



**Report of the individual review of the annual submission of the  
Czech Republic submitted in 2013**

**Note by the secretariat**

The report of the individual review of the annual submission of the Czech Republic submitted in 2013 was published on 14 August 2014. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2013/CZE, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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\* In the symbol for this document, 2013 refers to the year in which the inventory was submitted, and not to the year of publication.

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## I. Introduction and summary

1. This report covers the review of the 2013 annual submission of the Czech Republic, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 2 to 7 September 2013 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Riccardo de Laetis (Italy); energy – Mr. Daniel Tutu Benefoh (Ghana), Ms. Renee Kidson (Australia), Mr. Ricardo Fernandez (European Union (EU)) and Mr. Sangay Dorji (Bhutan); industrial processes and solvent and other product use – Mr. Stanford Mwakasonda (United Republic of Tanzania) and Ms. Valentina Idrissova (Kazakhstan); agriculture – Mr. Jean Stephan (Lebanon) and Mr. Kohei Sakai (Japan); land use, land-use change and forestry (LULUCF) – Mr. Eiichiro Nakama (Japan), Ms. Marina Vitullo (Italy) and Mr. Richard Volz (Switzerland); and waste – Ms. Estela Santalla (Argentina) and Mr. Kai Skoglund (Finland). Mr. de Laetis and Mr. Tutu Benefoh were the lead reviewers. The review was coordinated by Mr. Vitor Góis Ferreira (UNFCCC secretariat).

2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), 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. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2012 annual review report of the Czech Republic was published after the submission of the 2013 annual submission.

3. In 2011, the main greenhouse gas (GHG) in the Czech Republic was carbon dioxide (CO<sub>2</sub>), accounting for 85.1 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> equivalent (CO<sub>2</sub> eq), followed by methane (CH<sub>4</sub>) (7.6 per cent) and nitrous oxide (N<sub>2</sub>O) (5.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 1.5 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.5 per cent of total GHG emissions, followed by the industrial processes sector (9.4 per cent), the agriculture sector (6.0 per cent), the waste sector (2.8 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 134,345.79 Gg CO<sub>2</sub> eq and decreased by 31.5 per cent between the base year<sup>2</sup> and 2011. The ERT concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

4. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol, by gas and by sector and activity, respectively. In table 1, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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<sup>1</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

5. Additional background data on recalculations by the Czech Republic in the 2013 annual submission, as well as information to be included in the compilation and accounting database, can be found in annex I to this report.

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<sup>a</sup> to 2011**

	Greenhouse gas	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change (%)	
			1990	1995	2000	2008	2009	2010	2011	Base year–2011	
Annex A sources	CO <sub>2</sub>	164 812.75	164 812.75	128 037.89	125 711.08	122 004.67	114 427.74	118 005.01	114 296.49	–30.7	
	CH <sub>4</sub>	17 815.07	17 815.07	13 308.12	11 083.87	10 389.11	10 084.05	10 284.36	10 233.67	–42.6	
	N <sub>2</sub> O	13 483.90	13 483.90	9 367.25	8 740.52	8 485.31	7 948.17	7 690.63	7 841.75	–41.8	
	HFCs	0.21	NA, NE, NO	0.21	178.76	1 321.54	1 456.58	1 712.80	1 930.30	928 825.9	
	PFCs	0.12	NA, NE, NO	0.12	3.08	28.20	33.10	36.63	9.04	7 283.2	
	SF <sub>6</sub>	75.20	77.68	75.20	141.92	47.04	49.61	16.22	34.55	–54.1	
KP-LULUCF	Article 3.3 <sup>b</sup>	CO <sub>2</sub>				–112.21	–124.92	–115.82	–193.57		
		CH <sub>4</sub>				NO	NO	NO	NO		
		N <sub>2</sub> O				0.42	0.43	0.43	0.39		
	Article 3.4 <sup>c</sup>	CO <sub>2</sub>	NA				–4 562.21	–6 574.92	–5 237.44	–7 629.41	NA
		CH <sub>4</sub>	NA				143.63	121.44	128.21	55.11	NA
		N <sub>2</sub> O	NA				14.58	12.33	13.01	5.59	NA

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, 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.

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

<sup>b</sup> Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

<sup>c</sup> Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2  
Greenhouse gas emissions by sector and activity, base year<sup>a</sup> to 2011

	Sector	Gg CO <sub>2</sub> eq								Change (%)
		Base year <sup>a</sup>	1990	1995	2000	2008	2009	2010	2011	Base year–2011
Annex A	Energy	156 764.91	156 764.91	123 652.36	119 603.41	115 470.97	110 163.85	113 328.33	109 514.58	–30.1
	Industrial processes	19 600.69	19 602.83	13 187.70	13 471.65	14 145.21	11 595.58	12 277.97	12 570.12	–35.9
	Solvent and other product use	764.83	764.83	596.31	568.56	515.27	506.15	492.05	469.42	–38.6
	Agriculture	16 233.28	16 233.28	10 331.98	9 094.86	8 583.06	8 134.29	7 964.57	8 064.84	–50.3
	Waste	2 823.55	2 823.55	3 020.45	3 120.76	3 561.38	3 599.39	3 682.72	3 726.82	32.0
	LULUCF	NA	–3 617.94	–7 210.11	–7 524.24	–4 772.86	–6 863.11	–5 488.45	–7 959.22	NA
	<b>Total (with LULUCF)</b>	<b>NA</b>	<b>192 571.46</b>	<b>143 578.69</b>	<b>138 334.99</b>	<b>137 503.02</b>	<b>127 136.13</b>	<b>132 257.19</b>	<b>126 386.58</b>	<b>NA</b>
	<b>Total (without LULUCF)</b>	<b>196 187.25</b>	<b>196 189.40</b>	<b>150 788.80</b>	<b>145 859.23</b>	<b>142 275.89</b>	<b>133 999.25</b>	<b>137 745.64</b>	<b>134 345.79</b>	<b>–31.5</b>
	Other <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3 <sup>c</sup>									
	Afforestation and reforestation					–271.99	–294.68	–322.26	–356.88	
	Deforestation					160.20	170.19	206.87	163.70	
	<b>Total (3.3)</b>					<b>–111.79</b>	<b>–124.48</b>	<b>–115.39</b>	<b>–193.18</b>	
	Article 3.4 <sup>d</sup>									
	Forest management					–4 403.99	–6 441.15	–5 096.22	–7 568.71	
	Cropland management	NA				NA	NA	NA	NA	NA
Grazing land management	NA				NA	NA	NA	NA	NA	
Revegetation	NA				NA	NA	NA	NA	NA	
	<b>Total (3.4)</b>	<b>NA</b>				<b>–4 403.99</b>	<b>–6 441.15</b>	<b>–5 096.22</b>	<b>–7 568.71</b>	<b>NA</b>

Abbreviations: KP-LULUCF = LULUCF 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.

<sup>a</sup> “Base year” for sources included in Annex A to the Kyoto Protocol refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

<sup>c</sup> Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

<sup>d</sup> Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

## II. Technical assessment of the annual submission

### A. Overview

#### 1. Annual submission and other sources of information

6. The 2013 annual inventory submission was submitted on 15 April 2013; it contains a complete set of common reporting format (CRF) tables for the period 1990–2011 and an NIR. The Czech Republic also submitted the 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 the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2013. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The Czech Republic officially submitted revised emission estimates on 23 October 2013 in response to the list of potential problems and further questions raised by the ERT. The values used in this report are those submitted by the Czech Republic on 23 October 2013.

8. The full list of materials used during the review is provided in annex II to this report.

#### 2. Overall assessment of the inventory

9. Table 3 contains the ERT's overall assessment of the annual submission of the Czech Republic. For recommendations for improvements related to cross-cutting issues for specific categories, please see the paragraphs cross-referenced in the table.

Table 3

#### The expert review team's overall assessment of the annual submission

<i>General findings and recommendations</i>		
The expert review team's (ERT's) findings on completeness of the 2013 annual submission		
Annex A sources <sup>a</sup>	Complete	Mandatory: none  Non-mandatory: "NE" was reported for: CO <sub>2</sub> emissions from coal mining and handling (post-mining activities in underground mines, and mining activities and post-mining activities in surface mines); CO <sub>2</sub> emissions from fossil fuel transformation; CO <sub>2</sub> and N <sub>2</sub> O emissions from refining/storage of oil; CO <sub>2</sub> and CH <sub>4</sub> emissions from distribution of oil products; CO <sub>2</sub> from asphalt roofing; CO <sub>2</sub> from road paving with asphalt; imports and exports of HFCs, PFCs and SF <sub>6</sub> in products (potential emissions); CH <sub>4</sub> direct soil emissions; N <sub>2</sub> O emissions from industrial wastewater (wastewater and sludge)



<i>General findings and recommendations</i>		
Land use, land-use change and forestry <sup>a</sup>	Complete	<p>Mandatory: none</p> <p>Non-mandatory: no categories or pools were reported as “NE”. However, carbon stock changes in certain pools, such as mineral soils for wetlands and grassland converted to settlements, were reported as “NA” or “NO”; the ERT believes that it is reasonable to assume that such changes would have occurred and “NE” should had been reported (see para. 70 below)</p>
KP-LULUCF	Complete	See table 6 and paragraphs 95, 96 and 99 below
The ERT’s findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	<p>Recalculations have been performed in accordance with the IPCC <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and are generally transparently explained in the NIR and the CRF tables</p> <p>Possible inconsistencies in time series were identified in the energy sector (see paras. 18–19 and 39 below), the industrial processes sector (see para. 51 below) and the LULUCF sector (see para. 71 below)</p>
The ERT’s findings on verification and quality assurance/quality control procedures in the 2013 annual submission	Sufficient	<p>The Czech Republic performed category-specific QA/QC procedures and verification activities, including QA/QC of recalculations. An updated QA/QC plan was finalized with the 2012 annual submission and an outline of it is reported in the NIR (see para. 22 below). Other improvements were made for specific sectors (see para. 83 below)</p> <p>The ERT recommends that the Party further improve its QA/QC procedures, especially in the energy sector with respect to comparison with international statistics (see para. 28 below) and in the calculations of feedstocks and non-energy use of fuels (see paras. 30–31 and 33 below)</p> <p>Minor errors were identified in the annual submission (see para. 87 below), and the ERT recommends that the Party strengthen the QA/QC actions to avoid such errors in future submissions</p>

*General findings and recommendations*

The ERT's findings on the transparency of the 2013 annual submission	Generally transparent	The ERT recommends or encourages, depending on the specific issue, that the Czech Republic enhance the transparency of the NIR, including by including information supplied to the ERT during the review, for the following sectors: energy (see paras. 23, 25, 35, 36, 38, 39 and 40 below), industrial processes (see paras. 47, 50, 53 and 54 below), agriculture (see paras. 62, 63 and 67 below) and waste (see paras. 82, 84, 85 and 91 below); and improving the description of the methodologies in the LULUCF sector (see paras. 71–75 and 78 below) and for the KP-LULUCF activities (see paras. 93–95 below)
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*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, CRF = common reporting format, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = LULUCF 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, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control.

