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**Report of the individual review of the annual submission of
Slovenia submitted in 2012***

* In the symbol for this document, 2012 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 centralized review of the 2012 annual submission of Slovenia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 3 to 8 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Christopher Dore (United Kingdom of Great Britain and Northern Ireland) and Ms. Jolanta Merkeliene (Lithuania); energy – Ms. Carmen Teresa Meneses López (Venezuela (Bolivarian Republic of)), Mr. Ioannis Sempos (Greece) and Ms. Inga Valuntiene (Lithuania); industrial processes – Ms. Laura Dawidowski (Argentina) and Ms. Valentina Idrisova (Kazakhstan); agriculture – Mr. Chang Liang (Canada) and Mr. Yuiry Pyrozhenko (Ukraine); land use, land-use change and forestry (LULUCF) – Ms. Marina Shvangiradze (Georgia) and Mr. Richard Volz (Switzerland); and waste – Mr. Chart Chiemchaisri (Thailand), Ms. Baasansuren Jamsranjav (Mongolia) and Mr. Mikael Szudy (Sweden). Ms. Dawidowski and Mr. Dore were the lead reviewers. The review was coordinated by Ms. Kyoko Miwa (UNFCCC secretariat).

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

3. In 2010, the main greenhouse gas (GHG) in Slovenia was carbon dioxide (CO₂), accounting for 82.6 per cent of total GHG emissions¹ expressed in carbon dioxide equivalent (CO₂ eq), followed by methane (CH₄) (10.4 per cent) and nitrous oxide (N₂O) (5.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 1.2 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.9 per cent of total GHG emissions, followed by the agriculture sector (10.1 per cent), the industrial processes sector (5.0 per cent), the waste sector (3.0 per cent) and the solvent and other product use sector (0.2 per cent). Total GHG emissions amounted to 19,522.13 Gg CO₂ eq and decreased by 2.8 per cent between the base year² and 2010.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO₂, CH₄ and N₂O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

² “Base year” refers to the base year under the Kyoto Protocol, which is 1986 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

Table 1
Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year^a to 2010

		<i>Gg CO₂eq</i>								<i>Change</i>	
		<i>Greenhouse gas</i>	<i>Base year^a</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>Base year–2010 (%)</i>
Annex A sources		CO ₂	16 356.90	14 795.76	15 027.37	15 226.19	16 687.74	17 973.53	16 047.16	16 122.25	–1.4
		CH ₄	2 187.11	2 131.82	2 056.46	2 127.43	2 165.10	2 075.19	2 035.13	2 035.72	–6.9
		N ₂ O	1 391.87	1 270.71	1 230.41	1 307.32	1 206.52	1 156.11	1 167.34	1 135.38	–18.4
		HFCs	31.76	0.00	31.76	40.87	133.02	188.23	196.26	198.54	525.1
		PFCs	106.48	257.44	106.48	105.61	132.73	20.91	7.43	13.68	–87.2
		SF ₆	12.72	10.30	12.72	15.74	18.86	16.68	15.92	16.54	30.1
KP-LULUCF	Article 3.3 ^b	CO ₂						143.85	313.71	356.86	
		CH ₄						NO	NO	NO	
		N ₂ O						1.08	2.99	2.57	
	Article 3.4 ^c	CO ₂	NA					–10 313.42	–10 307.72	–10 309.16	NA
		CH ₄	NA					0.89	2.19	0.99	NA
		N ₂ O	NA					0.16	0.40	0.18	NA

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

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1986 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1986.

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

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

Table 2
Greenhouse gas emissions by sector and activity, base year^a to 2010

		Gg CO ₂ eq								Change
Sector		Base year ^a	1990	1995	2000	2005	2008	2009	2010	Base year–2010 (%)
Annex A	Energy	16 113.93	14 432.24	14 849.78	14 957.58	16 208.60	17 492.31	15 894.67	15 980.25	–0.8
	Industrial processes	1 181.41	1 317.65	1 001.68	1 062.82	1 372.96	1 327.37	972.61	971.17	–17.8
	Solvent and other product use	81.90	43.40	17.25	42.73	43.32	27.59	31.00	30.38	–62.9
	Agriculture	2 218.80	2 140.74	2 047.21	2 137.30	2 006.50	1 964.60	1 995.96	1 962.87	–11.5
	Waste	490.79	532.00	549.28	622.74	712.59	618.79	575.01	577.46	17.7
	LULUCF	NA	–7 201.89	–7 231.63	–7 194.41	–8 403.54	–8 407.51	–8 390.77	–8 490.89	NA
	Total (with LULUCF)	NA	11 264.14	11 233.57	11 628.76	11 940.43	13 023.15	11 078.48	11 031.24	NA
Total (without LULUCF)	20 086.83	18 466.03	18 465.20	18 823.17	20 343.97	21 430.66	19 469.25	19 522.13	–2.8	
Other ^b	NA	NA	NA	NA	NA	NA	NA	NA	NA	
KP-LULUCF	Article 3.3 ^c	Afforestation and reforestation					NO	NO	NO	
		Deforestation					144.93	316.71	359.43	
		Total (3.3)					144.93	316.71	359.43	
	Article 3.4 ^d	Forest management					–10 312.37	–10 305.14	–10 307.99	
		Cropland management	NA				NA	NA	NA	NA
		Grazing land management	NA				NA	NA	NA	NA
		Revegetation	NA				NA	NA	NA	NA
		Total (3.4)	NA				–10 312.37	–10 305.14	–10 307.99	NA

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

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1986 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1986.

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

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

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

Table 3
Information to be included in the compilation and accounting database in t CO₂ eq for the year 2010, including the commitment period reserve

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Commitment period reserve	84 265 734			84 265 734
Annex A emissions for current inventory year				
CO ₂	16 122 252			16 122 252
CH ₄	2 035 722			2 035 722
N ₂ O	1 135 384			1 135 384
HFCs	198 544			198 544
PFCs	13 682			13 682
SF ₆	16 542			16 542
Total Annex A sources	19 522 127			19 522 127
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	NO			NO
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NO			NO
3.3 Deforestation for current year of commitment period as reported	359 429			359 429
Activities under Article 3, paragraph 4, for current inventory year^c				
3.4 Forest management for current year of commitment period	-10 307 986			-10 307 986
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

Abbreviation: NO = not occurring.

