Framework Convention on Climate Change

Report of the individual review of the annual submission of the Czech Republic submitted in 2010*

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* In the symbol for this document, 2010 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of the Czech Republic, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 6 to 11 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Suvi Monni (Finland) and Mr. Dennis Rudov (Belarus); energy – Mr. Benon Yassin (Malawi), Mr. Takeshi Enoki (Japan), Mr. Jongikhaya Witi (South Africa) and Mr. Alexander Zahar (Australia); industrial processes – Ms. Alice Au (Canada), Ms. Laura Dawidowski (Argentina) and Ms. Natalya Parasyuk (Ukraine); agriculture – Ms. Yauheniya Bertosh (Belarus) and Mr. Donald Kamdonyo (Malawi); land use, land-use change and forestry (LULUCF) – Mr. Vladimir Korotkov (Russian Federation) and Ms. Naoko Tsukada (Japan); and waste – Ms. Mayra Rocha (Brazil) and Mr. Kai Skoglund (Finland). Ms. Monni and Mr. Witi were the lead reviewers. The review was coordinated by Mr. Javier Hanna and Ms. Inkar Kadyrzhanova (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.

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in the Czech Republic was carbon dioxide (CO_2), accounting for 85.4 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (8.2 per cent) and nitrous oxide (N_2O) (5.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.9 per cent of the total GHG emissions in the country. The energy sector accounted for 81.1 per cent of total GHG emissions, followed by the industrial processes sector (10.1 per cent), the agriculture sector (5.9 per cent), the waste sector (2.5 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 141,433.65 Gg CO_2 eq and decreased by 27.5 per cent between the base year[2] and 2008.

4. Table 1 shows GHG emissions from Annex A sources and emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF), by gas. Table 2 shows GHG emissions from Annex A sources and emissions and removals from the LULUCF sector under the Convention and from KP-LULUCF activities, by sector and by activity. 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.

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[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 2008

| | Greenhouse gas | *Gg CO$_2$ eq* | | | | | | | | *Change Base year–2008* |
		Base year[a]	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*(%)*
Annex A sources	CO$_2$	164 336.41	164 336.41	131 406.92	127 151.05	125 240.09	126 284.76	126 407.17	120 760.75	−26.5
	CH$_4$	18 463.82	18 463.82	13 647.31	12 087.74	11 676.07	12 070.48	11 693.41	11 545.73	−37.5
	N$_2$O	12 310.72	12 310.72	8 401.48	7 869.60	7 778.82	7 627.76	7 682.63	7 790.19	−36.7
	HFCs	0.73	NA, NE, NO	0.73	262.50	594.22	872.35	1 605.62	1 262.45	171 778.9
	PFCs	0.12	NA, NE, NO	0.12	8.81	10.08	22.56	20.16	27.48	22 333.7
	SF$_6$	75.20	77.68	75.20	141.92	85.88	83.07	75.85	47.04	−37.4
KP-LULUCF Article 3.3[b]	CO$_2$								−112.21	
	CH$_4$								NO	
	N$_2$O								0.42	
KP-LULUCF Article 3.4[c]	CO$_2$	NA							−4 571.87	NA
	CH$_4$	NA							143.63	NA
	N$_2$O	NA							14.58	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$_2$O, 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 to 2008

		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year– 2008 (%)*
						Gg CO₂ eq					*Change*
Annex A		Energy	156 241.18	156 241.18	125 535.24	121 434.40	119 783.97	120 029.84	119 772.76	114 644.65	−26.6
		Industrial processes	19 594.05	19 595.67	14 310.50	13 609.83	13 598.00	14 996.53	15 527.46	14 345.30	−26.8
		Solvent and other product use	764.83	764.83	596.31	568.56	513.77	512.93	512.17	515.27	−32.6
		Agriculture	15 937.36	15 937.36	9 897.18	8 658.52	8 066.35	7 937.48	8 116.97	8 323.92	−47.8
		LULUCF	NA	−3 629.76	−7 211.17	−7 544.77	−6 686.64	−3 472.07	−729.98	−4 778.28	NA
		Waste	2 649.59	2 649.59	3 192.54	3 250.32	3 423.06	3 484.19	3 555.49	3 604.51	36.0
		Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Total (with LULUCF)	**NA**	**191 558.87**	**146 320.60**	**139 976.85**	**138 698.51**	**143 488.91**	**146 754.87**	**136 655.37**	**NA**
		Total (without LULUCF)	**195 187.01**	**195 188.63**	**153 531.77**	**147 521.62**	**145 385.14**	**146 960.98**	**147 484.85**	**141 433.65**	**−27.5**
KP-LULUCF	Article 3.3[b]	Afforestation & reforestation								−271.99	
		Deforestation								160.20	
		Total (3.3)								**−111.79**	
	Article 3.4[c]	Forest management								−4 413.65	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	NA							NA	NA
		Total (3.4)	**NA**							**−4 413.65**	**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, LULUCF = land use, land-use change and forestry, 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] 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 3
Information to be included in the compilation and accounting database, in tonnes of carbon dioxide equivalent

	As reported	Adjustment[a]	Final[b]	Accounting quantity[c]
Commitment period reserve	**707 059 461**		**707 168 248**	
Annex A emissions for current inventory year				
CO_2	120 741 630		120 760 750	
CH_4	11 543 149		11 545 732	
N_2O	7 790 136		7 790 191	
HFCs	1 262 451		1 262 451	
PFCs	27 481		27 481	
SF_6	47 045		47 045	
Total Annex A sources	**141 411 892**		**141 433 650**	
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	–271 989		–271 989	
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	160 203		160 203	
Activities under Article 3, paragraph 4, for current inventory year[d]				
3.4 Forest management for current year of commitment period	–4 413 654		–4 413 654	
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 in base year				

Abbreviation: NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or several 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, of Kyoto Protocol are relevant only for Parties that elected one or more of these activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 14 April 2010; it contains a complete set of common reporting format (CRF) tables for the period 1990–2008 and a national inventory report (NIR). The NIR was resubmitted on 6 May 2010. 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 in the national system and in the national registry; and minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 14 April 2010 and resubmitted on 11 and 14 May 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The Czech Republic officially submitted revised emission estimates on 13 October 2010 in response to questions raised by the expert review team (ERT) in the course of the review. The Czech Republic also submitted revised information on KP-LULUCF on 13 October 2010 in response to questions raised by the ERT during the review (see paras. 126 and 127 below).

8. 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] Where necessary, the ERT also used the previous year's submission during the review.

9. During the review, the Czech Republic provided the ERT with additional information and documents which are not part of the annual submission and have not been referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory is generally complete in terms of categories and is complete in terms of gases, years, sectors and geographical coverage. In its 2010 annual submission, the Czech Republic did not include emission estimates for the following categories: CO_2 emissions from oil production were reported as not estimated ("NE"); CO_2, CH_4 and N_2O emissions from venting and flaring (oil) were reported as not occurring ("NO"); and CO_2 emissions from soda ash use were reported as "NO" (see paras. 60–62 and 76 below). These emissions do occur in the country and methods and emission factors (EFs) for estimating these emissions are available in 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). In response to the list of potential

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[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 (ITL) 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.

problems and further questions raised by the ERT during the review, the Czech Republic provided the missing emission estimates. The ERT recommends that the Czech Republic continue to include these emission estimates and report on the methods, activity data (AD) and EFs used for calculating the emission estimates in its next annual submission. The Czech Republic has also reported some categories as "NE" in the energy (see para. 41 below) and industrial processes (see para. 64 below) sectors for which estimation methodologies and/or EFs are not available in the IPCC good practice guidance or the Revised 1996 IPCC Guidelines. The ERT encourages the Party to explore the possibility of estimating these emissions.

11.   The Czech Republic has improved the completeness of its reporting by including the following emission estimates for the first time in its 2010 annual submission: CH_4 emissions from carbon black, dichloroethylene and styrene, which were included under other (chemical industry) in the industrial processes sector; N_2O emissions from nitrogen (N)-fixing crops, such as soya beans, under direct soil emissions in the agriculture sector; CO_2 emissions from dead organic matter (DOM) under forest land converted to other land-use categories in the LULUCF sector; and CH_4 and N_2O emissions under the hazardous waste and municipal solid waste subcategories of the waste incineration category in the waste sector. The ERT commends the Czech Republic for these improvements.

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

Overview

12.   The ERT concluded that the national system continues to perform its required functions. However, the ERT noted that a lack of sufficient resources negatively influences the accuracy of the inventory. In response to a question raised by the ERT during the review, the Czech Republic explained that, owing to severe budget restrictions, it has not been able to collect the AD and EFs necessary to move to higher-tier methods for estimating emissions for several key categories, as recommended in the previous review reports. The Czech Republic also explained that, owing to a lack of adequate financial resources, the new quality assurance/quality control (QA/QC) plan has been only partially implemented and the Party has not been able to improve its archiving system as planned. These issues reflect weaknesses in the national system. The ERT strongly recommends that the Party strengthen its national system in such a manner that the accuracy of the inventory can be improved by following the methodological choices presented in the IPCC good practice guidance for the key categories and by fully implementing the QA/QC plan.

13.   In the NIR, the Czech Republic has reported some changes in the national system. A new QA/QC plan has been developed and partially implemented and some recommendations of the previous review report have also been implemented (see para. 35 below). The ERT commends the Czech Republic for these improvements but notes a need to further strengthen the national system.

Inventory planning

14.   The NIR described the national system and institutional arrangements for the preparation of the inventory. The Czech Hydrometeorological Institute (CHMI) has overall responsibility for the national inventory; in particular, it collects and processes AD, selects appropriate EFs and methodologies, ensures quality management, manages and implements the QA/QC plan and oversees the archiving system. Other organizations are also involved in the preparation of the sector-specific elements of the annual inventory, in particular KONEKO Marketing Ltd. (stationary combustion and fugitive emissions), the Transport

Research Centre (CDV) (emissions from mobile sources), the Institute of Forest Ecosystem Research Ltd. (LULUCF sector) and the Charles University Environment Centre (waste sector).