<sup>a</sup> The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the IPCC *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

**3. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management**

Inventory planning

10. The NIR described the national system for the preparation of the inventory. The Ministry of the Environment (MoE) has overall responsibility for the national inventory and secures contracts with other governmental bodies involved in the preparation of the inventory, such as the Czech Statistical Office (CZSO), the Ministry of Industry and Trade and the Ministry of Agriculture. The Czech Hydrometeorological Institute (CHMI), under the supervision of MoE, is designated as the coordinating and managing organization responsible for the compilation of the national inventory and for reporting. CHMI aims to ensure quality management through the implementation of the quality assurance/quality control (QA/QC) plan and oversees the archiving system. The national inventory is prepared by CHMI and approved by MoE prior to its submission to the UNFCCC secretariat. The capacity of the team has been improved in comparison with the previous year, with a new expert involved in the preparation of emission estimates for the industrial processes sector. In addition to this improvement, and in response to a recommendation made in the previous review report, an improvement plan for future annual submissions prioritizing the planned improvements was included in the NIR. The ERT welcomes the improvements made to the national system.

Inventory preparation

11. Table 4 contains the ERT's assessment of the Czech Republic's inventory preparation process. For improvements related to specific categories, please see the paragraphs cross-referenced in the table.

Table 4  
**Assessment of inventory preparation by the Czech Republic**

<i>General findings and recommendations</i>		
<i>Key category analysis</i>		
Was the key category analysis performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> (hereinafter referred to as the IPCC good practice guidance) and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	
Approach followed?	Tier 1	During the review, the Czech Republic provided a preliminary version of the tier 2 key category analysis, which is still under final assessment and which the Party plans to include in the 2014 annual submission. The ERT commends the Party for the planned improvement
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	
Are there any changes to the key category analysis in the latest submission?	No	
<i>Assessment of uncertainty analysis</i>		
Approach followed?	Tier 1	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	During the review, the Czech Republic, responding to recommendations in the previous review report, provided a report documenting all the references for the uncertainty values for both AD and EFs. See also paragraph 21 below

*General findings and recommendations*

Quantitative uncertainty (including LULUCF)	Level = 3.6% Trend = 2.3%
Quantitative uncertainty (excluding LULUCF)	Level = 3.2% Trend = 2.2%

*Abbreviations:* AD = activity data, EF = emission factor, ERT = expert review team, LULUCF = land use, land-use change and forestry.

Inventory management

12. The Czech Republic has a centralized archiving system which includes the archiving of disaggregated emission factors (EFs) and activity data (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. The archive is located at CHMI, and it was developed in response to recommendations made in the previous review report. During the review, the ERT was provided with the requested additional archived information. The ERT commends the Party for the improvements made in the archiving system.

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

13. In order to comply with the recommendations made in previous review reports, many changes were performed by the Party in preparation for its 2013 annual submission. The ERT welcomes the improvements made, which are reported in detail in the NIR. In particular, chapter 10 of the NIR contains an extensive list of all the categories, by sector, that were subject to improvements in the methodologies used to estimate emissions.

14. The NIR also contains an improvement plan for future annual submissions. The ERT welcomes the fact that this plan is in accordance with the recommendations made in previous review reports and that it concentrates particularly on the use of higher-tier estimation methods and the implementation of country-specific EFs, where appropriate.

**5. Areas for further improvement identified by the expert review team**

15. During the review, the ERT identified a number of areas for improvement, including some related to specific categories. These are listed in the relevant chapters of this report and in table 8.

**B. Energy****1. Sector overview**

16. The energy sector is the main sector in the GHG inventory of the Czech Republic. In 2011, emissions from the energy sector amounted to 109,514.58 Gg CO<sub>2</sub> eq, or 81.5 per cent of net GHG emissions. Since 1990, emissions have decreased by 30.1 per cent. The key drivers for the fall in emissions are a reduction in heavy industries in the first part of the time series (1990–1999) and a shift in the composition of fuel consumed in the country since the base year (the share of gaseous fuel combustion has increased from 13.9 to 24.3 per cent of total energy consumption, while the share of liquid fuels has declined from 11.4 to 6.0 per cent of energy consumption, and energy consumption from biomass has

increased from 1.4 to 8.5 per cent). Within the sector, 53.3 per cent of the emissions were from energy industries, followed by 16.4 per cent from manufacturing industries and construction, 15.8 per cent from transport and 9.6 per cent from other sectors. Fugitive emissions from solid fuels accounted for 3.2 per cent and fugitive emissions from oil and natural gas accounted for 0.6 per cent. The remaining 1.0 per cent of emissions were from the category other (energy).

17. The ERT noted that the Czech Republic has made recalculations since the previous annual submission, including reallocations between the subcategories manufacture of solid fuels and other energy industries and manufacturing industries and construction, along with recalculations in the categories chemicals, pulp, paper and print and residential. In addition, recalculations in transport include an updated country-specific EF for natural gas (compressed natural gas (CNG) use in transport) and road transportation, and the development of a tier 3 method to estimate fugitive emissions from solid fuels and natural gas (see paras. 38 and 41 below). These recalculations are reported in a transparent and detailed manner in the NIR. The ERT commends the Party for the improvements made to the energy sector.

18. The ERT identified various instances of significant inter-annual variations in the time series of the emission estimates. In response to questions raised by the ERT during the review, the Party cited various reasons to account for these:

- (a) Differences in availability of AD before and after the separation of the former Czechoslovakia;
- (b) The use of improved methods and the development of new EFs for more recent years;
- (c) Changes in infrastructure and equipment.

19. However, despite the Party's explanations of these issues and others (see para. 39 below), the ERT was not able to conclude whether the Party had recalculated the entire time series on the basis of the new EFs and hence whether the Party was able to ensure time-series consistency. The ERT recommends that the Party ensure that recalculations are applied over the entire time series in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), and that the Party detail in a transparent manner the recalculation method applied.

20. 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 subcategories were reported as not estimated ("NE"), such as: CO<sub>2</sub> emissions from coal mining and handling (post-mining activities in underground mines, and mining activities and post-mining activities in surface mines); CO<sub>2</sub> emissions from fossil fuel transformation; CO<sub>2</sub> and N<sub>2</sub>O emissions from refining/storage of oil; and CO<sub>2</sub> and CH<sub>4</sub> emissions from distribution of oil products. The ERT noted that estimation methods and/or EFs are not available for those subcategories in either the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the IPCC good practice guidance, but encourages the Czech Republic in its efforts to provide emission estimates for these categories as soon as possible.

21. The Czech Republic reported in its NIR that major improvements have been made in relation to the uncertainty analysis, specifically by the reassessment of all uncertainty values. However, when queried by the ERT on how expert judgements were elicited, the Party did not provide sufficient detail. Therefore, the ERT recommends that, in the NIR of

future annual submissions, the Party provide a full elaboration of the expert judgement method with due reference to chapter 6 of the IPCC good practice guidance.

22. The ERT welcomes the implementation of an expanded and improved QA/QC plan, involving CZSO and the harmonization of data with the Czech Transport Research Centre (CDV). This QA/QC plan includes approaches consistent with IPCC tier 2 guidance, involving the use of independent data from other agency sources as a control.

23. The ERT noted that transparent information on the calculation of net calorific values (NCVs) was not available in the NIR, in particular regarding the frequency with which NCVs for fuels are measured and what standards are used. In response to questions raised by the ERT during the review, the Party provided a comprehensive explanation of the national standard that accredited laboratories must meet (Decree No. 12/2009), and the sampling frequency. The ERT recommends that the Party improve the level of transparency and disclosure, by including these explanations in the NIR.

## 2. Reference and sectoral approaches

24. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 25–33 below.

Table 5

### Review of reference and sectoral approaches

		<i>Paragraph cross-references</i>
Difference between the reference approach and the sectoral approach	Energy consumption: 13.05 PJ, 1.02%  CO <sub>2</sub> emissions: 1,526.99 Gg CO <sub>2</sub> eq, 1.47%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	No	25–27
Are differences with international statistics adequately explained?	No	28
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	No	30–33

*Abbreviations:* CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”.

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

25. Although the overall percentage difference between the reference approach and the sectoral approach was lower than 2 per cent, the percentage differences between the reference and sectoral approaches were frequently more than 2 per cent for both solid and

liquid fuels. In 2011, the difference in CO<sub>2</sub> emissions for liquid fuels was –4.8 per cent and for solid fuels the difference was 4.7 per cent. The Party did not provide information on these differences either in the NIR or during the review in response to questions raised by the ERT. The ERT recommends that the Party explain such differences for each fuel type in future annual submissions.

26. The ERT also noted that, in an annex to the NIR, the Party describes the quantitative differences between the reference approach and the sectoral approach in a descriptive manner but does not explain the reasons that may account for these differences. Therefore, the ERT recommends that the Party enhance the description of the reasons behind the differences.

27. The ERT noted an error in CRF table 1.A(c): the difference between the values reported in the columns “apparent energy consumption (excluding non-energy use of fuels)” and “apparent energy consumption” should match the sum of the column “fuel quantity” in CRF table 1.A(d). The Party appears to have subtracted only the energy content of the feedstock and non-energy use of fuels that were stored, instead of the total energy value of all feedstock and non-energy fuels (see para. 30 below). If this were to be corrected, the difference in energy consumption between the reference approach and sectoral approach would be –0.13 per cent. The ERT recommends that the Party revise the calculations and report the reference approach fully in accordance with the Revised 1996 IPCC Guidelines.

28. The ERT found repeated instances of inconsistencies between figures published by the International Energy Agency (IEA) and figures submitted in the CRF tables. For example, in the IEA data total apparent consumption is lower than the data in the CRF tables by 1 per cent for 1990, while the IEA consumption data are 2 per cent greater than the values reported by the Party in the reference approach for 2011. The change rate for the period 1990–2011 for the total apparent consumption is –26 per cent in the reference approach compared with –24 per cent in the IEA data. Therefore, the ERT recommends that the Party address the issue of data alignment between the data reported to IEA and the values in the CRF tables in the next annual submission, for this important verification measure.

#### *International bunker fuels*

29. The ERT noted that the IEA data attributes a significant quantity of jet kerosene fuel to civil aviation (1,806 TJ), relative to the Party’s allocation (21.50 TJ).<sup>3</sup> This also results in an overall difference larger than 10 per cent between total aviation fuel reported in the CRF tables and reported to the IEA. In response to questions raised by the ERT during the review, the Party explained that this issue had been identified in the list of potential problems and further questions during the 2011 review cycle. The ERT notes that transparent explanations were provided in the NIR and welcomes the transparent reporting.

#### *Feedstocks and non-energy use of fuels*

30. The ERT notes that in CRF table 1.A(c), the total apparent energy consumption (excluding feedstocks and non-energy use of fuels) (1,292.87 PJ, in 2011) should be equal to the value of total apparent energy consumption in the same table (1,418.95 PJ, in 2011) minus the total quantity of feedstock fuels reported in CRF table 1.A(d) (140.80 PJ, in 2011). However, the Party appears to have subtracted only the energy content of the stored

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<sup>3</sup> Synthesis and assessment report on the greenhouse gas inventories submitted in 2012 (Part I). Available at <[https://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/inventory\\_review\\_reports/items/6616.php](https://unfccc.int/national_reports/annex_i_ghg_inventories/inventory_review_reports/items/6616.php)>.

carbon from feedstocks. The ERT notes that this results in the energy consumption for the reference approach being overestimated. Therefore, the ERT recommends that the Party revisit the calculation of the values reported in table 1.A(c).

