Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2012/1**
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Report of the individual review of the annual submission of the Czech Republic submitted in 2011

Note by the secretariat

The report of the individual review of the annual submission of the Czech Republic submitted in 2011 was published on 6 January 2012. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2011/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 individual review of the annual submission of the Czech Republic submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

		Paragraphs	*Page*
I.	Introduction and summary	1–16	3
II.	Technical assessment of the annual submission	17–180	8
	A. Overview	17–56	8
	B. Energy	57–83	15
	C. Industrial processes and solvent and other product use	84–101	20
	D. Agriculture	102–129	24
	E. Land use, land-use change and forestry	130–144	29
	F. Waste	145–155	32
	G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol	156–180	35
III.	Conclusions and recommendations	181–194	39
IV.	Questions of implementation	195	41
Annexes			
I.	Documents and information used during the review		42
II.	Acronyms and abbreviations		45

I. Introduction and summary

1. This report covers the in-country review of the 2011 annual submission of the Czech Republic, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 29 August to 3 September 2011 in Prague, Czech Republic, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland); energy – Mr. Jongikhaya Witi (South Africa); industrial processes – Mr. Stanford Mwakasonda (United Republic of Tanzania); agriculture – Mr. Steen Gyldenkaerne (Denmark); land use, land-use change and forestry (LULUCF) – Mr. Daniel Martino (Uruguay); and waste – Ms. Maryna Bereznytska (Ukraine). Mr. Goodwin and Mr. Mwakasonda were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene (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, into this final version of the report.

3. In 2009, the main greenhouse gas (GHG) in the Czech Republic was carbon dioxide (CO_2), accounting for 84.9 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (8.3 per cent) and nitrous oxide (N_2O) (6.0 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 82.2 per cent of total GHG emissions, followed by the industrial processes sector (8.4 per cent), the agriculture sector (6.4 per cent), the waste sector (2.7 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 133,602.84 Gg CO_2 eq and decreased by 32.0 per cent between the base year[2] and 2009.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	164 600.54	164 600.54	131 511.63	127 043.15	124 566.87	126 050.69	120 433.41	106 384.85	–35.4
		CH_4	18 465.29	18 465.29	13 649.90	12 087.81	11 676.10	11 620.68	11 562.18	11 246.27	–39.1
		N_2O	13 304.42	13 304.42	9 022.39	8 571.85	8 453.78	8 347.60	8 470.52	7 999.15	–39.9
		HFCs	0.73	NA, NE, NO	0.73	262.50	594.21	1 605.85	1 262.45	1 041.67	141 719.8
		PFCs	0.12	NA, NE, NO	0.12	8.81	10.08	20.16	27.48	27.14	22 051.7
		SF_6	75.20	77.68	75.20	141.92	85.88	75.85	47.04	49.61	–34.0
KP-LULUCF	Article 3.3[b]	CO_2							–112.21	–124.92	
		CH_4							NO	NO	
		N_2O							0.0014	0.0014	
	Article 3.4[c]	CO_2	NA						–4 562.21	–6 574.92	NA
		CH_4	NA						6.84	5.78	NA
		N_2O	NA						0.05	0.04	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NE = not estimated, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2009

			Gg CO_2 eq							*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	156 514.63	156 514.63	125 826.80	121 434.89	119 784.49	119 773.11	114 691.83	109 812.14	–29.8
		Industrial processes	19 595.67	19 595.67	14 310.50	13 609.83	12 966.23	15 250.79	14 085.45	11 174.86	–43.0
		Solvent and other product use	764.83	764.83	596.31	568.56	513.77	512.17	515.27	506.15	–33.8
		Agriculture	16 862.07	16 862.07	10 525.35	9 354.15	8 741.90	8 782.92	8 996.18	8 554.67	–49.3
		Waste	2 710.72	2 710.72	3 001.02	3 148.63	3 380.52	3 401.83	3 514.35	3 555.03	31.1
		LULUCF	–3 629.76	–3 629.76	–7 211.17	–7 544.77	–6 686.64	–729.98	–4 778.28	–6 863.15	89.1
		Total (with LULUCF)	**NA**	**192 818.16**	**147 048.81**	**140 571.27**	**138 700.28**	**146 990.85**	**137 024.81**	**126 739.69**	**NA**
		Total (without LULUCF)	**196 447.92**	**196 447.92**	**154 259.98**	**148 116.04**	**145 386.91**	**147 720.83**	**141 803.09**	**133 602.84**	**–32.0**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation & reforestation							–271.99	–294.68	
		Deforestation							160.20	170.19	
		Total (3.3)							**–111.79**	**–124.48**	
	Article 3.4[d]	Forest management							–4 403.99	–6 441.15	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**–4 403.99**	**–6 441.15**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in the national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 3
Information to be included in the compilation and accounting database in tonnes of carbon dioxide equivalent

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	664 626 971	668 014 203		668 014 203	
Annex A emissions for current inventory year					
CO_2	106 384 858	106 384 858		106 384 858	
CH_4	11 246 269	11 246 269		11 246 269	
N_2O	7 312 708	7 990 154		7 990 154	
HFCs	1 041 666	1 041.666		1 041 666	
PFCs	27 136	27 136		27 136	
SF_6	49 609	49 609		49 609	
Total Annex A sources	**132 925 394**	**133 602 841**		**133 602 841**	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–294.68			–294.68	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NO			NO	
3.3 Deforestation for current year of commitment period as reported	170.19			170.19	
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period	–6 441.15			–6 441.15	
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period					
3.4 Revegetation for base year					

Abbreviations: NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one of these activities.

6. The Party's 2011 GHG inventory is generally in line 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) and the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and in line with the IPCC

Good Practice Guidance for Land Use, Land-Use Change and Forestry (hereinafter referred to as the IPCC good practice guidance for LULUCF).

7. The 2011 inventory submission covers all sectors and categories, but the expert review team (ERT) identified a need for further improvements in the following areas:

(a) Enhancing the capacity of the national system in order to perform all the functions required by decision 19/CMP.1, as identified in paragraphs 13, 28–30 and 46–48 below and in the conclusions and recommendations of this report (see para. 190 below);

(b) Improving transparency, by providing improved descriptions of trends, methods, data sources and assumptions;

(c) Increasing accuracy, by improving the accuracy of the estimates of N_2O emissions from agriculture and applying higher-tier methods to calculate emission estimates for key categories.

8. The Czech Republic acknowledged these findings at the time of the review and provided revised estimates for N_2O emissions from manure management and agricultural soils in response to the list of potential problems and further questions raised by the ERT during the review week.

9. By submitting the revised inventory and supplying the additional information requested by the ERT, the Czech Republic has demonstrated sufficient capacity to comply 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) and the IPCC good practice guidance.

10. The Czech Republic has submitted supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with chapter I of the annex to decision 15/CMP.1 but has not clearly identified the changes to the information reported under Article 3, paragraph 14, of the Kyoto Protocol.

11. The Czech Republic has chosen to account for activities under Article 3, paragraph 3, of the Kyoto Protocol at the end of the commitment period. The Party has elected forest management activities under Article 3, paragraph 4, of the Kyoto Protocol and has chosen accounting at the end of the commitment period. The Czech Republic has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and elected activities under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3.

12. The Czech Republic has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and has used the standard electronic format (SEF) tables as required by decision 14/CMP.1.

13. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1; however, the ERT identified that the material relevant to the annual submissions is not archived in a single location as encouraged by decision 19/CMP.1 (see para. 46 below), and that the quality assurance/quality control (QA/QC) plan has not been updated since 2009 (see para. 30 below). The ERT noted the changes to the national system (in particular, the recent change of the expert compiling the industrial processes sector of the GHG inventory and the change of the QA/QC manager (see para. 175 below)) and recommends that the Czech Republic ensure that the capacity and expertise of the national system is maintained through the provision of training for newly appointed experts.

14. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the

technical standards for data exchange between registry systems in accordance with the relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). However, the ERT identified that the Czech Republic does not currently make publicly available all required joint implementation (JI) project documentation and reports, as the specific information deemed confidential is not clearly and explicitly highlighted on the public website.

15. The Czech Republic has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its national inventory report (NIR). The Czech Republic submitted this information on 15 April 2011. During the in-country review, the Party provided the ERT with additional information on the changes to its activities since its 2010 submission (see para. 179 below).

16. In the course of the review, the ERT formulated a number of recommendations relating to the completeness, transparency, consistency and accuracy of the annual submission with regard to the description of trends, methods, data sources and assumptions used to calculate the emission estimates across most of the sectors (see paras. 21, 23, 31, 33, 34, 37 and 44 below).

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

17. The 2011 annual inventory submission was submitted on 15 April 2011; it contains a complete set of common reporting format (CRF) tables for the period 1990–2009 and an NIR. The Czech Republic also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes to the national system and to the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The SEF tables were submitted on 15 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1.

18. The Czech Republic officially submitted revised emission estimates on 10 October 2011 in response to questions raised by the ERT during the course of the in-country visit. The values used in this report are based on the values contained in the submission of 10 October 2011.

19. The ERT also used previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

20. During the review, the Czech Republic provided the ERT with additional information. The documents concerned are not a part of the annual submission but are in

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

21. The inventory covers all source and sink categories for the period 1990–2009 and is complete in terms of years and geographical coverage for the categories where IPCC methods are available. The ERT noted that the Czech Republic has completed all CRF tables, except table 8(b) (recalculations – explanatory information) and recommends that the Party complete CRF table 8(b) in its next annual submission. In a few cases in the energy, industrial processes, agriculture and waste sectors, the notation key "NE" (not estimated) was used to report categories for which no IPCC methods are available. The ERT encourages the Czech Republic to provide emission estimates for these categories in its next annual submission.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

22. The ERT concluded that the national system continues to perform its required functions. However, the ERT noted that a lack of resources continues to affect the accuracy and continuous improvement of the quality of the inventory by restricting the collection of additional data and the elaboration of higher-tier estimation methods for key categories in the industrial processes (see para. 93 below), agriculture (see para. 105 below) and LULUCF and KP-LULUCF (see paras. 134 and 166 below) sectors.

23. During the review, the Czech Republic explained that, owing to budget restrictions and staff shortages, it has not been able to improve its archiving system as outlined in the 2010 submission or to collect the activity data (AD) and emission factors (EFs) necessary to move to higher-tier methods for the estimation of emissions from several key categories, as recommended in the previous review reports. The ERT strongly recommends that the Party strengthen the capacity of its national system so that the accuracy of the inventory can be improved by moving to higher-tier methods and by fully implementing and maintaining the archiving system for annual submissions.

Inventory planning

24. During the in-country visit, the Czech Republic described the national system and institutional arrangements for the preparation of the inventory. The Ministry of the Environment (MoE) has overall responsibility for the national inventory and secures contracts with other governmental bodies involved in the preparation of the national inventory, such as the Czech Statistical Office (CSO), the Ministry of Industry and Trade and the Ministry of Agriculture.

25. The Czech Hydrometeorological Institute (CHMI), under the supervision of MoE, is designated as the coordinating and managing organization responsible for the compilation of the national inventory and for reporting its results. CHMI aims to ensure quality management through the implementation of the QA/QC plan and oversees the archiving system. The national inventory is prepared by CHMI and approved by MoE[4] prior to its submission to the UNFCCC secretariat.

[4] Evidence of the official consideration and approval of the inventory was provided by the Party to the ERT.

26. MoE also provides financial resources to CHMI to procure annual contracts for the preparation of the sector-specific elements of the annual inventory. The contracted organizations include KONEKO Marketing Ltd. (stationary combustion and fugitive emissions), the Transport Research Centre (transport emissions), the Institute of Forest Ecosystem Research (IFER) (emissions and removals from the agriculture and LULUCF sectors) and the Charles University Environment Centre (emissions from the waste sector). The ERT was provided with examples of the annual contracts and noted that they clearly specified the emissions to be estimated and the QA/QC procedures and archiving tasks to be undertaken.