15. AD are mainly based on information provided by the Czech Statistical Office (CSO). For the industrial processes sector, owing to the Czech Act on Statistics, data are not provided for inventory preparation if there are less than four enterprises in the country, and, in these cases, the inventory compilers have to either rely on information from sectoral associations or carry out the relevant inquiries. The ERT noted that the preparation of the inventory of the Czech Republic is hindered by a lack of financial resources and it acknowledges that additional time is needed to carry out the specific research and scientific studies necessary to fill in the gaps in the data from CSO. The ERT encourages the Czech Republic to explore ways to obtain data from CSO for inventory purposes in order to use the scarce resources for inventory preparation in an efficient manner.

16. As reported in the NIR, following the recommendations of the previous review report, the Czech Republic is currently working on the preparation of an inventory improvement plan that will include a gradual introduction of higher-tier estimation methods and the use of external data sources for inventory preparation, including data from the European Union emissions trading scheme (EU ETS), which is currently used in a limited way, for example as the data source for estimating emissions from cement production. The ERT recommends that the Party finalize and implement the improvement plan and report on the results of this activity in the next annual submission. The ERT also recommends that the Czech Republic ensure transparency and full adherence to the IPCC good practice guidance when using the EU ETS data in its next annual submission.

17. The ERT noted that the Czech Republic used the tier 1 estimation methods for several key categories in the energy, industrial processes, LULUCF and waste sectors. In the 2010 annual submission, the Czech Republic did not move to higher-tier methods for any categories, despite the recommendations of the previous review reports. The ERT also noted that the Czech Republic relies on the IPCC default EFs for most of the categories in the energy sector (see para. 46 below). To attract additional financial resources for inventory preparation and further inventory improvements, CHMI and the Ministry of the Environment (MoE) have prepared two project proposals. The ERT welcomes these efforts made by the Czech Republic and recommends that the Party implement the planned improvements as a matter of priority. The ERT further noted that, according to paragraph 13 of the annex to decision 19/CMP.1, each Party included in Annex I to the Convention (Annex I Party) should consider ways to improve the quality of AD, EFs, methods and other relevant technical parameters of inventories.

18. At the same time, the ERT reminds the Czech Republic that, according to paragraph 9 of the annex to decision 19/CMP.1, national systems should be designed and operated to enable Annex I Parties to consistently estimate anthropogenic emissions by all sources and removals by all sinks of all GHGs, as covered by the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. The ERT recommends that the Czech Republic make every effort in the future to ensure that sufficient resources are available for the preparation of the inventory in accordance with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines.

<u>Inventory preparation</u>

Key categories

19. The Czech Republic has reported a tier 1 key category analysis, both level and trend assessments, as part of its 2010 annual submission. The key category analysis performed by

the Czech Republic and that performed by the secretariat[4] produced similar results. The Czech Republic has included the LULUCF sector in its key category analysis, which was generally performed in accordance with the IPCC good practice guidance and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

20.   According to the IPCC good practice guidance, key categories are those whose contribution to the total GHG emissions exceeds 95 per cent. The ERT noted that, according to the NIR, the Czech Republic defined the key categories as those whose contribution to total emissions does not exceed 95 per cent, and, therefore, the key category analysis of the Czech Republic excludes the smallest category, which should be identified as a key category. In addition, the ERT noted some inconsistencies in the information provided in the NIR and in CRF table 7 with regard to the first key category that exceeds the 95 per cent threshold. For example, in the level assessment including the LULUCF sector, fugitive CH_4 emissions for the category oil, natural gas and other is identified as a key category in annex 1 to the NIR, but not in CRF table 7. In addition, in the sector-specific section of the NIR, this category is treated as a non-key category. The ERT recommends that the Czech Republic increase the accuracy of its key category analysis by identifying the first category that exceeds the 95 per cent threshold as a key category in the level and trend assessments. The ERT also recommends that the Czech Republic improve the consistency between the information provided in the NIR and CRF table 7.

21.   The Czech Republic did not report the key category analysis for 1990 in the NIR but reported it in CRF table 7. The ERT encourages the Czech Republic to include the key category analysis for 1990 in the NIR of its next annual submission, as recommended in 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).

22.   The Czech Republic has identified forest management as a key category for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. For reporting under the Convention, the Czech Republic identified forest land remaining forest land and cropland remaining cropland as key categories.

Uncertainties

23.   The Czech Republic has reported a tier 1 uncertainty analysis in the NIR. The uncertainty estimates are based on the IPCC defaults and expert judgement, following the IPCC good practice guidance. According to the NIR, the inventory uncertainty including the LULUCF sector is estimated at ±9.8 per cent for the level, with the corresponding uncertainty of the trend estimated at ±2.9 per cent. The total level uncertainty is higher than reported in the previous annual submission (6.3 per cent), owing to the inclusion of the LULUCF sector, whereas the trend uncertainty is lower (3.1 per cent in the 2009 annual submission). The ERT commends the Czech Republic for including the LULUCF sector in the uncertainty analysis for the first time in the 2010 annual submission.

24.   Since the previous annual submission, some uncertainty estimates have been revised; for example, the estimate of EF uncertainty for nitric acid production in the

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[4]   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 Land Use, Land-Use Change and Forestry*. 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.

industrial processes sector was changed from 25 per cent to 20 per cent. However, the Party did not explain the reason for the change. The Party reported in the NIR that improvements to the uncertainty estimates for some categories are planned for the future, such as for the metal production category in the industrial processes sector. The ERT welcomes the improvements implemented since the previous annual submission and encourages the Czech Republic to continue with the planned improvements. However, the ERT recommends that the Party provide transparent explanations for changes in uncertainty estimates. The ERT further encourages the Party to improve its uncertainty estimates, in particular for categories for which country-specific methods or EFs are used and for categories for which the methodology, EFs or AD have been updated.

Recalculations and time-series consistency

25.   Recalculations have been performed for all sectors, except for solvent and other product use. The recalculations have been performed and reported in accordance with the IPCC good practice guidance. This has resulted in improvements in the accuracy of the Party's reporting. The ERT noted that the recalculations reported by the Czech Republic have been undertaken in order to: take into account more accurate AD (in the energy and LULUCF sectors); improve completeness (in the energy, agriculture and LULUCF sectors); change from using a non-transparent country-specific EF to the IPCC default EF (in the energy sector), as recommended by the previous ERT; exclude emissions from venting and flaring (in the energy sector); use new data from measurements (in the industrial processes sector); and correct errors in the application of the IPCC default methods (in the agriculture sector). For the energy sector recalculations were carried out for the period 2003–2007, and for the industrial processes sector the estimates for nitric acid production were recalculated for 2004–2007. For the agriculture and LULUCF sectors, the recalculations were carried out for the entire time series. The combined impact of the recalculations on the estimated total GHG emissions was an increase of 0.2 per cent for 1990 and a decrease of 2.3 per cent for 2007. The rationale for these recalculations was provided in the NIR, but not in CRF table 8(b). The ERT recommends that the Czech Republic complete CRF table 8(b) by explaining the rationale for all recalculations in its next annual submission.

26.   The time series of emission estimates is generally consistent, but for some categories inconsistencies occur as a result of the use of different data sets for different years (in particular in the energy sector). In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that a lack of financial resources limits the improvements that can be made to the time series consistency. The ERT recommends that the Czech Republic improve the time series consistency, in particular for the key categories.

Verification and quality assurance/quality control approaches

27.   In response to a question raised by the ERT during the review, the Czech Republic stated that the application of the tier 2 QA/QC procedures that are part of the QA/QC plan has been accomplished only to a limited extent owing to the varying expert capacity in individual sectors. The ERT encourages the Czech Republic to implement the tier 2 QC procedures for the key categories where they are not yet in place, and to strengthen, in general, the QC procedures for its next annual submission. In addition, the ERT encourages the Czech Republic to improve the transparency of its reporting where QA/QC procedures for categories are described only superficially; for example, for solid waste disposal on land the Party only stated, in the NIR, that the AD received from the national agencies and ministries are subject to internal QA/QC procedures.

28.   The ERT found minor errors in the NIR, such as errors in the column headings of tables, missing column headings or obsolete parts of the text, which had not been corrected since the previous annual submission. The ERT also found that the information in the NIR

and the CRF tables was not always consistent. These minor errors in the NIR and inconsistencies between the information in the NIR and the CRF tables reduce transparency and make it difficult to measure progress from one annual submission to the next. The ERT encourages the Czech Republic to strengthen its QC procedures to avoid such errors in the next annual submission.

29.   The Czech Republic has reported in the NIR that, after conducting the QC procedures, it plans to organize audits and reviews to check and assess the quality of the inventory and identify areas for further improvement. Peer reviews are also planned as part of the bilateral cooperation with the Slovak inventory experts. However, a timeline for the planned audits and peer reviews is not presented in the NIR. A peer review was already carried out for road transportation in the energy sector in 2009. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that, owing to a lack of financial resources, it has not been able to implement all planned QA activities. The ERT encourages the Czech Republic to strengthen the efforts to carry out the planned QA and audit activities.

30.   In the previous review report, it was noted that there was a need to strengthen the national system and its institutional arrangements, in particular in relation to the coordinating role of CHMI and cooperation between the different institutions responsible for inventory preparation. In response to a question raised by the ERT during the review, the Czech Republic stated that a seminar had already been organized to improve collaboration between the responsible institutions, and that further seminars and coordinating meetings were planned for 2010. In addition, the start date of the annual contracts between CHMI and the sectoral institutions had been changed from 1 January to 1 July. This change improves the availability of experts in the first quarter of the year, which is crucial for inventory preparation. The ERT commends the Czech Republic for these improvements and encourages it to further strengthen the coordinating role of CHMI and the cooperation between the different institutions. The ERT noted that longer-term contracts with the sectoral institutions would further strengthen the national system.

Transparency

31.   In the previous review report, it was noted that the inventory was not fully transparent and that the Party could improve the transparency by providing additional tables of AD and EFs to support the descriptions of methodologies in the NIR. The ERT did not find any major improvements in the transparency of the Party's reporting in the 2010 NIR. The ERT reiterates the recommendations of the previous review report that the Czech Republic improve the transparency of its reporting for all sectors, in particular by: presenting a table of EFs and net calorific values (NCVs) used for all years for the energy sector; reporting the parameters used to estimate emissions from cement production and the AD and EFs used to estimate emissions from the use of HFCs, PFCs and SF_6 for the industrial processes sector; and providing additional explanatory information on waste utilization and disposal for the waste sector.