31. The ERT also found other potential errors in CRF table 1.A(d). Namely, for coke consumed in blast furnaces, the Party has reported the fraction of carbon stored as 1.0 per cent, but it reports the same quantity (5,738.06 Gg CO<sub>2</sub>) as CO<sub>2</sub> not emitted subtracted from the energy sector and the associated CO<sub>2</sub> emissions under the category iron and steel production, which is not consistent (the reported value equals CO<sub>2</sub> emissions from the total quantity of fuel multiplied by the carbon EF). Therefore, the ERT recommends that the Party revisit the reporting in CRF table 1A(d).

32. The Czech Republic reported in CRF table 1.A(d) that it has allocated CO<sub>2</sub> emissions (5,738.06 Gg CO<sub>2</sub> eq) from coke consumed in blast furnaces to the industrial processes sector (in the category iron and steel production), which the ERT considers to be in accordance with the IPCC good practice guidance. However, the ERT noted that the emissions reported under the category iron and steel production in CRF table 2(I).A for 2011 (5,623.30 Gg CO<sub>2</sub> eq) are lower than the value reported in CRF table 1.A(d). Therefore, the ERT strongly recommends that the Party revisit the calculations of emissions from coke consumed in blast furnaces to ensure that all emissions are accurately reported and provide the necessary recalculations or explanations in the next annual submission.

33. The ERT further noted that in CRF table 1.A(b) the Party reported total carbon stored as 3,071.31 Gg CO<sub>2</sub> in 2011, while it has reported the corresponding value in CRF table 1.A(d) as 3,059.78 Gg CO<sub>2</sub> eq (i.e. a 0.4 per cent difference). The ERT recommends that the Party resolve this apparent inconsistency or provide the necessary explanations in subsequent annual submissions.

### 3. Key categories

#### Stationary combustion – liquid and solid fuels and biomass – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O<sup>4</sup>

34. The ERT noted that the Czech Republic uses a tier 1 method together with default EFs to estimate emissions from liquid fuels in stationary combustion, which involves several key categories. In response to a question raised by the ERT during the review, the Party stated that the development of country-specific EFs is included in its inventory improvement plan. The ERT recommends that the Party, when implementing the plan, move to higher-order estimation methods, as appropriate, in accordance with the IPCC good practice guidance.

35. The ERT identified that the CO<sub>2</sub> implied emission factor (IEF) for the use of liquid fuels in manufacture of solid fuels is 73.33 t/TJ, which is low relative to other countries with similar levels of underground coal production (e.g. Germany produced 12,059 kt and reported a CO<sub>2</sub> IEF of 111.86 t/TJ, whereas the Czech Republic coal production was 11,265 kt). In response to a question raised by the ERT during the review, the Party provided additional information, including details of the highly country-specific operational processes that appear to justify a lower IEF. In particular, the Party's explanation relies upon 'energo-gas' used in the coking process, which the Party states has a lower EF than other commonly used fuels in coking processes. The ERT recommends that for this, and all similar instances where the Party's IEF deviates strongly from the IPCC default, or from

<sup>4</sup> Not all emissions related to all fuels and gases under this category are key categories, particularly emissions from liquid fuels and N<sub>2</sub>O emissions. However, since the calculation procedures for issues related to this category are discussed as whole, the individual gases are not assessed in separate sections.



those of similar countries, the Party elaborate full details in the NIR to justify the low IEF on the basis of operational differences in order to increase the transparency of its reporting.

36. Following the previous year's list of potential problems and further questions raised by the ERT, the Party has provided emission estimates for CH<sub>4</sub> and N<sub>2</sub>O emissions from charcoal combustion. However, the ERT notes that in this year's submission, the NIR (page 98) does not describe transparently the methodology used by the Party. Therefore, the ERT recommends that the Party include a transparent description of the methodology, including numerical details, in the NIRs of future annual submissions.

#### Coal mining and handling – CH<sub>4</sub>

37. The Czech Republic is a net exporter of coal, and much of its consumption of this fuel is produced internally. The Party's coal mining activities are primarily surface mining (46.64 Mt in 2011), with a smaller proportion from underground mines (11.27 Mt in 2011). Within CRF table 1.B.1 the Czech Republic reported CH<sub>4</sub> volumes recovered or flared for coal mining and handling as "NO" (not occurring) or "NA" (not applicable). However, the Party reports in its 2013 NIR that most abandoned coal mines in the Czech Republic have gas recovery systems, which the ERT finds to be inconsistent with the information in the CRF tables. This issue was communicated to the Party during the review week, and the Party indicated its intention to include this item in its inventory improvement plan for 2014. The ERT encourages the Party in its plans.

38. The Party is commended for the development of a higher-order method to estimate fugitive emissions from solid fuels (underground mines), which is based upon mine-specific data. The ERT further encourages the Party to increase the transparency of its NIR by documenting the supporting data sources.

39. However, the Czech Republic applied improved EFs, but it did not apply these improved factors to the time series in a consistent manner. For example, there is a marked decline in CH<sub>4</sub> emissions from underground mining between 1999 and 2000 (18.6 per cent). In response to a question raised by the ERT during the review, the Party indicated that this was the result of an improved EF that had been developed and applied from 2000 onwards. The ERT recommends that the Party ensure that recalculations are applied over the entire time series, and provide clear details of the recalculation method applied in the NIR.

#### Fugitive emissions from oil and natural gas – CO<sub>2</sub> and CH<sub>4</sub><sup>5</sup>

40. In CRF table 1.B.2 the Party has reported AD for transmission of natural gas (1,362.00 PJ) that are an order of magnitude higher than the figures provided for distribution (162.68 PJ). In response to a question raised by the ERT during the review, the Czech Republic explained that most of the high-pressure gas pipelines are transit pipelines for gas from Russian gas fields and serving Western Europe. The ERT recommends that the Party include such detail in future NIRs, to enhance the transparency of its reporting.

41. The Czech Republic developed tier 3 methods to estimate fugitive emissions from natural gas (production/processing, transmission, distribution and other leakage). Namely, the Party invested in developing country-specific EFs based on laboratory studies of NCVs of the natural gas imported into the Czech Republic. The ERT welcomes this improvement, because although the Party produces only a modest quantity of gas, the Party does host a large pipeline network (>60,000 km); therefore, the potential for fugitive emissions from

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<sup>5</sup> Not all emissions related to all gases under this category are key categories, particularly CO<sub>2</sub> emissions. However, since the calculation procedures for issues related to this category are discussed as whole, the individual gases are not assessed in separate sections.

these sources is substantial and the accuracy of the estimates is enhanced by the Party's use of a higher-tier method.

42. The ERT recommends that the Czech Republic employ higher-tier methods for the estimation of venting emissions from oil and natural gas, which to date the Party has presented on the basis of tier 1 methods.

#### 4. Non-key categories

##### Other – all fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

43. During the review, the ERT raised a question regarding the inclusion of military fuel use. The Party responded that data for military fuel use are very incomplete, but the inventory is not underestimated given that: data on consumption of diesel oil are subtracted from total sales in the country; consumption of jet fuel in military activities is included in other (mobile); and the remaining consumption of fuels reported under national aviation and international bunkers. The ERT encourages the Party to improve the completeness of its estimates of emissions from military fuel use in subsequent submissions, and also to improve the transparency of its reporting by clearly indicating in which category these emissions are allocated.

### C. Industrial processes and solvent and other product use

#### 1. Sector overview

44. In 2011, emissions from the industrial processes sector amounted to 12,570.12 Gg CO<sub>2</sub> eq, or 9.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 469.42 Gg CO<sub>2</sub> eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 35.9 per cent in the industrial processes sector, and decreased by 38.6 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector were the transition to a market economy in the early 1990s, the cessation of heavy industry activities in the country and investment in environmental protection in the industrial processes. Within the industrial processes sector, 45.2 per cent of the emissions were from metal production, followed by 30.4 per cent from mineral products, 15.7 per cent from consumption of halocarbons and SF<sub>6</sub> and 8.7 per cent from chemical industry.

45. The reporting on the industrial processes and solvent and other product use sectors is complete in terms of gases and years and generally complete in terms of categories. The Czech Republic has reported CO<sub>2</sub> emissions from asphalt roofing and from road paving with asphalt as "NE". Since there are no estimation methodologies available in the Revised 1996 IPCC Guidelines or in the IPCC good practice guidance for these categories, the ERT encourages the Party in its efforts to enhance the completeness of its reporting.

46. The NIR is generally complete and transparent, with a few areas requiring further attention to ensure transparency, as explained in paragraph 47 below. Nevertheless, the ERT noted that the Czech Republic made significant improvements to the transparency of descriptions of methodologies for the industrial processes sector in line with recommendations made in previous review reports. In particular, the description of the methodologies for consumption of halocarbons and SF<sub>6</sub>, iron and steel production, nitric acid production and ammonia production has improved. In addition, the ERT further noted that the Party is now providing detailed separate descriptions of category-specific QA/QC procedures, as recommended in previous review reports. The ERT commends the Party for these improvements in the transparency of its reporting on the industrial processes sector.

47. The ERT noted that the NIR provides descriptions of recalculations for each year. However, the impact of these recalculations on the estimates for categories is not included in the descriptions. Therefore, the ERT recommends that the Party further enhance the transparency of the recalculations by including explanations of the recalculations at the category level.

48. The Czech Republic explained in the NIR that it has enhanced the approach used for the uncertainty assessment, in line with recommendations made in the previous review report. The ERT commends the Party for this improvement.

## 2. Key categories

### Cement production – CO<sub>2</sub>

49. The Czech Republic states in the NIR that it uses a tier 3 approach, whereby CO<sub>2</sub> emissions from cement production are estimated based on data submitted by the cement kiln operators and taking account of the amount of cement kiln dust (CKD) generated. It is further explained in the NIR that, for one cement plant, a small part of the CKD was discarded for technical reasons. The ERT recommends that the Party monitor the recycling of CKD by the cement plants, especially where a small part is discarded, and reflect this information in the NIR to ensure that cement production emissions are accurately estimated and not underestimated.

### Lime production – CO<sub>2</sub>

50. The Czech Republic explains in the NIR that the methodologies in the IPCC good practice guidance are used to calculate emissions from lime production. However, the ERT noted that the Party uses an EF of 0.788 t CO<sub>2</sub>/t lime produced, which is higher than the default IPCC EF (0.785 t/t) for 100 per cent of calcium oxide (CaO). In response to a question raised by the ERT during the review on the reasons underlying the choice of this EF, given that the NIR mentions the production of both high calcium and dolomitic lime, the Party acknowledged that three types of lime are produced in the country, namely high calcium lime, dolomitic lime and hydraulic lime. In addition, the IEF reported in CRF table 2(II).A-G is 0.733 t/t lime produced. The ERT notes that the three types of lime have different default EFs in the IPCC good practice guidance (table 3.4). Therefore, the ERT recommends that the Party make separate calculations of emissions from lime production, according to type of lime, and apply the appropriate EF for each type of lime, and enhance the transparency of reporting the calculations in the NIR.

