories and gases. However, the ERT identified some problems relating to documentation and transparency. For example, the Czech Republic has not followed the required structure of the NIR, according to which all sources and gases for the agriculture sector should be reported, and for each source a brief description of source category, methodological issues, uncertainty and time-series consistency, QA/QC and verification, recalculations and planned improvements should be provided; this should be rectified in the Party's next submission.

72. This part of the Czech Republic's GHG inventory has improved since the 2005 submission. In the 2006 NIR, revised tier 2 emission factors for dairy and non-dairy cattle have been reported, which has produced more accurate estimates of CH_4 emissions from enteric fermentation. These new EFs for cattle are in line with values for other European countries.

Key categories

Enteric fermentation – CH_4

73. In 1990, CH_4 emissions from enteric fermentation amounted to 231.9 Gg CH_4, or 82.8 per cent of total CH_4 emissions (280.0 Gg) from agriculture. Cattle account for 95.1 per cent of CH_4 emissions from enteric fermentation. In the 2006 NIR, the Czech Republic has reported tier 2 country-specific emission factors for dairy and non-dairy cattle, and used the *Statistical Environmental Yearbook of the Czech Republic* as a source for animal population data. These new EFs for cattle are in line with those used by other European countries. However, the methods used for deriving the tier 2 EFs come from studies by Hons and Mudrik (2003) and by Kolar et al. (2004), which have not been published in peer-reviewed scientific journals, and are available only in Czech. The ERT recommends that the Czech Republic present more information on major assumptions, data collections, expert consultations and parameters in the NIR to improve transparency for this key category.

Direct emissions from agricultural soils – N_2O

74. In 1990, direct N_2O emissions from agricultural soils amounted to 14.8 Gg N_2O and accounted for 51.4 per cent of total N_2O emissions from agricultural soils; in 2004, these emissions amounted to 8.7 Gg N_2O (56.4 per cent). Emissions from this source decreased by 41.2 per cent from 1990 to 2004, mainly because of reductions in animal populations, the consumption of synthetic nitrogen (N) fertilizers and crop production. N_2O emissions from animal manure on pasture, range and paddock (category 4.D.2) are included in direct emissions from soils (category 4.D.1) in the key category analysis conducted by the Czech Republic. For comparability with other Parties' inventories and the secretariat's analysis, the Czech Republic should consider separating the two categories.

75. Three sources – synthetic N fertilizers, animal manure applied as fertilizers and crop residue decomposition – collectively accounted for 98.8 per cent of total direct N_2O emissions from agricultural soils in 1990 (98.7 per cent in 2004). The Czech Republic uses the IPCC default EFs of 0.0125 kg N_2O-N/kg N for synthetic N fertilizers, animal manure applied to soils, biological N fixation and crop residue decomposition, and the factor of 8 kg N_2O-N/ha/yr for cultivation of histosols.

76. As noted by the previous reviews, the Czech Republic has not reported the fractional parameters (CRF table 4.Ds2) for all years and the ERT recommends that the Party complete the relevant additional tables.

77. The sum of animal waste management systems (AWMS) (excluding pasture, range and paddock) multiplied by the IPCC default for $Frac_{GASM}$ of 0.2 does not produce the same value as the one reported in CRF table 4.D. The difference arises from the fact that the Czech Republic has not included manure from daily spread as part of manure applied to soils. This is not consistent with the Revised 1996 IPCC

Guidelines. The ERT recommends that for its next submission the Czech Republic correct this problem and ensure consistency in the CRF tables across all years.

Indirect emissions from agricultural soils – N_2O

78. In 1990, indirect N_2O emissions from agricultural soils amounted to 11.7 Gg N_2O and accounted for 40.6 per cent of total emissions from agricultural soils; in 2004, these emissions amounted to 5.8 Gg N_2O (38.0 per cent). Indirect N_2O emissions decreased by 50.0 per cent from 1990 to 2004. Emissions from leaching and run-off accounted for 83.4 per cent of indirect N_2O emissions from agricultural soils in 1990, and atmospheric deposition for the remaining 16.6 per cent; these shares have remained almost the same in 2004. The Czech Republic uses the IPCC default EF of 0.025 kg N_2O-N/kg N and an N leaching factor of 30 per cent, and IPCC default EFs and volatilization factors of 10 per cent for synthetic N fertilizers and 20 per cent for manure N. The fractional parameters are not reported in the CRF tables; the ERT recommends that the Czech Republic rectify this for its next submission.

Non-key categories

Pasture, range and paddock manure – N_2O

79. Emissions from this source decreased from 2.3 Gg N_2O in 1990 to 0.9 Gg N_2O in 2004, a reduction of 62.1 per cent, because of the decrease in animal populations since 1990. The IPCC tier 1 method has been used. The secretariat identified N_2O emissions from animal manure on pasture, range and paddock as a key category by trend assessment in 2004, but the Czech Republic did not; the Czech Republic should review this during the preparation of the key category analysis for its next submission.