32.   The Czech Republic did not report in a sufficiently transparent manner on the spatial assessment unit used for the identification of the area of land units for activities under Article 3, paragraph 3, of the Kyoto Protocol (see para. 120 below). The ERT recommends that the Czech Republic describe more explicitly the minimum size of the spatial assessment unit in the NIR of its next annual submission to improve the transparency of its reporting.

33.   The ERT identified inappropriate use of the notation keys in the CRF tables. For example, aviation gasoline consumption for international aviation was reported as "NE" for the entire time series, but, during the review, the Czech Republic informed the ERT that aviation gasoline was not used for international bunkers. Therefore, the correct notation key

would be "NO". Under the waste sector, the Party reported a waste generation rate as "NA", when "NE" would be the more appropriate notation key. The ERT recommends that the Party revise the use of the notation keys in the next annual submission.

Inventory management

34.   The Czech Republic has a simple archiving system, based on the storage of documents in a central databox located at CHMI. The archive includes the disaggregated EFs and AD and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. In the 2010 annual submission, the description of the archiving system provided in the NIR has improved since the previous annual submission. The NIR includes a list of items archived at CHMI. However, as noted in the previous review report, the ERT concluded that the archiving system does not completely fulfil the requirements of decision 19/CMP.1. According to the NIR, the Czech Republic has started to introduce a new archiving system. New archiving software has been purchased but, owing to limited financial and human capacity at CHMI, the archiving system has not yet been fully implemented. The ERT recommends that the Czech Republic enhance its efforts to ensure that the archiving system is in accordance with the requirements of decision 19/CMP.1.

3.   **Follow-up to previous reviews**

35.   Following the recommendation of the previous review report, the Czech Republic elaborated a QA/QC plan. However, the plan has not been fully implemented, owing to a lack of financial resources (see para. 27 above). The ERT noted that the Party has improved the completeness of the inventory by performing recalculations for a number of categories, partly in response to the recommendations of the previous review report (see para. 25 above). For example, the estimates of emissions from energy industries and manufacturing industries and construction were recalculated to improve time series consistency between 2003 and 2007 (see para. 44 below). The estimates of emissions from nitric acid production were recalculated due to the availability of new plant-specific data (see para. 71 below).

36.   The ERT noted that the following recommendations of the previous review report have not yet been implemented and recommends that the Czech Republic implement them in its next annual submission:

(a)   The improvement of the time-series consistency of the liquid fuel EFs in the transport category of the energy sector;

(b)   The application of tier 2 estimation methodologies for the key categories, where appropriate;

(c)   The use of uncertainty estimates in the context of inventory improvement.

4.   **Areas for further improvement**

Identified by the Party

37.   In the 2010 NIR, the Czech Republic identified several areas for improvement:

(a)   The development and implementation of the inventory improvement plan, including its timetable (see para. 16 above);

(b)   The use of the EU ETS data for verification of AD in the energy sector;

(c)   The performance of recalculations for the years prior to 2003 in the energy sector (see para. 44 below);

(d)   The development and application of QA/QC procedures for all key categories;

(e)   The improvement of the methodology for estimating fugitive CH_4 emissions for the natural gas category of the energy sector;

(f)   The implementation of improvements to the uncertainty analysis (see para. 24 above);

(g)   The application of tier 2 estimation methodology for iron and steel production under the industrial processes sector;

(h)   The use of AD related to the lifetime of refrigeration and air-conditioning equipment for estimating the actual emissions from consumption of halocarbons and SF_6;

(i)   The implementation of inventory improvements for the LULUCF sector; for example, reporting emissions and removals by subcategories of major tree species groups, revising the categorization of land use and improving the system to determine land use.

Identified by the expert review team

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

(a)   The full implementation of the QA/QC plan, including the planning and implementation of tier 2 QC procedures for the key categories;

(b)   The implementation of planned improvements to the archiving system;

(c)   The provision of more information on the methods, AD and EFs used and the provision of consistent information reported in the various sections of the NIR and between the NIR and the CRF tables;

(d)   The improvement of time series consistency in cases where different methods and data sources are used for different years, in particular in the energy and waste sectors;

(e)   The correct use of the notation keys in the CRF tables (see para. 33 above);

(f)   The provision of more detailed, documented and verifiable information demonstrating that the litter, deadwood and soil organic carbon pools for forest management are not net sources of emissions individually.

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

B.   Energy

1.   Sector overview

40.   The energy sector is the main sector in the GHG inventory of the Czech Republic. In 2008, emissions from the energy sector amounted to 114,644.65 Gg CO_2 eq, or 81.1 per cent of total GHG emissions. Since 1990, emissions from the energy sector have decreased by 26.6 per cent. As a whole, total emissions from the energy sector have a fluctuating trend, with 1990 being the year with the highest level of emissions. The key driver for the fall in emissions is a decrease in productivity in manufacturing industries and construction and a consequent decrease in the demand for fuels. Within the energy sector, in 2008, 54.4 per cent of the emissions were from energy industries, followed by 16.3 per cent from transport, 14.0 per cent from manufacturing industries and construction, 9.8 per cent from

other sectors, 4.5 per cent from fugitive emissions and the remaining 1.0 per cent from the category other.

41. 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: N_2O emissions from liquefied petroleum gas and biomass combustion in road transportation; CO_2 emissions from coal mining and handling for both underground and surface mines; CO_2 and CH_4 emissions from oil exploration; CO_2 and N_2O emissions from oil refining/storage; and CO_2 and CH_4 emissions from the distribution of oil products. 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.

42. In the NIR, the Czech Republic has reported that nine categories were identified as key categories under the energy sector, but, in CRF table 7, 11 categories were identified as key categories. This occurred because the level of disaggregation used in the NIR and in the CRF tables was not consistently applied. The ERT noted that, in the NIR, the Czech Republic has reported that CH_4 emissions from stationary combustion of solid fuels (page 66) and from stationary combustion of biomass and other fuels (page 52) were not key categories, while, in CRF table 7, CH_4 emissions from stationary combustion of coal and from stationary combustion of biomass were identified as key categories. The ERT recommends that the Czech Republic strengthen its QC procedures in order to avoid this type of error in its next annual submission.

43. The ERT noted that several recommendations of the previous review reports have not been addressed by the Czech Republic, such as the recommendations to develop country-specific EFs for the key categories and to improve the time series consistency of the AD on liquid fuel use in transport. The ERT recommends that the Czech Republic, in its next annual submission, address all the issues identified in this and previous review reports and that the Party make efforts to improve the time series consistency and accuracy of the energy sector inventory, in particular for the key categories. The ERT also recommends that the Party report on the progress made in its next annual submission.

44. For its 2010 annual submission, the Czech Republic conducted major recalculations for energy industries and manufacturing industries and construction for the years 2003–2007, following the recommendation of the previous review report. In the previous annual submission, the Czech Republic used different sources of AD for the years 2003–2005 (KONEKO Marketing Ltd.) and for the years after 2005 (CSO). In the 2010 annual submission, the CSO statistics have been consistently used for the years 2003–2008, which has improved the time-series consistency for this period. The AD used in the recalculations were based on the statistical data elaborated by CSO for the International Energy Agency (IEA) and Eurostat, whereas previously the AD were taken from the annually published "Energy balance of the Czech Republic", which were considered less suitable for conversion for input into the CRF tables. The use of the CSO data in the inventory was enabled by concluding a memorandum of understanding on data exchange between CHMI and CSO. Therefore, the ERT considers that the recalculations have improved the accuracy of the inventory. However, the ERT recommends that the Czech Republic improve time-series consistency in the energy industries and manufacturing industries and construction categories by carrying out consistent recalculations for the years prior to 2003.

45. In response to the recommendations of the previous review report, the Czech Republic performed recalculations for the following categories: other (manufacturing industries and construction); other transportation; venting and flaring (oil) (the estimated emissions were reported in the 2009 annual submission, but were reported as "NO" in the 2010 annual submission); and production/processing (natural gas). The recalculations for

the energy sector resulted in an increase in the estimate of emissions of 0.0001 per cent for 1990 and a decrease of 3.1 per cent for 2007.

46.   For stationary combustion, most of the CO_2 EFs are the IPCC default values and are mostly held constant throughout the time series. In the previous review reports, the ERT recommended that the Czech Republic explore options for the application of country-specific CO_2 EFs for all key categories within the energy sector. During the review, the Czech Republic informed the ERT that no financial resources are available for the systematic research that would be necessary to develop country-specific EFs. However, as noted by the previous ERT, the application of such country-specific EFs is good practice and should be a part of the standard annual inventory compilation process, especially as the EFs change over time. The ERT reiterates the recommendation of the previous review reports that the Czech Republic develop country-specific EFs for its next annual submission. The ERT noted that the EU ETS data may be a useful source of information. If the EU ETS data are used, the ERT recommends that the Party ensure that the emissions are estimated in accordance with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines, that the time series is consistent, and that appropriate QA/QC procedures are carried out for such data to ensure that the data used are in line with the IPCC good practice guidance.

47.   As a follow-up to a recommendation of the previous review report, the Czech Republic has reported some information on the general emission trends in the energy sector. However, the ERT noted that changes in emission trends and energy use are significant in the period 1990–2008. The ERT therefore recommends that the Czech Republic explain in more detail the drivers of the emission trends for different categories in its next annual submission.

48.   The Czech Republic has reported in the NIR that country-specific CO_2 EFs are used to estimate emissions from stationary combustion of coal and lignite, whereas for the other fuels the Party has used the default EFs from the Revised 1996 IPCC Guidelines. The NCVs are provided by CSO, which is also responsible for providing the information in the IEA questionnaires. The Czech Republic has reported in the NIR the average EFs and NCVs. However, the ERT reiterates the recommendation of the previous review report that the Czech Republic provide a table in the NIR with information on all the EFs and NCVs used for calculating the estimates for the entire time series, in order to improve the transparency of its reporting in the next annual submission.

49.   In the 2010 annual submission, the Czech Republic has reported its QA/QC procedures in detail. According to the NIR, the conversion of data from the IEA questionnaires into inventory data, the application of NCVs and the use of EFs for individual fuel types are all subject to QC procedures. In addition, the Czech Republic has reported that the calculation algorithms are also subject to QC procedures. The QC protocol was developed by and has been archived at CHMI. As part of the Party's QA activities, a one-day internal seminar was organized on QA in the energy sector for the experts and representatives from KONEKO Marketing Ltd., CDV, CHMI, CSO, MoE and the Ministry of Industry and Trade. The aim of the seminar was to discuss how to convert data correctly during the conversion from the IEA questionnaires into the AD in the CRF tables. Further, at the seminar, the Czech Republic considered how to integrate the experts from CSO into the Czech inventory team. The ERT welcomes the Czech Republic's efforts to conduct QA/QC procedures and to integrate the CSO experts into the Czech inventory team and encourages the Czech Republic to implement QA procedures as described in the IPCC good practice guidance.