### Limestone and dolomite use – CO<sub>2</sub>

51. The ERT noted in the NIR that the use of limestone and dolomite in sintering, which is a significant use of limestone and dolomite, was overlooked and not included in the inventory until 2006 when it was reportedly detected in data from the EU Emissions Trading System (EU ETS). The ERT recommends that the Party undertake a comprehensive study or survey to ensure that all possible sources of emissions from limestone and dolomite use are covered in the national inventory for the whole time series, in order to ensure the consistency of the time series.

### Iron and steel production – CO<sub>2</sub>

52. The ERT noted that the Party uses a tier 1 approach to calculate emissions from iron and steel, although it is a key category. The ERT strongly reiterates recommendations made in previous review reports that the Party improve the accuracy of its inventory by moving to a tier 2 methodology.

53. The ERT also reiterates recommendations made in previous review reports that the Czech Republic improve the transparency of its reporting by: providing details of the flows of blast furnace gas between pig iron production and steel production; establishing a full carbon balance to support the verification of CO<sub>2</sub> emissions for iron and steel production; and reporting the carbon balance in the NIR.

54. The ERT noted that the CO<sub>2</sub> IEF for iron and steel decreased by 20.2 per cent between 1990 and 2011. In response to a question raised by the ERT during the review, the Czech Republic stated that the evolution of the IEFs reflect the ratios of production technologies, namely the ratio of electric arc furnaces to traditional iron works, and that the shift in IEFs could be attributed to a higher level of recycling of scrap iron and increasing electric arc-based melting technologies. The ERT recommends that the Party include such information on the changes in iron and steel processes in the NIR to increase the transparency of its reporting.

#### Consumption of halocarbons and SF<sub>6</sub> – HFCs, PFCs and SF<sub>6</sub>

55. The ERT noted some level of improvement in the reporting of emissions from consumption of halocarbons and SF<sub>6</sub>, in accordance with recommendations made in previous review reports. This includes some improvement in transparency by including the AD on the average annual stock of fluorinated gases (F-gases) and by providing the parameters used for estimating these emissions. The ERT commends the Party for making this effort to improve the transparency of its reporting.

56. The ERT noted that the Party was still reporting as “NO” emissions of HFCs, PFCs and SF<sub>6</sub> from the disposal of appliances and equipment in CRF table 2(II) in its original submission of 15 April 2013. In response to a question raised by the ERT during the review about this issue, the Party indicated that disposal emissions were estimated as not occurring since the disposed equipment and appliances were still filled with ozone-depleting substances covered by the Montreal Protocol. The ERT noted, however, that when responding to the previous review the Party had explained that it was working on acquiring AD on F-gas emissions from the decommissioning of various devices. The ERT also noted that reporting of F-gas consumption in the Czech Republic started in 1995 and the time frame of F-gas appliances and equipment use in the Czech Republic is beyond the stated lifetime of major appliances (e.g. 12 years for domestic refrigerators responsible for 95.4 per cent of actual F-gas emissions in the Czech Republic), which would mean that decommission emissions should have been reported by 2011. Moreover, the Party reports in the NIR that new models taking into account the lifetimes of equipment have already been developed and used. Therefore, the ERT concluded that this issue presents a potential underestimation from consumption of halocarbons and SF<sub>6</sub> and included it in the list of potential problems and further questions raised by the ERT.

57. Responding to the list of potential problems and further questions raised by the ERT, the Czech Republic provided revised emission estimates from this category and submitted revised CRF tables for the entire time series. The ERT considered the issue resolved, because the Czech Republic had calculated and included F-gas disposal emission estimates in accordance with the IPCC good practice guidance. Recalculations resulted in an increase of CO<sub>2</sub> equivalent emissions from the category by 779.50 Gg or 6.6 per cent of the total emissions from the industrial processes sector in 2011.

### **3. Non-key categories**

#### Ammonia production – CO<sub>2</sub>

58. The ERT noted the statement in the NIR that in the Czech Republic ammonia production is derived from residual oil containing 84.6 per cent carbon (i.e. resulting in a

2.402 t CO<sub>2</sub>/t ammonia (NH<sub>3</sub>) EF (99 per cent carbon oxidation efficiency)). The ERT commends the Party for the clarification of the methodology used, which is an improvement on the reporting in previous annual submissions, made in line with recommendations made in previous review reports.

#### Glass production – CO<sub>2</sub>

59. The Czech Republic estimated emissions from use of manufactured glass without taking into account the quantity of recycled glass used as raw material. The ERT reiterates the encouragement it provided in the previous review report for the Party to obtain data on recycled glass and improve the accuracy of the estimates for this category.

## **D. Agriculture**

### **1. Sector overview**

60. In 2011, emissions from the agriculture sector amounted to 8,064.84 Gg CO<sub>2</sub> eq, or 6.0 per cent of total GHG emissions. Since 1990, emissions have decreased by 50.3 per cent. The key drivers for the fall in emissions were the decreases in the livestock population and the amount of synthetic fertilizer applied to soils. Within the sector, 62.2 per cent of the emissions were from agricultural soils, followed by 24.8 per cent from enteric fermentation and 12.9 per cent from manure management. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues were reported as “NO”.

### **2. Key categories**

#### Enteric fermentation – CH<sub>4</sub>

61. The Czech Republic used a tier 2 approach to estimate CH<sub>4</sub> emissions from enteric fermentation for cattle and a tier 1 approach together with default EFs from the Revised 1996 IPCC Guidelines to calculate emissions from other livestock types. The ERT found this to be in accordance with the IPCC good practice guidance.

62. The ERT noted that, in the NIR (table 6-4), the percentage of grazing suckler cows had significantly changed over time: 1999–2004, by 20 per cent; 2005–2009, by 22 per cent; and 2010–2011, by 95 per cent. In response to a question raised by the ERT during the review, the Party explained that country-specific livestock data, including data on animal management systems, were updated in 2009 and used in inventory estimates. The data show that in a short period of time there was a significant shift from dairy cattle to meat-producing breeds. At the same time the percentage of livestock housed in stables decreased while the percentage kept on pasture increased. The ERT recommends that the Czech Republic include in the NIR the appropriate explanations for the significant increase in grazing suckler cows in order to improve the transparency of its reporting. In addition, the ERT recommends that the Party enhance the documentation of the methodology used, by including documentation of the number of grazing days.

63. The ERT noted that the Czech Republic reported the weights of cattle in the NIR (table 6-3). However, it did not report weights of cattle in CRF tables 4.A and 4.B (excluding for dairy cattle in table 4.A). Therefore, the ERT encourages the Czech Republic to report the weighted average weights of cattle in CRF tables 4.A and 4.B when data are available.

#### Manure management – CH<sub>4</sub> and N<sub>2</sub>O

64. The Czech Republic used a tier 1 method to estimate CH<sub>4</sub> emissions from manure management using the default EFs for Western Europe for cattle and swine and the default

EFs for developed countries for other livestock types. The ERT concludes that this is in line with the IPCC good practice guidance, since dairy cattle (29.0 per cent in 2011), non-dairy cattle (32.3 per cent in 2011) and swine (29.1 per cent in 2011) are the significant animal types of this key category.

65. The Czech Republic used a tier 2 method to estimate N<sub>2</sub>O emissions from manure management for cattle together with country-specific data on nitrogen (N) excretion rates (N<sub>ex</sub>) and the distribution of animal waste management systems (AWMS), and used a tier 1 method and default N<sub>ex</sub> to calculate emissions from manure management for other livestock categories. The ERT concluded that this approach is in accordance with the IPCC good practice guidance because it covers the significant animal types (dairy cattle, 48.2 per cent; non-dairy cattle, 33.3 per cent) of this key category in 2011.

#### Agricultural soils – N<sub>2</sub>O

66. The Czech Republic used a tier 1 approach to estimate N<sub>2</sub>O emissions from agricultural soils. Country-specific parameters were used to estimate N<sub>2</sub>O emissions from N-fixation for the crops clover and alfalfa, and from crop residues for potatoes and sugar beet. For other parameters, the Party used the default values in the Revised 1996 IPCC Guidelines.

67. In the NIR of the 2013 annual submission, the Czech Republic enhanced the transparency of its reporting by providing the description of the calculation of country-specific parameters for N-fixing crops for alfalfa and clover, and crop residues for potatoes and sugar beet and by specifying which categories were recalculated since the previous annual submission. The ERT commends the Party for these improvements in the transparency of the NIR, but noted that the transparency for this category could be further improved, as follows:

(a) In the NIR it is not clear which AD are used to estimate N<sub>2</sub>O emissions from N-fixation and crop residues. In response to a question raised by the ERT during the review, the Party explained that it estimated N<sub>2</sub>O emissions from N-fixation for pulses, soya, alfalfa and clover, and N<sub>2</sub>O emissions from crop residues for crops (cereals), potatoes and sugar beet. The ERT recommends that the Czech Republic enhance the description of the explanations for this subcategory in the NIR;

(b) The previous review report recommended that the Party improve the transparency of the NIR by providing further documentation on the methodology used and values for the atmospheric deposition and the N lost through leaching and run-off. However, the Party has not improved this reporting since the last annual submission. In response to a question raised by the ERT during the review regarding this issue, the Party provided the ERT with a table showing disaggregated AD for indirect emissions from agricultural soils. The ERT recommends that the Party increase the transparency of its reporting by including the related information in the NIR.

68. In addition, the ERT reiterates the recommendation made in the previous review report that the Czech Republic streamline and harmonize its reporting of ammonia emissions to different international bodies by using the *EMEP/EEA*<sup>6</sup> *Air Pollutant Emission Inventory Guidebook* or by using well-documented national data.

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<sup>6</sup> EMEP = European Monitoring and Evaluation Programme; EEA = European Environment Agency.

## E. Land use, land-use change and forestry

### 1. Sector overview

69. In 2011, net removals from the LULUCF sector amounted to 7,959.22 Gg CO<sub>2</sub> eq. Since 1990, net removals have increased by 120.0 per cent. The key drivers for the rise in removals are the increase in living biomass in forests and the decrease in emissions from cropland. However, there is a significant inter-annual variability in the amount of wood harvested and the increase in net removals between 1990 and 2011 does not represent the general trend: for example, the harvest in 1990 was the second highest in the period, resulting in higher emissions than expected. Within the sector, removals of 7,903.49 Gg CO<sub>2</sub> eq were from forest land, followed by 328.93 Gg CO<sub>2</sub> eq net removals from grassland. Cropland accounted for 154.09 Gg CO<sub>2</sub> eq net emissions, settlements accounted for 87.48 Gg CO<sub>2</sub> eq net emissions and wetlands accounted for 31.62 Gg CO<sub>2</sub> eq net emissions. The remaining emissions of 0.01 Gg CO<sub>2</sub> eq were from other (CO<sub>2</sub> emissions from lime application on forest land).