Manure management – CH_4

80. The Czech Republic uses the IPCC tier 1 method for estimating emissions from this category, which amounted to 48.1 Gg CH_4 in 1990 and 24.6 Gg CH_4 in 2004. Between 1990 and 2004, these emissions decreased by 48.9 per cent, due mainly to the reduction in the cattle population since 1990. The secretariat identified CH_4 emissions from manure management as a key category by trend assessment in 2004, but the Czech Republic did not; the Czech Republic should review this during the preparation of the key category analysis for its next submission.

81. The ERT considers it desirable to develop tier 2 emission factors for dairy and beef cattle since data on daily feed intakes are available. Tier 2 emission factors could be derived from data on enteric fermentation in the studies by Hons and Mudrik (2003) and Kolar et al. (2004). Other parameters such as methane producing potential (Bo) and the methane conversion factor (MCF) are also available from the IPCC good practice guidance. The ERT encourages the Czech Republic to derive tier 2 country-specific CH_4 EFs for dairy and beef cattle. In line with the improvement plan mentioned in the 2006 NIR, the ERT also encourages the Czech Republic to determine a country-specific allocation of the distribution of livestock between different AWMS.

7. Land use, land-use change and forestry

Sector overview

82. Forest land covers 33.6 per cent of the total land area of the Czech Republic. According to the data reported, net GHG removals by LULUCF increased by about 177.7 per cent between base year and 2004. In 2004 the LULUCF sector was a net sink of 4,804.4 Gg CO_2 equivalent, which offset about 3.4 per cent of total GHG emissions from other sectors. In 1990 net removals from LULUCF were about 1,730.1 Gg CO_2 equivalent, offsetting only 0.9 per cent of GHG emissions from other sectors.

83. In its 2006 submission, the Czech Republic has reported the LULUCF sector for the first time using the revised CRF tables, as agreed in decision 13/CP.9, and, following the transition to the LULUCF format, has recalculated all years from 1990 to 2004. Also for the first time in 2006, the Czech Republic has reported emissions/removals for such categories as grassland, wetland and other land.

General and cross-cutting issues relating to LULUCF

84. The 2006 submission of the Czech Republic is more complete than its previous submissions. However, for several land-use categories, such as cropland remaining cropland (5.B.1), land converted to cropland (5.B.2), grassland remaining grassland (5.C.1) and land converted to settlements (5.E.2), emissions and removals have been considered as negligible and are therefore reported as "not estimated" ("NE") or "not occurring" ("NO"). The NIR states that this assumption is based on the application of tier 1 methods of the IPCC good practice guidance for LULUCF; however, the work on which this assumption is based and the basis for excluding these categories have not been reported, and the assumption has not been justified. There is no provision in the UNFCCC reporting guidelines to exclude the reporting of any category or source other than the optional ones. The ERT recommends that the Czech Republic complete its reporting by estimating the categories which are currently reported as "NE" or "NO", in accordance with the UNFCCC reporting guidelines and the IPCC good practice guidance for LULUCF, using national data or, if national data are not available, default IPCC data.

85. The sampling system used in collecting measurements and updates for the Forest Management Plans (FMP) database is not described in the NIR. The methods used in deriving activity data and references for some of the factors used have not been provided. The ERT encourages the Czech Republic to include in its next NIR a complete description of the sampling system used in collecting AD for GHG inventory purposes.

86. Estimates of uncertainty have not been provided for the LULUCF sector. The ERT was informed that an estimation of uncertainty will be prepared and included in the Party's next submission; the ERT encouraged the Czech Republic to do so.

87. No information on key category analysis has been provided in CRF table 7. The key category analysis performed by the UNFCCC secretariat identified three key categories in the LULUCF sector: forest land remaining forest land – CO_2 (level and trend assessments), cropland remaining cropland – CO_2 (trend assessment) and other land – CO_2 (level and trend assessments). The NIR indicates that carbon stock change in biomass in forest land is the only key category identified by the Czech Republic but it does not specify in which subcategory (forest land remaining forest land or land converted to forest land) and does not describe the method used. It is clear that there is a discrepancy in the results of these two key category analyses. During the in-country visit the ERT was informed that a key category analysis using the IPCC tier 1 method had been conducted. The ERT recommends that the Czech Republic provide transparent documentation of its key category analysis, including the LULUCF sector, in its next submission.

88. QA/QC procedures have not been properly established for the inventory preparation process in the LULUCF sector. A summary table for national land area and land-use categories has not been provided in the NIR. The ERT was informed that a LULUCF steering group has been established to provide advice on the selection of methods and data, and to check and review the GHG estimates for the LULUCF sector. The ERT recommends that the Czech Republic establish and document clearly its QA/QC procedures for the LULUCF sector and provide tabulated data for land-use categories in the general section on QA/QC of its next NIR.