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

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

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

Table 4
**Information to be included in the compilation and accounting database in t CO₂ eq
for the year 2009**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2009				
CO ₂	16 047 165			16 047 165
CH ₄	2 035 132			2 035 132
N ₂ O	1 167 343			1 167 343
HFCs	196 256			196 256
PFCs	7 433			7 433
SF ₆	15 919			15 919
Total Annex A sources	19 469 248			19 469 248
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	NO			NO
3.3 Afforestation and reforestation on harvested land for 2009 as reported	NO			NO
3.3 Deforestation for 2009 as reported	316 707			316 707
Activities under Article 3, paragraph 4, for 2009^c				
3.4 Forest management for 2009	-10 305 137			-10 305 137
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009				
3.4 Revegetation in base year				

Abbreviation: NO = not occurring.

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

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

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

Table 5
**Information to be included in the compilation and accounting database in t CO₂ eq
for the year 2008**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2008				
CO ₂	17 973 529			17 973 529
CH ₄	2 075 190			2 075 190
N ₂ O	1 156 115			1 156 115
HFCs	188 232			188 232
PFCs	20 915			20 915
SF ₆	16 678			16 678
Total Annex A sources	21 430 659			21 430 659
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	NO			NO
3.3 Afforestation and reforestation on harvested land for 2008 as reported	NO			NO
3.3 Deforestation for 2008 as reported	144 926			144 926
Activities under Article 3, paragraph 4, for 2008^c				
3.4 Forest management for 2008	-10 312 365			-10 312 365
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008				
3.4 Revegetation in base year				

Abbreviation: NO = not occurring.

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

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

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2012 annual inventory submission, containing a complete set of common reporting format (CRF) tables for the period 1986–2010, was submitted on 12 April 2012 and the national inventory report (NIR) was submitted on 13 April 2012. Slovenia submitted a revised NIR on 25 May 2012. The Party also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and 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 12 April 2012. The annual submission was submitted in accordance with decision 15/CMP.1.

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

8. During the review, Slovenia provided the ERT with additional information. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

9. The inventory submission covers all sectors for the period 1986–2010, is complete in terms of years, gases and geographical coverage, and is generally complete in terms of mandatory⁴ source and sink categories. During the review, the ERT noted that Slovenia has not estimated the potential emissions of fluorinated gases (F-gases) contained in products for import and export (see paras. 61, 66 and 67 below). The ERT encourages the Party to provide complete estimates of potential emissions from consumption of HFCs and SF₆ in its next annual submission. The ERT further notes that Slovenia has not estimated the emissions and removals from wetlands remaining wetlands, settlements remaining settlements and other land remaining other land (see para. 81 below).

10. The ERT noted that Slovenia has not estimated the carbon stock changes in litter and mineral soils on areas under forest management for the KP-LULUCF activities (see para. 115 below). The ERT strongly recommends that Slovenia provide these estimates in

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

⁴ Mandatory source and sink categories under the Kyoto Protocol are all source and sink categories for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* provide methodologies and/or emission factors to estimate GHG emissions.

its 2014 annual submission at the latest, or provide additional, verifiable, information, as required by paragraph 6(e) of the annex to decision 15/CMP.1 and in line with section 4.2.3.1 of the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) to demonstrate that these pools are not net sources.

11. The ERT noted that Slovenia has reported, under the solvent and other product use sector, as not estimated (“NE”) N₂O emissions from aerosol cans (other), N₂O and CO₂ emissions from degreasing and dry cleaning, and CO₂ emissions from chemical products, manufacture and processing for which IPCC methodologies are not available (see para. 62 below). The ERT encourages Slovenia to continue its efforts to include emission estimates for the categories still reported as “NE” in its next annual submission.

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

Overview

12. The ERT concluded that the national system continued to perform its required functions. Slovenia reported that there have been no changes to its national system since the previous annual submission.

Inventory planning

13. The NIR describes the national system for the preparation of the inventory. The Environmental Agency of the Republic of Slovenia (ARSO) is the single national entity with overall responsibility for the national inventory. ARSO is a body of the Ministry of Environment and Spatial Planning. Other organizations involved in the preparation of the inventory include the Slovenian Agricultural Institute and the Slovenian Forestry Institute, which assist in the estimation of emissions from the agriculture sector and the LULUCF sector, respectively. The Statistical Office of the Republic of Slovenia (SORS) and the Ministry of Environment and Spatial Planning provide the main data sources for the inventory; some additional information on transport is provided by the Ministry of Transport, the Directorate of National Roads and the Ministry of Internal Affairs. ARSO has established agreements with the organizations that participate in the preparation of the inventory and with SORS, in order to ensure that the data required are provided in a timely manner. The Ministry of Environment and Spatial Planning officially approves the inventory before it is submitted to the UNFCCC secretariat.

14. In response to a question raised by the ERT during the review, Slovenia provided comprehensive information on how the activities related to the preparation of the GHG inventory are allocated and organized within ARSO and on the fields of expertise of the available experts directly involved in the preparation of the GHG inventory. The GHG inventory and air emissions inventories under the United Nations Economic Commission for Europe Convention on Long-range Transboundary Air Pollution (CLRTAP) are prepared by the Environment and Nature Conservation Office of ARSO, which is one of the offices responsible for performing administrative, technical and other types of tasks in relation to environmental impact assessments, as well as for preparing reports on the state of the environment, air quality, water quality, water management, waste management, nature conservation, industrial pollution and rehabilitation following natural and other disasters.

15. In 2011, two specialists from the Environment and Nature Conservation Office of ARSO were engaged for most of the year in the preparation of the GHG inventory and two to four people supported the preparation of the activity data (AD) for the GHG inventory.

The emission estimates for the LULUCF sector were completely outsourced to the Slovenian Forestry Institute. ARSO was responsible for collecting data related to the European Union emissions trading system (EU ETS, these data are used to estimate emissions from the energy and industrial processes sectors as well as for category-specific quality assurance/quality control (QA/QC) procedures), the use and consumption of F-gases, and waste (data on the generation and handling of all types of waste and wastewater). Two CLRTAP experts were also involved in the preparation and transfer of AD and emission factors (EFs) to a common database which is used to calculate the GHG emissions and air pollutants under CLRTAP, archive the AD, EFs and other parameters and automatically fill in the CRF tables. The database is also used to perform QC checks, such as checks of completeness, time-series consistency, recalculations and transcription errors, checks to ensure that the emissions and removals have been correctly calculated and checks to ensure that the correct parameters and units have been used. The ERT commends Slovenia for providing this information and recommends that the Party include it in the NIR of its next annual submission, in order to increase the transparency of the national inventory preparation and reporting processes.