70. The reporting on the LULUCF sector is complete in terms of categories, carbon pools and gases, and estimates are provided for all pools and categories for which there are methodologies available in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). However, as also noted in the previous review report, in some cases (e.g. mineral soils for wetlands and grassland converted to settlements), carbon stock changes in certain pools were reported as “NA” or “NO”, when it is reasonable to assume that such changes would have occurred and “NE” or an emission/removal value should had been reported. In response to a question raised by the ERT during the review, the Party explained that the use of these notation keys reflects the fact that there are no estimation methods provided in the IPCC good practice guidance for LULUCF for these pools and categories. The ERT recognizes that, as it is not mandatory to report on those categories, reporting as “NE” would be more appropriate if emissions/removals from these pools and categories occur. Therefore, the ERT reiterates the recommendation made in the previous review report that the Party revise all cases in which carbon stock changes in pools have been reported as “NO” or “NA” and consider the cases where “NE” should be used in line with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). In addition, the ERT encourages the Party to enhance the completeness of the inventory.

71. The Czech Republic provided a complete series of land-use change matrices for all years from 1990 to 2011. In a similar manner to what was identified in previous review reports, the ERT noted some small inconsistencies in the land-use change matrices due to discrepancies between the values for the final and initial areas for different land-use categories reported for consecutive years. For example, for grassland, the final area in 1990 was 878.2 kha while the initial area in 1991 was 877.4 kha, whereas it would be expected that the same value be reported. In response to questions raised by the ERT during the review, the Party indicated that this was the effect of the data set for the period before 1992 having a lower resolution than the current data set. The ERT reiterates the recommendation made in the previous review report that the Czech Republic provide additional and transparent information in its NIR clarifying the origin of the observed residual discrepancies in land-use areas and the actions made to ensure a consistent time series, in order to improve the transparency of its LULUCF inventory.

72. The Czech Republic provided in the NIR a vector map on soil organic contents showing cadastral data for forest and agricultural soils. These carbon stock values were used as country-specific reference levels. The Party also provided in the NIR average

carbon stock levels for grassland. In its methodology, the Party used a single set of default stock change factors ( $F_{LU}=1$ ,  $F_{MG}=1.08$  and  $F_I=1$ ) to obtain spatially averaged values for the carbon stock of mineral soils for annual and woody crops. The ERT noted that, as mentioned in the previous review report, the stock change factors given in the IPCC good practice guidance for LULUCF are meant to be used with the default reference carbon stock values (i.e. annual crops with reduced tillage and medium input) and Parties should develop their own country-specific stock change factors when using tier 2 methods or country-specific parameters. Therefore, the ERT reiterates the recommendation made in the previous review report that the Czech Republic improve the accuracy of its estimates of the carbon stock changes in mineral soils by subdividing the area under cropland management within cadastral units by the type of tillage and input regime and associating country-specific stock change factors with these areas. The ERT further reiterates the recommendation made in previous review reports that the Party include transparent information in the NIR on how the mineral soil carbon stocks for cropland were derived, including detailed descriptions of the methodology, assumptions and the relevant soil carbon stock levels applied for the calculation of estimates for land-use changes, in order to increase the transparency of its reporting.

73. The ERT noted that the Czech Republic reports in CRF tables 5.A, 5.B and 5.C areas of wetlands converted to forest land, cropland and grassland. However, the area of organic soils is reported as “NO”. As organic soils are common in wetlands it would be expected that land-use conversions from wetlands organic soils would be reported. Therefore, the ERT recommends that the Party investigate the existence of organic soils and whether these are subject to the above-mentioned land-use changes, or provide transparent information that no organic soils occur under the converted land from wetlands to the other land-use categories.

74. The ERT notes that, in its NIR, the Czech Republic sometimes refers to methodologies of the IPCC good practice guidance for LULUCF and sometimes to the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) without further justification that the use of the 2006 IPCC Guidelines is in accordance with the IPCC good practice guidance for LULUCF and the UNFCCC reporting guidelines. In response to a question raised by the ERT during the review regarding the use of the 2006 IPCC Guidelines, the Party explained that it has prioritized the use of the 2006 IPCC Guidelines as a measure of the improvement of the accuracy of the inventory for future annual submissions. The ERT notes that, in accordance with the UNFCCC reporting guidelines, Parties included in Annex I to the Convention may use their own national EF and AD, where available, provided that: they are developed in a manner consistent with the IPCC good practice guidance for LULUCF; they are considered to be more accurate; and the use is reported transparently. The ERT recommends that the Czech Republic justify in the NIR of its next annual submission its use of methodologies from the 2006 IPCC Guidelines in terms of the IPCC good practice guidance for LULUCF and country-specific circumstances.

## 2. Key categories

### Forest land remaining forest land – CO<sub>2</sub>

75. The Czech Republic states in its NIR that it uses the annual amount of total harvest reported by CZSO to estimate biomass losses, and also states that it assumes an additional 5 per cent loss and 15 per cent loss for accidental logging and salvage logging, respectively. It also assumes that 15 per cent of the residues are burned. In response to a question raised by the ERT during the review, the Party clarified that the 5 per cent loss represents additional harvest volume that is assumed to be cut or destroyed in addition to the officially reported harvest in the national statistics. It further explained that salvage logging in 2011



was mostly included in the statistical harvest data. Losses in carbon stocks from harvested residues are included in the reported estimates in CRF table 5.A, excluding emissions from the 15 per cent biomass burning that are reported in CRF table 5(V). The previous review report stated that the values assumed for losses from additional disturbances could lead to a potential underestimation of emissions, since the recovery of biomass as salvage logging in areas subject to natural disturbances is usually very limited. Therefore, the ERT reiterates the recommendation made in previous review reports that the Party either include transparent information to support its assumed values or, alternatively, use the actual information on areas subject to natural disturbances together with the biomass stocks of these areas to estimate the total biomass losses due to natural disturbances.

76. The Czech Republic has applied a tier 1 approach from the IPCC good practice guidance for LULUCF assuming that carbon stocks in dead organic matter (DOM) are constant over time (i.e. carbon stock change is reported as “NO”). In line with the previous review report, the ERT noted that, as forest land remaining forest land is a key category, it is not good practice to apply this assumption in accordance with the IPCC good practice guidance for LULUCF. The ERT considers that there could be significant stock changes in the carbon pool of DOM owing to the fact that harvest volumes have fluctuated significantly over the entire time series. In response to questions raised by the ERT during the review, the Party informed the ERT that, in 2014, it is expecting sound data from the second cycle of the national forest inventory (NFI) that would allow the Party to move to a higher tier. Therefore, the ERT reiterates the recommendation made in the previous review report that the Czech Republic use the results of the next NFI, when they are available, to estimate the carbon stock changes in the DOM pool.

77. The Czech Republic has also applied a tier 1 approach from the IPCC good practice guidance for LULUCF, assuming that carbon stocks in mineral soils are constant (i.e. reporting carbon stock changes as “NO”). In line with the previous review report, the ERT noted that, as forest land remaining forest land is a key category, it is not good practice to apply a tier 1 approach. In response to a recommendation made in the previous review report and an additional question raised by the ERT during the current review, the Party referred to peer-reviewed studies using the soil model YASSO which support the conclusion that the soil carbon pool is not a net source. The ERT notes that, when reporting under the LULUCF sector, Parties should follow the IPCC good practice guidance for LULUCF and that the fact that there is not a net source is not a reason not to estimate emissions and removals. As forest land remaining forest land is a key category the ERT recommends that the Party use the results of the peer-reviewed studies to estimate emissions/removals for the soil carbon pool in line with the IPCC good practice guidance for LULUCF (in particular, the decision tree of the IPCC good practice guidance for LULUCF, p. 3.18).

### **3. Non-key categories**

#### Land converted to forest land – CO<sub>2</sub>

78. As noted in the previous review report, the Czech Republic considered biomass losses for land converted to forest land to be insignificant as it assumes that there has been no harvesting on such land and the first thinning losses take place in older age classes of forest. During the review, the ERT raised a question regarding whether or not there are biomass losses due to natural disturbances for land converted to forest land through wind, fungal disease and bark beetle attacks. The Party could not provide the requested information during the review week. Therefore, the ERT reiterates the recommendation made in the previous review report that the Party either estimate the carbon stock changes in land converted to forest land by collecting information on the area of young forest stands affected by natural disturbances, or provide transparent information substantiating the

assumption that areas of younger age classes of forests are not affected by natural disturbances.

79. The Czech Republic provided estimates for the above-ground biomass increment for land converted to forest land using the area weights for the main tree species for forest land remaining forest land, owing to the fact that the specific species composition of the newly converted land is unknown. As noted in the previous review report, this could potentially lead to an underestimation or overestimation of the average biomass increment for land converted to forest land: the deviation, which could be either positive or negative, depends on the species composition of the areas of land converted to forest land, since biomass increment varies significantly by species. The ERT reiterates the recommendation made in the previous review report that the Czech Republic revise the biomass increment value for land converted to forest land used to estimate the carbon stock changes in the biomass pool for land converted to forest land, using relevant information from the second cycle of the NFI, when it is available.

## **F. Waste**

### **1. Sector overview**

80. In 2011, emissions from the waste sector amounted to 3,726.82 Gg CO<sub>2</sub> eq, or 2.8 per cent of total GHG emissions. Since 1990, emissions have increased by 32.0 per cent. The key driver for the rise in emissions was the growth of CH<sub>4</sub> emissions from solid waste disposal on land due to an increased amount of solid organic waste disposed on landfills. Within the sector, 73.6 per cent of the emissions were from solid waste disposal on land, followed by 21.2 per cent from wastewater handling and 5.1 per cent from waste incineration.

81. The inventory is complete in terms of categories and gases. The only category reported as “NE” is N<sub>2</sub>O emissions from industrial wastewater handling, for which there are no methodologies available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. The ERT encourages the Party in its efforts to enhance the completeness of its reporting.

82. The descriptions of methods, AD and EFs are generally transparent, but the ERT identified the following areas for improvement: there is a lack of description of the management practices of solid waste disposal sites (SWDS); and the reasons behind the trend of AD, (amount of waste incinerated) are not provided in the NIR. The ERT recommends that the Party enhance the transparency of reporting in the above-mentioned areas.

83. The Czech Republic made no recalculations in the waste sector since the last annual submission. It has updated the QA/QC plan for the waste sector and extended its use to the whole sector, in line with the recommendations made in the previous review report. The ERT commends the Party for these improvements. The ERT noticed that, for the majority of categories, the uncertainty estimates were based on expert judgement. The ERT encourages the Party to improve the uncertainty analysis by using country-specific data to determine the uncertainty values.