50.   During the review, the Czech Republic informed the ERT that one of the planned improvements for the 2011 annual submission is the use of data from external data sources for verification of AD, such as the EU ETS and the Czech national emission and air

pollution sources inventory, and preparation of a comprehensive database on EFs, NCVs and AD used in the reports verified by the EU ETS. In addition, the Czech Republic has reported that it will examine the possibility of updating the EFs for individual fuel types for the key categories. The ERT welcomes these developments and encourages the Czech Republic to implement the planned activities related to QA procedures and the use of country-specific EFs for its next annual submission.

2. Reference and sectoral approaches

<u>Comparison of the reference approach with the sectoral approach and international statistics</u>

51. In the 2010 annual submission, the Czech Republic has reported CO_2 emissions from apparent energy consumption using the reference approach and the sectoral approach. For 2008, the difference between the CO_2 emission estimates calculated using the reference approach and the sectoral approach is 9.61 per cent as reflected in CRF table 1.A. However, the ERT noted that for the reference approach reported in CRF table 1.A the Czech Republic has not reported on energy consumption excluding non-energy use and feedstocks. The Party reported in CRF table 1.A that a detailed comparison of the sectoral and reference approaches is given in annex 1 to the NIR, while, in fact, the reference and sectoral approaches are compared in annex 4 to the NIR, but the same comparison as in CRF table 1.A has not been presented in the NIR. Therefore, the ERT considers that the differences between the reference and sectoral approaches have not been appropriately explained and, as such, recommends that the Party transparently explain the differences between the reference and sectoral approaches in its next annual submission. Furthermore, the ERT recommends that the Czech Republic correctly report apparent energy consumption excluding non-energy use and feedstocks in CRF table 1.A.

52. The ERT commends the Czech Republic for reviewing its fuel properties, following the recommendation of the previous review report, specifically the fuel calorific values. However, the ERT noted that there is a difference between the jet kerosene consumption reported in the CRF tables (524 TJ) and that reported to IEA (2,666 TJ) of 408.8 per cent. The ERT recommends that the Czech Republic transparently explain this difference in its next annual submission.

International bunker fuels

53. As noted in the previous review report, the Czech Republic agreed to estimate the fuel use for international navigation on rivers and report this in its next annual submission.[5] However, the Czech Republic did not report recalculations of the estimates of emissions from international marine bunkers in its 2010 annual submission. In response to a question raised by the ERT during the review, CDV, which is responsible for the inventory for the transport sector, checked the availability of data on fuel use for international navigation. As a result, the Czech Republic informed the ERT that, on the basis of the estimates of CDV and the information provided by ship owners, fuel consumption for international navigation was considered negligible. However, as the Czech Republic has information on fuel consumption, the ERT recommends that the Party include estimates of emissions from international navigation in its next annual submission and make any necessary revisions to the estimates of emissions from domestic navigation.

54. Aviation gasoline consumption was reported as "NE" for the entire time series. During the review, the Czech Republic informed the ERT that aviation gasoline was not used for international bunkers. The ERT recommends that the Czech Republic use the

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[5] FCCC/ARR/2009/CZE, paragraph 50.

correct notation key "NO" to report aviation gasoline consumption in its next annual submission.

Feedstocks and non-energy use of fuels

55. The Czech Republic uses mostly the carbon storage factors from the Revised 1996 IPCC Guidelines. The percentage of carbon stored in naphtha was reported as 50 per cent for the years 1990–2003, 60 per cent for 2004, 70 per cent for 2005 and 80 per cent for the years after 2006. The Czech Republic has reported in the NIR that this increase is due to the introduction of the recycling of plastic materials in the Czech Republic in approximately 2003. Consequently, the volume of recycled materials gradually increased. The ERT recommends that the Czech Republic provide the information source for this assumption and include this information in its next annual submission.

3. Key categories

Stationary combustion: solid fuels – CO_2

56. Only aggregate values for AD and emissions have been reported for manufacturing industries and construction for the years 1990–2002. According to the NIR, the available energy statistics for this period did not provide the AD necessary to enable the disaggregation of the data into individual subcategories. The ERT recommends that the Czech Republic make efforts to provide disaggregated estimates for manufacturing industries and construction in its next annual submission.

57. In response to a question raised by the ERT during the review, the Czech Republic explained that, owing to time constraints and problems accessing relevant data, the recommendation made in the previous review report on the inclusion of CO_2 emissions from blast furnace gas under the energy sector has not been addressed in the 2010 annual submission. All CO_2 emissions from metallurgical coke used in blast furnaces are reported under the industrial processes sector and estimated according to the amount of carbon in the coke. During the review, the Czech Republic informed the ERT that this approach is realistic, as most of the blast furnace gas is combusted in the three metallurgical plants and not used elsewhere. The ERT recommends that the Party improve transparency by clearly explaining in the NIR the method used to estimate the emissions and the rationale for the emission allocation. The ERT encourages the Party to consider moving to a tier 2 estimation method for the next annual submission.

Stationary combustion: other fuels – CO_2

58. CO_2 emissions from waste incineration for energy purposes were reported under the waste sector, but were reported as "NO" under the energy sector although waste is incinerated for energy purposes in the Czech Republic. The ERT reiterates the recommendation of the previous review report that the Czech Republic allocate the emissions from waste incineration used for energy purposes to the energy sector. The ERT recommends that the Czech Republic report the emissions under the public electricity and heat production category, or under the corresponding industry if the energy is generated by autoproducers. During the review, the Czech Republic informed the ERT that the necessary revisions to the allocation of the emissions will be made in its next annual submission.

Road transportation: liquid fuels – CO_2 and N_2O

59. The time series of EFs for road transportation is inconsistent, as the source of the CO_2, CH_4 and N_2O EFs used is not consistent throughout the time series. For the years 1990–1994, CO_2 and N_2O emissions are estimated using the IPCC default EFs taken from the Revised 1996 IPCC Guidelines, whereas for the years 1994–2000 the EFs are

interpolated or held constant at the IPCC default values. The data source was changed to the European Monitoring and Evaluation Programme database starting from 2000, when CDV took over responsibility for the emission estimates for the transport category. The same observation is relevant to CH_4 emissions from road transportation (although it is not a key category). During the review, the Czech Republic informed the ERT that the EFs for road transportation would be revised for the entire time series in its next annual submission. The ERT reiterates the recommendation of the previous review report that the Czech Republic develop a consistent time series for the EFs for this category, using country-specific values in accordance with the IPCC good practice guidance, and provide a clear description of the reasons for the resulting recalculations. The ERT also strongly recommends that the Party, in the NIR, list the EFs used, provide the rationale for the choice of EFs, document the source of EFs, including the page number reference of the source material, and explain the reasons for any inconsistency in the EFs throughout the time series.

4. Non-key categories

Oil and natural gas: liquid fuels – CO_2, CH_4 and N_2O

60. The Czech Republic has reported fugitive CH_4 emissions from oil production in its 2010 annual submission. However, the Party has reported CO_2 emissions from oil production as "NE". In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided the missing emission estimates by using the default EF ($2.7E-04$ $Gg/10^3$ m^3) from the IPCC good practice guidance (table 2.16, page 2.86). The default EF value provided in $Gg/1,000$ m^3 was converted to the unit kg/PJ by using a typical value of density for crude oil of 880 kg/m^3 and an NCV of 41.78 TJ/kg. The ERT considers that the estimate is appropriate.

61. The Czech Republic has reported emissions from venting and flaring (oil) as "NO" in its 2010 annual submission. In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided CO_2, CH_4 and N_2O emission estimates by using the default EFs (venting: $6.2E-05$ to $270E-05$ Gg $CH_4/10^3$ m^3; $1.2E-05$ Gg $CO_2/10^3$ m^3 and 0 Gg $N_2O/10^3$ m^3; and flaring: $0.5E-05$ to $27E-05$ Gg $CH_4/10^3$ m^3; $6.7E-02$ Gg $CO_2/10^3$ m^3 and $6.4E-07$ Gg $N_2O/10^3$ m^3) from the IPCC good practice guidance (table 2.16, page 2.86). The same conversion from m^3 to PJ was used as in the case of CO_2 emissions from oil production. In the case of CH_4 emissions, as EFs are provided as a range in the IPCC good practice guidance, the Czech Republic assumed that the range represents a lognormal distribution and chose an EF which was an average of the logarithms of the minimum and maximum values. The ERT considers that the estimate is appropriate.

62. The impact of the recalculations on the estimate of emissions from oil production was an increase of 0.015 Gg CO_2 eq for 1990 and an increase of 0.074 Gg CO_2 eq for 2008. The impact of the recalculations on the estimate of emissions from venting and flaring (oil) was an increase of 0.026 Gg CH_4, 3.85 Gg CO_2 and 0.000037 Gg N_2O for 1990 and increase of 0.123 Gg CH_4, 18.56 Gg CO_2 and 0.00018 Gg N_2O for 2008. The ERT recommends that the Czech Republic include information on the methodologies and EFs used for estimating these emissions and the estimates in its next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

63. In 2008, emissions from the industrial processes sector amounted to 14,345.30 Gg CO_2 eq, or 10.1 per cent of total GHG emissions, and emissions from the solvent and other

product use sector amounted to 515.27 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Since 1990, emissions have decreased by 26.8 per cent in the industrial processes sector and decreased by 32.6 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector between 1990 and 2008 is the decrease in iron and steel production. Emissions from iron and steel production decreased by 40.8 per cent between 1990 and 2008. Within the industrial processes sector, in 2008, 52.2 per cent of the emissions were from metal production, followed by 28.8 per cent from mineral products, 9.7 per cent from chemical industry and 9.3 per cent from consumption of halocarbons and SF_6.