Inventory preparation

Key categories

16. Slovenia has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2012 annual submission, both with and without LULUCF. The ERT notes that the Party has performed the key category analysis on the basis of a sectoral distribution of emissions using the tier 1 approach, but has not disaggregated the CO₂ emissions from stationary combustion by fuel type. Consequently, the key category analysis performed by Slovenia and that performed by the secretariat⁵ produced different results. For example, the category ranked as the second largest source of emissions for 2010, according to the secretariat's analysis, is the category public electricity and heat production – solid fuels (CO₂), responsible for 17.4 per cent of total GHG emissions, while the Party identified the category as responsible for 18.4 per cent of total GHG emissions. The ERT concludes that Slovenia has not performed the key category analysis in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). The ERT strongly recommends that the Party perform and report the key category analysis including a disaggregation of CO₂ emissions from stationary combustion by fuel type, in its next annual submission.

17. The ERT noted that, in its NIR, Slovenia has not provided information on how the results of the key category analysis and uncertainty assessment are used to prioritize the development and improvement of the inventory. In response to questions raised by the ERT during the review, the Party informed the ERT that inventory improvements are mostly made in response to the recommendations made in the previous review report. Slovenia also explained that the key category analysis is used to prioritize future inventory improvement plans, taking into account the uncertainty estimates. Slovenia provided examples of planned inventory improvements, such as:

⁵ The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

(a) The collection of national forest inventory (NFI) data in 2012–2013 for the LULUCF sector, in order to improve the AD collection for forest land remaining forest land, which was the largest key category according to the level assessment for 2010;

(b) The improvement of the accuracy of the HFC emission estimates for the subcategories refrigeration and air-conditioning equipment, foam blowing, fire extinguishers, aerosols/metered dose inhalers and electrical equipment.

18. The ERT welcomes these planned improvements and recommends that Slovenia further use the results of the key category analysis and uncertainty assessment as a tool for selecting the estimation methods and QA/QC activities to be performed, in line with the IPCC good practice guidance, and report thereon in its next annual submission. The ERT also noted that in CRF table 7 (summary overview for key categories), the Party did not report the key categories excluding LULUCF. The ERT recommends that Slovenia complete CRF table 7 by reporting the key categories both including and excluding LULUCF in its next annual submission.

19. Slovenia has identified deforestation and forest management as 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 GHG inventory, as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

Uncertainties

20. Slovenia has reported a tier 1 uncertainty assessment in its 2012 annual submission, both including and excluding LULUCF. The uncertainty estimate for total GHG emissions with LULUCF was 30.0 per cent for 2010, while the uncertainty estimate for the trend since 1986 was 4.2 per cent. The uncertainty estimate for total GHG emissions without LULUCF was 6.9 per cent and the trend uncertainty was 2.7 per cent, respectively, for 2010. In comparison with the previous annual submission, the overall uncertainty of the GHG inventory has not changed significantly. The ERT noted that, in its NIR, Slovenia has not provided information on how the results of the uncertainty assessment are used to prioritize the development and improvement of the inventory, and reiterates the recommendation made in paragraph 18 above.

21. The ERT noted that Slovenia reported higher uncertainty values for the emissions from consumption of halocarbons and SF₆ in the 2012 annual submission compared to the values reported in the previous annual submission. The ERT also noted that the Party reported that significant improvements were made to the estimates for this category in the 2012 annual submission. In response to a question raised by the ERT during the review, Slovenia explained that, as a result of the improvements made to the emission estimates for consumption of halocarbons and SF₆, the uncertainties of the AD and EFs were also revised, and it was considered that the estimated uncertainties reported in the previous annual submissions were not realistic. The ERT commends the Party for this improvement to the uncertainty assessment and recommends that Slovenia explain any changes with regard to the revision of the uncertainty values in its next annual submission.

22. Slovenia has indicated in the NIR that it uses expert judgement to evaluate the uncertainties, except for the categories for which uncertainty estimates are available in the IPCC good practice guidance. The ERT notes that the Party has not included details of the expert judgment process for most categories, with the exception of the subcategory public electricity and heat production. The ERT recommends that in its next annual submission Slovenia provide the rationale for the decisions taken and processes used by the experts to estimate the uncertainties, in order to improve the transparency of the uncertainty estimates.

Recalculations and time-series consistency

23. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that the recalculations of the emission estimates reported by Slovenia for the time series 1986–2009 have been undertaken to take into account improvements in AD and EFs, to correct identified errors, and in response to the recommendations in the previous review report. The main recalculations took place in the following categories:

(a) In the energy sector, the main recalculations were performed for CO₂, CH₄ and N₂O emissions from public electricity and heat production for 2009, due to changes in the EFs for plastic waste combustion; and for CO₂, CH₄ and N₂O emissions from residential for the years 2000–2009, due to changes in the AD used for biomass and brown coal consumption (see para. 35 below);

(b) In the industrial processes and solvent and other product use sectors, the main recalculations were made for CO₂ emissions from limestone and dolomite use for the entire time series (1986–2010), due to the inclusion of new AD for 1986 and 2009; for CO₂ emissions from the category other (industrial processes) for 2009, due to improvements in the collection of AD; and for the category HFC and SF₆ consumption from refrigeration and air-conditioning equipment for the years 1997–2009, due to the availability of new AD and the correction of identified errors (see para. 59 below);

(c) In the agriculture sector, the main recalculations were performed for CH₄ emissions from manure management for 2009, due to changes in the EFs; and N₂O emissions from direct and indirect emissions from agricultural soils for 1986, due to their inclusion for the first time in the 2012 annual submission in response to the recommendation in previous review reports (see para. 71 below);

(d) In the LULUCF sector, the main recalculations for 2009 were made for removals from forest land, due to the reduction in emissions from forest fires; and for N₂O emissions from cropland due to disturbances associated with land-use conversion to cropland (see para. 80 below);

(e) In the waste sector, the main recalculations for 2009 were performed for CH₄ emissions from domestic wastewater treatment, due to the availability of new AD, and for the period 1986–2003, the recalculations were based on the actual volume of wastewater used instead of the production units and default wastewater quantity per unit of product (see para. 95 below). Additional information is provided in the respective sector chapters of this report.

24. The effect of the recalculations on estimated total GHG emissions is a decrease of 0.03 per cent for 1986 and an increase of 0.2 per cent for 2009. The effect of the recalculations on estimated total GHG emissions including the LULUCF sector is a decrease of 0.6 per cent for 1986 and an increase of 0.9 per cent for 2009. The rationale for these recalculations is provided in the NIR and in CRF table 8(b).