### **2. Key categories**

#### Solid waste disposal on land – CH<sub>4</sub>

84. The Party used the tier 2 first-order decay (FOD) method and country-specific AD to estimate emissions for this category, which is in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. During the review, the ERT noticed that a

methane conversion factor (MCF) of 1.0 was used for the entire time series of 1990–2011 for managed waste disposal sites. The ERT notes that for most European countries and for recent years all SWDS are managed in accordance with implementation of the EU legislation on waste disposal sites (the landfill directive (1999/31/EC)), but that in the early 1990s it was common that some SWDS were unmanaged among European countries. In response to a question raised by the ERT during the review, the Party explained that in the Czech Republic waste legislation had been established before the EU landfill directive, and management conditions of landfills had been gradually improving even before 1990. To further improve the transparency of the inventory, the ERT recommends that the Party include this information, together with the description of the national legislation concerning landfill management practices, in the NIR.

85. The Czech Republic reports on waste composition data: for the years in the period 1990–1995 the IPCC default values for Eastern Europe have been used; for 2001 and the years in the period 2005–2009, data are country-specific and based on waste surveys conducted in the Czech Republic; data for the years in the periods 1996–2000 and 2002–2004 are based on interpolation between other data points; finally, a constant value for the years 2009–2011 has been used. In response to questions raised by the ERT during the review, the Party explained that the waste composition monitoring programme has been terminated and that is the reason that no updates were made after 2009. Considering the fact that the waste composition usually changes quite slowly, the ERT agrees that it would be acceptable to use a constant value for waste composition for a limited number of years if yearly data are not available. However, the NIR did not contain the explanations provided to the ERT during the review. In addition, the NIR did not include the information on waste composition for the years 1950–1989. Therefore, to further improve the transparency of the inventory the ERT recommends that the Party include waste composition data including the degradable organic carbon (DOC) values for all the years in the NIR. The ERT also recommends that the Party develop efforts to collect data on waste composition for future years.

### **3. Non-key categories**

#### Wastewater handling – CH<sub>4</sub> and N<sub>2</sub>O

86. To estimate CH<sub>4</sub> and N<sub>2</sub>O emissions from domestic and commercial wastewater handling the Czech Republic used a tier 1 approach together with default EFs from the Revised 1996 IPCC Guidelines, for most cases, and country-specific AD reflecting the current wastewater treatment technologies used in the country. The ERT considers that this is in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

87. However, during the review the ERT found a minor error in the NIR: specifically, that table 8-12 of the NIR presents emissions for the year 2009. In response to a question raised by the ERT during the review regarding the values in the table, the Party explained that the emissions presented in the table were actually for the year 2011. The ERT recommends that the Party revise this information in the next annual submission and recommends that the Party further strengthen its QA/QC procedures, to avoid similar errors in future annual submissions.

88. To estimate N<sub>2</sub>O emissions from human sewage the Party used a tier 1 method. However, in its original submission, the Party used the value 68.5 g/day/person for protein intake, which is lower than the value provided by FAOSTAT, the database of the Food and Agriculture Organization of the United Nations (FAO) in the food balance sheet for the Czech Republic in 2009 (92.2 g/day/person). The value used by the Party in its GHG inventory is 25 per cent lower than the one reported to FAO. In response to a question raised by the ERT during the review regarding the difference between the country-specific value and the FAOSTAT value, the Party explained that it is not using the FAOSTAT data

for reporting, and that the value used is country-specific. However, the Party did not include the appropriate documentation on the country-specific protein consumption during the review week. The ERT also found that the value reported by the Czech Republic is the lowest among reporting Parties for 2011 (25.00–45.97 kg/year/person).

89. In addition, the ERT noted that, in the NIR, the Party stated that FAO nutrition statistics were used. The ERT agrees that it is good practise to use country-specific AD in the emission estimation, but if country-specific values are lower than the default values, then the used values should be justified. Therefore, the ERT concluded that there was a potential underestimation of N<sub>2</sub>O emissions and included this issue in the list of potential problems and further questions raised by the ERT. In response, the Czech Republic provided revised estimates using the protein consumption values reported to FAOSTAT. The ERT agrees with the revised calculations. Recalculations resulted in an increase of CO<sub>2</sub> equivalent emissions from the category of 70.79 Gg or 1.9 per cent of the total emissions from the waste sector in 2011.

#### Waste incineration – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

90. To estimate emissions of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from waste incineration a tier 1 method with the default values and country-specific AD was used. CO<sub>2</sub> emissions of biogenic and non-biogenic origins were estimated and reported separately. The emissions from the incineration of municipal solid waste (MSW) were allocated in the energy sector due to the fact that MSW is incinerated in energy recovery facilities. In the category waste incineration only emissions from waste incineration without energy recovery were reported. These procedures are in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

91. The ERT noted that the amount of waste incinerated has decreased by 22.0 per cent since 2008. In response to a question raised by the ERT during the review regarding the decreasing trend, the Party explained that the economic slowdown that started in 2008 influenced the amount of waste incinerated. To further improve the transparency of the inventory the ERT recommends that the Party include this information in the NIR.

## **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

92. Table 6 provides an overview of the information reported and parameters selected by the Czech Republic under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6

#### **Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol**

<i>Findings and recommendations</i>		
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1?	Sufficient	See paragraphs 93 and 100 below
Identify any elected activities under Article 3, paragraph 4, of	Activities elected:	forest management

*Findings and recommendations*

the Kyoto Protocol	Years reported: 2008, 2009, 2010, 2011	
Identify the period of accounting	Commitment period accounting	
Assessment of the Party's ability to identify areas of land and areas of land-use change	Not sufficient	<p>The Czech Republic provided a complete series of land-use change matrices. However, the ERT noted some small inconsistencies due to discrepancies between the values for the final and initial areas of consecutive years (see para. 71 above)</p> <p>The Czech Republic did not provide sufficient information on how it ensures that the conversion to forest of areas classified as deforestation land is distinguished from afforestation and reforestation (see para. 94 below)</p> <p>The sum of the area of deforestation and forest management has slightly decreased since 2008 (see para. 97 below)</p> <p>The land representation system does not enable to assess the land-use and management on deforested land adequately, which could lead to inaccurate estimation of emissions or removals (see para. 98 below)</p>

*Abbreviations:* ERT = expert review team, NO = not occurring.

93. The ERT noted that the notation key “R” (reported) was used to report changes in carbon stock in the dead wood pool in CRF table NIR-1 for the activities afforestation/reforestation and forest management. However, the Party reports these carbon stock changes as “NO” in CRF tables 5(KP-I)A.1.1 and 5(KP-I)B.1 together with verifiable information in the NIR that these pools are not net sources. The ERT considers that the reporting in CRF table NIR-1 is not consistent with the other tables and it is incorrect, and therefore recommends that the Party report the correct notation key “NR” (not reported) in CRF table NIR 1.

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

*Afforestation and reforestation – CO<sub>2</sub>*

94. As raised in previous review reports, the Czech Republic did not provide information on how it ensures that the conversion to forest of areas classified as deforestation land is distinguished from afforestation and reforestation taking place on other land. Therefore, the ERT reiterates the recommendation made in previous review reports that the Party provide transparent information in the NIR.

95. Emission estimates of GHGs from biomass burning are restricted to areas under forest management, while emissions from other areas are reported as “NO” in CRF table 5(KP-II)5. These estimates are based on the reporting on forest land remaining forest land under the LULUCF sector. However, as noted in the previous review report, in the LULUCF sector, the areas of land converted to forest land are moved to the category forest land remaining forest land after a 20-year period (i.e. areas converted to forest in 1990 were reported as forest land remaining forest land in 2010, although these areas remain reported under afforestation/reforestation activities). The ERT noted that it is not clear in the Party's

submission whether biomass burning occurred on these areas and, in particular, the ERT noted that, if biomass burning does occur, it would have to be reported under afforestation/reforestation and not under forest management. The ERT recommends that the Party include transparent information on emissions from biomass burning practices in areas afforested/reforested or provide information confirming that no wildfires occurred on land under afforestation/reforestation.

96. The ERT reiterates the recommendation made in the previous review report that the Czech Republic improve the accuracy and completeness of reporting on the biomass losses due to natural disturbances that are currently not included in carbon stock change estimates (these changes are considered insignificant) using the relevant information from the ongoing NFI campaign study, and in accordance with the recommendations for the LULUCF sector (see para. 78 above).

#### *Deforestation – CO<sub>2</sub>*

97. The ERT found that the sum of the areas reported as deforestation and forest management have decreased slightly during the period from 2008 to 2011 (by 0.19 kha, from 2,594.27 kha in 2008 to 2,594.08 kha in 2011). However, as the area of forest management can only decrease by deforestation activities, the sum of those areas should not decrease. In response to a question raised by the ERT during the review, the Party stated that the digitizing process of the cadastral system might be causing this situation and that it is also related to the fact that the area of the entire country varies from year to year slightly. The ERT concluded that the area of deforestation could be potentially underestimated, and it strongly recommends that the Czech Republic make efforts to obtain consistent data and time-series trends and provide transparent information in its NIR, clarifying the origin of the observed trend of the sum of these areas.

98. The review report of the 2011 annual submission<sup>7</sup> noted that the system for the representation of land use was unable to assess land use and management on deforested lands adequately, which could lead to an inaccurate estimation of the emissions or removals. The Party has not provided any additional information on this issue in the current annual submission. Therefore, the ERT reiterates the recommendation made in the 2011 and 2012 review reports that the Party improve the tracking of deforested lands, including information on subsequent land-use changes and the management practices applied to them (e.g. practices leading to changes in soil organic carbon, the application of lime and the burning of biomass), in order to enhance the accuracy of its reporting

99. The Czech Republic states in the NIR that there are three data sets on forests available in the country: forest management plans (FMPs); data from the first survey of the NFI; and the statistical source CzechTerra. These differ in their results particularly regarding the volume of the stock of living biomass in the forest: forest management plans report 262 m<sup>3</sup>/ha; the NFI reports 328 m<sup>3</sup>/ha; and CzechTerra reports 305 m<sup>3</sup>/ha. The ERT noted that applying the volume of the stock of living biomass from forest management plans results in lower emissions from deforestation in comparison with applying the values from the NFI or CzechTerra. The ERT also noted that NFIs provide generally the most reliable information on forests. The ERT considers that applying the biomass stock from forest management plans results in a potential underestimation of emissions from deforestation. Therefore, the ERT strongly recommends that the Czech Republic provide additional information demonstrating that applying the stock of biomass from forest management plans is accurate or, if it cannot provide that information, apply a value for biomass stock that avoids underestimation of emissions from deforestation.

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<sup>7</sup> FCCC/ARR/2011/CZE, paragraph 163.

Activities under Article 3, paragraph 4, of the Kyoto Protocol*Forest management – CO<sub>2</sub>*

100. The ERT noted that the Party has reported “NO” for carbon stock changes in dead wood and litter in accordance with the use of the tier 1 approach (no change). Information has been provided in the NIR to justify that this pool is not a source, but the ERT considers that there could be significant stock changes in the carbon pool of dead wood and litter owing to the fact that harvest volumes have fluctuated significantly over the entire time series. Given that the Party is expecting data from the second cycle of the NFI (see paras. 76 and 79 above), the ERT reiterates the encouragement made in the previous review report that the Czech Republic use the results of the second NFI, when they are available, to estimate the carbon stock changes in the dead wood pool.