64.   The reporting on the industrial processes and solvent and other product use sectors is complete in terms of gases and years and is generally complete in terms of categories. The Czech Republic has reported the following categories as "NE": CO_2 emissions from asphalt roofing and from road paving with asphalt; CO_2 and CH_4 emissions from ferroalloys production; and SF_6 emissions from the disposal or decommissioning of electrical equipment. The ERT noted that for the first two categories there is no estimation methodology available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that in ferroalloys production the reducing agent used does not contain carbon, and therefore no GHG emissions are produced. The ERT recommends that the Czech Republic replace the notation key "NE" with "NA" in the CRF tables and explain the rationale for the use of the notation key in the NIR of its next annual submission.

65.   The Czech Republic did not provide fully transparent information on the methodologies applied for estimating emissions from the industrial processes sector. For some of the categories, such as consumption of halocarbons and SF_6 or nitric acid production, the explanation of the methodologies or EFs used referred to Czech-language scientific literature. The ERT recommends that the Czech Republic provide in the NIR more detailed information on the methodologies applied, in particular for the key categories, to improve the transparency of its reporting in its next annual submission.

66.   The Czech Republic has reported in the NIR that the uncertainty estimates for the industrial processes sector were calculated on the basis of expert judgement. However, the Czech Republic has reported that improved uncertainty estimates will be reported in its next annual submission, for example for metal production. The ERT recommends that the Czech Republic continue with the planned improvements to the uncertainty estimates for the industrial processes sector and report the results of this work in the next annual submission.

67.   The EU ETS data has been used as AD for cement production and limestone and dolomite use and it has also been used to verify emission estimates, for example emission estimates from lime production. The ERT recommends that the Party provide more transparent information on the methods used to estimate emissions for the EU ETS.

2.   Key categories

Cement production – CO_2

68.   The Czech Republic has reported in the NIR that it used plant-specific EU ETS data on CO_2 emissions from cement production. The Party also reported in the NIR that the EU ETS data cover all cement kilns in the country. As a QA/QC procedure, the Czech Republic compared the EU ETS data with the cement production data prepared by the Czech Cement Association. The ERT encourages the Czech Republic to improve the transparency of its reporting by explaining the magnitude of the discrepancies between the EU ETS and Czech Cement Association data, the reasons for the differences and the actions taken as a result of the data comparison in its next annual submission.

69. The parameters used to calculate the emission estimates, namely the content of calcium oxide, dolomite, magnesium carbonate and fissile carbon, were reported by the Czech Republic as confidential. The impact of the listed parameters on the emission estimates was not clearly explained in the NIR. The ERT recommends that the Czech Republic increase the transparency of its reporting by clarifying the impact of these parameters on the emission estimates in its next annual submission. Furthermore, the ERT recommends that the Party explain, in the next annual submission, how the plants participating in the EU ETS derive their CO_2 emission estimates.

Limestone and dolomite use – CO_2

70. The Czech Republic has reported in the NIR that it estimated the emissions from limestone and dolomite use for sulphur removal in power plants and from limestone and dolomite use in sintering plants on the basis of the EU ETS data. The ERT recommends that the Party explain in the NIR how the plants have derived their estimates of CO_2 emissions for the reporting under the EU ETS. In response to a question raised by the ERT during the review, the Party clarified that limestone and dolomite use does not occur in the pulp and paper industry. However, the ERT encourages the Czech Republic to explore whether limestone and dolomite use occurs in other industries in the Czech Republic and to include this information, including emission estimates if relevant, in its next annual submission.

Nitric acid production – N_2O

71. The Czech Republic has performed recalculations of the estimates of N_2O emissions from nitric acid production for the years 2004–2007 in accordance with the IPCC good practice guidance. The recalculations were due to a revision of one of the pressure condition specific EFs. The Czech Republic explained in the NIR that the new plant measurements revealed that the value of 1.09 kg N_2O/t HNO_3 used for the years 1990–2003 was also suitable for estimating N_2O emissions for the years after 2003. The Czech Republic therefore revised the N_2O emission estimates for the years 2004–2007 using this value, which resulted in a decrease in the estimate of N_2O emissions from nitric acid production of 8.6 per cent for 2007.

Iron and steel production – CO_2

72. The emissions from iron and steel production are estimated using a tier 1 method from the IPCC good practice guidance based on coke consumption in blast furnaces. In the NIR, the Czech Republic has reported that it used data on coke consumption as AD, but in the CRF tables it has reported data on steel production as AD. The ERT recommends that the Czech Republic correct this inconsistency by reporting data on coke consumption as the AD in the CRF tables in its next annual submission.

73. As recommended in the previous review report, the Czech Republic included in the NIR information on the prevailing technology used for iron and steel production. The ERT commends the Czech Republic for this improvement in the transparency of its reporting.

74. The Czech Republic has reported in the NIR that it plans to use a tier 2 method to estimate CO_2 emissions from iron and steel production in the future. The ERT reiterates the recommendation of the previous review report that the Czech Republic implement this plan in order to improve the accuracy of the emission estimates in its next annual submission.

Consumption of halocarbons and SF_6 – HFCs and PFCs

75. The Czech Republic has reported all emissions from stationary refrigeration under the domestic refrigeration category. The ERT reiterates the recommendation of the previous review report that the Czech Republic disaggregate the emissions from stationary

refrigeration into the relevant subcategories and provide information in the NIR on the methods, EFs and AD used to calculate the emission estimates for these subcategories, in order to improve the transparency of its reporting in the next annual submission.

3. Non-key categories

Soda ash production and use – CO_2

76. In the 2010 annual submission, the Czech Republic reported emissions from the use of soda ash in pulp and paper production as "NO". In response to the list of potential problems and further questions raised by the ERT, the Czech Republic resubmitted the CRF tables and included estimates of CO_2 emissions from soda ash use in pulp and paper production for the years 2001–2008. Estimated CO_2 emissions from soda ash use in 2008 amounted to 0.56 Gg CO_2. In addition, in response to the list of potential problems and further questions raised by the ERT, the Czech Republic indicated that soda ash has been used only since 2001 by the pulp and paper industry, and that CO_2 emissions from the soda ash use in other industries (e.g. ceramic and glass production) were already reported under other (mineral products). The EF applied for the soda ash production and use category was 415 kg CO_2/t soda ash, which is in line with the Revised 1996 IPCC Guidelines. The ERT considers that this estimate is appropriate.

77. The ERT recommends that the Czech Republic continue to report emission estimates for this category and all the necessary associated information (e.g. category description, methodological issues, uncertainty, time-series consistency, recalculations and planned improvements), in order to improve the transparency of its reporting in the next annual submission.

Other (chemical industry) – CH_4

78. As a follow-up to a recommendation of the previous review report, the Czech Republic has reported the emissions from carbon black, dichloroethylene, methanol and styrene for 2008, and as "NE" for the period 1990–2007, under the chemical industry category. The ERT commends the Czech Republic for this improvement in the completeness of its reporting for the latest year of the time series. The Party has reported emissions from methanol production as "NE" for 1998 and 1999 and as "NO" for the rest of the time series. The ERT recommends that the Party include, in the next annual submission, estimates of emissions from carbon black, dichloroethylene, methanol and styrene for the years for which the emissions are currently reported as "NE", to improve the completeness of its reporting.

Consumption of halocarbons and SF_6 – SF_6

79. The Czech Republic has reported in the NIR on the use of a tier 3a method to estimate SF_6 emissions from electrical equipment. The ERT noted that this method requires the accounting of the emissions from the disposal or decommissioning of electrical equipment, which were reported as "NE" in the CRF tables. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that SF_6 is reused. The ERT noted that SF_6 is usually used with a high degree of purity and its reuse may not always be possible. Therefore, the ERT recommends that the Czech Republic further investigate the disposal or decommissioning practices (e.g. the destruction or recycling of SF_6), that the Party include this information in the NIR and that it use the appropriate notation keys in the CRF tables, in order to improve the transparency and accuracy of its reporting in the next annual submission.

Solvent and other product use – N_2O

80.   In the previous annual submissions, the Czech Republic reported that N_2O for use in anaesthesia and for aerosol cans was produced at a single plant. In the 2010 NIR, the Czech Republic has reported that the official production data were not available and that the emissions were calculated on the basis of expert judgement. The ERT reiterates the encouragement of the previous ERT that the Czech Republic include this explanation in the NIR of its next annual submission, in order to increase the transparency of its reporting. The ERT noted that the Party kept the time series of emission estimates for the period 1990–2008 constant for the categories of N_2O use for anaesthesia and N_2O from aerosol cans. The ERT recommends that the Party reconsider the estimates reported for these categories and develop year-specific estimates for its next annual submission.

D.   Agriculture

1.   Sector overview

81.   In 2008, emissions from the agriculture sector amounted to 8,323.92 Gg CO_2 eq, or 5.9 per cent of total GHG emissions. Since 1990, emissions have decreased by 47.8 per cent. The key driver for the fall in emissions is a decrease in the animal population, mainly the cattle population. Within the sector, in 2008, 61.3 per cent of the emissions were from agricultural soils, followed by 29.0 per cent from enteric fermentation and 9.7 per cent from manure management.

82.   The reporting on the agriculture sector is complete in terms of gases, categories and years, and is in accordance with the Revised 1996 IPCC Guidelines. Although there has been a marked improvement compared with the previous annual submission in the transparency of the reporting by the Czech Republic on the methods, AD, EFs and other inventory parameters, the information in the NIR was still not sufficiently transparent to explain the changes in the animal population and milk production between 1990 and 2008. The ERT recommends that the Czech Republic provide more information in the NIR explaining the reasons for the fluctuations in AD, especially in the data on animal population for the enteric fermentation and manure management categories.

83.   In response to the recommendations of the previous review report, the Czech Republic conducted recalculations of the estimates of N_2O emissions from agricultural soils (direct and indirect) and manure management for the entire time series. The recalculations were performed in order to use the appropriate default parameters and equations from the IPCC good practice guidance and the correct fractional parameters ($Frac_{BURN}$, $Frac_{NCRO}$, etc.), and to include soya beans in the emission estimates for N-fixing crops. The ERT noted that these recalculations resulted in an increase in the emission estimates of 3.0 per cent for 1990 and 3.6 per cent for 2007. The recalculations improved the accuracy of the reporting.

84.   The Czech Republic has reported a tier 1 uncertainty analysis but did not report the sources of the uncertainty estimates of AD and EFs for the sector. The ERT recommends that the Czech Republic improve the transparency of its reporting by providing information on the sources of the uncertainty estimates in the NIR of its next annual submission.