27. The ERT noted that management meetings of the national system are coordinated by MoE and organized three to four times per year to discuss issues regarding outputs, additional related projects, the capacity of the inventory team and funding for core inventory work and for inventory development. These meetings include the participation of CHMI and MoE. If required, experts from the organizations involved in preparing the sector-specific parts of the GHG inventory also participate in the meetings; they meet on a regular basis with experts from CHMI to discuss issues related to the development of the sector-specific parts of the GHG inventory. The minutes for some of these meetings were provided to the ERT during the review.

28. The ERT noted with concern that since November 2010 the capacity within the national system has been substantially weakened due to staff shortages and that the Czech Republic has been unable to implement the QA/QC plan developed for the 2010 submission or the planned improvements to its archiving system. During the review, the Party provided the ERT with details of a "National inventory system education plan" designed to improve capacity and transfer know-how to a newly appointed coordinator of the national system and a compiler of emission estimates for the industrial processes sector through on-the-job training at CHMI. The ERT encourages the Party to formalize its staff training plans, to ensure that the requisite capacity is in place to manage the national system and to maintain and update the QA/QC plan and archiving system.

29. The Party may wish to consider developing additional expertise in the LULUCF sector in order to fully benefit the future improvements to the emission and removal estimates for the agriculture (see paras. 138–140 and 142 below) and LULUCF (see paras. 159 and 163 below) sectors. The ERT concluded that, despite these difficulties, the Czech Republic was able to demonstrate its capacity to meet the requirements identified in decision 19/CMP.1 and noted that the quality of the inventory will be improved if these issues are addressed in future annual submissions.

30. The ERT noted that the overall QA/QC plan was prepared in December 2009 and has not been updated for the 2011 submission. The ERT also noted that the plan itself did not contain information on the current and previous versions in use, on the history of changes made to it or on ownership, and that it was out of date with respect to the personnel responsible for QA/QC activities. In spite of this, the QA/QC plan outlined the QA/QC tasks assigned to sector-specific organizations in their annual contracts and contained the elements required by decision 19/CMP.1. Up-to-date sector-specific QA/QC plans outlining the basic functions involved in the compilation and checking of emission and removal estimates were provided only for the LULUCF and agriculture sectors by IFER, without reference to specific QA/QC checks.

31. The ERT encourages the Party to regularly update its QA/QC plan, including information on relevant QA/QC roles and activities, the version in current use and ownership. The ERT recommends that the Czech Republic improve the sector-specific QA/QC plans by including references to the detailed checklists used for the annual QC checks (provided as examples to the ERT during the review) and by providing additional details on planned and completed QA (peer-review) activities.

32. The ERT noted a number of planned inventory improvements described in the sector-specific sections of the NIR and details of possible improvements in response to the recommendations in the previous review report. However, the NIR does not provide any specific information on how the improvements are prioritized or on how the Czech Republic plans to implement a more structured introduction of more sophisticated higher-tier methods. In response to a question raised by the ERT during the review, the Party provided a draft list of improvements highlighting the organizations responsible for carrying out the improvements, the key categories involved and the expected years of completion.

33. The ERT encourages the Czech Republic to elaborate and maintain this list of improvements as its "inventory improvement plan" and to include, for each listed item, details of the origin of the improvement, the priority, the resource needs, the time frame and the status (e.g. proposed, accepted, funded, ongoing, implemented, etc.). The ERT recommends that the Party prioritize this list based on its key category and uncertainty analyses and that it improve the transparency of its reporting of the improvements in its next annual submission, including the information provided to the ERT during the review (see para. 0 above).

Inventory preparation

Key categories

34. The Czech Republic has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 submission for the base year and for 2009. The key category analysis performed by the Czech Republic and that performed by the secretariat[5] produced similar results. The Czech Republic has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT recommends that the Czech Republic use the key category analysis to prioritize inventory improvements and to document these improvements in the NIR of its next annual submission.

35. The Czech Republic has identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and has established the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

Uncertainties

36. The Czech Republic has reported a tier 1 uncertainty analysis in the NIR. According to the NIR, the inventory level uncertainty including the LULUCF sector is estimated at ±10.7 per cent, mainly due to unrealistically high uncertainty values for forest land remaining forest land (see para. 133 below). The trend uncertainty is estimated at ±3.9 per cent. The inventory level uncertainty excluding the LULUCF sector is estimated at ±4.19 per cent with the corresponding uncertainty of the trend estimated at ±2.2 per cent.

37. The uncertainty estimates are based on the IPCC default values and expert judgement and generally follow the IPCC good practice guidance. However, the ERT noted

[5] The secretariat identified, for each Party, the 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 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.

that little or no documentation is provided on the expert judgement used to derive the uncertainty values for the AD and EFs used to estimate emissions from the industrial processes (see para. 89 below), agriculture (see para. 103 below), LULUCF (see para. 133 below) and waste (see para. 147 below) sectors. The Party does not have an established procedure for eliciting expert judgement as defined in the IPCC good practice guidance. The ERT therefore recommends that the Czech Republic establish and follow the procedure defined in the IPCC good practice guidance for eliciting expert judgement and enhance the documentation provided on the expert judgement used to derive the uncertainty values accordingly. The ERT encourages the Party to improve the completeness of the uncertainty analysis for the energy (see para. 65 below), industrial processes (see para. 100 below) and agriculture (see para. 103 below) sectors.

Recalculations and time-series consistency

38. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that the recalculations reported by the Czech Republic of the time series 1990–2008 have been undertaken to take into account revisions of or improvements to AD (e.g. in the energy, industrial processes and waste sectors). The effect of the recalculations is an increase in estimated total GHG emissions of 0.7 per cent in 1990 and an increase of 0.3 per cent in 2008, excluding LULUCF. The rationale for these recalculations is provided in the relevant sectoral sections of the Party's NIR.

39. The major changes, and the magnitude of the impact for 2008, include: an increase of 132.6 per cent (447.95 Gg CO_2 eq) for N_2O emissions from manure management; a decrease of 3.6 per cent (272.29 Gg CO_2 eq) for CO_2 emissions from metal production; an increase of 4.4 per cent (224.32 Gg CO_2 eq) for N_2O emissions from agricultural soils; a decrease of 23.3 per cent (105.96 Gg CO_2 eq) for CO_2 emissions from waste incineration; an increase of 0.3 per cent (47.18 Gg CO_2 eq) for CO_2, CH_4 and N_2O emissions from transport; and an increase of 0.2 per cent (9.66 Gg CO_2 eq) for emissions from forest management.

40. The ERT noted that the Czech Republic did not provide an overall percentage figure for the impact of the recalculations for each sector in the NIR, and encourages the Party to provide this information in the NIR of its next annual submission. The ERT noted that the explanatory information in CRF table 8(b) was not provided in the 2010 or 2011 submissions and recommends that the Party provide this information in its next annual submission.

Verification and quality assurance/quality control approaches

41. The Czech Republic has provided information on its QA/QC procedures in line with the UNFCCC reporting guidelines. An overall QA/QC plan managed by CHMI is in place and is in accordance with decision 19/CMP.1 and the IPCC good practice guidance. The ERT noted that the overall QA/QC plan has not been updated since its preparation in December 2009 (see para. 30 above) and therefore recommends that the Party update the QA/QC plan on a regular basis, implement it and report thereon in its next annual submission.

42. The ERT noted that the Party delegates certain QA/QC responsibilities to the organizations responsible for preparing the sector-specific parts of the inventory via formal contracts. The ERT noted that, in order to verify the emission estimates for some categories in the industrial processes sector, the Party used relevant data from the European Union emissions trading scheme (EU ETS). During the review, the Czech Republic provided the ERT with the sector-specific QA/QC plans and examples of QC checklists for the agriculture sector (see para. 104 below), but did not provide any sector-specific QA/QC documentation for the remaining sectors. The ERT encourages the Party to develop and

implement sector-specific QA/QC plans for the waste, energy and industrial processes sectors.

43. The ERT noted that some of the Party's QA/QC procedures and activities have not been fully implemented (e.g. fugitive emissions from fuels, for which a QA/QC sheet checklist for the previous submission (prepared in June 2010) was provided). The ERT also noted several errors in the CRF tables for the reference and sectoral approaches and some inconsistencies between the CRF tables and the NIR in the waste sector. The ERT recommends that the Czech Republic improve the quality of its inventory through the implementation of enhanced QA/QC activities and that the Party archive QA/QC-related material in the archiving system.

Transparency

44. The information contained in the NIR is generally transparent but is, in some cases, insufficient for the ERT to understand the methods, data sources and assumptions used to estimate emissions. The recalculations are documented and a rationale is provided for the changes. The ERT encourages the Party to improve the transparency of its reporting for the LULUCF sector (see para. 135 below), and provide a more detailed description of the methodology used to estimate CO_2 emissions from oil production and a more detailed rationale for the use of notation keys in the energy sector. The ERT reiterates the recommendation from the previous review report that the Czech Republic provide a more detailed description of the methodologies applied to estimate emissions from the industrial processes sector (see paras. 87, 91, 92, 93, 95 and 98 below). The ERT recommends that the Czech Republic provide further detail in the NIR on the methods and EFs used as well as a description of the data sources and assumptions.

45. The ERT encourages the Party to improve the transparency of its reporting by reallocating emissions from suckling cows to the category non-dairy cattle (see para. 107 below) and by reporting separately the emissions from the production of ammonia and nitric acid in the industrial processes sector (see para. 91 below).

Inventory management

46. The ERT concluded that the archiving system is not performing as recommended by decision 19/CMP.1, which states that a Party should archive all information together in a single location. The NIR describes the fact that the Czech Republic has acquired software designed to facilitate the development of the centralized archive for the Party's annual submissions at CHMI. It also reports that, due to the limited financial and human capacities at CHMI, the archiving system has not yet been implemented.

47. Although the Party has only a partially complete centralized archive at CHMI, it has indicated that there are separate archives within each of the organizations involved in the preparation of the sector-specific elements of the annual inventory. In response to a question raised by the ERT during the review, the Party provided a table outlining the location of all information required by decision 19/CMP.1, paragraph 16(a). During the review, the ERT made efforts to assess whether the sectoral data are archived at each of the organizations involved in the inventory preparation process and concluded that the information stored at CHMI or at the other organizations was complete for all annual submissions since 2009.

48. The ERT encourages the Czech Republic to collect together in a centralized archive all material relevant to the annual submissions (in accordance with decision 19/CMP.1, para. 16(a)). If archived material remains distributed across multiple locations, then the ERT encourages the Party to indicate where each part of the archive is stored and to illustrate the archiving processes for each organization so as to enable the ERT to assess

whether all the required information has been included and is accessible in accordance with decision 19/CMP.1.

3. Follow-up to previous reviews

49. The ERT noted a number of improvements undertaken by the Czech Republic in response to previous review reports, including:

(a) In the energy sector: increased cooperation between MoE and CSO; the verification of N_2O EFs for road transportation; and the estimation of CH_4 emissions from oil transportation;

(b) In the industrial processes sector: a more detailed explanation of emission trends; improvements in the description of cement production methods and in the estimation of emissions from iron and steel, and soda ash production and use; more accurate statistics on CO_2 and CH_4 emissions from brick and ceramics production; an improved description of cement kiln dust and the use of EU ETS data; an improved description of the methods and EFs used to calculate N_2O emissions from nitric acid production; and the inclusion of additional sources of CH_4 emissions in the chemical industry for some years of the time series;

(c) In the LULUCF sector: the inclusion of estimates for the dead organic matter pool; an improved description of QA/QC procedures and activities; the provision of details on the geographical location of forest lands under Article 3, paragraphs 3 and 4, of the Kyoto Protocol; the inclusion of information on how harvesting or forest disturbance followed by the re-establishment of forest is distinguished from deforestation; and an explanation of how activities that started after 1989 are human-induced;

(d) In the waste sector: an improvement in the level of accuracy of the reporting of emissions from solid waste disposal on land while revising oxygen demand values.

50. The ERT commends the Czech Republic for making these improvements. No improvements in the agriculture sector were identified by the ERT.