Consistent representation of land area

89. The NIR does not provide a sufficient and transparent description of methods used in land-use classification or consistent land representation and has not provided the national land-use definitions to enable the ERT to check for possible inconsistency in land use classification. In the NIR it is indicated that the details on how land uses have been classified into IPCC categories are included in a report prepared for the Czech Ministry of Environment (Cienciala *et al*, 2005a), but this report is available only in the Czech language. In addition, a data table of national area and land uses has not been included, although it is required by the UNFCCC guidelines, to ensure that no double counting or omission of area has occurred.

90. During the in-country visit the ERT was informed of how classification of land use and consistent land representation has been performed. The information presented to the ERT shows the national land-use categories used by the Czech Office for Survey, Mapping and Cadastre (COSMC) and the land uses categories used by the other data source, Land Cover Database of the Pan-European CORINE project for 1990 and 2000. The presentation also illustrates how COSMC and CORINE land uses have been grouped, matched and classified into the corresponding IPCC categories and how land-use change and areas has been identified. The information received during the in-country visit clarified the approaches and methods used by the Czech Republic for land representations and revealed a good practice approach. However, these efforts have not been transparently documented in the NIR. The ERT encourages the Czech Republic to document clearly in its next NIR all the steps taken and application of approaches and methods used for land representation in a similar way to the presentation provided during the in-country visit.

Key categories

Forest land remaining forest land – CO_2

91. This category was identified by both the secretariat and the Czech Republic as a key category (both in 1990 and in 2004). A tier 2 method was used to estimate both CO_2 and non-CO_2 emissions for this category. Although the Czech Republic has detailed data on land areas, forest types, species and other inventory-related parameters, all the estimates for four distinct forest types have been reported together on an aggregate level. Such aggregated reporting does not provide sufficient transparency and may lead to wrong estimates of GHG emissions. Estimates should be prepared using available national data and methods at the most disaggregated level; results can then be aggregated at the national level. The ERT recommends that the Czech Republic make more effort to use the data that are available, at their actual disaggregated level, in order to provide more detailed, well-documented estimates in its future GHG inventories.

92. There is a lack of transparency in the description and documentation of how the data on volume increment were derived by Forest Management Institute from the data reported to the FMP database. The way the values in table 7.4 and 7.5 have been weighted to arrive at an average value for the forest land category is not described, and not all reference sources for these values have been included in the NIR, for example, for the expansion to over-bark volume factor (F_B) and the factor of unreported harvest loss (F_{HL}).

93. Equations 1 and 2 in section 7.2.2 of the NIR are modifications of the original equations 3.2.5 and 3.2.7 of the IPCC good practice guidance for LULUCF. In equation 1 the Party has included factor F_B to expand volume under bark to volume over bark. In equation 2 factor R (the root ratio) has been introduced with the argument that this was omitted from the IPCC good practice guidance for LULUCF but this was corrected in the recent 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Another factor, F_{HL}, has been introduced to include the unaccounted loss associated with harvest, and in the same equation factor F_{BL} of the fraction of biomass left to decay has been removed from the equation. The ERT was informed that, in the opinion of the Czech experts, these modifications

to the IPCC equations do not change the nature of the equations; rather they add clarity and enable the Czech Republic to input its available data directly. However, some of the factors used are not well referenced, for example, F_B and F_{HL}. In addition, the way in which other inputs (e.g., wood density (D), and biomass expansion factor applicable to the increment (BEF1)) have been weighted or averaged is not described. It was therefore not possible for the ERT to assess the implications of these modifications for the IPCC equations. The ERT suggests that the Czech Republic change its national data to fit the IPCC equations and document them in a tabular format, or use its national equations and provide adequate documentation as required.

94. For soil carbon, only emissions from mineral soils have been estimated. Changes in carbon stock in organic soil are considered negligible. However, the wrong notation key ("NO") is used instead of "NE" in CRF table 5.A; this should be corrected in the Party's next submission.

Cropland remaining cropland – CO_2

95. The Czech Republic reports category 5.B.1 as "NE" and notes in CRF table 5.B that "Under the conditions of the country, carbon stock change of this category can safely be considered negligible". During the in-country visit the Party also indicated the lack of data needed to estimate GHG emissions in this category. The ERT noted that the Party has used default methods and data for other categories in this submission and suggests that the Party can similarly use default methods and data to report estimates for this category until the required data are developed. The ERT also noticed that the notation keys are not used correctly, for example, the notation key "NO" is used for soil carbon. Despite the fact that emissions for 5.B.1 are reported as "NE", category "Cropland remaining cropland – CO_2" was identified by the secretariat as a key category for both 1990 (by level assessment) and 2004 (by trend assessment), because it also includes carbon emissions from lime application in agriculture, which have been reported by the Czech Republic.

96. Only carbon emissions from lime application in agriculture have been estimated and reported as an aggregated value because, as the NIR states, it is impossible to separate the data for limestone and dolomite applications. The ERT encourages the Czech Republic to find an approach to separate these data and to provide disaggregated estimates in its future submissions.