25. The emission estimates are generally consistent over the time series. However, the ERT identified some inconsistencies in the time series due to the use of different data sets, including inconsistent data on the area of perennial crops for the years prior to 1980 and after 1986, and a lack of data for the period between 1980 and 1986 (see para. 91 below). Other concerns relating to time-series consistency, the possible reasons for which were neither explained in the NIR nor provided during the review, include: inter-annual fluctuations in the CH₄ emission estimates for post-mining activities (see para. 51 below); and the significant difference between the CO₂ emission estimates for 2008 and 2009 for each carbon pool for deforestation under the KP-LULUCF activities (see para. 111 below). The ERT recommends that Slovenia ensure the time-series consistency of the emission

estimates for all categories and provide clear information on this issue in the NIR of its next annual submission, including the methods used to ensure time-series consistency, in particular where the methods, data sources or EFs change over time.

Verification and quality assurance/quality control approaches

26. The NIR reports that Slovenia has a QA/QC plan in place that covers the QA/QC procedures applied to data collection, the calculation of emission estimates, and the reporting in the NIR. The NIR provides a description of the Party's QA/QC procedures that follow the tier 1 approach of the IPCC good practice guidance. In the NIR, Slovenia indicates that the QA procedures consist of independent third-party reviews, performed for one sector per year and that, in 2011, the peer review for the waste sector was performed and no significant errors were identified. Although the ERT recommended in the previous review report that Slovenia explain whether all QC procedures listed in the NIR were implemented for all inventory categories, in its 2012 annual submission the Party has not provided sufficient information thereon (e.g. on the frequency of the implementation of the QC procedures). In response to a question raised by the ERT during the review, Slovenia confirmed that the QC procedures listed in chapter 1.6 of the NIR were implemented for all categories in the 2012 annual submission. The ERT recommends that the Party include, in the NIR of its next annual submission, information on the timetable of the implementation of its QC procedures.

27. During the review, Slovenia explained that special attention was paid to the QC procedures during the preparation of the NIR of the 2012 annual submission, since many errors were identified in previous NIRs. Despite such efforts, a number of inconsistencies and errors were still identified by the ERT, such as inconsistencies in the reporting of the information on feedstocks and non-energy use of fuels (see para. 40 below), the allocation of data in CRF table 4.B(a) (see para. 72 below) and inconsistencies between the data on the area of perennial crops for the years prior to 1980 and after 1986 (see para. 91 below). The ERT recommends that Slovenia strengthen the implementation of its QC procedures in the next annual submission.

28. In response to a recommendation in the previous review report, Slovenia states in the NIR that it has improved the description of the category-specific QC procedures by providing additional information on these procedures; for example, for the subcategories under consumption of halocarbons and SF₆, the Party has performed a comparison of the country-specific EFs with the IPCC default EFs. The ERT commends Slovenia for this improvement; however, it also notes that the information on the category-specific QC checks is still limited throughout the NIR. Therefore, the ERT reiterates the recommendation in the previous review report that Slovenia improve the description of how the category-specific QC checks are implemented in its next annual submission, including the QA checks applied to the EU ETS data.

Transparency

29. The ERT concludes that the CRF tables and the descriptions provided in the NIR are generally transparent. Nevertheless, the ERT notes that further improvements are needed throughout the NIR to enhance the current level of transparency with regard to the underlying information on the selection and estimation of country-specific data. The ERT recommends that Slovenia improve the transparency of the information in its next annual submission, in particular by:

(a) Providing the rationale for the use of the EFs and other parameters, including the net calorific values (NCVs) for the liquid fuels used to estimate emissions from the energy industries and from manufacturing industries and construction, for the use of the country-specific CH₄ EFs for natural gas transmission, and by providing a more detailed

description in the NIR of the subcategory other (manufacturing industries and construction) (see paras. 46, 47 and 56 below);

(b) Providing an explanation of the trends of the implied emission factors (IEFs) at the category level, where relevant (e.g. the trend of the CO₂ IEFs for gasoline used in road transportation) (see para. 48 below);

(c) Reporting the CO₂ and CH₄ emission estimates for venting/flaring from oil, natural gas and combined activities separately from those reported for natural gas transmission (see para. 57 below);

(d) Providing a description of how the non-CO₂ emissions from biofuel consumption in road transportation are estimated (see para. 53 below);

(e) Providing additional information on the methodologies and parameters used in the agriculture sector, including further information on animal waste management systems (AWMS) (see para. 75 below) and on the assumptions used to derive the time series of the nitrogen (N) excretion (Nex) rate for non-dairy cattle (see para. 76 below);

(f) Reporting the areas of perennial and annual crops, the conversions between these crop types and the associated carbon stock changes as separate entries in CRF table 5.B (see para. 90 below);

(g) Providing complete information on the methods used to estimate emissions from living biomass through the conversion of other land uses to settlements (see para. 92 below);

(h) Including detailed information on the AD used to estimate CH₄ emissions from municipal solid waste (MSW) disposal (see para. 101 below);

(i) Providing information on the amount of biogenic waste used as fuel (see para. 105 below);

(j) Revising the notation keys used, particularly in the reporting of the energy and LULUCF sectors (e.g. correcting the notation key used to report the AD for gaseous fuels in road transportation from not applicable (“NA”) to not occurring (“NO”) (see para. 54 below); changing the notation key “NO” to the notation key included elsewhere (“IE”) for fugitive emissions from oil, natural gas, and venting and flaring (see para. 57 below); and checking the appropriate use of the notation key “NA” in the reporting of the LULUCF sector (see paras. 81 and 86 below)).

Inventory management

30. Slovenia has a centralized archiving system, which includes the archiving of EFs and AD at a disaggregated category level, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. During the review, in response to a request made by the ERT, Slovenia provided additional archived information on the peer reviews conducted for the waste sector. In its 2012 annual submission, the Party has addressed the recommendations made in the previous review report by providing, in chapter 1.6 of the NIR, information on the archiving of internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. In addition, in response to a recommendation in the previous review report, Slovenia has reported in the NIR that all the hard copies of the archived documentation have been converted into electronic format. The ERT commends Slovenia for these improvements. During the review, the ERT was provided with the requested additional archived information.

3. Follow-up to previous reviews

31. Slovenia has implemented several inventory improvements based on the recommendations in the previous review report, such as:

(a) The improvement of information on the category-specific QC checks performed (see para. 27 above);

(b) The inclusion of information on how the internal documentation is archived and the progress made in converting the hard-copy documentation into electronic format (see para. 29 above);

(c) The investigation of the discrepancies between the NIR and the CRF tables (see paras. 93 and 108 below);

(d) The reallocation of emissions from the Army to mobile (other) in the energy sector (see para. 35 below);

(e) The provision of CO₂ emission estimates for limestone and dolomite used in bricks and ceramics production (see para. 63 below);

(f) The recalculation of HFC emissions, due to the use of updated and improved AD (see para. 64 below);

(g) The provision of HFC-134a emission estimates for aerosols/metered dose inhalers (see para. 65 below);

(h) The inclusion of additional supporting data to verify the use of the country-specific Nex rates for swine (see para. 74 below);

(i) The provision of estimates for direct and indirect N₂O emissions associated with the application of sewage sludge on agricultural soils for the entire time series (see para. 77 below).