51. The ERT noted that none of the recommendations in the previous review reports for improvements in the agriculture sector have been implemented and a number of recommendations for the other sectors have not yet been addressed by the Party, including:

(a) The strengthening of its national system;

(b) The completion of CRF table 8(b);

(c) The removal of inconsistencies between the NIR and the CRF tables;

(d) The improvement of transparency by including the AD and EFs used in a tabular format and by describing the methods used (e.g. for the industrial processes sector);

(e) The use of higher-tier methods for key categories and non-key categories (including for the energy, industrial processes and LULUCF sectors);

(f) Addressing questions regarding the unrealistically high uncertainty values for the LULUCF sector;

(g) The further investigation of the disposal or decommissioning practices for SF_6, the provision of emission estimates for carbon black, dichloroethylene, methanol and styrene and the reporting of data on coke consumption used as the AD.

52. During the review, the Czech Republic explained that it has incorporated a number of these issues into its inventory improvement plan. The ERT reiterates the recommendations in the previous review reports that the Czech Republic address all the

issues identified in the current and previous review reports for its next annual submission and encourages the Party to formalize and prioritize its inventory improvement plan.

4. Areas for further improvement

Identified by the Party

53. The 2011 NIR identifies several areas for improvement including:

(a) In the energy sector: the development of a database containing the national data used for the EU ETS and the use of this database when performing QA/QC procedures; the application of QA/QC procedures when preparing inventories for the transport category; the refinement of methodologies for each subcategory of the transport category; and the determination and completion of an uncertainty assessment for fugitive emissions from fuels;

(b) In the industrial processes and solvent and other product use sectors: the provision of a category and national uncertainty assessment; continuing to improve the accuracy of the uncertainty of the data for metal production and chemical industry; the development of a tier 2 methodology for iron and steel production; the use of a new model for the calculation of emission estimates from consumption of halocarbons and SF_6; and the use of a more accurate EF for non-methane volatile organic compounds (NMVOCs) in solvent and other product use;

(c) In the waste sector: the use of country-specific data on waste composition; the estimation of emissions from composting using parameters from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines); and the development of an uncertainty analysis for the whole sector using the Monte Carlo method.

54. During the review, the Czech Republic provided the ERT with an inventory improvement plan indicating time frames and responsible persons for each of the planned sectoral improvements listed in paragraph 53 above.

Identified by the expert review team

55. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 193 below.

56. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

57. The energy sector is the main sector in the GHG inventory of the Czech Republic. In 2009, emissions from the energy sector amounted to 109,812.14 Gg CO_2 eq, or 82.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 29.8 per cent. The key driver for the fall in emissions is a decrease in productivity in manufacturing industries and construction and a consequent decrease in demand for fuels. Within the sector, 44.4 per cent of the emissions were from energy industries, followed by 13.9 per cent from transport, 11.8 per cent from manufacturing industries and construction and 8.1 per cent from other sectors. Fugitive emissions accounted for 3.5 per cent and the category other accounted for 0.9 per cent.

58. The Czech Republic has made recalculations for the energy sector between the 2010 and 2011 submissions in response to the 2010 annual review report. The impact of these recalculations on the energy sector is an increase in emissions of 0.04 per cent for 2008. The main recalculations took place in the following categories:

(a) Fugitive CO_2 emissions from oil production;

(b) CO_2, CH_4 and N_2O emissions from venting and flaring of oil.

59. The reporting on the energy sector is complete in terms of gases and years, and generally complete in terms of categories. The ERT noted that a few categories were reported as "NE", such as CH_4 emissions from oil exploration; distribution of oil products; CO_2 emissions from mining and post-mining activities; solid fuel transformation, refining and storage; and N_2O emissions from refining and storage. The ERT further noted that IPCC estimation methods and/or EFs are not available for these categories. The ERT encourages the Czech Republic to provide emission estimates for these categories in its next annual submission. In response to a question raised by the ERT during the review regarding the occurrence of oil exploration, the Party clarified that there is no oil exploration in the country. The ERT recommends that the Czech Republic revise the notation keys used in its next annual submission and encourages the Party to update the EFs for CH_4 emissions from underground coal mining.

60. The ERT noted an inconsistency between CRF table 7 and the NIR in the reporting of key categories for the energy sector. In the NIR, the Czech Republic has identified 10 key categories under the energy sector, but in CRF table 7, 11 key categories were correctly reported, including fugitive GHG emissions from oil and gas operations by level assessment. This category is identified as a non-key category in table 3.17 of the NIR. The ERT reiterates the recommendation in the previous review report that the Czech Republic strengthen its QC procedures for the energy sector.

61. The ERT noted that the Czech Republic has addressed some of the recommendations in the previous review reports, such as developing country-specific EFs for N_2O emissions from road transportation as well as estimating CO_2 emissions from oil transportation. However, some recommendations, such as developing country-specific EFs for the key categories (e.g. CO_2 emissions from road transportation) and harmonizing the AD time series for solid fuels, have not yet been implemented. During the review, the Czech Republic explained that those improvements are included in its inventory improvement plan. The ERT reiterates the recommendations made in the previous review reports that the Czech Republic systematically address the recommendations of the current and previous review reports.

62. Following a recommendation in the previous review report to improve time-series consistency for GHG emissions from road transportation, the Czech Republic has recalculated these emissions for the period 1990–1999 by further disaggregating fuel consumption by vehicle fleet profile. In addition, N_2O emissions from biomass, liquid petroleum gas and compressed natural gas, which were previously reported as "NE", were estimated using AD and EFs identified in the 2006 IPCC Guidelines. The ERT commends the Czech Republic for this improvement in the accuracy of its inventory.

63. The Czech Republic has provided in the NIR information on the general trends in the energy sector. During the review, the Party provided the ERT with a detailed explanation of the drivers of the emission trends, particularly for fuels used in stationary combustion, including fluctuations in the economic development of the country and challenges with achieving consistency in the AD time series. The ERT noted apparent time-series inconsistencies in the emission estimates of solid fuels and liquid fuels used in stationary combustion prior to 2003. The ERT reiterates the recommendation in the

previous review report that the Czech Republic provide further detail on the drivers of emission trends in its next annual submission.

64. The Czech Republic has reported on its QA/QC procedures for the energy sector and has demonstrated how it implements these procedures; however, these procedures are not a formal part of the process followed by KONEKO Marketing Ltd. to estimate emissions from stationary combustion. The ERT recommends that the Czech Republic further develop and formalize its QA/QC procedures for the preparation of emission estimates from stationary categories.

65. To assess uncertainty for the energy sector, the Czech Republic has used a tier 1 method but has not performed an uncertainty assessment for fugitive emissions from fuels. During the review, the Party indicated its intention to perform an uncertainty assessment for this category and to include the results in its next annual submission. The ERT welcomes this intention from the Czech Republic and encourages it to consider undertaking a tier 2 uncertainty analysis for the energy sector.

66. The ERT noted with appreciation the efforts made by the Czech Republic to verify its N_2O emission estimates from road transportation and recommends that the Party include the results of this verification exercise in the NIR of its next annual submission.

67. During the review, in response to a question raised by the ERT, the Party clarified that abandoned mines exist in the country and that all of them have CH_4 recovery systems. The ERT recommends that the Czech Republic, in its next annual submission, elaborate on how the recovered CH_4 emissions from each abandoned mine are treated.

2. Reference and sectoral approaches

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

68. The ERT noted, as reported by the previous ERT, that the differences between the reference and sectoral approaches (6.0 per cent for 2009) have not been clearly explained in the NIR. The ERT also noted that the apparent energy consumption reported includes fuel used for non-energy purposes. The ERT reiterates the recommendation in the previous review report that the Czech Republic clearly explain the difference between the sectoral and reference approaches and report apparent energy consumption excluding non-energy use and feedstocks in CRF table 1.A(c).

69. The ERT commends the Czech Republic for reviewing its fuel properties, specifically the fuel calorific values, following the recommendations in the previous review report. However, the ERT noted that the total jet kerosene consumption for 2009 reported by the International Energy Agency (IEA) (1,247 TJ) and that reported by the Party in CRF table 1.A(a) (86.6 TJ) differs by 1,340.0 per cent. During the review, the Czech Republic explained that the fuel classification within civil aviation differs between the IEA and the CRF tables and that the harmonization of the AD for civil aviation is ongoing. The ERT welcomes the effort of the Czech Republic to harmonize the AD for civil aviation and recommends that the Party include the results of this exercise in its next annual submission.

International bunker fuels

70. The ERT noted that the Party has reported emissions from aviation gasoline consumption for aviation bunkers as "NE" in CRF table 1.C, as the emissions are considered negligible. The ERT recommends that the Czech Republic assess whether emissions from aviation gasoline used for international travel occur, estimate them, if applicable, and include the estimates in its next annual submission.

Feedstocks and non-energy use of fuels

71. As observed in the previous review report, the Czech Republic uses a carbon storage factor of 50 per cent for the period 1990–2006 and of 80 per cent for the period 2007–2009, citing an unreferenced survey that assumes that the recycling of plastic materials has reduced the oxidation of carbon stored in naphtha. In response to a question raised by the ERT, the Party specified that the increase in the share of carbon stored is based on expert judgement. The ERT recommends that the Czech Republic provide documentation substantiating the expert judgement in its next annual submission.

Country-specific issues

72. During the review, the Czech Republic indicated that there is a coal gasification facility that produces "town gas", which is combusted in a gas turbine for the production of electricity and heat and is allocated under energy industries. The Party also indicated that, since 1996, in addition to the "town gas" combusted, there have been "town gas" production emissions (mainly CO_2) as a result of the gasification of brown coal under pressure. Acknowledging that there is no methodology described in the IPCC good practice guidance for the estimation of "town gas" production emissions, the Czech Republic may wish to estimate these emissions and report them under solid fuel transformation.

3. Key categories

Stationary combustion: solid fuels – CO_2

73. As observed by the ERT in the previous review reports, there is an apparent inconsistency in the AD across the time series for manufacturing industries and construction. The ERT noted that the Party used aggregated AD for the period 1990–2002 and more disaggregated AD obtained from CSO for 2003 onwards. In response to a question raised by the ERT during the review, the Czech Republic indicated that a study is under way with the aim of harmonizing the AD from 2000 onwards. The ERT commends the Czech Republic for this intention and encourages the Party to harmonize the AD for the entire time series.

Stationary combustion: liquid fuels – CO_2

74. The ERT noted significant fluctuations in liquid fuel use in petroleum refining (a decrease of 24.3 per cent from 2006 to 2007). Although there is a correlation between liquid fuel use and refinery intake, the refinery feedstock used decreased only by 4 per cent from 2006 to 2007. In addition, the ERT noted that refinery gas consumption in the Czech Republic ceased in 2003; however, the rationale for this was not provided in the NIR. The ERT recommends that the Party include explanations for these fluctuations and apparent discrepancies in the next annual submission. The ERT reiterates the recommendation in the previous review reports that the Czech Republic verify the data for liquid fuel use in petroleum refining using the data derived from the EU ETS.

75. The ERT noted that the Czech Republic has used country-specific EFs to estimate GHG emissions from solid fuels used in stationary combustion and IPCC default EFs for other fuels. The ERT reiterates the recommendation in the previous review reports that the Czech Republic periodically verify the suitability of the application of the IPCC default EFs for liquid fuels used in the country.

Stationary combustion: other fuels – CO_2

76. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that the reporting of emissions from waste incineration for energy

production was included under the waste sector. The ERT noted that it is good practice to report these emissions under the energy sector. The ERT reiterates the recommendation from the previous review report that the Czech Republic report these emissions under the public electricity and heat production category or under the corresponding industry if the energy is generated by autoproducers.

Road transportation: liquid fuels – CO_2 and N_2O

77. The ERT noted that the Czech Republic has continued to use IPCC default EFs to estimate CO_2 emissions from combustion of diesel and gasoline in road transportation. In response to a question raised by the ERT during the review, the Party informed the ERT about its intention to initiate a study to update the CO_2 EFs for road transportation and to include the results of this study in its 2013 submission. The ERT commends the Czech Republic for this initiative and recommends that the Party report on the progress or preliminary results of the study in its next annual submission.