Other land – CO_2

97. The reporting of emissions from other land remaining other land is not mandatory. All emissions from land conversion to other land have been reported as "NE" except for forest land and cropland converted to other land, which have been reported using IPCC tier 1 default methods.

98. The land-use classification used by the Czech Republic allows areas such as infrastructure, airports and roads to be part of the other land category. This classification is not consistent with the IPCC good practice guidance for LULUCF, in which such land-use areas are defined as coming under the settlements category. The IPCC good practice guidance for LULUCF defines other land as bare soil, rocks, ice and unmanaged land areas that do not fall into any of the other five land-use categories. The rationale for having such a category is to allow the area of identified land uses to match the national land area. The ERT encourages the Czech Republic to harmonize its land-use definitions with the definitions used by the IPCC good practice guidance for LULUCF, particularly for other land and settlements.

Non-key categories

Land converted to grassland – CO_2

99. For this category, the IPCC tier 1 default method has been used. The ERT observed some large inter-annual differences in the estimates for some years because of changes in the area data used in the years 1991 and 1996. These changes are mainly attributed to conversion from cropland to grassland. During the in-country review the Party explained that the data used are from official sources, such as the

CSO, and that for the transitional period in the early 1990s it is difficult to identify the underlying reasons for the differences. The ERT was informed that the cropland area is, in general, decreasing, being affected by a number of EU-related regulations and policies. The ERT recommends that the Czech Republic carefully check such variations and provide explanatory information in the NIR and the relevant CRF tables, especially when the values of AD and emissions fluctuate considerably.

Settlements remaining settlements – CO_2

100. The NIR states that land used for infrastructure such as industrial zones and city parks is included under other land. The ERT advises the Czech Republic to harmonize its land-use definitions for this category with the IPCC good practice guidance for LULUCF.

8. Waste

Sector overview

101. In 2004, the waste sector contributed 2.3 per cent of total national GHG emissions in the Czech Republic and 24.3 per cent of total CH_4 emissions, whereas in 1990 it contributed 1.4 per cent of total GHG emissions and 13.5 per cent of total CH_4 emissions. From 1990 to 2004, emissions from the sector increased by 26.0 per cent (or by 687.7 Gg CO_2 equivalent), despite a reduction in emissions from managed waste disposal sites as a result of the introduction of CH_4 recovery systems and a decrease in population.

102. A major improvement since the 2005 submission is that the Czech Republic has provided all the CRF tables for the whole time series, including the base year. The estimates for the waste sector are complete with the following exceptions:

(a) N_2O emissions from waste incineration are provided only for the years 2003 and 2004;

(b) CH_4 emissions from waste incineration are reported as "not estimated", since they are considered negligible;

(c) CO_2 emissions from waste incineration are not reported for 1990, being considered as "not occurring".

103. The methodologies, data sources and formulae used for calculations are described in the NIR for all reported categories, with some minor exceptions which are detailed below. Greater clarity is, however, still needed in the description of the sources, the parameters used and the years in which they have been applied, and in how certain parameters (e.g., the degradable organic content, DOC) are calculated.

104. In the course of the 2006 in-country review the Czech Republic revised its estimates for CH_4 emissions from solid waste disposal on land (a key category) using a tier 2 methodology, as suggested by the ERT and recommended by the IPCC good practice guidance. The corresponding explanation is provided below in paragraphs 106–109. The ERT appreciated very much that the Czech Republic accepted the ERT's recommendation to recalculate these emissions and submitted these recalculations in a timely fashion.

Key categories

Solid waste disposal on land – CH_4

105. In the base year (1990), CH_4 emissions from this category amounted to 1,662.6 Gg CO_2 equivalent and represented 62.7 per cent of total GHG emissions from the waste sector.

106. The Czech Republic has been encouraged by ERTs in previous years to apply the first order decay (FOD) method (a tier 2 method) for calculating CH_4 emissions from solid waste disposal sites, instead of using the default methodology (tier 1),[12] since this is a key category and a tier 1 methodology tends to overestimate emissions for the base year. The Czech Republic expressed its intention to do so next year, once gaps in the activity data for years before 1990 are filled. However, the time from which the new methodology is applied is crucial, for two main reasons: (a) the assigned amount is to be fixed during this initial review, and it would probably be based on an overestimated number; and (b) a change of methodology to tier 2 after the assigned amount has been fixed could result in lower emissions during the first commitment period, introducing a bias in the trend and resulting in an inconsistency in the time series.

107. During the in-country visit, therefore, the ERT encouraged the Czech Republic to estimate these CH_4 emissions using the FOD method, applying the available national data or the default parameters most appropriate for the national circumstances where no national data are available. In doing so, the Czech Republic had to ensure that the information provided was in accordance with the UNFCCC reporting guidelines and included the following:

(a) A description of the methodology and formulae used for the estimation of historical data (AD, EFs, other parameters, as appropriate);

(b) The assumptions made and the rationale for each of the formulae, parameters and values;

(c) Recalculation of the whole time series, including the data sets used in the calculation.