32. However, several recommendations from the previous review report have not yet been addressed by Slovenia, including:

(a) The collection of national data on the use of aerosols/metered dose inhalers containing HFCs (see para. 65 below);

(b) The provision of data on the carbon stock changes in dead wood (see para. 87 below);

(c) The provision of updated land-use data (see para. 82 below);

(d) The provision of information on the carbon stock changes in organic soils and land converted to grassland (see para. 84 below);

(e) The estimation of the uncertainties for the LULUCF sector (see para. 85 below);

(f) The reporting of the losses from living biomass in organic matter (see para. 89 below);

(g) The provision of information on the methods applied to estimate the emissions from relevant pools under land converted to settlements (see para. 92 below);

(h) The harmonization of the discrepancies in the estimated areas between the reporting under the Convention and under the Kyoto Protocol (see para. 108 below);

(i) The estimation of uncertainties for the KP-LULUCF activities (see para. 110 below);

(j) The provision of information on the emissions for each carbon pool under deforestation (see para. 111 below);

(k) The provision of documentation on the completeness of the system managed by the Slovenian Forest Service (SFS) (see para. 114 below);

(l) The estimation of the carbon stock changes in litter and mineral soils in areas under forest management (see para. 115 below).

4. Areas for further improvement identified by the expert review team

33. During the review, the ERT identified a number of areas for improvement. These are listed in table 6 below.

34. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6 below.

B. Energy

1. Sector overview

35. The energy sector is the main sector in the GHG inventory of Slovenia. In 2010, emissions from the energy sector amounted to 15,980.25 Gg CO₂ eq, or 81.9 per cent of total GHG emissions. Since 1986, emissions have decreased by 0.8 per cent. The key drivers for the fall in emissions are the transition of Slovenia's economy during the period 1986–1991; the economic growth and revival of industry during the period 1992–1997; the availability of electricity from the Krško Nuclear Power Plant; the extent of “gasoline tourism” from neighbouring countries; the increase in consumption of electricity and road transportation following the economic growth during the years 1999–2007; and the global economic crisis affecting Slovenia's emissions from manufacturing industries and construction and from road transportation for 2009 and 2010. The most significant changes between 1986 and 2010 were observed for emissions from manufacturing industries and construction, which decreased by 56.9 per cent, and for emissions from transport, which increased by 158.4 per cent. Within the sector for 2010, 38.9 per cent of emissions were from energy industries, followed by 33.0 per cent from transport, 13.9 per cent from other sectors, 11.9 per cent from manufacturing industries and construction and 2.2 per cent from fugitive emissions from fuels. The remaining 0.02 per cent were from other (energy).

36. Slovenia has made recalculations for the energy sector between the 2011 and 2012 annual submissions following changes in AD and EFs. The impact of these recalculations on the energy sector is an increase in emissions of 0.1 per cent for 2009 and an increase of 0.3 per cent for 1986. The main recalculations took place in the following categories:

(a) CO₂ and N₂O emissions from public electricity and heat production for 2009: an increase in CO₂ emissions of 0.1 per cent (6.20 Gg) and a decrease in N₂O emissions of 1.7 per cent (0.45 Gg CO₂ eq) due to changes in the EFs used for the estimation of emissions from plastic waste incineration;

(b) CO₂, CH₄ and N₂O emissions from residential for the years 2000–2009: for 2009, an increase in CO₂ emissions by 0.3 per cent (3.07 Gg), an increase in CH₄ emissions by 32.4 per cent (28.63 Gg CO₂ eq) and an increase in N₂O emissions by 29.5 per cent (5.61 Gg CO₂ eq) due to an update of the AD for biomass, liquefied petroleum gas and brown coal;

(c) CO₂, CH₄ and N₂O emissions from mobile (other): reporting emissions of CO₂ (41.1 Gg), CH₄ (0.01 Gg CO₂ eq) and N₂O (0.36 Gg CO₂ eq) from mobile (other) for

the base year, by including emissions from the Army for the period 1986–2007, which had been previously included in the emissions from international bunkers.

37. During the review, the ERT did not identify any issues relating to the completeness of the inventory for the energy sector. The ERT noted that the data for kerosene, lubricants, bitumen, naphtha, refinery feedstocks and other oil are reported as “NE” in CRF table 1.A(b) for the reference approach for some years prior to 2004. As these data have been reported by Slovenia to the International Energy Agency (IEA), the ERT concludes that the Party has access to the relevant information. The ERT therefore reiterates the recommendation in the previous review report that Slovenia improves the completeness of the reporting of the reference approach by estimating and reporting the emissions from these fuels, in its next annual submission.

38. The NIR is generally transparent. However, the ERT identified room for improvement in relation to the transparency of the NIR, such as: the description of the rationale for the selection of the NCVs for fuels; the description of the trends of the IEFs used in road transportation; the provision of disaggregated data on the subcategory other (manufacturing industries and construction) in the NIR; the description of the category-specific QC procedures applied to the category manufacturing industries and construction and to natural gas transmission and distribution; and the reporting of venting/flaring emissions from oil, natural gas and combined activities.

2. Reference and sectoral approaches

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

39. CO₂ emissions from fuel combustion were calculated using the reference and sectoral approaches. For 2010, the CO₂ emissions estimated using the reference approach (15,268.39 Gg) were 0.19 per cent lower than the CO₂ emissions estimated using the sectoral approach (15,297.44 Gg). The ERT noted that for the period 1986–2010, the differences in CO₂ emissions are generally less than 2 per cent, with the exception of the year 1992 and the period 1995–1999, for which the differences range between 2.4 per cent (1992) and 4.5 per cent (1999). However, the Party has not explained in the NIR why the differences for these years exceed 2 per cent. The ERT encourages Slovenia to examine the causes for the differences between the reference and sectoral approaches that exceed 2 per cent for liquid, gaseous and solid fuels for the whole time series (1986–2010) and report thereon in its next annual submission. The ERT also noted that for some years (e.g. 2009 and 2010), although the apparent consumption according to the reference approach is higher than the total fuel consumption according to the sectoral approach, the CO₂ emission estimates for the reference approach are lower than those for the sectoral approach. The ERT recommends that Slovenia examine the reasons for this difference and report thereon in its next annual submission.