85.   In response to a recommendation of the previous review report, the Czech Republic formulated a sector-specific QA/QC plan that is linked to the general QA/QC inventory plan. The plan assigned staff specific responsibilities and included a timetable for sector-specific QA/QC procedures. However, the ERT noted that the QA/QC plan has not been fully implemented. The ERT recommends that the Czech Republic implement the sectoral QA/QC plan and provide information on the results in its next annual submission.

2. Key categories

Enteric fermentation – CH$_4$

86. The Czech Republic used a tier 2 method and country-specific EFs to estimate CH$_4$ emissions from cattle and a tier 1 method as well as the IPCC default EFs for other livestock species. This is in accordance with the IPCC good practice guidance.

Manure management – CH$_4$

87. The Czech Republic has used a tier 1 method to estimate CH$_4$ emissions for this category, with the justification that this is a key category by trend only. This methodological approach is not in accordance with the IPCC good practice guidance, and the ERT therefore reiterates the recommendation of the 2008 and 2009 review reports that the Czech Republic estimate emissions from cattle using a higher-tier method for its next annual submission.

Direct soil emissions – N$_2$O

88. The Czech Republic has used a tier 1 method and the IPCC default EFs to estimate emissions for all subcategories related to agricultural soils. In response to a recommendation of the previous review report, the Czech Republic applied the methodology from the IPCC good practice guidance to correct the amount of N excreted from animal waste management systems after discounting N volatilized as ammonia and nitrogen oxide (Frac$_{GASM}$ = 0.2), which previously did not match the value reported for N input from animal manure applied to soils. The Czech Republic also corrected the default value of Frac$_{BURN}$ from 0.1 to zero for crop residue, since the burning of crop residue did not occur in the country. The Czech Republic included soya beans in the estimates of emissions from crop residue and N-fixing crops, whereas previously the Czech Republic included only cereals and pulses in the N$_2$O emission estimates. The ERT commends the Party for these improvements and encourages the Czech Republic to explore possibilities to develop country-specific EFs and parameters for this key category.

89. The Czech Republic revised all the fractional parameters (Frac$_{NCRO}$, Frac$_{NCRBF}$, Frac$_R$ and Frac$_{GRAZ}$) for the entire time series by using the IPCC default values (0.015 kg N/kg dm, 0.03 kg N/kg dm, 0.45 kg N/kg dm and 0.20 kg N/kg crop–N, respectively), which is in accordance with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. The ERT commends the Czech Republic for these improvements.

Indirect emissions – N$_2$O

90. The Czech Republic used a tier 1 method in accordance with the Revised 1996 IPCC Guidelines, default values for fraction parameters and the IPCC default EFs for all the subcategories to estimate indirect N$_2$O emissions. In the previous annual submission, the Czech Republic had erroneously reported the AD for and estimates of N$_2$O emissions from N from fertilizers and animal manure that is lost through leaching and run-off for 1997, 2003 and 2006, and the AD for and estimates of N$_2$O emissions from volatized N from fertilizers and animal manure for 1997 and 2006. The Czech Republic corrected these values in the 2010 annual submission. The ERT commends the Czech Republic for these improvements. The ERT encourages the Czech Republic to explore possibilities to develop country-specific EFs and parameters for this key category.

3. Non-key categories

Manure management – N_2O

91. In its 2009 annual submission, the Czech Republic used a tier 1 method and default values from table 4-21 of the Revised 1996 IPCC Guidelines for the allocation of manure per animal waste management system for all animal categories. In response to a recommendation of the previous review report, in its 2010 annual submission the Czech Republic used the default parameters taken from tables B-3 to B-6 of the Reference Manual (Vol. 3) of the Revised 1996 IPCC Guidelines for the animal waste management systems for dairy cattle, non-dairy cattle and swine. The ERT commends the Czech Republic for this improvement.

E. Land use, land-use change and forestry

1. Sector overview

92. In 2008, net removals from the LULUCF sector amounted to 4,778.28 Gg CO_2 eq. Since 1990, net removals have increased by 31.6 per cent. The LULUCF sector showed net removals with high inter-annual variability for the entire time series. The key driver for the inter-annual variability in removals is the annual volume of wood harvested and the extent of damages caused by natural disturbances in forest land. Within the sector, in 2008, 4,682.47 Gg CO_2 eq of the removals were from forest land, followed by removals of 384.39 Gg CO_2 eq from grassland. Cropland (171.69 Gg CO_2 eq), settlements (94.62 Gg CO_2 eq) and wetlands (22.26 Gg CO_2 eq) were reported as net sources.

93. The reporting on the LULUCF sector is complete in terms of gases and categories. The Czech Republic has improved the completeness and transparency of its reporting by providing estimates or corresponding notation keys in all the cells in the CRF tables. Removals and emissions from the LULUCF sector were reported for all years of the time series, for the full geographical area and for all the carbon pools.

94. The Czech Republic has a total land area of 7,886.4 kha. For a consistent representation of land, the annually updated areas from the Czech Office for Surveying, Mapping and Cadastre were used, linking the land-use definitions to the IPCC land-use categories. The method used has the attributes of both the tier 2 and tier 3 approaches of the IPCC good practice guidance for LULUCF. In the 2010 annual submission, about 41.4 per cent of the country's total area was classified as cropland, 33.6 per cent as forest land and 13.0 per cent as grassland, and the remaining 8.5 per cent, 2.1 per cent and 1.4 per cent were classified as settlements, wetlands and other land, respectively.

95. The methodologies that the Czech Republic has used to estimate the changes in carbon stocks and emissions of non-CO_2 gases for the LULUCF sector are consistent with the IPCC good practice guidance for LULUCF. For the changes in carbon stocks in living biomass, the Czech Republic has used either a tier 2 or tier 3 approach, whereby country-specific biomass conversion and expansion factors were applied to estimate increments and losses. For the DOM pool for land converted to forest land and for DOM and soils for forest land remaining forest land, a tier 1 method was applied, as the Czech Republic made an assumption that there had been no carbon stock change in the pools. The Party also assumed that no changes in carbon stocks had occurred on wetlands remaining wetlands, settlements remaining settlements, and other land. Emissions from organic soils are estimated for spruce forest only, since organic soils are observed only in this type of forest.

96. The recalculations for the LULUCF sector were performed for the entire time series. Several LULUCF categories were recalculated following the revision of biomass conversion and expansion factors. The application of the new biomass conversion and

expansion factors affected all the land-use categories related to forest land, including land conversions to forest land and forest land converted to other land uses. Another recalculation was performed following the inclusion of the emissions from the deadwood component in the DOM pool for forest land converted to other land uses. This recalculation affected all the subcategories related to the conversion of forest land to other land uses, including forest land converted to cropland, grassland, wetlands and settlements. The recalculations resulted in a decrease in the estimated annual CO_2 removals of between 9 and 58 per cent for the period 1990–2007.

97. The results of the uncertainty analysis of the LULUCF sector were included in the NIR. However, combining the uncertainties of individual categories into the total for the LULUCF sector was found to be problematic as the obtained sector-level uncertainty values were very high. The Czech Republic has reported that it plans to further improve the uncertainty assessment by using the Monte Carlo method.

98. Following a recommendation of the previous review report, the Czech Republic formulated a sector-specific QA/QC plan linked to that of the inventory. The QA/QC procedures for the LULUCF sector cover the elements listed in the IPCC good practice guidance for LULUCF. The Czech Republic has reported that it archives all the input information and calculations in its archiving system.

2. Key categories

Forest land remaining forest land – CO_2

99. For this category, the Czech Republic has reported the changes in carbon stocks in living biomass and non-CO_2 emissions from biomass burning. The IPCC default method (the gain–loss method) was used to estimate the changes in carbon stocks in living biomass. Country-specific biomass conversion and expansion factors were used for increment and harvest (losses). The implied emission factors for gains and losses in living biomass were found to be consistent with those of countries with similar environmental conditions. The Czech Republic has reported in the NIR that it is considering using the stock change method with an assessment of recently collected statistical data for its future annual submissions. The ERT welcomes this planned improvement in the accuracy and transparency of the inventory.

100. The Czech Republic has reported in the NIR that the change in carbon stocks in DOM and soils is assumed to be equal to zero or that no change has occurred (tier 1), as no significant changes have occurred in forest types, disturbance or management regimes within the reporting period. In the previous review report, the ERT noted that, given the forest activities (management and harvesting) occurring in the forests of the Czech Republic, the changes in carbon stocks in DOM had to be estimated. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that it plans to obtain more accurate data on DOM for forest land remaining forest land using repeated cycles of forest inventory statistical data and to estimate the related emissions and removals for its next annual submission. The ERT recommends that the Czech Republic report any changes in carbon stocks in DOM and encourages the Party to estimate carbon stock changes in soils using higher-tier methods for its next annual submission.

Cropland remaining cropland – CO_2

101. Cropland remaining cropland was identified as a key category by the trend assessment. This reflected the effect of liming on emissions from agricultural soils, which have rapidly decreased since the early 1990s. Cropland is a dominant land-use category in the Czech Republic, but the area has constantly decreased since the 1970s. In the NIR, the

Czech Republic has reported that this trend has been particularly strong since 1990 and can be expected to continue.

102. The changes in carbon stocks in living biomass and soils are estimated for this category following a tier 2 method from the IPCC good practice guidance for LULUCF. CO_2 emissions resulting from the application of agricultural lime are estimated using a tier 1 method from the IPCC good practice guidance for LULUCF. Non-CO_2 emissions from biomass burning are reported as "NO", as this practice was not observed in the country.

103. In the previous review report, the ERT encouraged the Czech Republic to provide information on the abrupt decreasing trend in CO_2 emissions associated with lime application. The Czech Republic provided additional explanatory information in the NIR in the 2010 annual submission. However, the ERT encourages the Czech Republic to provide annual data on agricultural lime application from 1990 to 2008 to support the explanatory information in the NIR of the next annual submission.

3. Non-key categories

Land converted to forest land – CO_2

104. The Czech Republic assumed that the loss in carbon stocks in living biomass for this category is insignificant (zero), because the first significant thinning (when there are more carbon losses) occurred only in older classes, which is implicitly accounted for within the forest land remaining forest land category. To report losses in carbon stocks for land converted to forest land in CRF table 5.A, the Czech Republic used the notation key "NA". In the previous review report, the ERT recommended that the Czech Republic apply the notation key for included elsewhere ("IE"). The ERT reiterates the recommendation made in the previous review report.