108. In its timely response, the Czech Republic provided to the ERT during the review a comprehensive document presenting the application of the FOD method and all information defined in the paragraph above (Havránek, 2004). The revised 1990 value for CH_4 emissions from solid waste disposal sites was accepted by the ERT. It amounts to 79.2 Gg CH_4 (the previous estimate was 93.2 Gg) emissions or 1,662.6 Gg CO_2 equivalent (the previous estimate was 1,957.2 Gg).

109. The ERT recommends that the Czech Republic implement this method for its next inventory submission and provide the relevant recalculation tables for the years 1990–2004. The same values for the parameters (i.e., OX = 0.1, DOC_f = 0.5, F = 0.55) and the same assumptions should be used as in the CUEC Working Paper 2007/2 (Havránek, 2007). The ERT also recommends that the Czech Republic provide in its next NIR a description of the FOD method used, the assumptions made, a table of the most important parameters, and references to the sources of data.

110. Sources for the data on CH_4 recovery are not referenced clearly in the NIR, but they were clarified during the in-country visit. Data for the years 1990–2001 are taken from a study that includes information about particular landfills with their corresponding amount of landfill gas incinerated, based on information provided by the companies operating those landfills. From 2002 onwards, the data have been provided by the Ministry of Trade and Industry in an aggregated format (showing the total quantity recovered) but not broken down by operating facility. The ERT recommends that in the Party's next submission the source of these data be clearly referenced in the NIR, and that efforts be made to provide the information in a disaggregated manner. The ERT also noted that the IPCC good practice guidance suggests that an inventory of known recovery facilities should be available.

[12] CH_4 emissions had been estimated using a modified default IPCC methodology (tier 1), which, although it is discussed in the NIR, is not described clearly or with the detail required. As the Czech experts explained during the in-country review, the DOC was estimated not based on the composition of waste (as the IPCC default method suggests) but based on measurements of methane generation from particular sites in the country, known kinetics of landfill gas generation, amount of waste and a constant value of *k*. The decrease of DOC (from 0.10 in 1990 to 0.08 from 1997 onwards) assumes an increasing influence of waste separation (paper) and increasing use of plastics. However, the method used for estimating the DOC is not provided in the NIR. The value of DOC equalled the lowest value from the IPCC default range for 1997 onwards.

Non-key categories

Wastewater handling – CH_4

111. The Czech Republic uses a tier 1 method as recommended by the IPCC good practice guidance for estimating emissions from domestic and industrial wastewater. A description of the methodology, an example of the calculation and the sources of data used are provided in the NIR and the corresponding CRF tables. In the case of domestic waste water, the sources for total population, the percentage of the people connected to the sewer and the percentage of the water treated are not clearly referenced. During the in-country visit, the Party clarified that the information is taken from the *Statistical Yearbook of the Czech Republic*; this reference should be included in the Party's next NIR.

Waste incineration – CO_2

112. Emissions from waste incineration are not reported for 1990, because there was no incineration. However, the Czech Republic should report these emissions as "NO" in CRF table 6.C for 1990 and provide the corresponding explanation in the NIR.

113. The trend in emissions from waste incineration seems to be inconsistent (a constant value is used for the years 1991–2002, but not after 2002) and it is not explained in the NIR. During the review, the Party clarified that the years 1991–2002 (reported as constant) needed to be recalculated because they are based on aggregated data. Data for 2003 and 2004 are based on the *Statistical Yearbook* and include the amounts for municipal, sludge, hazardous and clinical wastes separately. The ERT recommends that the Czech Republic recalculate the emissions using estimated disaggregated data, as stated in its NIR, in order to ensure consistency in the time series.

114. The NIR includes information about the amount of waste (192 Gg in 2004) that is incinerated as a fuel. The corresponding emissions are reported in the waste sector. To improve transparency and comparability, and be consistent with the IPCC good practice guidance, the ERT recommends that these emissions be allocated to other fuel in the energy sector, and that the corresponding recalculation be performed for the whole time series.

C. Calculation of the assigned amount

115. The Czech Republic's base year is 1990 and the Party has chosen 1995 as the base year for HFCs, PFCs and SF_6. Its quantified emission limitation is 92 per cent of base year emissions as defined in Annex B to the Kyoto Protocol.

116. Following the ERT's request that the Party revise its emission estimates for several categories, and the subsequent revision of the 2006 inventory (see paras. 22, 29, 51–56, 106–109), the Czech Republic recalculated the value of the assigned amount in the document "Response of the Czech Republic to questions from the expert review Team (ERT) formulated in the course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006". The recalculation has resulted in a change in the estimate of base year emissions from 196,280,576 tonnes CO_2 equivalent (as presented in the initial report) to 194,248,218 tonnes CO_2 equivalent. Based on this revised value and its Kyoto Protocol target (92 per cent), the Party has calculated its assigned amount to be 893,541,801 tonnes CO_2 equivalent. The ERT has reviewed the calculation and confirms that the assigned amount pursuant to Article 3, paragraphs 7 and 8, is calculated in accordance with the annex to decision 13/CMP.1.