78. The ERT further noted that the drivers behind the high inter-annual variations of the N_2O implied EFs (IEFs) for gasoline for the years 1999–2000 (10.6 per cent) and 2001–2002 (12.2 per cent) have not been explained in the NIR. The 2009 value (18.0 kg/TJ) is 151.7 per cent higher than the 1990 value (7.15 kg/TJ). During the review, the Czech Republic informed the ERT that a three-year study will start in January 2012 with the aim of investigating N_2O emissions from vehicles, revising country-specific EFs and thus improving time-series consistency. The ERT welcomes these efforts by the Czech Republic.

Coal mining and handling: solid fuels – CH_4

79. The ERT commends the Czech Republic for using country-specific EFs for the estimation of CH_4 emissions from underground mines and notes that these EFs are based on research conducted in 1997. The ERT notes that mining conditions and the quality of the coal may have changed since that time and encourages the Czech Republic to revise its CH_4 EFs by conducting new research to improve the accuracy of its emission estimates for this category.

4. Non-key categories

Civil aviation: liquid fuels – CO_2

80. The ERT noted that the drivers behind the significant reduction in CO_2 emissions from this category (from 158.3 Gg CO_2 in 1990 to 12.9 Gg CO_2 in 2009) have not been explained in the NIR. In response to a question raised by the ERT during the review, the Czech Republic acknowledged that the allocation of fuel consumption between civil aviation and bunker fuels is challenging and indicated that a study is ongoing to harmonize the AD for civil aviation. The ERT reiterates the recommendation in the previous review report that the Czech Republic collect additional data or use expert judgement in order to allocate its AD into individual subcategories between civil aviation and bunker fuels so as to improve the time-series consistency of CO_2 emissions from liquid fuel use in civil aviation.

Oil and natural gas: liquid fuels – CO_2

81. The ERT noted that CO_2 emissions from oil production have, for the first time, been included in the CRF tables without providing a description of the methodologies used in the NIR. In response to a question raised by the ERT during the review, the Czech Republic explained that the AD for inland oil production was sourced from an IEA/CSO questionnaire and the EFs were taken from the IPCC good practice guidance. The ERT

welcomes this explanation and recommends that the Party include it in its next annual submission.

5. Areas for further improvement

Identified by the Party

82. The Czech Republic has identified the following areas for improvement:

(a) Updating country-specific CO_2 EFs based on the EU ETS data;

(b) Developing country-specific CO_2 and N_2O EFs for gasoline and diesel;

(c) Developing an EU ETS national database and using it as part of its QA/QC procedures;

(d) Strengthening the QA/QC procedures used for the annual submissions;

(e) Improving the estimates of emissions from transport by gathering more AD for the calculation of N_2O emissions and refining the methodologies used for each subcategory;

(f) Assessing the uncertainty for fugitive emissions from fuels.

Identified by the expert review team

83. The ERT has identified the following areas for further improvement:

(a) Estimating emissions from aviation gasoline consumption for aviation bunkers;

(b) Reallocating CO_2 emissions from gasification to fugitive emissions, instead of energy industries;

(c) Reallocating emissions from non-combustion "town gas" production from energy industries to fugitive emissions from fuels – solid fuel transformation;

(d) Reallocating emissions from waste incineration for energy production from the waste sector to the energy sector;

(e) Improving the time-series consistency for emissions from the use of solid fuels and emissions from civil aviation;

(f) Further developing and formalizing the QA/QC procedures for emissions from stationary categories;

(g) Addressing the recommendations identified in the previous review reports.

C. Industrial processes and solvent and other product use

1. Sector overview

84. In 2009, emissions from the industrial processes sector amounted to 11,174.86 Gg CO_2 eq, or 8.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 506.15 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 43.0 per cent in the industrial processes sector, and decreased by 33.8 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector, as explained in the NIR and during the review, is the economic downturn, especially the reduction (by 42.2 per cent) in iron and steel production in the period 1990–2009. Within the industrial processes sector, 47.8 per cent of the emissions were from metal production, followed by

30.9 per cent from mineral products and 11.3 from chemical industry. The remaining 10.0 per cent were from consumption of halocarbons and SF_6. The ERT noted that, in the NIR, the Czech Republic reported the shares of the industrial processes sector based on total GHG emissions including LULUCF and thus reported an 8.9 per cent sectoral contribution to total GHG emissions.

85. The Czech Republic has made recalculations of emissions from the industrial processes sector between the 2010 and 2011 submissions in response to the 2010 annual review report and due to changes in the AD collected for the national inventory. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 1.8 per cent in 2008. The main reasons for the recalculations were as follows:

(a) The improvement in the completeness of reporting for soda ash use;

(b) The application of new AD (obtained from CSO) for brick and ceramics production for the estimation of CO_2 and CH_4 emissions;

(c) Updated AD for the estimation of CO_2 emissions from iron and steel production.

86. The ERT acknowledged the rationale for the recalculations provided by the Party and noted that the recalculations were conducted in line with the IPCC good practice guidance. The ERT also noted that the Czech Republic did not provide an overall value of the impact of the recalculations of GHG emissions from the industrial processes sector in the NIR and encourages the Czech Republic to do so in its next annual submission.

87. The ERT reiterates the recommendation in the previous review report that the Czech Republic provide more transparent information on the methodologies applied for estimating emissions from the industrial processes sector. Specific categories requiring increased transparency include: consumption of halocarbons and SF_6; iron and steel production; nitric acid production; and ammonia production. The ERT recommends that the Czech Republic improve the transparency of its reporting by providing more detailed information on the key categories in its next annual submission.

88. The ERT noted that the NIR described the methods, assumptions and data sources used on an aggregated category level (i.e. rather than providing information on individual emission categories), and recommends that the Czech Republic elaborate on each category separately in its next annual submission.

89. The Czech Republic has reported that the uncertainties were calculated on the basis of expert judgement and that improvements have been made to the uncertainty estimates for the industrial processes sector. The ERT recommends that the Party provide an explanation of the uncertainty estimation process and of how the uncertainty parameters are derived in the next annual submission.

2. Key categories

Cement production – CO_2

90. Following the recommendation in the previous review reports, the Czech Republic provided the content of calcium oxide/magnesium oxide (CaO/MgO) and the composition of limestone in cement in its NIR. However, the Party did not report the content of CaO, dolomite, magnesium carbonate and carbon, as this information was considered to be confidential. The ERT commends the Czech Republic for providing this explanation during the review and encourages the Party to continue collecting country-specific data on the content of CaO/MgO and on the composition of limestone. The ERT also encourages the Czech Republic to regularly assess the rationale for classifying the data as confidential.

Ammonia production – CO_2

91. The Czech Republic did not include a separate section in the NIR on ammonia production and this category is described together with nitric acid production. The ERT recommends that the Party improve the transparency of its reporting by providing a separate chapter describing ammonia production in its next annual submission.

Nitric acid production – N_2O

92. The ERT noted that, in order to improve the quality of the NIR, the Czech Republic has revised its estimates of N_2O emissions from nitric acid production, taking into account the revision of one of the EFs (dependent on pressure conditions) and has improved the description of the methods and EFs used. The ERT commends the Czech Republic for these improvements and recommends that the Party provide a separate description of nitric acid production under chemical industry in the next annual submission. The ERT further recommends that the Czech Republic elaborate in the NIR on the abatement technologies used in nitric acid production.

Iron and steel production – CO_2

93. During the review, the ERT learned that the Czech Republic has an integrated iron and steel plant and that emissions from steel production and those from iron production are reported together. The ERT reiterates the recommendation in the previous review report that the Party implement its plan to use a tier 2 method to estimate emissions from iron and steel production as a key category in its next annual submission in order to improve the accuracy of its reporting. The ERT also recommends that the Czech Republic increase the transparency of its reporting by providing a description of the methodology used to calculate emissions both from iron and from steel production processes, including details of the flows of blast furnace gas between pig-iron production and steel production in cases where these plants are not owned by one owner.

Consumption of halocarbons and SF_6 – HFCs and PFCs

94. The Czech Republic has reported emissions of HFCs and PFCs from the disposal of equipment as not occurring ("NO"), assuming that the lifetime of the equipment is 15 years, starting in 1995. The Czech Republic indicated that it will start to report AD for these emissions for the inventory year 2010 and include them in its next annual submission. The ERT recommends that the Czech Republic implement this plan. The ERT encourages the Party, when estimating these emissions, to use the model mentioned during the review, which takes into account the lifetimes of refrigeration and air-conditioning equipment.

95. The Czech Republic has reported the AD for HFC and PFC emissions from operating systems (average annual stocks) as "NE"; however, it has provided estimates of these emissions from stocks. During the review, the Party provided the ERT with the AD for average annual stocks and explained that the emissions from these stocks are not yet occurring. The ERT recommends that the Czech Republic improve the transparency of its reporting by including the AD on the average annual stock of fluorinated gases (F-gases) and by providing the parameters used in estimating these gases in its next annual submission.

3. Non-key categories

Glass production – CO_2

96. The Czech Republic used manufactured glass AD to estimate emissions from glass production without taking into account the EFs for recycled glass. The ERT recommends

that the Czech Republic factor in the recycled glass EFs when estimating CO_2 emissions from glass production in order to improve the accuracy of its reporting.

Other (chemical industry) – CH_4

97. Following the recommendation in the previous review report, the Czech Republic has reported emissions from carbon black, dichloroethylene, methanol and styrene for 2008 and 2009. The ERT commends the Czech Republic for this improvement to the completeness of its reporting and reiterates the recommendation in the previous review report that the Party improve time-series consistency by including estimates from these subcategories for the years where these emissions occurred but have been reported as "NE".

Consumption of halocarbons and SF_6 – SF_6

98. Following the recommendation in the previous review report, the Czech Republic provided further explanation in the NIR on the assumptions used to estimate SF_6 emissions from consumption of halocarbons and SF_6. Namely, the Party explained that the purity of the SF_6 remaining in products is tested and, if the purity standards are met, the SF_6 is reused without any treatment; if the purity is deemed to be too low, the SF_6 is treated before reuse. The ERT recommends that the Czech Republic improve the transparency of its reporting by including this explanation in its next annual submission.

Solvent and other product use – N_2O

99. The Czech Republic reported N_2O emissions from solvent and other product use based on the production and import of N_2O, as reported in a research report.[6] The ERT commends the Czech Republic for this improvement and encourages the Party to continue collecting data on both the production and the import of N_2O using a sustainable source of data.

4. Areas for further improvement

Identified by the Party

100. The ERT noted in the NIR that the Czech Republic plans to make the following improvements in future annual submissions:

(a) The improvement of the uncertainty assessment by: processing all available information on uncertainty using the EU ETS data; carrying out an uncertainty assessment for the metal industry and applying a tier 2 methodology for the estimation of emissions from iron and steel production; continuing to improve the uncertainty assessment for chemical industry; providing category-specific uncertainty assessments for cement production, lime production, limestone and dolomite use, glass production, brick and ceramics production and consumption of halocarbons and SF_6;

(b) The use of a new model to estimate emissions of F-gases from consumption of halocarbons and SF_6 and the inclusion of these estimates in the 2012 annual submission;

(c) The acquisition of a more accurate EF for NMVOCs in solvent and other product use.

Identified by the expert review team

101. The ERT recommends that the Czech Republic make the following improvements in future annual submissions:

[6] Geiplova H. 2010. *Inventory of NMVOC Emissions in 2009. The Use and Applications of Solvents, Sector 060000*. Prague, SVUOM Ltd. (in Czech).

(a) The improvement of transparency by: specifying the impacts of recalculations at a subcategory and sectoral level; elaborating on the methodologies applied, in particular for the key categories; disaggregating, to the extent feasible, the reporting in its NIR from the category to the subcategory level; and substantiating the expert judgement used for the uncertainty assessment;

(b) The improvement of completeness by providing estimates of CH_4 emissions from carbon black, dichloroethylene, methanol and styrene for the period 1990–2007.

D. Agriculture

1. Sector overview

102. In 2009, emissions from the agriculture sector amounted to 8,554.67 Gg CO_2 eq, or 6.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 49.3 per cent. The key driver for the fall in emissions is the decrease in the animal population and the reduced consumption of mineral fertilizer. Within the sector, 58.5 per cent of the emissions were from agricultural soils, followed by 27.5 per cent from enteric fermentation and 13.9 per cent from manure management.