**2. Information on Kyoto Protocol units**Standard electronic format and reports from the national registry

101. 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 included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.<sup>8</sup> The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

102. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, 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 (CDM) registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). 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. The national registry has adequate procedures in place to minimize discrepancies.

Calculation of the commitment period reserve

103. The Czech Republic has reported its commitment period reserve in its 2013 annual submission. The Czech Republic reported its commitment period reserve to be 667,477,520 t CO<sub>2</sub> eq based on the national emissions in its most recently reviewed inventory (133,495.50 Gg CO<sub>2</sub> eq). The ERT notes that based on the submission of revised emission estimates by the Czech Republic during the course of the review of the 2013 annual submission, the commitment period reserve for the Czech Republic changed, and the new commitment period reserve is reported as 671,728,969 t CO<sub>2</sub> eq based on the revised national emissions in 2011 (134,345.79 Gg CO<sub>2</sub> eq). The ERT agrees with this figure.

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<sup>8</sup> The SEF comparison report is prepared by the international transaction log (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.

### **3. Changes to the national system**

104. The Czech Republic reported that there is a minor change in its national system since the previous annual submission. The Party described the change, regarding the addition of a sectoral expert supporting the industrial processes sector, in its NIR. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

### **4. Changes to the national registry**

105. The Czech Republic reported that there are changes in its national registry since the previous annual submission. The Party described the changes, specifically due to the centralization of the EU ETS operations into a single EU registry operated by the European Commission called the Consolidated System of European Union Registries (CSEUR), in its NIR (see page 290). CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

106. The ERT noted that there were recommendations in the SIAR related to CSEUR that had not been addressed by the Party, in particular recommendations related to the updating of publicly available information on the website, reporting a description of the changes in database structure and reporting of test results.

107. In response to questions raised by the ERT during the review, the Czech Republic provided further information, some confidential, on the changes to the national registry, including information on the data model and test results.

108. The ERT noted in the SIAR that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1, and that the SIAR assessor recommends that the Party include account information, holding and transaction information, and the list of legal entities authorized by the Party. The ERT also noted the conclusion in the SIAR that the Czech Republic is relying upon public information to fulfil its requirements under decision 13/CMP.1, annex, paragraph 44, with specific reference to paragraphs 45, 47 and 48, which is not under the Party's direct control. The ERT noted the recommendation in the SIAR that the Czech Republic include public information directly on the website of the national registry or via a link from the registry website to another website controlled by the Party. The SIAR recommends that the publicly available information be up to date (i.e. updated as close to real time as possible, but at least updated on a monthly basis).

109. The ERT concluded that, taking into account the confirmed changes in the national registry, and the additional information provided to the ERT during the review, the Czech Republic's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. With respect to the provision of information related to database structure specifically, the ERT encourages the Party to provide additional information in the NIR. The ERT recommends that the Party include all other additional information in response to the SIAR findings in its NIR in accordance with decision 15/CMP.1, annex, chapter I.G.

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

110. The Czech Republic reported that there have been no changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission. The ERT concluded that the information provided continues to be complete and transparent.



111. In its 2013 NIR, the Czech Republic has underlined that, being a member of the EU, the minimization of adverse impacts on developing countries is largely dictated by the European Commission’s policy on climate change and by its policies and programmes affecting developing countries. Moreover, regulation at the European level controls or influences market conditions, fiscal incentives, tax and duty exemptions and subsidies in all economic sectors in EU member States. An impact assessment of new policy initiatives has been established in the EU, which allows their potential adverse social, environmental and economic impacts on various stakeholders, including developing country Parties, to be identified and limited at an early stage in the legislative process.

112. In addition, in its NIR the Party has listed a series of country-specific national measures that limit subsidies (e.g. in agriculture) and deregulate many sectors of the national economy (e.g. electricity production). The Czech Republic has listed several cooperative initiatives with Parties not included in Annex I to the Convention and updated the list included in the NIR. The updated list includes projects in Bosnia and Herzegovina, Cambodia, Georgia and Viet Nam regarding the diffusion of new technologies and efficiency improvements related to fossil fuel use.

### III. Conclusions and recommendations

#### A. Conclusions

113. Table 7 summarizes the ERT’s conclusions on the 2013 annual submission of the Czech Republic, in accordance with the Article 8 review guidelines.

Table 7

**Expert review team’s conclusions on the 2013 annual submission of the Czech Republic**

		<i>Paragraph cross-references</i>
The ERT concludes that the inventory submission of the Czech Republic is complete (categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2011)		
Annex A sources <sup>a</sup>	Complete	
LULUCF <sup>a</sup>	Complete	
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of the Czech Republic has been prepared and reported in accordance with the UNFCCC reporting guidelines	Generally yes	74, table 4
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Generally yes	Table 6
The Czech Republic’s inventory is in accordance with the <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i> , the <i>IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and the <i>IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>	Generally yes	27, 34, 74, 76, 77

The Czech Republic has reported information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	
The Czech Republic has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	108 and 109
Did the Czech Republic provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	Yes	

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, UNFCCC reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”..

<sup>a</sup> The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the IPCC *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

## B. Recommendations

114. The ERT identified the issues for improvement listed in table 8. All recommendations are for the next annual submission, unless otherwise specified.

Table 8

### Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-reference</i>
Cross-cutting	QA/QC	The ERT recommends that the Party further improve its QA/QC procedures	Table 3
	Transparency	Enhance the transparency of the NIR, including information supplied to the ERT during the review	Table 3
Energy	Sector overview	Ensure that recalculations are applied over the entire time series and detail clearly the recalculation method applied	19
	Sector overview –	Provide a full elaboration of the expert judgement	21

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-reference</i>
	uncertainties	methods in relation to the uncertainty analysis	
	Sector overview – transparency	Include the explanations provided to the ERT during the review regarding the calculation of net calorific values	23
	Comparison of the reference approach with the sectoral approach	Provide explanations in the NIR for differences between the reference approach and the sectoral approach for individual fuels	25
		Enhance the description of the reasons behind the differences between the reference approach and the sectoral approach	26
		Revise the calculations and report the reference approach fully in accordance with the Revised 1996 IPCC Guidelines	27
		Address the data alignment between the IEA data and the values reported in the CRF tables	28
	Feedstocks and non-energy use of fuels	Revisit reporting in the CRF tables 1A(c) and 1A(d), including the correction of identified errors or apparent inconsistencies	30–33
	Stationary combustion – liquid and solid fuels and biomass – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Move to higher-order estimation methods for use of liquid fuels	34
		Elaborate full details in the NIR to justify the low IEF for the use of liquid fuels in manufacture of solid fuels and for other similar situations where the Party's IEF deviates strongly from the IPCC default, or from those of similar countries	35
		Include a transparent description of the methodology used to estimate CH <sub>4</sub> and N <sub>2</sub> O emissions from charcoal combustion	36
	Coal mining and handling – CH <sub>4</sub>	Ensure recalculations are applied over the entire time series, and provide clear details of the recalculation method applied	39
	Fugitive emissions from oil and natural gas – CO <sub>2</sub> and	Include details in the NIR of the system used to transmit natural gas, in order to clarify the reported AD	40

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-reference</i>
	CH <sub>4</sub>		
		Use higher-tier methods to estimate venting emissions from oil and natural gas	42
Industrial processes and solvent and other product use	Sector overview – recalculations	Enhance the transparency of the recalculations by including explanations of the impact of recalculations at the category level	47
	Cement production – CO <sub>2</sub>	Monitor the recycling of cement kiln dust by the cement plants, especially where a small part is discarded, and reflect this information in the NIR to ensure that cement production emissions are accurately estimated	49
	Lime production – CO <sub>2</sub>	Make separate calculations of emissions from lime production, according to type of lime, apply the appropriate EF for each type of lime and enhance transparency of reporting	50
	Limestone and dolomite use – CO <sub>2</sub>	Ensure that all possible sources of emissions from limestone and dolomite use are covered in the national inventory for the whole time series	51
	Iron and steel production – CO <sub>2</sub>	Improve the accuracy of the inventory by moving to a tier 2 methodology	52
		Improve the transparency of reporting by: providing details of the flows of blast furnace gas between pig iron production and steel production; establishing a full carbon balance to support the verification of CO <sub>2</sub> emissions for iron and steel production; and reporting the carbon balance	53
		Include information on the changes in iron and steel processes that could explain the trend of IEF values	54
Agriculture	Enteric fermentation – CH <sub>4</sub>	Include explanations regarding the significant increase in grazing suckler cows and include in the NIR the number of grazing days	62
	Agricultural soils – N <sub>2</sub> O	Enhance the description of which AD are used to estimate N <sub>2</sub> O emissions from agricultural soils	67
		Streamline and harmonize the reporting of ammonia emissions under different international bodies	68
LULUCF	Sector overview – completeness	Examine all cases in which carbon stock changes in pools have been reported as “NO” or “NA” and revisit the use of notation keys, if appropriate	70
	Sector overview	Provide additional and transparent information in the NIR clarifying the origin of the observed residual discrepancies in land-use areas and the actions made to	71

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-reference</i>
		ensure a consistent time series	
		Improve the accuracy of the estimates of the carbon stock changes in mineral soils by subdividing the cropland areas within cadastral units by tillage type and input regime and associating country-specific stock change factors with those areas. In addition, include transparent information in the NIR on how the mineral soil carbon stocks for cropland were derived	72
		Investigate the existence of organic soils and whether these are subject to land-use conversions from wetlands organic soils, or provide transparent information that no organic soils occur under the converted land from wetlands to the other land-use categories	73
		Justify in the NIR the use of the 2006 IPCC Guidelines as a measure of the improvement of the accuracy of the inventory in terms of the IPCC good practice guidance for LULUCF and country-specific circumstances	74
	Forest land remaining forest land – CO <sub>2</sub>	Include transparent information to support the assumed values of accidental/salvage logging or, alternatively, use the actual information on areas subject to natural disturbances together with the biomass stocks to estimate the total biomass losses due to natural disturbances	75
		Use the results from the second cycle of the NFI, when they are available, to estimate the carbon stock changes in dead organic matter pool	76
		Use the results of peer-reviewed studies to estimate emissions/removals for the soil carbon pool using higher-tier methods in line with the IPCC good practice guidance for LULUCF	77
	Land converted to forest land – CO <sub>2</sub>	Estimate the carbon stock changes in land converted to forest land due to natural disturbances, or provide transparent information substantiating the assumption that areas of younger age classes of forests are not affected by natural disturbances	78
		Revise the biomass increment value for land converted to forest land used to estimate the carbon stock changes in the biomass pool for land converted to forest land, using relevant information from the second cycle of the NFI	79
Waste	Sector overview	Enhance the transparency of reporting by providing a description of the management practices at solid waste disposal sites and providing an explanation of the trend of AD	82
	Solid waste disposal on	Include the information provided to the ERT during the review, together with a description of the national	84