D. Calculation of the commitment period reserve

117. Following the ERT's request to the Party to revise its emission estimates for several categories, and the subsequent revision of the 2006 inventory (see paras. 22, 29, 51–56, 106–109), the Czech Republic recalculated the value of the commitment period reserve (CPR) in the document "Response of the Czech Republic to questions from the expert review team (ERT) formulated in the

course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006". The recalculation has resulted in a CPR value of 732,161,864 tonnes CO_2 equivalent, which is based on total GHG emissions in the last year of the latest reported inventory (inventory for the year 2004). The ERT has reviewed the calculation and confirms that the CPR is calculated in accordance with paragraph 6 of the annex to decision 11/CMP.1.

E. National registry

118. Table 5 summarizes the information provided by the Czech Republic on the mandatory reporting elements on the national registry system, as stipulated by decision 15/CMP.1, which describes how its national registry system performs the functions defined in annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The information provided is transparent and in accordance with the UNFCCC guidelines.

Table 5. Summary of reporting on the national registry system

Reporting element	Provided / referenced	Comments
Registry administrator		
Name and contact information	Yes	Operátor trhu s elektrinou, a.s.
Cooperation with other Parties in a consolidated system		
Names of other Parties with which the Czech Republic cooperates, or clarification that no such cooperation exists	Yes	No such cooperation exists.
Database structure and capacity of the national registry		
Description of the database structure	Yes	Seringas™ system
Description of the capacity of the national registry	Yes	Covered in the Independent Assessment Report (IAR) [a]
Conformity with data exchange standards (DES)		
Description of how the national registry conforms to the technical DES between registry systems	Yes	Covered in the IAR
Procedures for minimizing and handling of discrepancies		
Description of the procedures employed in the national registry to minimize discrepancies in the transaction of Kyoto Protocol units	Yes	Covered in the IAR
Description of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction	Yes	Covered by additional information provided by the Party
Prevention of unauthorized manipulations and operator error		
An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error	Yes	Covered by additional information provided by the Party
An overview of how these measures are kept up to date	Yes	Covered by additional information provided by the Party
User interface of the national registry		
The Internet address of the interface to Party's national registry	Yes	https://www.povolenky.cz
Integrity of data storage and recovery		
A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	Yes	Covered in the IAR
Test results		
The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems	Yes	Covered in the IAR

[a] Pursuant to decision 16/CP.10, once registry systems become operational, the administrator of the international transaction log (ITL) is requested to facilitate an interactive exercise, including with experts from Parties to the Kyoto Protocol not included in Annex I to the Convention, demonstrating the functioning of the ITL with other registry systems. The results of this exercise will be included in an independent assessment report (IAR). They will be also included in its annual report to the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol.

119. By the time of the in-country visit complete information on procedures and tests as well as on steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction as well as an overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error was not available. However, the Czech Republic provided such information to the ERT after the in-country visit (see the next paragraph).

120. The ERT took note of the results of the technical assessment of the national registry, including the results of standardized testing, as reported in the independent assessment report (IAR) that was forwarded to the ERT by the UNFCCC secretariat as the administrator of the International Transaction Log (ITL) on 7 August 2007 as well as of the additional information forwarded to the ERT by the Czech Republic on 20 August 2007.

121. The ERT reiterated the main findings of the IAR, including that the registry has fulfilled sufficient obligations regarding conformity with the data exchange standards (DES). These obligations include having adequate transaction procedures, adequate security measures to prevent and resolve unauthorized manipulations, and adequate measures for data storage and registry recovery.

122. Based on the results of the technical assessment, as reported in the IAR, the ERT concluded that Czech Republic's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1, noting that registries do not have obligations regarding operational performance or public availability of information prior to the operational phase.

F. Land use, land-use change and forestry parameters and election of activities

123. Table 6 shows the Party's selection of parameters for forest definition as well as the elections for activities under Article 3, paragraphs 3 and 4, in accordance with decision 16/CMP.1. These values are within the agreed values in decision 16/CMP.1. The Czech Republic has also defined a value of 20 metres as a minimum width for linear forest formation.

Table 6. Selection of LULUCF parameters

Parameters for forest definition		
Minimum tree cover		30%
Minimum land area		0.05 ha
Minimum tree height		2 m
Minimum width for linear forest formation (non-mandatory)		20 m
Elections for Article 3, paragraphs 3 and 4, activities		
Article 3, paragraph 3, activities	**Election**	**Accounting period**
Afforestation and reforestation	Mandatory	Commitment period
Deforestation	Mandatory	Commitment period
Article 3, paragraph 4, activities	Election	Accounting period
Forest land management	Elected	Commitment period
Cropland management	Not elected	Not applicable
Grazing land management	Not elected	Not applicable
Revegetation	Not elected	Not applicable

124. The values are not fully consistent with what the Czech Republic has reported to the Food and Agriculture Organization of the United Nations (FAO). This is because the forest area data reported to the FAO are based on cadastral data which include permanently unstocked area (infrastructure) within forest land. These permanently unstocked areas have not been included in the latest recalculations of the

LULUCF time series (in the 2006 submission) and will not be used for reporting under the Kyoto Protocol.