103. The Czech Republic has reported a tier 1 uncertainty analysis but has not reported the sources of the uncertainty estimates, which are mostly based on expert judgement on AD and EFs. The ERT recommends that the Party improve the transparency of its reporting by providing information on the sources of the uncertainty estimates in its next annual submission.

104. Following the recommendation in the previous review reports of the Party's 2009[7] and 2010[8] annual submissions, the Czech Republic prepared and presented, during the review, a QA/QC plan for the agriculture sector that is part of the overall QA/QC inventory improvement plan. The QA/QC plan for the agriculture sector outlines the compilation of emission estimates and the QC checks applied to the inventory, but does not include a description of sector-specific quality checks. During the review, the Party provided the ERT with the QC checklists used for the agriculture sector. The ERT recommends that the Czech Republic update the QA/QC plan for the agriculture sector by including the checklists used for the annual QC process and by identifying planned and completed QA activities.

105. The Czech Republic used tier 1 methodologies to estimate GHG emissions from the key categories in the agriculture sector except for those from enteric fermentation, for which a tier 2 methodology was applied. The ERT noted that it is good practice to use higher-tier methodologies to estimate emissions from key categories and recommends that the Czech Republic do so in its next annual submission.

106. During the review, the ERT learned that national parameters are available for the distribution of animal waste management systems (AWMS), as well as for protein intake and fat content in milk and requested the Party to revise its estimates of N_2O emissions from: manure management; animal manure applied to soils; pasture, range and paddock manure; atmospheric deposition; and nitrogen (N) leaching and run-off, using the more accurate country-specific data. In response to the request made by the ERT during the review to revise N_2O emissions from the categories mentioned above, the Czech Republic revised its estimates of N_2O emissions from manure management using a tier 2 methodology and from animal manure applied to soils using a tier 1b methodology. The revisions resulted in an increase in GHG emissions from agriculture of 8.1 per cent

[7] FCCC/ARR/2009/CZE. Available at <http://unfccc.int/resource/docs/2010/arr/cze.pdf>.
[8] FCCC/ARR/2010/CZE. Available at <http://unfccc.int/resource/docs/2011/arr/cze.pdf>.

(672.2 Gg CO_2 eq) in 2008 and of 8.6 per cent in 2009 (677.5 Gg CO_2 eq), and an increase in total national GHG emissions of 0.5 per cent in 2009 and in 1990. The ERT agrees with these revisions and commends the Czech Republic for its effort to increase the accuracy of its reporting.

107. The ERT noted that CH_4 emissions from suckling cows has been reported under the category dairy cattle; however, according to the IPCC good practice guidance, suckling cows should not be classified as dairy cows. The ERT recommends that the Czech Republic report emissions from suckling cows under the category non-dairy cattle in its next annual submission.

2. Key categories

Enteric fermentation – CH_4

108. The Czech Republic used a tier 2 method to estimate feed consumption by cattle, a default CH_4 EF to estimate CH_4 emissions from cattle, and a tier 1 method and default CH_4 EFs to estimate CH_4 emissions from other livestock species. This is in accordance with the IPCC good practice guidance. The estimation methodology used to calculate emissions from enteric fermentation includes a country-specific value for grazing days in each relevant animal category.

Manure management – CH_4

109. The Czech Republic has used a tier 1 method to estimate CH_4 emissions from AWMS. Noting that this is a key category by trend, the ERT recommends that the Party, in line with the IPCC good practice guidance, use a higher-tier method to estimate emissions from this category.

110. According to the information provided by the Czech Republic during the review, the ERT noted that the type of manure and the manure storing practices applied (especially for dairy cattle and other cattle) are not reported in line with the IPCC good practice guidance. The Party applies the default value from the Revised 1996 IPCC Guidelines whereby 20 per cent of the manure from dairy cattle is daily spread and thus does not emit CH_4. Following a request made by the ERT during the review, the Czech Republic provided country-specific information on the distribution of manure types and practices in 1990 and 2003 based on expert judgement.[9] This expert judgement indicates that the manure distribution by type differs from the default distribution ratios reported in the CRF tables and is similar to that reported by the neighbouring countries, namely Poland and Slovakia.

111. These manure distribution ratios by type are used to estimate N_2O emissions but are not used to estimate CH_4 emissions from manure management (see para. 113 below). As there seems to be high uncertainty regarding the way in which manure is handled in the Czech Republic, the ERT recommends that the Party increase the accuracy of its reporting by further investigating the actual manure handling practices. The investigation should include the amount of manure stored in the different AWMS and the actual storage time of the manure, as these conditions influence the amount of CH_4 emitted.

112. The Czech Republic has used IPCC default values for the number of grazing days to estimate CH_4 and N_2O emissions from manure management. These are different from the national data used to estimate CH_4 emissions from enteric fermentation (see para. 108 above). For example, for dairy cattle, the national data assume an average grazing period of 11 per cent/year when estimating CH_4 emissions from enteric fermentation and an average

[9] Mudřík Z and P Hons. 2004. Excel spreadsheet received from the Czech Republic during the review week.

grazing period of 19 per cent when estimating N from manure applied to pasture, range and paddock. The ERT recommends that the Czech Republic increase the consistency of its reporting within the sector and revise the number of grazing days applied in the estimation of N_2O and CH_4 emissions from manure management in its next annual submission.

Manure management – N_2O

113. The Czech Republic has used the default ratio of manure type distribution by AWMS (20 per cent of the manure from dairy cows is daily spread, the EF for which is equal to zero) to estimate N_2O emissions from manure management. Following questions raised by the ERT during the review, the Czech Republic was not able to provide documentation to substantiate its claim that daily spread is a commonly used practice in the country. Preliminary country-specific data on manure management systems (MMS) provided by the Party during the review indicate that the fraction of manure which is managed as solid storage and dry lot may be as high as 82 per cent from dairy cattle. The fact that the default EF for solid storage and dry lot (0.2 kg N_2O-N/kg N) is significantly higher than the default EF for liquid systems (0.001 kg N_2O-N/kg N) implies that, due to the AWMS distribution method reported by the Party, there is an underestimation of N_2O emissions from manure management.

114. The Czech Republic has estimated N_2O emissions from manure management of dairy cattle using a tier 1 approach and a default N excretion rate (Nex) of 100 kg N/head (dairy cattle)/year and default values for the distribution of animal manure per AWMS for the entire period from 1990 to 2009.[10] The ERT noted that during this period the milk production per dairy cow increased from 10.6 litres/day (1990) to 19.1 litres/day (2009), leading to an increased feed intake. In response to a question raised by the ERT during the review, the Czech Republic indicated that the protein content in cattle feed was 18 per cent protein/kg dry matter feed.

115. According to information on the feed consumption of dairy cows used to estimate CH_4 emissions from enteric fermentation and the protein content, the ERT noted that the total N intake of dairy cattle should be approximately 160–170 kg N/head/year. The dairy cows' retention of N in milk can be estimated at approximately 40 kg N/head/year. The ERT therefore concluded that the Nex for dairy cows was approximately 120–130 kg N/head/year in 2009 and higher than the default value (100 kg Nex) and that the application of these default values is contributing to an additional underestimation of N_2O emissions from dairy cattle. The ERT requested that the Czech Republic revise its emission estimates for manure management and the Nex value for dairy cattle.

116. In response to the list of potential problems and further questions raised by the ERT during the review week, the Czech Republic revised the Nex values for dairy cattle (reporting both dairy cows and suckling cows together to be 144.83 kg Nex/head/year in 2009) and changed the distribution ratio of manure per AWMS according to national conditions based on expert judgement[11] (see para. 110 above) but maintained the distribution ratio for the period 2003–2009. These revisions resulted in an increase in N_2O emissions from AWMS from 1.00 Gg N_2O to 2.45 Gg N_2O in 2009, or by 145.1 per cent. The ERT agrees with the revised emission estimates, commends the efforts of the Czech

[10] Zapletal M, P Chroust, D Kuňák, M Sáňka, M Fara, I Skořepová, D Fottová, T Pačes, H Kazmarová, P Čupr, E Budská, P Fabiánek and J Seják. 2004. Efficiency investigation of measures for the reduction of air pollution based on the abatement of negative effects of pollutants on environmental compartments and human health. Project VaV 740/1/02. Ekotoxa Opava, Opava, 600 pp. (in Czech, summary in English). The ERT has only received chapter 2, entitled "Modelování prostorovÉ distribuce emisí amoniaku na území České republiky".

[11] Mudřík Z and P Hons. 2004. Excel spreadsheet received from the Czech Republic during the review week.

Republic to improve the accuracy of its reporting and recommends that the Party document the national distribution pattern of AWMS in its next annual submission.

117. The currently used data on milk production are based on data collected by an external expert. The ERT recommends that the Czech Republic, in its next annual submission, use the data on milk production published annually by CSO and include on-farm milk use and other milk use which is not included in the published total milk production delivered to dairy factories.

Direct soil emissions – N_2O

118. The Czech Republic used a tier 1 approach to estimate N_2O emissions from animal manure applied to soils for dairy cattle (see paras. 110 and 116 above) and IPCC default values for the distribution of animal manure applied to soils per manure management practice. During the review, the ERT learned that national data for the ratios of manure per AWMS are available and requested that the Party revise its estimates of N_2O emissions from animal manure applied to soils applying these national data and a revised Nex value.

119. In response to the list of potential problems and further questions raised by the ERT during the review week, the Czech Republic revised its N_2O emission estimates for animal manure applied to soils (from 2.13 Gg N_2O to 2.56 Gg N_2O), which resulted in an increase in N_2O emissions from direct soil emissions of 4.9 per cent in 2009. The ERT commends the Party for this improvement in the accuracy of its inventory and recommends that the Czech Republic document the methodology used in its next annual submission.

120. The Czech Republic used a tier 1 approach to estimate N_2O emissions from crop residues returned to soil. The ERT recommends that the Party increase the transparency of its reporting by providing further documentation on country-specific AD and on the national circumstances influencing these data.

Pasture, range and paddock manure – N_2O

121. The Party used a tier 1 approach to estimate N_2O emissions from pasture, range and paddock manure from dairy cattle (see paras. 110 and 116 above), a default EF (100 kg N/dairy cattle (Nex)) and default ratios for the distribution of AWMS, which is not in accordance with the IPCC good practice guidance for the key categories. The ERT concluded that the N_2O emissions from pasture, range and paddock manure could be under- or overestimated and requested that the Czech Republic revise the estimates of N_2O emissions from pasture, range and paddock manure, applying the revised Nex value and available country-specific data.

122. In response to the list of potential problems and further questions raised by the ERT during the review week, the Czech Republic revised the estimates of N_2O emissions from pasture, range and paddock manure from 1.15 Gg N_2O to 1.09 Gg N_2O. This revision resulted in a decrease in N_2O emissions from pasture, range and paddock manure of 5.0 per cent for 2009. The decrease is due to the application of a lower number of grazing days. The ERT agrees with the revised estimate, commends the Czech Republic for this improvement to the inventory and recommends that it document the methodology used and the number of grazing days in its next annual submission.

Indirect soil emissions – N_2O

123. The Czech Republic used a tier 1b approach to estimate indirect N_2O emissions from atmospheric deposition. As the Nex value for dairy cows was underestimated (see paras. 110 and 116 above), the ERT concluded that the indirect N_2O emissions from atmospheric deposition were also underestimated and requested that the Party revise the emissions using the revised Nex value and country-specific data.

124. In response to the list of potential problems and further questions raised by the ERT during the review week, the Czech Republic revised the estimates of indirect N_2O emissions from atmospheric deposition (from 0.89 Gg N_2O to 0.97 Gg N_2O). The revision resulted in an increase in N_2O emissions from atmospheric deposition of 8.9 per cent for 2009. The ERT agrees with the revised estimate, commends the Czech Republic for this improvement to the inventory and recommends that it document the methodology used in its next annual submission.