40. The ERT noted that the apparent consumption according to Slovenia’s reference approach for all available years, except for 1990 and 1997, corresponds to the IEA data within 2 per cent. For 1990 and 1997, the differences in the apparent consumption between the reference approach and the IEA data are 7 per cent and 3 per cent, respectively. In response to questions raised by the ERT during the review, Slovenia explained that the discrepancies may be caused by the rounding of the fuel quantity figures (the IEA fuel data are rounded to 1,000 t, while some of the fuel data used in the CRF tables are more precise and rounded to 1 t). The ERT recommends that Slovenia further investigate the reasons for the discrepancies in the apparent consumption between the reference approach and the IEA data and report thereon in the NIR of the next annual submission.

Feedstocks and non-energy use of fuels

41. The ERT noted that Slovenia has not corrected the inconsistencies in the reporting of the information on feedstocks and non-energy use of fuels that were contained in recommendations in the previous review report. In the 2012 annual submission, the Party has reported approximately 6.1 PJ of liquid fuels used for non-energy use and feedstocks for 2010 in CRF table 1.A(d). However, in CRF table 1.A(c), for the comparison between the reference approach and the sectoral approach, Slovenia has reported the apparent consumption of liquid fuels excluding non-energy use and feedstocks as only approximately 3.7 PJ lower than the total apparent consumption of liquid fuels including non-energy purposes. Therefore, the ERT recommends that Slovenia further investigate the causes of this discrepancy, correct it and report revised estimates in its next annual submission.

42. Slovenia has reported the apparent consumption of petroleum coke from fuel combustion activities as 1,519.00 TJ for 2010 in CRF table 1.A(b) for the reference approach. However, in CRF table 1.A(d), the Party has reported that 1,616.60 TJ of petroleum coke has been used for non-energy use and feedstocks. The ERT noted that the data reported by Slovenia are therefore inconsistent, given that the apparent consumption should be the sum of the energy and non-energy use of fuels. In response to a question raised by the ERT during the review, Slovenia informed the ERT that the data reported for petroleum coke in CRF table 1.A(d) for feedstocks and non-energy use of fuels are not correct, because they represent the total petroleum coke consumed by Slovenia in 2010, including both energy and non-energy use. The ERT recommends that the Party rectify this error and report the correct values in the CRF tables in its next annual submission.

43. The ERT noted that the NIR and the CRF tables do not indicate the allocation of the emissions associated with the non-energy use of diesel oil and liquefied petroleum gas. In response to a question raised by the ERT during the review, Slovenia confirmed that the non-energy use of liquefied petroleum gas occurred in chemical industry, and that fuel oil was used in construction. The ERT recommends that Slovenia include the information provided to the ERT during the review in the NIR of its next annual submission.

44. The fraction of carbon stored in lubricants for the years 2004–2008 is significantly higher (between 73.6 per cent and 86.5 per cent) than those for 2009 and 2010, which amount to 61.8 per cent and 43.6 per cent, respectively. In response to a question raised by the ERT during the review, Slovenia informed the ERT that the decreasing trend is due to the substantial increase in the use of waste oils as alternatives to fossil fuels. The ERT recommends that the Party include this information in its next annual submission.

3. Key categories

Stationary combustion: solid and liquid fuels – CO₂

45. The ERT noted that Slovenia applied IPCC default EFs to estimate CO₂ emissions from stationary combustion of liquid fuels, which is not in accordance with the IPCC good practice guidance. Moreover, in the NIR, the Party indicates that there are no planned improvements regarding the use of country-specific or plant-specific EFs for the estimation of CO₂ emissions from liquid fuels. The ERT reiterates the recommendation in the previous review report that Slovenia develop country-specific CO₂ EFs for all fuels with a significant share in the fuel mix for each key category, in order to improve the accuracy of the estimates, in line with the IPCC good practice guidance.

46. The ERT noted that, according to CRF table 1.A(b) (reference approach), crude oil has not been imported or produced since 2003. However, Slovenia has reported emission estimates for crude oil in petroleum refining under energy industries for the years

2003–2010. In response to questions raised by the ERT during the review, the Party explained that the reported emissions under petroleum refining for 2003 onwards are associated with support activities for oil and natural gas extraction. The ERT recommends that Slovenia reallocate these emissions to the subcategory manufacture of solid fuels and other energy industries under the energy industries category, in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), in its next annual submission.

47. The ERT noted that the NCVs for liquid fuels used to estimate emissions from energy industries and manufacturing industries and construction (presented in tables 3.2.8 and 3.2.28 of the NIR) are, in most cases, lower than the IPCC default values. Despite the question raised by the ERT during the review in this regard, Slovenia did not provide an explanation for the selection of these NCVs. The ERT recommends that the Party provide the rationale for the selection of these NCVs in the NIR of its next annual submission.

48. The ERT noted that, although the subcategory other (manufacturing industries and construction) is the largest source of CO₂ emissions under manufacturing industries and construction, it is not transparently described in the NIR. The ERT recommends that, in its next annual submission, Slovenia provide more detailed descriptions in the NIR for this subcategory, including disaggregated AD and CO₂ emission estimates according to the specific types of industries included in this subcategory.

Road transportation: liquid fuels – CO₂

49. The ERT noted that the CO₂ IEF for gasoline shows a decreasing trend, from 73.7 t CO₂/TJ for 1986 to 71.4 t CO₂/TJ for 2010. The Party has not provided an explanation for this decreasing trend in the NIR of the 2012 annual submission. During the review, in response to a question raised by the ERT, Slovenia informed the ERT that the decreasing trend is attributed to the introduction of unleaded gasoline in the country, which has a lower carbon content than leaded gasoline. The ERT recommends that Slovenia include this explanation in the NIR of its next annual submission.