125. The ERT noted that the value for minimum tree cover is different from that used in the NIR, where it is stated to be at least 20 per cent (section 7.2.1). The Party clarified that this is an error and that the only value for the minimum tree cover for the Czech Republic is 30 per cent, as reported in the initial report.

III. Conclusions and recommendations

A. Conclusions

126. The Czech Republic submitted or made available during the review process the information specified in the relevant provisions of paragraphs 6, 7 and 8 of the annex to decision 13/CMP.1, section I of the annex to decision 15/CMP.1, and relevant decisions of the CMP.

127. The national system of the Czech Republic is functional and the ERT considers it to be broadly consistent with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Shortcomings relate to incomplete fulfilment of reporting requirements with respect to transparency; to the fact that QA/QC and archiving are still under development; to the lack of resources; and to poor documentation of the decision-making processes.

128. The GHG inventory including a full set of CRF tables for the years 1990–2004 and an NIR have been submitted by the Czech Republic. The ERT considers the inventory submission to be broadly consistent with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Areas for further improvement relate to: the identification of key categories; the reporting of emissions for some missing categories; greater transparency in the reporting on methodologies and data sources, and of the approach used to estimate uncertainties; the inclusion of uncertainties for non-key categories; the need for regular recalculations in order to base the inventory on the final energy data; and further improvement in consistency between the NIR and the CRF.

129. The ERT confirms that the assigned amount pursuant to Article 3, paragraphs 7 and 8, has been calculated in accordance with the annex to decision 13/CMP.1. It amounts to 893,541,801 tonnes CO_2 equivalent. The ERT also confirms that the value of the commitment period reserve calculated by the Party (732,161,864 t CO_2 equivalent) has been calculated in accordance with paragraph 6 of the annex to decision 11/CMP.1.

130. Based on the results of the in-country review visit and the technical assessment, as reported in the IAR, the ERT concluded that Czech Republic's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1.

131. The Czech Republic has defined forests and chosen forest management as an additional activity under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decision 16/CMP.1.

B. Recommendations

132. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of the Czech Republic's information presented in the initial report. Many recommendations have been implemented during the review process and potential problems that could have led to an overestimation of base year emissions have been solved. The key remaining recommendations[13] are that the Czech Republic:

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

- Prepare for the 2008 submission updated information on the national system, including the information that was provided to the ERT during the in-country visit and reflecting the improvements planned up to the beginning of 2008, for example, with respect to QA/QC, archiving, the completeness of the inventory, recalculations, and transparency;

- Describe in more detail in its next inventory submission the improvements intended to make the national system more robust, for example, with regard to staffing and financial resources;

- Include in the 2008 submission emissions data for the source categories for which emissions have not so far been estimated.

133. In order to close gaps in the emissions data within the limits of available resources, the ERT suggests that the Czech Republic make use of approaches that use only country-specific data that are already available. However, such estimates should also include an assessment of the associated uncertainties. This assessment might be based on expert judgement.

134. The ERT appreciated the efforts the Czech Republic has made to revise emission estimates for the categories CO_2 emissions from the combustion of solid fossil fuels; CH_4 emissions from fuel combustion; N_2O emissions from fuel combustion; and CH_4 emissions from solid waste disposal sites. The ERT believes that this effort has notably improved the robustness of the estimates of emissions in the base year, the assigned amount and the commitment period reserve.

135. The ERT also noted the great efforts the Party has made to establish its national registry in time to avoid triggering a question of implementation.

136. The ERT suggests that the Party consider carefully any implications for the consistency of the time series when introducing further improvements to the inventory related to the use of higher-tier methods.

C. Questions of implementation

137. No questions of implementation were identified by the ERT during the initial review.

Annex I

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at: <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

IPCC. Good practice guidance for land use, land-use change and forestry, 2003. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.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>.

UNFCCC. 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/SBSTA/2004/8. Available at <http://unfccc.int/resource/docs/2004/sbsta/08.pdf>.

UNFCCC. 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. Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol. FCCC/KP/CMP/2005/8/Add.3. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>

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

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

UNFCCC secretariat. Status report for the Czech Republic. 2006. Available at <http://unfccc.int/resource/docs/2006/asr/cze.pdf>.

UNFCCC secretariat. Synthesis and assessment report on the greenhouse gas inventories submitted in 2006. FCCC/WEB/SAI/2006 (in preparation).

UNFCCC secretariat. The Czech Republic: Report of the individual review of the greenhouse gas inventory submitted in the year 2005. FCCC/WEB/IRI/2005/CZE. Available at <http://unfccc.int/resource/docs/2006/arr/cze.pdf>.