125. The Czech Republic used a tier 1b approach to estimate indirect N_2O emissions from N leaching and run-off. As the Nex value for dairy cattle was underestimated (see paras. 110 and 116 above), the ERT concluded that the N_2O emissions from N leaching and run-off were also underestimated and requested that the Party revise the emissions using the revised Nex value and country-specific data.

126. In response to the list of potential problems and further questions raised by the ERT during the review week, the Czech Republic revised the estimates of indirect N_2O emissions from N leaching and run-off from 4.64 Gg N_2O to 4.94 Gg N_2O. The revision resulted in an increase in indirect N_2O emissions from N leaching and run-off of 6.4 per cent in 2009. The ERT agrees with the revised estimate, commends the Czech Republic for this improvement to the inventory and recommends that it document the methodology used in its next annual submission.

127. The Czech Republic used a tier 1 methodology to estimate indirect N_2O emissions from atmospheric deposition (ammonia EFs) and to estimate the amount of manure applied to soils and mineral fertilizer applied to soils (loss factors). In addition to reporting under the Convention and the Kyoto Protocol, the Czech Republic also reports its annual ammonia emissions under the Convention on Long-range Transboundary Air Pollution (CLRTAP) and to the EU under its National Emission Ceilings Directive (NECD). However, although CHMI reports the Party's ammonia emissions under both CLRTAP and the Convention, the data used for these estimates differ, although the origin of the source is the same. The ERT recommends that the Czech Republic streamline and harmonize its reporting of ammonia emissions under different international bodies by using the *EMEP/EEA Air Pollutant Emission Inventory Guidebook*[12] or by using well-documented national data.

3. Areas for further improvement

Identified by the Party

128. Although the Czech Republic has been reporting since its 2009 submission that the analysis of uncertainties in the agriculture sector is in the process of being carried out, the ERT has not noted any improvements to the uncertainty analysis thus far.

Identified by the expert review team

129. The ERT recommends that the Czech Republic make the following improvements in future annual submissions:

(a) Enhance the cooperation between the inventory compilers and the national agricultural researchers in order to facilitate the inclusion of the most recent national agricultural developments in the GHG inventory;

(b) Improve the accuracy of reporting by advancing to higher-tier methods for the estimation of CH_4 and N_2O emissions from manure management for non-dairy cattle

[12] European Environment Agency (EEA). 2009. Available at <http://www.eea.europa.eu/themes/air/emep-eea-air-pollutant-emission-inventory-guidebook/emep>.

and by reporting the exact numbers of the animal population (not rounding up the numbers to the nearest thousand);

(c) Enhance the transparency of reporting by providing a more detailed description of the AD for all components reported under agricultural soils;

(d) Further investigate national manure management practices and apply the country-specific distribution of these practices across AWMS, including the application of the country-specific number of grazing days for the relevant inventory categories;

(e) Improve the accuracy of the uncertainty estimates for all categories and for the agriculture sector as a whole.

E. Land use, land-use change and forestry

1. Sector overview

130. In 2009, net removals from the LULUCF sector amounted to 6,863.15 Gg CO_2 eq. Since the base year, net removals have increased by 89.1 per cent. The key driver for the rise in removals is the increase in carbon stock in forest land. The significant inter-annual variability in net removals is associated with variations in the volumes of harvested wood. Within the sector, 6,735.86 Gg CO_2 eq of the removals were from forest land remaining forest land, followed by 120.45 Gg CO_2 from grassland, 102.79 Gg CO_2 from settlements and 20.48 Gg CO_2 from wetlands. Cropland was a net source and accounted for emissions of 120.45 Gg CO_2, which are mainly related to the application of lime.

131. The reporting on the LULUCF sector is complete in terms of gases and categories. In general, the Czech Republic has followed the recommendations in the previous review reports to further improve the accuracy of the emission estimates. In particular, it has provided complete matrices of annual land-use changes for the entire time series (1990–2009), which implied a big effort on the part of the Czech Republic to reconstruct the changes that have occurred since 1970. No recalculations were made for the LULUCF sector in the 2011 submission.

132. The areas subject to land-use changes totalled, on average, 19.1 kha/year during the period 1990–2009. Some apparent inconsistencies in the time series were identified by the ERT, with some years showing very high values (e.g. 55.1 kha in 1996, 39.5 ha in 1991 and 35.6 kha in 1998). The Party explained during the review that such anomalies in the time series reflect real changes related to the transition to a market economy and also to limitations in the information available for the period prior to 1990. The ERT encourages the Party to continue its efforts to improve the accuracy of the representation of historical land use and to provide transparent information to explain the apparent inconsistencies in the time series of the areas subject to changes in land use.

133. During the review, the ERT and the Party agreed that the reported uncertainties for removals in the LULUCF categories (e.g. 178 per cent for forest land remaining forest land and 59 per cent for land converted to forest land) were unrealistically high. Although the Czech Republic already closely follows the IPCC good practice guidance for LULUCF to estimate uncertainties, the ERT reiterates the recommendation in the previous review report that the Party revise the uncertainty assessment for the LULUCF sector. Specifically, the Czech Republic may wish to consider deriving country-specific values for the uncertainties of the various parameters used for the calculations, applying existing statistics, new sampling schemes or, if these data are unavailable, applying expert judgement according to the IPCC good practice guidance (section 6.2.5). The ERT encourages the Czech Republic to consider using a tier 2 approach for the estimation of uncertainties or, if the application of a tier 2 approach is not possible, to aggregate categories to avoid the possible effects of

correlation among input variables, according to the IPCC good practice guidance for LULUCF (box 5.2.2).

2. Key categories

Forest land remaining forest land – CO_2

134. Altogether, 98.1 per cent of total net removals in the LULUCF sector are reported under forest land remaining forest land. Carbon stock changes in living biomass (above-ground and below-ground) were estimated by applying a combination of tier 2 and tier 3 approaches (using the default gains and losses method, country-specific parameters and models). For the other carbon pools (dead wood, litter and soil organic carbon), a tier 1 approach was applied, resulting in no stock changes throughout the time series. Although all methodologies used are appropriate and in line with the IPCC good practice guidance for LULUCF, the ERT reiterates the recommendations in the previous review reports that the Czech Republic improve the accuracy of its reporting by adopting the carbon stock change method to estimate changes in biomass carbon stocks and by using higher-tier methods for dead wood, litter and soil organic carbon.

135. The key parameter used for the estimation of carbon stock changes in living biomass is the annual increment in the volume of merchantable wood (I_v). This parameter was estimated for each individual stand and for each of the four main species (spruce, pine, birch and oak) using data from the Forest Management Plan. Reported I_v values increased by 16.7, 15.9, 8.5 and 5.5 per cent for each of the species, respectively, during the period 1990–2009. The Party explained during the review that such increases are due to the effects of atmospheric N deposition, the increase in the mean air temperature and the changes in forest management practices during the period. The ERT encourages the Party to improve the transparency of its reporting by providing documented evidence of these effects in the NIR of its next annual submission.

136. The fraction of forest harvest residues that is burned after forest clear cut was estimated by expert judgement at 30 per cent. The Party explained during the review that this figure was based on consultation with experts in 2005 and is now considered to be lower due to the increasing interest in using biomass for energy purposes. During the review, the Party described its intention to conduct a new survey/consultation with experts and to use an updated value in the next annual submission. The ERT encourages the Czech Republic to proceed with this planned improvement and recommends that the Party follow the IPCC good practice guidance in appraising the expert judgement.

Cropland remaining cropland – CO_2

137. The application of lime on agricultural land has decreased sharply since 1990 and the category cropland remaining cropland is therefore identified as a key category by trend assessment. During the review, the Party provided information on the AD and explained the reasons for the abrupt decrease in the application of lime due to the economic downturn. The ERT reiterates the recommendation in the previous review report that the Party provide this information in the NIR of its next annual submission.

138. The carbon stock changes in mineral soils under cropland are estimated using a simplified version of a tier 1 approach provided in the 2006 IPCC Guidelines. A single combination of default values for stock change factors F_{MG} (1.08) and F_I (1.00) was selected for the whole area of cropland in the country. These values correspond to reduced soil tillage and a medium level of inputs, respectively.

139. During the review, the ERT verified that not all cropland areas are under reduced tillage, implying that different values of F_{MG} would be applicable to different areas. The

values for the reference soil organic carbon content, by which those stock change factors were multiplied, were derived at the cadastral unit level. These cadastral units have relatively large areas containing different types of soils and different land-use and management practices, implying that the values of the reference soil organic carbon content may be not acceptable when applying the tier 1 method provided in the 2006 IPCC Guidelines. The ERT encourages the Czech Republic to improve the accuracy of the estimates of changes in the soil organic carbon pool by subdividing the cropland area by cropping systems based on the tillage system and the level of inputs in order to apply the right combination of stock change factors to each system. It also encourages the Party to derive the values of the reference soil organic carbon content that are linked to soil types and specific land uses rather than to cadastral units and to apply these values in the next annual submission.

140. During the review, the Party informed the ERT that in recent years there has been an increase in the area of short-rotation forest plantations for the purpose of biomass production and that these plantations are classified as cropland. No information was provided on these plantations in the NIR. The ERT encourages the Party to estimate and report the carbon stock changes attributable to these plantations in the next annual submission and to consider their inclusion under forest land in cases where this land use becomes permanent.

3. Non-key categories

Land converted to forest land – CO_2

141. Since the composition of tree species used in the areas of land converted to forest land is unknown, the carbon stock changes in biomass were estimated using country-specific growth rates for each species, assuming that the area distribution among species is the same as for the category forest land remaining forest land. This assumption may lead to the inaccurate estimation of carbon stock changes, considering that there are significant differences in the growth rates, basic wood densities and biomass expansion factors among the four species. For dead organic matter pools (dead wood and litter), it was assumed that there are no carbon stock changes. The ERT reiterates its encouragement from the previous review reports that the Party develop more accurate estimates of the areas of land converted to forest land corresponding to each tree species and adopt higher-tier methods for the estimation of dead organic matter pools.

Grassland remaining grassland – CO_2

142. The carbon stock changes in mineral soils under grassland remaining grassland are estimated using a simplified version of the tier 1 method provided in the 2006 IPCC Guidelines. A single default value for the stock change factor F_{MG} (0.95) was selected for the whole area of grassland in the country. This value corresponds to overgrazed or moderately degraded grassland receiving no management inputs. This may not represent the situation of all the grassland areas in the country. The ERT therefore encourages the Czech Republic to improve the accuracy of the estimates of changes in the soil organic carbon pool for future annual submissions by stratifying the grassland area by areas with different combinations of degradation status and management inputs in order to apply the right combination of stock change factors to each system. The ERT also encourages the Party, in line with paragraph 139 above, to derive the values of the reference soil organic carbon content that are linked to soil types and specific land-use categories rather than to cadastral units.

4. Areas for further improvement

Identified by the Party

143. The ERT noted from the NIR that the Czech Republic plans to undertake the following improvements in future annual submissions:

(a) The adoption of a stock change method for the estimation of carbon stock changes in biomass in forest land;

(b) The refinement of the procedure for estimating uncertainties in order to obtain values that more closely reflect reality.

Identified by the expert review team

144. The ERT recommends that the Czech Republic make the following improvements in future annual submissions:

(a) The enhancement of expertise within the national system for the agriculture and LULUCF sectors, in order to enable a more accurate reporting of carbon stock changes and GHG emissions in cropland and grassland;

(b) The improvement of the transparency of reporting by providing further detail on the AD used and by providing an analysis of the main drivers for the trends of the AD;

(c) The implementation of QC checks to improve the accuracy and consistency of the land-use data provided by the Czech Office for Surveying, Mapping and Cadastre (COSMC); and the further improvement of QC processes based on the development of fully digitized information systems (currently under development).

F. Waste

1. Sector overview

145. In 2009, emissions from the waste sector amounted to 3,555.03 Gg CO_2 eq, or 2.7 per cent of total GHG emissions. Since 1990, emissions from the waste sector have increased by 31.1 per cent. Within the sector, 71.2 per cent of the emissions were from solid waste disposal on land, followed by 20.0 per cent from wastewater handling and 8.8 per cent from waste incineration in 2009. The waste sector is the only sector in the inventory that shows an increasing trend in emissions driven by the growth of CH_4 emissions from solid waste disposal on land due to an increased amount of solid organic waste disposed on landfills. CH_4 emissions from solid waste disposal on land is a key category by level and trend assessment.