105. The Czech Republic did not report the net carbon stock changes in DOM for land converted to forest land in its previous annual submission. Considering the accumulation of biomass (and carbon) due to forest growth, and in order to improve the completeness of the reporting on carbon pools, the ERT recommends that the Czech Republic report the changes in carbon stocks in this pool in its next annual submission.

F. Waste

1. Sector overview

106. In 2008, emissions from the waste sector amounted to 3,604.51 Gg CO_2 eq, or 2.5 per cent of total GHG emissions. Since 1990, emissions have increased by 36.0 per cent. The key drivers for the rise in emissions are the improved waste management practices in the country and the consequent increase in solid waste disposal on land. Within the sector, in 2008, 67.4 per cent of the emissions were from solid waste disposal on land, followed by 19.9 per cent from wastewater handling and 12.7 per cent from waste incineration. Waste is the only sector in the inventory that shows an increasing trend in emissions. CH_4 emissions from solid waste disposal on land is a key category by level and trend assessment, while CO_2 emissions from waste incineration is a key category by trend only.

107. The reporting on the waste sector is complete in terms of gases, categories and years. The Czech Republic has reported limited information in the overview of the sector and the descriptions of methodological issues in the NIR. The ERT recommends that the Czech Republic provide a more detailed explanation of waste utilization and disposal, in order to provide a better understanding of the waste management practices in the country, in its next annual submission.

108.   Following a recommendation of the previous review report, the Czech Republic performed recalculations for waste incineration. For the 2010 annual submission, CH_4 and N_2O emissions from waste incineration were estimated using the default parameters from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories (*hereinafter referred to as the 2006 IPCC Guidelines). However, the Czech Republic performed the recalculations only for 2003 onwards. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that it was not possible to recalculate the entire time series, owing to methodological changes and data availability. However, the Czech Republic also informed the ERT that it plans to recalculate the entire time series for its next annual submission. The ERT recommends that the Czech Republic perform the recalculations for the entire time series for its next annual submission.

109.   The ERT noted that several typographical errors in the NIR identified in the previous review report had not been corrected. The ERT recommends that the Czech Republic strengthen its QC procedures to eliminate these errors in the NIR of its next annual submission.

2.   Key categories

Solid waste disposal on land – CH_4

110.   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, with a default regional value for waste composition and the assumption that this composition is stable throughout the time series. The ERT recommends that the Czech Republic acquire country-specific data on waste composition, as this parameter is important for the accuracy of the estimates. In fact, waste composition is dynamic and varies over time, and, therefore, using default values with a stable waste composition is not appropriate and increases the uncertainty of the emission estimates. This issue had already been identified in four previous review reports. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that it has started collecting waste composition data. The ERT recommends that the Czech Republic obtain the data on waste composition as planned and use it to perform recalculations of its estimates of emissions from solid waste disposal sites for the next annual submission.

111.   In the 2010 annual submission, the waste generation rate for 2008 was reported as "NA" in CRF table 6.A.. The Party explained in the comment box that, at the time of the preparation of the submission, the data on the waste generation rate and fraction of waste disposed to landfills were not available. However, the preliminary data on municipal waste utilization and disposal practices were presented in table 8.2 of the NIR and used in the calculations of the emissions from landfills. The ERT recommends that the Czech Republic improve the transparency of its reporting by explaining, in the next NIR, which data source is used to obtain the amount of waste disposed to landfills. The ERT further recommends that the Party obtain the final statistical data to be used in the inventory and recalculate the entire time series, if the final statistical data are different from the preliminary data used in the inventory. Furthermore, the ERT encourages the Party to report the waste generation rate and fraction of waste disposed to landfills and, if this is not possible, to correct the notation key used from "NA" to "NE" in the CRF tables.

Waste incineration – CO_2

112.   The Czech Republic used a tier 1 method and default EFs from the IPCC good practice guidance to estimate CO_2 emissions from waste incineration, as no country-specific data were available. No recalculations have been performed since the previous annual submission.

113.   The Czech Republic has reported that the AD used to estimate emissions from waste incineration were provided by CSO. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that the volumes of waste disposed for incineration and waste used to produce energy have been determined following the national definitions of waste categories. The ERT recommends that the Czech Republic provide a clearer explanation in the NIR of its next annual submission regarding the allocation of emissions between the waste and energy sectors, and that the Party improve the definitions of clinical and hazardous waste that is incinerated and contributes to the emissions from waste incineration.

114.   The IPCC default values are used for the fraction of fossil carbon in all types of incinerated waste, including hazardous and clinical waste. The ERT encourages the Czech Republic to assess the actual fossil carbon fraction in all types of waste and to apply a representative country-specific value, in order to increase the accuracy of the reporting in its next annual submission.

115.   As already pointed out in previous review reports, CO_2 emissions from waste incineration were not estimated for 1990 and the emissions were reported as constant from 1991 to 2002. In the previous review report, it was noted that the Czech Republic had reported the emissions in this way owing to delays in the acquisition of actual data on waste incineration, and that an estimate of CO_2 emissions for 1990 would be reported in the 2010 of the previous review report that the Czech Republic collect the corresponding data and carry out the necessary recalculations, in order to ensure the consistency of the time series in its next annual submission.

3.   Non-key categories

Wastewater handling – CH_4

116.   The methodologies used to estimate CH_4 emissions from wastewater handling are in accordance with the Revised 1996 IPCC Guidelines, with mostly default values applied. As already pointed out in the previous review reports, the types of industrial wastewater reported in the NIR and in the CRF tables were not consistent. In the additional information box provided in CRF table 6.B, the Czech Republic has reported some industrial wastewater types as "NE" for which data were presented in table 8.9 of the NIR. The ERT recommends that the Czech Republic improve the consistency of its reporting between the NIR and the CRF tables in its next annual submission.

117.   The Czech Republic used a default chemical oxygen demand value from the IPCC good practice guidance to estimate CH_4 emissions from industrial wastewater. The ERT encourages the Czech Republic to explore possibilities to obtain chemical oxygen demand values based on measurements taken in the most important industries and to use these values for estimating the emissions.

Waste incineration – CH_4 and N_2O

118.   The estimates of N_2O and CH_4 emissions from waste incineration were recalculated in accordance with the 2006 IPCC Guidelines, even though the recalculations were conducted only for 2003 onwards. The recalculations did not result in any changes to the estimated emissions for 1990, but did lead to an increase in N_2O emissions of 3.0 per cent and an increase in CH_4 emissions of 0.00012 per cent for 2007. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that it was not possible to recalculate the entire time series, owing to methodological changes and data availability. The Czech Republic also informed the ERT that it plans to recalculate the entire time series for its next annual submission. The ERT recommends that the Czech

Republic improve the time series consistency by performing recalculations using the same method for the years prior to 2003.

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

119.   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 5–9 of the annex to decision 15/CMP.1. The information was reported in part 2 of the NIR and in the corresponding CRF tables. For the activities under Article 3, paragraph 4, of the Kyoto Protocol, the Czech Republic elected only forest management and the Party chose commitment period accounting for all the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The geographical location of the boundary areas that encompass the units of land subject to afforestation/reforestation (A/R) and deforestation activities and land subject to forest management is specified as the whole national boundary and these areas are identified using reporting method 1 from the IPCC good practice guidance for LULUCF. The definition of forest and the land-identification system used to determine the area 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.

120.   The Czech Republic did not report sufficiently clear information on the spatial assessment unit used for the identification of the area of the land units subject to activities under Article 3, paragraph 3, of the Kyoto Protocol, as required by decision 15/CMP.1. The Czech Republic did not report, in particular, whether the size of the spatial assessment unit used to identify the units of land is not larger than 1 ha, in line with the IPCC good practice guidance for LULUCF and decision 16/CMP.1. The ERT recommends that the Czech Republic provide a more explicit description of the minimum size of the spatial assessment unit in the NIR of its next annual submission, in order to improve the transparency of the reporting.

121.   The Czech Republic chose not to account for the litter and soil organic carbon pools for forest management, since it was assumed that these pools were not net sources of emissions. The ERT considered that the information provided by the Czech Republic in the NIR and in response to the questions raised by the ERT during the review was not sufficient to justify this assumption. In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided additional information demonstrating that these pools were not net sources of emissions, which the ERT considered sufficient (see paras. 126 and 127 below).

122.   The Czech Republic has reported the deadwood pool under forest management as "NO", but did not provide sufficiently verifiable information to justify that this pool was not a net source. In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided additional information demonstrating that this pool was not a net source of emissions, which the ERT considered sufficient (see paras. 126 and 127 below).

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

Afforestation and reforestation – CO_2

123.   The Czech Republic provided estimates for the changes in carbon stocks in above-ground biomass, below-ground biomass and mineral soils for these activities. The change in carbon stock in litter has been estimated jointly with that in the mineral soil organic carbon pool and has been reported as "IE" in the CRF tables. Carbon stock changes in deadwood and organic soils are reported as "NO", since deadwood does not exist in A/R areas and A/R does not occur on organic soils. Tier 2 and tier 3 approaches were applied to estimate emissions, in accordance with the IPCC good practice guidance for LULUCF. Most of the EFs and parameters used are country-specific and have been appropriately selected. It is assumed that no harvest on lands subject to A/R has occurred in the country since the beginning of the commitment period and this has therefore been reported as "NO" in the CRF tables. The Czech Republic has reported all non-CO_2 gases as "NO", with the corresponding explanations provided in the NIR.

Deforestation – CO_2 and N_2O

124.   The Czech Republic has reported estimates for the changes in carbon stocks in above-ground biomass, below-ground biomass, deadwood and mineral soils for deforestation. The change in carbon stock in litter has been estimated jointly with that in mineral soils and has been reported as "IE" in the CRF tables (the same as for A/R). Carbon stock changes in organic soils are reported as "NO", as deforestation does not occur on organic soils. N_2O emissions from disturbance associated with land-use conversion to cropland have also been estimated. Tier 2 and tier 3 approaches were applied to calculate the estimates, in accordance with the IPCC good practice guidance for LULUCF. Most of the EFs and parameters used are country-specific and have been appropriately selected.