UNFCCC secretariat. The Czech Republic: Independent assessment report of the national registry of the Czech Republic. Reg_IAR_CZ_2007_1. Will be available at <www.unfccc.int>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Pavel Zamyslicky (National UNFCCC Focal Point, Department of Climate Change / Emissions Trading Unit, Ministry of the Environment of the Czech Republic) including additional material on the methodology and assumptions used. The following additional information was provided by the Czech Republic during the review.[1]

Czech Statistical Office, *Statistical Yearbook of the Czech Republic, 2005* (Praha) (a paper and an electronic copy).

Czech Statistical Office, *Statistical Yearbook of the Czech Republic, 2006* (Praha) (electronic copy).

Dufek, J. 2005. "Verification and evaluation of weight criteria of available data sources for N_2O from transportation", Report of the Transport Research Centre (CDV) for the Czech Hydrometeorological Institute, Brno.

Fott, P. 1999. "Carbon emission factors of coal and lignite: analysis of Czech coal data and comparison to European values", *Environmental Science and Policy*, 2/3 (June), pp. 347–354(8).

Havránek, M. 2007. "Emissions of methane from solid waste disposal sites in the Czech Republic during 1990–2005: Application of a first order decay model", CUEC Working Paper 2007/2, Environment Centre, Charles University, March.

Hons, P., and Mudrik, Z. 2003. "Czech country-specific data for estimation of methane emissions from enteric fermentation of cattle", AGROBIO Report for the Czech Hydrometeorological Institute (in Czech), Prague.

Informal communication: Calculation of CH_4 emissions from municipal solid waste.

Informal communication: Comments from the Czech Statistical Office on the energy, agriculture and LULUCF data.

Informal communication: Comparison of GHG emissions estimates between the second national communication and the 2006 inventory submission.

Informal communication: Estimates of CH_4 emissions from municipal solid waste under several scenarios.

Informal communication: Sources of information – Agriculture in the 2006 NIR.

Informal communication: Sources of information – Energy.

Informal communication: Sources of information – LULUCF in the 2006 NIR.

Kolar, F., Havlikova, M., Fott, P. 2004. "Recalculation of emission series of methane from enteric fermentation of cattle", Report of the Czech Hydrometeorological Institute (in Czech), Prague.

KONEKO Marketing Co, Ltd, *Energy Economy: Czech Republic*, 1995–1999, 1996–2000, 1997–2001, 1999–2003, 2000–2004 and 2001–2005 editions.

Markvart, M. and Bernauer, B. 2005. "Emissions of nitrous from chemical industry", Report for the Czech Hydrometeorological Institute (in Czech), Prague.

Rehacek, V. and Michalek, L. 2005. "Antropogenni emise fluoride siroveho, castecne fluorovanych uhlovodiku a zcela fluorovanych uhlovodiku v r. 2004 v Ceske republice', Listopad.

[1] This list does not include the presentations made by Czech experts during the in-country visit.

"Response of the Czech Republic to questions from the expert review Team (ERT) formulated in the course of the in-country review of Czech Republic's initial report under the Kyoto Protocol and Czech Republic's GHG inventory submitted in 2006" (submitted to the ERT through the UNFCCC secretariat on 13 April 2007).

Svoboda, K. 1996. "Emisni factory N_2O pro spalovacich procesy ve stacionarnich zdrojich a navrhy opatreni pro snizeni emisi", Report for the Czech Hydrometeorological Institute.

Takla, G. and P. Novacek. 1997. "Emise dulnich plynu v ostravsko-karvinskem uhelnem reviru a moznosti jejich minimalizace", in *Cesky Plynarensky a Naftovy Svaz: Technicky vybor "Plyn a zivotni prostredi"* (Praha).

1. Takla, G. 2002. "Uvolnovani metanu pri hlubinne tezbe uhli", in *Cesky Plynarensky Svaz*, Praha.

2. Vyzkumny Ustav Maltovin Praha spol. s.r.o. Problematika emisi sklenikovych plynu pri vyrobe cementu. Prosinec, 2003.

Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
CO_2	carbon dioxide
CO_2 eq.	carbon dioxide equivalent
CRF	common reporting format
EC	European Community
EIT	economy in transition
EF	emission factor
ERT	expert review team
EU	European Union
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 10^9 joule)
GWP	global warming potential
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1 thousand grams)
kgoe	kilograms of oil equivalent
LULUCF	land use, land-use change and forestry
m^3	cubic metre
Mg	megagram (1 Mg = 1 tonne)
Mt	million tonnes
Mtoe	millions of tonnes of oil equivalent
NA	not applicable
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SF_6	sulphur hexafluoride
SO_2	sulphur dioxide
Tg	teragram (1 Tg = 1 million tonnes)
TJ	terajoule (1 TJ = 10^{12} joule
UNFCCC	United Nations Framework Convention on Climate Change

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