146. The Czech Republic has recalculated CH_4, CO_2 and N_2O emissions from the waste sector for the years 1990–2008 due to an improvement in the AD for landfill gas recovery in 2007–2008 and due to the update of the amount of incinerated waste based on the bottom-up approach for the whole time series. The recalculations resulted in an increase in CH_4 emissions from waste disposal on land of 0.7 per cent (0.75 Gg), a decrease in CO_2 emissions from waste incineration of 23.3 per cent (104.06 Gg CO_2 eq) and a decrease in N_2O emissions of 18.6 per cent (0.01 Gg) for 2008. The recalculations resulted in a decrease in total GHG emissions from the waste sector of 90.16 Gg CO_2 eq (or 2.5 per cent) in 2008 and an increase in emissions from the waste sector of 61.14 Gg CO_2 eq (or 2.3 per cent) in 1990. The recalculations took place in the following categories:

(a) Solid waste disposal on land (an increase of 15.79 Gg CO_2 eq for 2008);

(b) Waste incineration (a decrease of 105.96 Gg CO_2 eq for 2008).

147. For the waste sector, the Czech Republic applied a tier 1 approach to derive sectoral uncertainty estimates and undertook tier 1 QA/QC activities, with the exception of the key category solid waste disposal on land for which tier 2 QC procedures were applied. However, the ERT noted that the Party did not systematically document these activities and did not archive the checklists and comments from the QA/QC activities in the centralized archive. The ERT recommends that the Czech Republic more systematically document its QA/QC procedures and describe them in the NIR of its next annual submission.

2. Key categories

Solid waste disposal on land – CH_4

148. To estimate CH_4 emissions from solid waste disposal on land, the Czech Republic used a tier 2 first order decay method provided in the 2006 IPCC Guidelines, default regional values for waste composition and the assumption that this composition is stable throughout the time series. During the review, the Party informed the ERT that in 2011 it completed the collection of waste composition data for the years 1975, 1985–1987, 1997, 2000 and 2008–2010 and that it intends to use these data in its next annual submission. The ERT commends the Czech Republic for its efforts to collect country-specific data on waste composition and recommends that the Party include these data in its next annual submission in order to improve the accuracy of its reporting and to reduce the uncertainty of the CH_4 emission estimates from solid waste disposal on land.

149. The Czech Republic did not provide sufficient information in the NIR on the flows of industrial waste and it was not clear to the ERT whether the emissions from industrial waste have been accounted for in the Party's NIR. During the review, the ERT noted that, according to statistical yearbooks,[13] some organic industrial waste (namely from textiles and the pulp and paper industry) is disposed at the solid waste disposal sites (SWDS) together with the municipal solid waste. The Czech Republic explained the procedures for applying the data from CSO reports to the preparation of the inventory[14] and that the emissions from industrial waste are included under total managed waste disposal on land. The ERT recommends that the Czech Republic describe the sources of the AD and parameters used for estimating the emissions from solid waste disposal on land and improve the transparency of its reporting when describing the allocation of emissions across different categories.

3. Non-key categories

Wastewater handling – CH_4 and N_2O

150. The ERT noted that the methodologies used for estimating CH_4 emissions from wastewater handling were in line with the Revised 1996 IPCC Guidelines, with mostly default values applied. The ERT commends the Party for the estimation of national chemical oxygen demand values generated by individual subcategories of industrial wastewater. This improvement was made following a recommendation in the previous review report.

[13] Czech Statistical Office. 2010. Statistical report, available at <http://www.czso.cz/csu/2010edicniplan.nsf/p/2001-10>.

[14] Inventory experts use the amount of "Other waste" landfilled from the statistical data collected by MoE. The share of industrial waste is estimated to amount to 1.7 per cent of that amount.

Waste incineration – CO_2, CH_4 and N_2O

151. The AD used for the calculations of GHG emissions from waste incineration are based on the bottom-up approach and on information gathered from incineration facilities through the special questionnaire of the Ministry on Industry and Trade. All CO_2 emissions from waste incineration are reported under the waste sector, although part of the energy from the waste incinerated is recovered and used for heating purposes. The ERT recommends that the Czech Republic split the CO_2 emissions and report separately those recovered and used for energy purposes under the energy sector.

152. Emissions of biogenic N_2O from waste incineration are reported as "NE". During the review, the ERT was informed by the Czech Republic that the AD and related N_2O emissions from biogenic waste incineration are included in the category other (waste incineration (other – non-biogenic)). The ERT recommends that the Czech Republic separate these emissions and report the emission estimates under the category waste incineration – biogenic. If this is not possible, the ERT recommends that the Party report biogenic N_2O emissions from waste incineration as included elsewhere ("IE") and specify in the documentation box where the emissions are included.

153. The ERT noted that the NIR provides limited explanations on the methods, data sources and assumptions used to estimate emissions from waste incineration with energy use and reiterates the recommendation from the previous review reports that the Party provide this information in the next annual submission.

4. Areas for further improvement

Identified by the Party

154. The ERT noted in the NIR that the Czech Republic plans to make the following improvements in future annual submissions:

(a) The use of country-specific data related to waste composition;

(b) The estimation of emissions from composting using parameters from the 2006 IPCC Guidelines;

(c) The provision of uncertainty estimates using the Monte Carlo method for the waste sector.

Identified by the expert review team

155. The ERT recommends that the Czech Republic make the following improvements in future annual submissions:

(a) The provision of a description on how industrial organic waste disposed on land is estimated;

(b) The enhancement of the QA/QC procedures and the improvement of their documentation for the entire sector, in particular for the key category solid waste disposal on land;

(c) The reporting of CO_2 emissions from waste incinerated with energy recovery under the energy sector.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

156. The Czech Republic provided supplementary information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the requirements outlined in paragraphs 5 to 9 of the annex to decision 15/CMP.1. The information corresponding to the years 2008 and 2009 was reported in the KP-LULUCF CRF tables and in chapter 11 of the NIR, following the annotated outline of the NIR. The NIR clearly distinguishes these activities from the emissions from sources listed in Annex A to the Kyoto Protocol.

157. For the activities under Article 3, paragraph 4, of the Kyoto Protocol, the Czech Republic elected only forest management and for all activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, it elected commitment period accounting. The geographical location of the boundaries of areas that encompass the units of land subject to afforestation/reforestation, deforestation and forest management activities is specified as the national boundary, and these areas are identified using the reporting method 1 from the IPCC good practice guidance for LULUCF. The definitions of forest and the land identification system used to determine the areas subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are in accordance with the IPCC good practice guidance for LULUCF.

158. In response to a request made by the ERT in the previous review report, the Party provided information on the spatial assessment unit used for the identification of the areas of land units subject to activities under Article 3, paragraph 3, of the Kyoto Protocol, which is 100 m^2 for both afforestation/reforestation and deforestation, and is therefore in line with the requirements of paragraph 3 of the annex to decision 16/CMP.1.

159. The Czech Republic did not provide an explanation of how it ensures that afforestation/reforestation activities occurring on lands under deforestation are distinguished from afforestation/reforestation activities occurring on other lands. During the review, the Party explained that it is unlikely that afforestation/reforestation activities occur on other lands because all land-use change activities require permits from the Government or local authorities, and those land-use changes implying the conversion of forest land are normally only allowed for permanent changes, such as the establishment of settlements. While the ERT acknowledges the rationale provided by the Party, it considers that the possibility exists for the development of afforestation/reforestation activities on land classified as deforested and encourages the Party to ensure that the national system has the capacity to identify such activities.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

160. The Czech Republic has reported an area under afforestation and reforestation of 40.03 kha in 2009 and corresponding net removals of 294.68 Gg CO_2 eq, which corresponds to an implied stock change factor of 7.36 Mg CO_2/ha. The areas under afforestation and reforestation and the related removals reported under the Convention and under Article 3, paragraph 3, of the Kyoto Protocol have been reported in a consistent way.

161. The Czech Republic has reported increases in the litter and soil organic carbon pools in an aggregated manner as changes in soil organic carbon. The carbon stock changes in litter were reported as "IE" in the corresponding KP-LULUCF CRF table. The Party

explained during the review that this was due to the fact that the spatial maps of soil organic carbon content used as the source of information include litter as part of the soil carbon. The Party also provided peer-reviewed literature to support the assumptions made. The ERT acknowledges the accuracy of the reported increases in these carbon pools. However, in order to improve the transparency of its reporting, it encourages the Party to make an effort to provide disaggregated estimates for each individual pool in future annual submissions.

Deforestation – CO_2

162. The Czech Republic has reported an area under deforestation of 13.01 kha in 2009 and corresponding net emissions of 170.19 Gg CO_2 eq. The ERT found that there was consistency between the areas and emissions reported under the Convention and those reported under Article 3, paragraph 3, of the Kyoto Protocol.

163. The emissions reported for lands under deforestation correspond mostly to biomass losses in the area of forest land converted in 2009 (0.47 kha) and, to a lesser extent, to decreases in the soil organic carbon pool from forest land conversions in previous years. The ERT considers that the current system for the representation of land use does not enable an adequate assessment of land use and management on deforested lands. This may lead to an inaccurate estimation of emissions or removals other than those related to the losses of carbon currently estimated by the Czech Republic. The ERT therefore recommends that the Party improve the tracking of deforested lands, including information on the management practices applied to them (e.g. practices leading to changes in soil organic carbon, the application of lime and the burning of biomass), in order to enhance the accuracy of the emission and removal estimates for the next annual submission.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

164. The Czech Republic has reported an area under forest management of 2,562.08 kha for 2009 and associated net removals of 6,411.15 Gg CO_2 eq. This corresponds to an implied stock change factor of 2.50 Mg CO_2/ha. The net removals in 2009 are much higher than the cap of 1,173.33 Gg CO_2 eq/year established in decision 16/CMP.1 for forest management in the commitment period. The ERT noted that there is consistency between the areas and removals reported in the LULUCF sector under the Convention and under Article 3, paragraph 4, of the Kyoto Protocol.

165. The Czech Republic has adopted a broad definition of forest management and identified the entire area of forest land remaining forest land as subject to this elected activity under Article 3, paragraph 4, of the Kyoto Protocol. The Czech Republic provided estimates of the changes in carbon stocks in living biomass using tier 2 and tier 3 methods. For dead wood, litter and soil organic carbon, a tier 1 method was applied, implying that there are no changes to these pools. Emissions from biomass burning were estimated using a tier 1 method. In all cases, the parameters and EFs were appropriately selected and in line with the IPCC good practice guidance for LULUCF.

166. Forest management has been identified as a key category, and while the Czech Republic provided clear evidence that the omitted pools are not net sources, increases in these pools may occur. Therefore, in line with the recommendations from previous review reports, the ERT encourages the Party to develop higher-tier methods for these pools.

167. The CO_2 emissions from the application of 81 Mg of limestone to forest management land are reported in CRF table 5(KP-II)4 for 2009. This is not consistent with the reporting under the Convention, since no emissions from this category are reported

under the category other (CO_2 emissions from agricultural land application) under the Convention. The Party explained during the review that the emissions do occur on forest land remaining forest land. The ERT recommends that the Czech Republic resolve this inconsistency between the Convention and the Kyoto Protocol reporting in the next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

168. The Czech Republic has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and the SEF comparison report.[15] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

169. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1 and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements set out in paragraph 88(a–j) of the annex to decision 22/CMP.1.

National registry

170. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

171. However, the SIAR identified the following problems, namely that the Party must: provide information on national holding, cancellation and retirement accounts; display in the public reports the identifier of the representative of the account holder, using the Party identifier and a number unique to that representative within the Party's registry; make all required information on JI projects publicly available, including project documentation and reports; and state clearly and explicitly what this information relates to, not only in the NIR but also on the public website.