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-reference</i>
	land – CH <sub>4</sub>	legislation concerning landfill management practices justifying the use of the methane conversion factor of 1.0 for the entire time series of 1990–2011	
		Improve the transparency of the inventory by including waste composition data, including the degradable organic carbon factor for all the years, and develop efforts to collect data on waste composition for future years	85
	Wastewater handling – CH <sub>4</sub> and N <sub>2</sub> O	Further enhance the QA/QC procedures and amend an identified error	87
	Waste incineration – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Include explanations on the trend of the amount of waste incinerated	91
KP-LULUCF	Overview	Apply the correct notation key (“NR”) in CRF table NIR 1 for the dead wood pool in a manner consistent with the other tables	93
	Afforestation and reforestation – CO <sub>2</sub>	Provide transparent information in the NIR on how the Party ensures that the conversion to forest of areas classified as deforestation land is distinguished from afforestation and reforestation taking place on other land	94
		Include transparent information on biomass burning practices or provide information confirming that no wildfires occurred on land under afforestation/reforestation	95
		Improve the accuracy of reporting on biomass losses due to natural disturbances	96
	Deforestation – CO <sub>2</sub>	Obtain consistent data on areas under deforestation and forest management	97
		Improve the tracking of deforested lands, including information on subsequent land-use changes and the management changes applied to them	98
		Provide additional information demonstrating that applying the stock of biomass from forest management plans is accurate or apply a value for biomass stock that avoids underestimation of emissions from deforestation	99
National registry		Include all additional information in response to the SIAR findings in the NIR in accordance with decision 15/CMP.1, annex, chapter I.G	108 and 109

*Abbreviations:* AD = activity data, CRF = common reporting format, EF = emission factor, ERT = expert review team, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, NR = not reported, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, SIAR = standard independent assessment report, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

#### **IV. Questions of implementation**

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

## Annex I

## Background data on recalculations and information to be included in the compilation and accounting database

Table 9  
Recalculations in the 2013 annual submission for the base year and the most recent year

<i>Greenhouse gas source and sink categories</i>	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		<i>Reason for the recalculation</i>
	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	
<b>1. Energy</b>	-284.23	-2 054.87	-0.2	-1.8	Changed EF, reallocation and error correction
A. Fuel combustion (sectoral approach)	-284.23	-2 054.87	-0.2	-1.8	
1. Energy industries	-41.00	2 514.37	-0.1	4.5	
2. Manufacturing industries and construction	-131.51	-4 402.82	-0.3	-18.5	
3. Transport	-10.87	-24.01	-0.1	-0.1	
4. Other sectors	-100.84	-142.41	-0.3	-1.2	
5. Other					
B. Fugitive emissions from fuels					
1. Solid fuels	0				
2. Oil and natural gas	0.00	0.00	0.0	0.0	
<b>2. Industrial processes</b>	0.00	216.82	0.0	1.8	Changed AD, methodological change
A. Mineral products	0.00	0.19	0.0	0.0	
B. Chemical industry	0.00	0.00	0.0	0.0	
C. Metal production	0.00	0.00	0.0	0.0	
D. Other production	NA	NA	NA	NA	
E. Production of halocarbons and SF <sub>6</sub>	NA, NO	NA, NO	NA	NA	
F. Consumption of halocarbons and SF <sub>6</sub>	0.00	216.64	0.0	14.0	
G. Other	NA	NA	NA	NA	
<b>3. Solvent and other product use</b>	0.00	-10.63	0.0	-2.1	Error correction
<b>4. Agriculture</b>	0.00	0.00	0.0	0.0	
A. Enteric fermentation	0.00	0.00	0.0	0.0	
B. Manure management	0.00	0.00	0.0	0.0	
C. Rice cultivation	NO	NO	NA	NA	
D. Agricultural soils	0.00	0.00	0.0	0.0	
E. Prescribed burning of savannas	NO	NO	NA	NA	
F. Field burning of agricultural residues	NO	NO	NA	NA	



<i>Greenhouse gas source and sink categories</i>	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		
G. Other	NA	NA	NA	NA	
<b>5. Land use, land–use change and forestry</b>	0.00	30.05	0.0	–0.5	Error correction
A. Forest land	0.00	30.05	0.0	–0.6	
B. Cropland	0.00	0.00	0.0	0.0	
C. Grassland	0.00	0.00	0.0	0.0	
D. Wetlands	0.00	0.00	0.0	0.0	
E. Settlements	0.00	0.00	0.0	0.0	
F. Other land	NO	NO	NA	NA	
G. Other	0.00	0.00	0.0	0.0	
<b>6. Waste</b>	150.37	70.93	5.6	2.0	Changed AD
A. Solid waste disposal on land	0.00	0.00	0.0	0.0	
B. Wastewater handling	150.37	70.93	15.2	9.8	
C. Waste incineration	0.00	0.00	0.0	0.0	
D. Other	NA	NA	NA	NA	
<b>7. Other</b>	NA	NA	NA	NA	
<b>Total CO<sub>2</sub> equivalent without LULUCF</b>	–133.85	–1 777.74	–0.1	–1.3	
<b>Total CO<sub>2</sub> equivalent with LULUCF</b>	–133.85	–1 747.70	–0.1	–1.3	

*Abbreviations:* AD = activity data, EF = emission factor, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

Table 10  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2011, including the commitment period reserve**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Commitment period reserve</b>	667 477 520	671 728 969		671 728 969
<b>Annex A emissions for 2011</b>				
CO <sub>2</sub>	114 296 491			114 296 491
CH <sub>4</sub>	10 233 666			10 233 666
N <sub>2</sub> O	7 770 952	7 841 745		7 841 745
HFCs	1 130 418	1 930 297		1 930 297
PFCs	29 428	9 044		9 044
SF <sub>6</sub>	34 550			34 550
<b>Total Annex A sources</b>	<b>133 495 504</b>	<b>134 345 794</b>		<b>134 345 794</b>
<b>Activities under Article 3, paragraph 3, for 2011</b>				
3.3 Afforestation and reforestation on non-harvested land for 2011	-356 883			-356 883
3.3 Afforestation and reforestation on harvested land for 2011	NO			NO
3.3 Deforestation for 2011	163 702			163 702
<b>Activities under Article 3, paragraph 4, for 2011<sup>c</sup></b>				
3.4 Forest management for 2011	-7 568 708			-7 568 708
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2010**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2010</b>				
CO <sub>2</sub>	118 005 006			118 005 006
CH <sub>4</sub>	10 284 356			10 284 356
N <sub>2</sub> O	7 619 697	7 690 629		7 690 629
HFCs	1 467 855	1 712 802		1 712 802
PFCs	29 428	36 626		36 626
SF <sub>6</sub>	16 221			16 221
<b>Total Annex A sources</b>	<b>137 422 562</b>	<b>137 745 641</b>		<b>137 745 641</b>
<b>Activities under Article 3, paragraph 3, for 2010</b>				
3.3 Afforestation and reforestation on non-harvested land for 2010	-322 263			-322 263
3.3 Afforestation and reforestation on harvested land for 2010	NO			NO
3.3 Deforestation for 2010	206 873			206 873
<b>Activities under Article 3, paragraph 4, for 2010<sup>c</sup></b>				
3.4 Forest management for 2010	-5 096 223			-5 096 223
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2009**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2009</b>				
CO <sub>2</sub>	114 427 739			114 427 739
CH <sub>4</sub>	10 084 053			10 084 053
N <sub>2</sub> O	7 877 406	7 948 168		7 948 168
HFCs	1 020 249	1 456 576		1 456 576
PFCs	27 136	33 099		33 099
SF <sub>6</sub>	49 609			49 609
<b>Total Annex A sources</b>	<b>133 486 193</b>	<b>133 999 245</b>		<b>133 999 245</b>
<b>Activities under Article 3, paragraph 3, for 2009</b>				
3.3 Afforestation and reforestation on non-harvested land for 2009	-294 675			-294 675
3.3 Afforestation and reforestation on harvested land for 2009	NO			NO
3.3 Deforestation for 2009	170 193			170 193
<b>Activities under Article 3, paragraph 4, for 2009<sup>c</sup></b>				
3.4 Forest management for 2009	-6 441 150			-6 441 150
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2008**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2008</b>				
CO <sub>2</sub>	122 004 674			122 004 674
CH <sub>4</sub>	10 389 107			10 389 107
N <sub>2</sub> O	8 415 608	8 485 312		8 485 312
HFCs	1 262 451	1 321 544		1 321 544
PFCs	27 481	28 203		28 203
SF <sub>6</sub>	47 045			47 045
<b>Total Annex A sources</b>	<b>142 146 366</b>	<b>142 275 885</b>		<b>142 275 885</b>
<b>Activities under Article 3, paragraph 3, for 2008</b>				
3.3 Afforestation and reforestation on non-harvested land for 2008	-271 989			-271 989
3.3 Afforestation and reforestation on harvested land for 2008	NO			NO
3.3 Deforestation for 2008	160 203			160 203
<b>Activities under Article 3, paragraph 4, for 2008<sup>c</sup></b>				
3.4 Forest management for 2008	-4 403 993			-4 403 993
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

## Annex II

### 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 2013. Available at <http://unfccc.int/resource/docs/2013/asr/cze.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2013. Available at <http://unfccc.int/resource/webdocs/sai/2013.pdf>.

FCCC/ARR/2012/CZE. Report of the individual review of the annual submission of the Czech Republic submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/cze.pdf>.

Standard independent assessment report, parts 1 and 2. Available at [http://unfccc.int/kyoto\\_protocol/registry\\_systems/independent\\_assessment\\_reports/items/4061.php](http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php).

## **B. Additional information provided by the Party**

Responses to questions during the review were received from Mr. Ondrej Minovsky (Czech Hydrometeorological Institute), including additional material on the methodologies and assumptions used. The following documents<sup>1</sup> were also provided by the Czech Republic:

Capla, Havlat. 2006. *Calculating the Carbon Dioxide Emission Factor for Natural Gas* PLYN vol.LXXXVI 2006.

Krtkova, Fott and Neuzil.2013. *CO<sub>2</sub> country specific emission factor for combustion of Natural Gas*.

CHMI. 2012. *Návrh na zkvalitnění současného stavu emisní inventarizace skleníkových plynů včetně analýzy nejistot (Proposal to improve the current state of the of greenhouse gas inventories including uncertainty analysis)*. Development of the system of monitoring, inventories and projections of greenhouse gas in the Czech Republic. Task 5 Project for the State Environmental Fund of the Czech Republic, Prague, November 2012

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<sup>1</sup> Reproduced as received from the Party.

## Annex III

### Acronyms and abbreviations

AD	activity data
CaO	calcium oxide
CH <sub>4</sub>	methane
CKD	cement kiln dust
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
CSEUR	Consolidated System of European Union Registries
DOM	dead organic matter
EF	emission factor
ERT	expert review team
EU	European Union
FAOSTAT	the database of the Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
kha	kilohectare
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
kt	kiloton
LULUCF	land use, land-use change and forestry
m <sup>3</sup>	cubic metre
Mt	million tonnes
N	nitrogen
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NCVs	net calorific values
NE	not estimated
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
NR	not reported
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 <sup>15</sup> joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)



UNFCCC United Nations Framework Convention on Climate Change

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