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

Forest management – CO_2

125.   The Czech Republic adopted a broad definition of forest management and identified the entire forest area as area subject to this activity under Article 3, paragraph 4, of the Kyoto Protocol. The Czech Republic provided estimates of the changes in carbon stocks in both above-ground and below-ground biomass. Tier 2 and tier 3 approaches were applied, in accordance with the IPCC good practice guidance for LULUCF. Most of the EFs and parameters used are country-specific and have been appropriately selected.

126.   The litter and soil organic carbon pools were not accounted for and the Czech Republic did not provide verifiable information in its 2010 annual submission to demonstrate that these pools are not net sources. In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided an explanation based on the peer-reviewed scientific study of Cienciala et al. (2008). The ERT considers that this study does not directly explain that the carbon stock changes in the litter pool and the soil organic carbon pool do not result in these pools being net sources. However, applying the YASSO model using the actual data on forest biomass, growth performance and growing conditions, the analysis shows that, under the adopted sustainable forest management practices implemented in the Czech Republic, the forest soil carbon pool does not decrease (i.e. it is not a net source of emissions). The ERT considers that, for the purposes of this review, this information is sufficient to judge that both the litter pool and the soil organic carbon pool are not net sources. However, the ERT strongly recommends that the Czech Republic provide, in its next annual submission, more detailed,

documented and verifiable information demonstrating that these pools are not net sources of CO_2 individually, if that is the case.

127. For the carbon stock changes in deadwood, the Czech Republic applied the assumptions of the tier 1 method and reported these changes as "NO". However, the Czech Republic did not provide verifiable information to demonstrate that the pool is not a net source. In response to the list of potential problems and further questions raised by the ERT, the Czech Republic stated that the assumption that the amount of deadwood is roughly proportional to the growing stock is based on solid reasoning. Since the growing stock on forest land steadily increased during the reporting period, the same trend applies to the volume of deadwood. The Czech Republic provided an analysis based on the statistically representative empirical data from two independent statistical inventories conducted during the years 2001–2004 and 2008–2009 covering the reference years of 2003 and 2009, respectively. The analysis of these two data sets indicates that the total carbon content of deadwood on forest land in the Czech Republic increased during the six years from 2003 to 2009. The ERT considers that this explanation is sufficient to make the judgement, for the purposes of this review, that the deadwood pool is not a net source. However, the ERT strongly recommends that the Czech Republic provide, in its next annual submission, additional verifiable and transparent information that demonstrates that the deadwood pool is not a net source.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

128. 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.[6] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterates the main findings and recommendations contained in the SIAR.

129. 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. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred.

National registry

130. 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 also took note of 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

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

measures in place and its operational performance is adequate. The ERT reiterates the recommendation included in the SIAR, which reiterates the recommendation of the previous review report, that the Czech Republic should make publicly available all of the information referred to in paragraph 45 of the annex to decision 13/CMP.1.

Calculation of the commitment period reserve

131.   The Czech Republic has reported its commitment period reserve in its 2010 annual submission. The Party has reported its commitment period reserve to be 707,059,461 t CO_2 eq based on the national emissions in its most recently reviewed inventory (141,411.89 Gg CO_2 eq). In response to the list of potential problems and further questions raised by the ERT, the Czech Republic revised the estimates in its most recently reviewed inventory (2008) and reported its commitment period reserve to be 707,168,248 t CO_2 eq based on the national emissions in its most recently reviewed inventory (141,433.65 Gg CO_2 eq). The ERT agrees with this figure.

3.   Changes to the national system

132.   In section 13 of the NIR, the Czech Republic has reported the following changes to the national system: the development of the new QA/QC plan and its ongoing implementation; and the gradual implementation of the recommendations of the previous ERT. The ERT commends the Czech Republic for developing and implementing the QA/QC plan, which is an important improvement in the national system. However, the ERT noted that the QA/QC plan is not yet fully implemented (see para. 27 above). The ERT concludes that, taking into account the reported changes in the national system, the national system of the Czech Republic continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1.

4.   Changes to the national registry

133.   The Czech Republic has reported the changes to its national registry since the previous annual submission. These include the change of the name of the Czech Registry Administrator from "Operator trhu s elektřinou, a.s." to "OTE, a.s.". The ERT concludes that, taking into account the confirmed changes in the national registry, the national registry of the Czech Republic 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 decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

134.   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 2010 annual submission. The Czech Republic submitted this information on 14 April 2010 and resubmitted it on 6 May 2010. The reported information is complete and transparent.

135.   The Czech Republic has reported in section 15 of the NIR on how it strives to minimize adverse impacts, for example by strengthening capacity in developing countries and through bilateral development assistance projects focusing on the reduction of dependence on fossil fuels and the development of renewable energy sources. For example, the Party's development assistance projects include providing solar energy for schools in Kenya and the development of renewable energy sources for poor rural areas in Viet Nam.

III.   Conclusions and recommendations

136.   The Czech Republic submitted its annual submission on 14 April 2010; it contains a complete set of CRF tables and an NIR. The NIR was resubmitted on 6 May 2010. The Czech Republic also submitted supplementary information 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 the national registry, and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This is in line with decision 15/CMP.1. In response to the list of potential problems and further questions raised by the ERT during the review, on 13 October 2010 the Czech Republic officially submitted revised CRF tables as well as additional information on the non-inventory elements of the annual submission related to the reporting on KP-LULUCF.

137.   The ERT concludes that the 2010 annual submission of the Czech Republic has been prepared and the information reported in accordance with the UNFCCC reporting guidelines. The 2010 annual submission is complete in terms of gases, geographical coverage, years and sectors and is generally complete in terms of categories. In the 2010 annual submission, the Czech Republic did not include emission estimates for some activities which occur in the country and for which methodologies and EFs to estimate the emissions are available in the Revised 1996 IPCC Guidelines and/or in the IPCC good practice guidance, such as: CO_2 emissions from oil production, reported as "NE"; CO_2, CH_4 and N_2O emissions from venting and flaring (oil), reported as "NO"; and CO_2 emissions from soda ash use, reported as "NO". In response to the list of potential problems and further questions raised by the ERT, the Czech Republic provided all the missing emission estimates in the revised CRF tables.

138.   The information required under Article 7, paragraph 1, of the Kyoto Protocol has generally been prepared and reported in accordance with decision 15/CMP.1.

139.   The Czech Republic's inventory is generally in accordance with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the Czech Republic has used tier 1 methods for several key categories. This is not fully in accordance with the IPCC good practice guidance. In response to a question raised by the ERT during the review, the Czech Republic informed the ERT that resources to enable the use of higher-tier methods are lacking in the country.

140.   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 used the required reporting format tables as required by decision 14/CMP.1

141.   The Czech Republic selected commitment period accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and reported most of the information required in paragraphs 5–9 of the annex to decision 15/CMP.1. The Czech Republic chose not to account for the litter, deadwood and soil organic carbon pools for forest management, since it was assumed that these pools were not net sources of emissions. In response to the list of potential problems and further questions raised by the ERT during the review, the Czech Republic provided further explanations based on a peer-reviewed scientific study for the litter and soil organic carbon pools and on empirical data from two independent statistical inventories for the deadwood pool. The ERT considers that, for the purposes of this review, the information provided is sufficient to judge that the litter, soil organic carbon and deadwood pools are not net sources.

142.   The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. However, the ERT noted that the Czech Republic has

difficulties in implementing higher-tier estimation methods, establishing an archiving system and implementing QA/QC procedures in line with decision 19/CMP.1.

143. 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 decisions of the CMP.

144. The Czech Republic has reported the information requested in chapter I.H of the annex to decision 15/CMP.1 on minimization of adverse impacts in accordance with Article 3, paragraph 14, as part of the 2010 annual submission. The information is complete and transparent.

145. During the review, the ERT formulated a number of recommendations related to the transparency, time series consistency and accuracy of the information reported in the Czech Republic's 2010 annual submission. The key recommendations are that the Czech Republic:

(a)   Include more detailed information on the methods, AD and EFs used for all sectors and include discussions on emission trends in the NIR, in particular for the energy, industrial processes and agriculture sectors;

(b)   Remove inconsistencies in the information reported in the various sections of the NIR and between the NIR and the CRF tables;

(c)   Improve the justifications provided for the use of the notation keys in the CRF tables;

(d)   Improve the time-series consistency in cases where different methods and data sources were used for estimating emissions for different years, in particular for the energy and waste sectors;

(e)   Move to using higher-tier estimation methods or country-specific EFs in accordance with the IPCC good practice guidance, in particular for the energy sector;

(f)   Address, as a matter of priority, the existing difficulties in implementing higher-tier methods, establishing an archiving system and implementing QA/QC procedures;

(g)   Provide more detailed, well-documented and verifiable information demonstrating that the litter pool and the soil organic carbon pool are not net sources of emissions individually, if that is the case;

(h)   Make publicly available all required information on the national registry in accordance with paragraph 46 of the annex to decision 13/CMP.1.

IV.   Questions of implementation

146. 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 2010. Available at
<http://unfccc.int/resource/docs/2010/asr/cze.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2010. Available at <http://unfccc.int/resource/webdocs/sai/2010.pdf>.

FCCC/ARR/2009/CZE. Report of the individual review of the annual submission of the Czech Republic submitted in 2009. Available at
<http://unfccc.int/resource/docs/2009/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 (Czech Hydrometeorological Institute), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by the Czech Republic:

Karbanova, Ludmila. 2008. Inventarizace HFC, PFC a SF_6 v dovážených a vyvážených produktech. Diplomová práce, Univerzita J.E. Purkyně. *In English:* Karbanova, Ludmila. 2008. Inventories of HFC, PFC and SF6 in imported and exported products. Diploma thesis, University of J. E. Purkyne

Vacha, Dusan. 2010. Emise F-plynů z dovozu a vývozu výrobků v České republice. *In English:* Vacha, Dusan. 2010. Emissions of F-gases from imported and exported products.

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[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
A/R	afforestation/reforestation
CDV	Transport Research Centre
CH_4	methane
CHMI	Czech Hydrometeorological Institute
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
CSO	Czech Statistical Office
DOM	dead organic matter
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
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
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
m^3	cubic metre
MoE	Ministry of the Environment
N	nitrogen
NA	not applicable
NCV	net calorific value
NE	not estimated
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change