Coal mining and handling: solid fuels – CH₄

50. The ERT noted that the EF used for the estimation of CH₄ emissions from mining activities for underground mines (ranging from 0.51 m³ CH₄/t to 3.13 m³ CH₄/t) reported under coal mining and handling is one of the lowest EFs used by reporting Parties (ranging between 1 m³ CH₄/t and 45 m³ CH₄/t for 2010), and is much smaller than the default range (between 10 m³ CH₄/t and 25 m³ CH₄/t) provided in the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. According to the NIR, the country-specific CH₄ EFs are based on a study performed by the Ecological Research Institute of Slovenia in 1999 that refers to the years 1986 and 1990–1996 (available in Slovenian only). For the years 1997 onwards, the average of the EFs from the previous years was used. However, the Party has not included further information on the study in the NIR. In response to a question raised by the ERT during the review, Slovenia provided additional information on how the country-specific CH₄ EFs were developed, including descriptions of the measurements performed (e.g. the frequency, sampling, coverage of the mining pits), the verification and uncertainty of the EFs, and the changes in mining practices. Further, the Party provided a table containing the CH₄ EFs for all mining pits, both for mining and post-mining activities, for each year of the time series (1986–2010), which were used in the CH₄ emission estimates. The ERT recommends that Slovenia include this detailed information in its next annual submission. In addition, since this is a key category, the ERT encourages the Party to verify the applied EFs based on recent measurements from the two mines that are still in operation (i.e. Velenje and Trbovlje–Hrastnik) and report thereon in the next annual submission.

51. The ERT noted that the Party did not provide information on the date of the closure of mines in the country or the methods used to seal abandoned/closed mines. The ERT encourages Slovenia to report this information in its next annual submission, as well as information on the size and depth of abandoned/closed mines, as such information would be useful for the future estimation of any related emissions.

52. The ERT noted that, according to table 3.3.6 of the NIR, in 1986 and 1990 CH₄ emissions from post-mining activities are between approximately three and six times higher than the emissions from mining activities. For the other years of the time series, the emissions from post-mining activities amount to less than half the emissions from mining activities. Despite the question raised by the ERT during the review in this regard, Slovenia did not provide any explanations for these differences, but stated only that the reported emissions are based on a study performed by the Ecological Research Institute of Slovenia in 1999 that refers to the years 1986 and 1990–1996 (available in Slovenian only). To ensure the accuracy and time-series consistency of the emission estimates, the ERT recommends that Slovenia provide an explanation for the differences in mining and post-mining activities in the NIR of its next annual submission.

4. Non-key categories

Stationary combustion: other fuels – N₂O

53. The ERT noted that in its 2012 annual submission, Slovenia has reported N₂O emissions from other fuels under public electricity and heat production as “NO” for the entire time series, while the Party reported these emissions in its previous annual submission. In response to a question raised by the ERT during the review, Slovenia explained that these emissions correspond to the plastics combusted in incineration plants, and that in the 2012 annual submission the Party assumed that the plastics combusted in the modern plants do not contain N and, thus, that N₂O emissions associated with the combustion of plastics do not occur. The ERT notes that N₂O emissions from combustion processes are related to the N content in the air and also with the combustion conditions, particularly the temperature. Nevertheless, the ERT also notes that no specific EFs are provided in the Revised 1996 IPCC Guidelines or in the IPCC good practice guidance to estimate N₂O emissions from combustion of plastics. During the review, the Party informed the ERT that it is planning to estimate N₂O emissions from the incineration of plastics by applying the EFs from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) and report them under stationary combustion in the next annual submission. The ERT commends Slovenia for its plans to estimate these emissions.

Road transportation: gaseous and biomass fuels – CO₂, CH₄ and N₂O

54. The ERT noted that the Party has not provided a description in the NIR of how the non-CO₂ emissions from biofuel consumption in road transportation are estimated. In response to a question raised by the ERT during the review, Slovenia explained that the CH₄ and N₂O emissions have been calculated using the COPERT IV model, based on the total amount of fossil fuel and biofuel used. Owing to the reporting requirements regarding the disaggregation of fossil fuels and biofuels in the CRF tables, the amount of CH₄ and N₂O from biodiesel and bioethanol has been subtracted from the total emissions calculated by the COPERT IV model. The ERT recommends that Slovenia include this information in its next annual submission.

55. The ERT noted that the GHG emissions from gaseous fuels in road transportation were reported as “NA”. In response to questions raised by the ERT during the review, Slovenia explained that gaseous fuels are not used in road transportation. The ERT

recommends that the Party use the notation key “NO” instead of the notation key “NA” to report the emissions for this category in its next annual submission.

Other transportation: gaseous fuels – CO₂, CH₄ and N₂O

56. The ERT noted that emissions from other transportation under transport are reported as “NO”, even though natural gas is transmitted in Slovenia. The GHG emissions associated with the fuel used in compressor stations that facilitate the transmission of natural gas should be reported under this category. In response to a question raised by the ERT during the review, Slovenia explained that these emissions are included in the subcategory commercial/institutional under the category other sectors. The ERT recommends that Slovenia reallocate the GHG emissions associated with the fuel used in compressor stations that facilitate the transmission of natural gas from commercial/institutional to other transportation in its next annual submission.

Oil and natural gas: gaseous fuels – CH₄

57. The ERT noted that the IEFs for CH₄ emissions from natural gas transmission (203.07 kg CH₄/km of pipeline in 2010) and distribution (141.17 kg CH₄/km of pipeline in 2010) were much lower than the default EFs provided in the IPCC good practice guidance (between 2,100 kg CH₄/km and 2,900 kg CH₄/km for transmission and between 520 kg CH₄/km and 710 kg CH₄/km for distribution). The NIR of the 2012 annual submission states that the estimation of CH₄ emissions from natural gas transmission and distribution systems is based on EFs obtained from an article⁶ by the Fraunhofer Institute for Systems and Innovation Research. In response to a question raised by the ERT during the review, Slovenia provided a copy of this article to the ERT and explained that these EFs were used because the pipeline system of Slovenia was considered to resemble that of the former East Germany for the years 1986–1992 and that of the former West Germany since 2009. From 1993 to 2009 an annual 10 per cent reduction in the EFs had been taken into account for the emission estimates. In addition, Slovenia provided the ERT with the results of a verification exercise based on the 2006 IPCC Guidelines, in which the reported CH₄ emissions were checked against the estimated emissions using EFs for the transmission and distribution of natural gas which are based on the amount of marketable gas. The reported emissions are within the range of the EFs suggested by the 2006 IPCC Guidelines. The ERT commends Slovenia for its efforts to verify the emissions for this category, and recommends that the Party include the above rationale for the selection of the EFs, together with the results of the verification exercise, in its next annual submission.

58. The ERT noted that CO₂ and CH₄ emissions from venting and flaring were reported as “NO”. However, the ERT also noted that, according to the NIR and the CRF tables, oil-associated activities (e.g. production, refining/storage and distribution of oil products) occurred during the years 1986–2002 and natural gas associated activities (e.g. production, transmission and distribution) occurred throughout the entire time series within the country, and which the ERT believes likely resulted in venting and flaring emissions. In response to a question raised by the ERT during the review, Slovenia explained that the associated emissions from natural gas venting are included under the subcategory natural gas transmission (fugitive emissions from oil, natural gas and other sectors). The ERT considers that the transparency of the emission estimates for venting and flaring is impaired due to the joint reporting of emissions under natural gas transmission. The ERT strongly recommends that Slovenia transparently report, in the next annual submission, the CO₂, CH₄ and N₂O emissions from venting and flaring for all oil, natural gas and combined activities.