172. During the review, the Party indicated that, as a result of updates to the Seringas system, it can now provide information on national holding, cancellation and retirement accounts and not just on authorized legal entities' accounts and can now also provide identifiers of the representative of the account holder. The Party also indicated that information on JI projects is currently being uploaded on the MoE website and the upload should be finalized by the end 2011. The ERT recommends that the Czech Republic address the remaining problems and report on the results in its next annual submission.

[15] The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Czech Republic's SEF tables with corresponding records contained in the ITL.

Calculation of the commitment period reserve

173. The Czech Republic has reported its commitment period reserve in its 2011 annual submission. The Party reported its commitment period reserve to be 664,626,971 t CO_2 eq based on the national emissions in its most recently reviewed inventory (132,925,394 t CO_2 eq – the 2009 value reported in the 2011 annual submission). The ERT disagrees with this figure.

174. During the review, the Czech Republic provided revised estimates for N_2O and CH_4 emissions from manure management and agricultural soils for the entire time series and a revised value of its commitment period reserve. The revised commitment period reserve is equal to 668,014,203 t CO_2 eq and is based on the national total GHG emissions in the most recently reviewed inventory year (2009) (133,602,841 t CO_2 eq). The ERT agrees with this figure.

3. Changes to the national system

175. The Czech Republic reported that there have been no changes to its national system since the previous annual submission. However, during the review, the Party indicated that there have been changes to the national system in that a new QA/QC manager and an expert in charge of compiling the industrial processes sector of the inventory have been appointed and that these changes would be documented in the next NIR. The ERT recommends that the Czech Republic ensure that it maintains the requisite capacity and expertise within the national system through the provision of support and training for any newly appointed experts.

176. The ERT concluded that, taking into account the confirmed changes to the national system, the Czech Republic's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1. The ERT recommends that the Party report, in its next annual submission, any changes to its national system in accordance with chapter I.F of the annex to decision 15/CMP.1.

4. Changes to the national registry

177. The Czech Republic has reported on some minor changes to its national registry in the 2011 annual submission, including a change in the registry administrator team in 2010 and the fact that all performance was moved back to the primary production environment after failed tests of the disaster recovery plan. The ERT concluded that the Czech Republic's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

178. The Czech Republic did not provide information on any changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged the following changes in its reporting under Article 3, paragraph 14, of the Kyoto Protocol:

(a) The introduction of a system to utilize renewable energy sources through the construction of mini-hydropower plants in the Philippines;

(b) The finalization of projects on the promotion of solar energy in schools in Kenya;

(c) The completion of a study on carbon dioxide capture and storage potential in the Czech Republic, noting that there is currently no ongoing or planned national demonstration project for carbon dioxide capture and storage.

179. Among other issues, the Czech Republic has reported on capacity-building projects in developing countries. The Party mentions bilateral development assistance projects focusing on the reduction of dependence on fossil fuels and the development of renewable energy sources, citing the construction of a small hydropower plant in Angola; the development of solar power plants in poor rural areas of Viet Nam; the development of small hydropower projects in Viet Nam (technology transfer); and the development of small and medium-sized energy sources and interconnecting networks in Palestine.

180. The ERT concluded that, taking into account the confirmed changes in the reporting under Article 3, paragraph 14, of the Kyoto Protocol, the information provided is complete and transparent. The ERT recommends that the Party, in its next annual submission, report on any changes in its information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with chapter I.H of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

181. The Czech Republic made its annual submission on 15 April 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

182. The ERT concludes that the inventory submission of the Czech Republic has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Czech Republic has submitted a complete set of CRF tables for the years 1990–2009 and an NIR; these are complete in terms of geographical coverage, years and sectors, and in terms of categories and gases.

183. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. The ERT noted that the Czech Republic reported information required under Article 3, paragraph 14, of the Kyoto Protocol but did not specify the changes that have occurred since the previous annual submission.

184. The Czech Republic's inventory is generally in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and in line with the IPCC good practice guidance for LULUCF. The ERT noted that a tier 1 methodology and default EFs have been used for a number of key categories in the energy, industrial processes, agriculture and waste sectors.

185. The Czech Republic has made recalculations for the inventory between the 2010 and 2011 submissions in response to the 2010 annual review report following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the national total GHG emissions is an increase of 0.3 per cent for 2008 and an increase of 0.7 per cent for 1990. The main recalculations took place in the following categories:

(a) CO_2 emissions from metal production (a decrease of 0.2 per cent);

(b) CO_2 emissions from waste incineration (a decrease of 0.1 per cent);

(c) CO_2, CH_4 and N_2O emissions from transport (an increase of 0.03 per cent).

186. The Party has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and elected activities under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3.

187. The Czech Republic has made recalculations for the KP-LULUCF activities (forest management) between the 2010 and 2011 submissions following changes in AD. The impact of these recalculations on the national total GHG emissions is an increase of 0.007 per cent in 2008. The ERT noted that these recalculations were not reflected in the LULUCF sector of the 2011 submission.

188. In response to a request made by the ERT during the review, the Czech Republic revised its N_2O emission estimates for manure management and for agricultural soils. The revised estimates resulted in an increase in the national total GHG emissions of 0.5 per cent (or 677.45 Gg CO_2 eq) in 1990 and in 2009.

189. The Czech Republic has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and has used the required reporting format tables as required by decision 14/CMP.1.

190. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1; however, the ERT identified that the QA/QC plan has not been updated since the 2010 submission.

191. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions. However, the SIAR identified several areas for improvement with regard to information on national holding, cancellation and retirement accounts and information on JI projects. During the review, the Party indicated that the issues related to the national accounts have been resolved and the information on JI projects will have been uploaded onto the MoE website by the end of 2011.

192. The Czech Republic has reported information under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2011 annual submission. This information was provided on 15 April 2011. The ERT noted that the Czech Republic did not clearly report on the changes that have occurred since the previous annual submission. In response to questions raised by the ERT during the review week, the Party provided details of changes to its reporting under Article 3, paragraph 14, of the Kyoto Protocol, including information on the projects to construct mini-hydropower plants in the Philippines and on solar energy use in schools in Kenya.

193. The ERT identifies the following cross-cutting issues for improvement:

(a) The maintenance and enhancement of the capacity of the national system, in particular through:

(i) The improved coordination of QA/QC procedures; and the updating and full implementation of the QA/QC plan, including the provision of enhanced documentation on the sectoral QA/QC procedures in the energy, industrial processes and waste sectors;

(ii) The allocation of resources for the application of higher-tier methods for the key categories in all sectors;

(iii) Ensuring the transition of expertise and the provision of training for newly appointed experts in the industrial processes sector;

(iv) The improvement of the archiving system by assembling all relevant information together in a centralized location;

(v) The maintenance of an improvement plan prioritized by the key category and uncertainty analyses, and reviewed and managed through the coordination meetings of the national inventory system;

(b) The improvement of the completeness of the inventory submission by completing CRF table 8(b);

(c) The enhancement of the documentation on the expert judgement used for the uncertainty analysis; and the improvement of the quantitative uncertainty estimates for all categories.

194. In the course of the review, the ERT formulated a number of recommendations relating to the transparency, completeness, consistency, comparability and accuracy of the information presented in the Czech Republic's annual submission. The key recommendations are that the Party:

(a) The improvement of the transparency of reporting in the energy, industrial processes, LULUCF and waste sectors by providing more detailed descriptions of the methodologies used;

(b) The improvement of accuracy by applying higher-tier methods to the key categories in all sectors;

(c) The improvement of time-series consistency for the energy and industrial processes sectors;

(d) Report on any changes to activities undertaken under Article 3, paragraph 14, of the Kyoto Protocol.

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index. html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"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/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"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>.

"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf# page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng /08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for the Czech Republic 2011. Available at <http://unfccc.int/resource/docs/2011/asr/cze.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011. Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/CZE. Report of the individual review of the greenhouse gas inventory of the Czech Republic submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/arr/cze.pdf>.

UNFCCC. *Standard Independent Assessment Report*, parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Czech Republic

Responses to questions during the review were received from Mr. Pavel Fott and Mr. Ondřej Miňovský (Czech Hydrometoeorological Institute (CHMI)), Mr. Vladimír Neuzil and Ms. Eva Krtková (KONEKO Marketing Ltd.), Mr. Jiři Jedlička and Mr. Jakub Tichý (Transport Research Centre), Mr. Emil Cienciala and Ms. Zuzana Exnerová (Institute of Forest Ecosystem Research), Mr. Miroslav Havránek (Charles University Environment Centre), Mr. Dusan Vacha (external consultant of CHMI), Mr. Miroslav Rehor (Electricity Market Operator) and Mr. Michal Danhelka (Ministry of the Environment), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by the Czech Republic:

General

Fott P., Table of planned improvement for key categories (draft): Table of planned improvement for KC Draft2.doc.

Fott P., Minutes of the NIS coordination meeting on 28 April 2011 (translated extracts).

Fott P., Example contract between Český hydrometeorologický ústav and KONEKO marketing, spol. s r.o. For elaboration of inventory of greenhouse gases in the National Inventory System (NIS) for the "Energy" with a focus on stationary sources.

Fott P., QC sheet provided for Energy 1B, dated June 2010 (see QC_Energy-1B-Sub-10.pdf).

Fott P., Agriculture sector checking example provided "QC_protocol_AGRI_2010.pdf", dated February 2010.

Exnerová Z. (IFER), QC_protocol_LULUCF_2011 and QC_protocol_Agri_2011 QA/QC checklists for 2011.

Sector specific QC plans for Agriculture and LULUCF (QC PLAN_IFER_Final).

Miňovský O., NIS Coordinator education/progression plan (NIS education plan.xls).

Fott P., 2010 QA/QC plan.

Industrial processes

Geiplova, H., 2010. Inventory of NMVOC emissions in 2009. The use and applications of solvents, sector 060000, SVUOM Ltd., Prague, December 2010 (in Czech).

Agriculture

Mudřík, Z and Hons P. (2004). Excel spreadsheet received from the Czech Republic during the review week.

Zapletal, M., P. Chroust, D. Kuňák, M. Sáňka, M. Fara, I. Skořepová, D. Fottová, T. Pačes, H. Kazmarová, P. Čupr, E. Budská, P. Fabiánek, and J. Seják. 2004. Efficiency investigation of measures for reduction of air pollution based on abatement of negative effects of pollutants on environmental compartments and human health. Project VaV 740/1/02. Ekotoxa Opava, Opava, 600 pp. (in Czech, summary in English). (The ERT has only received chapter 2) "Modelování prostorovÉ distribuce emisí amoniaku na území České republiky."

[1] Reproduced as received from the Czech Republic.

Land use, land-use change and forestry

Cienciala, E., Exnerová, Z., Schelhaas, M.J. 2008. *Development of forest carbon stock and wood production in the Czech Republic until 2060*. Ann. For. Sci. 65(2008) 603. DOI: 10.1051/forest:2008043.

Cienciala, E., Apltauer, J., Henžlík Z., Zatloukal, V. 2006. *Assessment of carbon stock change in forests – adopting IPCC LULUCF Good Practice Guidance in the Czech Republic*. Forestry Journal 52 (1):17–28.

Cienciala, E., Apltauer, J., Exnerová Z., Tatarinov, F.. 2008. *Biomass functions applicable to oak trees grown in Central-European forestry*. Journal of Forest Science 54 (3):109–120.

Cienciala, E., Černý, M., Tatarinov, F., Apltauer, J., Exnerová Z., 2006. *Biomass functions applicable to Scots pine*. Trees 20:483–495.

Wirth, C., Schumacher, J., Schulze, E.D. 2004. *Generic biomass functions for Norway spruce in Central Europe – a meta-analysis approach toward prediction and uncertainty estimation*. Tree Physiology 24:121–139.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
CaO	calcium oxide
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
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
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
JI	joint implementation
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	Land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
MgO	magnesium oxide
MMS	manure management systems
m^2	square meter
N	nitrogen
NA	not applicable
NE	not estimated
Nex	N excretion rate
N_2O	nitrous oxide
NIR	national inventory report
NMVOCs	non methane volatile organic compounds
NO	not occuring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change