⁶ Fraunhofer Institute for Systems and Innovation Research. 2000. *Methanemissionen Durch den Einsatz von Gas in Deutschland von 1990 bis 1997 mit einem Ausblick auf 2010.*

C. Industrial processes and solvent and other product use

1. Sector overview

59. In 2010, emissions from the industrial processes sector amounted to 971.17 Gg CO₂ eq, or 5.0 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 30.38 Gg CO₂ eq, or 0.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 17.8 per cent in the industrial processes sector, and decreased by 62.9 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are the decrease in PFC emissions from aluminium production (due to the closure of the Horizontal Stud Soderberg and pre-baked anode type plants in 1991 and 2007) and the global economic recession from 2007 to 2009, leading, in particular, to a decrease in emissions from mineral products and metal production activities. The sectoral activities in 2010 remain at similar levels to those in 2009. Since the base year, cement production has decreased by 28.5 per cent and metal production by 73.4 per cent. Within the industrial processes sector, 64.7 per cent of the emissions were from mineral products, followed by 22.1 per cent from consumption of halocarbons and SF₆, 12.6 per cent from metal production and 0.5 per cent from chemical industry.

60. Slovenia has made recalculations for the industrial processes sector between the 2011 and 2012 annual submissions in response to the 2011 annual review report, following changes in AD, and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is an increase in emissions of 3.6 per cent for 2009 and an increase in emissions of 2.2 per cent for 1986. The main recalculations took place in the following categories:

(a) CO₂ emissions from limestone and dolomite use for the entire time series (1986–2009): including an increase in emissions of 58.5 per cent for 2009, due to the inclusion of new categories, such as the production of ceramics, mineral wool, dyes and pigments;

(b) CO₂ emissions from other (metal production) for the period 2005–2009: including a decrease in emissions of 7.3 per cent for 2009, due to the availability of more precise AD on the amount of anode burn-off;

(c) HFC emissions from refrigeration and air-conditioning equipment for the period 1997–2009: including a decrease in emissions of 21.1 per cent for 2009, due to the availability of new AD and the correction of identified errors;

(d) SF₆ emissions from electrical equipment for the period 2005–2009: an increase in emissions of 12.3 per cent for 2009, due to the availability of new AD.

61. The ERT noted that Slovenia has addressed all of the recommendations in the previous review report related to the completeness of the emission estimates for limestone and dolomite use (see para. 64 below) and consumption of halocarbons and SF₆ (see para. 65 below). The ERT also noted that Slovenia has improved the transparency of the descriptions of the methodologies, EFs and AD used for the estimation of emissions from glass production and for all subcategories under consumption of HFCs and SF₆. The ERT commends the Party for these improvements.

62. The ERT noted that Slovenia has focused its resources on the estimation of actual emissions as opposed to potential emissions from consumption of HFCs and SF₆, as the Party has not estimated the amount of those gases imported and exported in products (see paras. 66 and 67 below). The ERT considers that complete estimates of potential emissions should be provided and therefore encourages Slovenia, as part of its QA/QC efforts, to provide complete emission estimates of potential emissions from consumption of HFCs and

SF₆, as these can provide a useful QC check for the completeness of the inventory for the industrial processes sector.

63. The ERT noted that Slovenia has reported the following emissions from the solvent and other product use sector as “NE”: N₂O emissions from aerosol cans; CO₂ and N₂O emissions from degreasing and dry cleaning, and CO₂ emissions from chemical products, manufacture and processing. Although there are no IPCC methodologies available to estimate the emissions for these categories, the ERT encourages Slovenia to include emission estimates for these categories in its next annual submission.

2. Key categories

Limestone and dolomite use – CO₂

64. In response to the recommendations made in the previous review report, Slovenia has included in its 2012 annual submission emission estimates for dolomite used in bricks and ceramics production for the entire time series. Further, during a detailed assessment, the Party also identified the use of limestone and dolomite in mineral wool production and in manufacture of dyes and pigments. Slovenia has estimated the emissions from these activities for the whole time series and has reported them in the NIR and in the CRF tables. The ERT commends Slovenia for these improvements.

Consumption of halocarbons and SF₆ – HFCs and SF₆

65. In response to recommendations made in the previous review report, Slovenia has made recalculations of HFC emissions from refrigeration and air-conditioning equipment (for the period 1997–2009) and SF₆ emissions from electrical equipment (for the period 2005–2009). The Party used new AD from an F-gas database established in 2011 and from industrial companies, as well as customs data. The information on the leakage rate of industrial refrigeration and stationary air conditioning was updated and improved. The Party has also included emissions from species that were not previously accounted for, such as: HFC-32, HFC-125 and HFC-143a emissions from some F-gas blends (e.g. R-407c, R-410a and R-404a) used in stationary air conditioning and commercial and industrial refrigeration; HFC-227ea from fire extinguishers; and HFC-134a from aerosols/metered dose inhalers. The ERT commends Slovenia for these improvements.

66. Slovenia has reported emissions of HFC-134a from aerosols/metered dose inhalers using Austria’s emission estimates multiplied by the ratio between the Austrian and Slovenian populations, and by assigning 100 per cent uncertainty to the corresponding estimates, based on expert judgement. In the NIR and in response to a question raised by the ERT during the review, the Party explained that country-specific AD are not available. However, Slovenia also reported that health-insurance companies are collecting data on medicines sold and are willing to provide such data upon request. In order to improve the accuracy of the emission estimates, the ERT encourages Slovenia to obtain these AD and calculate the corresponding emission estimates in its next annual submission.

67. Slovenia has reported potential emissions of SF₆ in products for import and export as “NE”. In response to a question raised by the ERT during the review, the Party explained that some country-specific AD are available, such as AD on the amount of gas used in new manufactured products, and confirmed that it is planning to estimate the corresponding emissions using those AD in its next annual submission. The ERT encourages Slovenia to estimate the potential emissions of SF₆ under this category and report them in the next annual submission, in order to improve the completeness of the inventory.

68. Slovenia has reported potential emissions of HFC-134a in products for import and export, both in bulk and in products, as “NE”. In response to a question raised by the ERT

during the review, the Party explained that data on the number of units imported and exported are available, but the corresponding amount of gas in these units is not available. The ERT encourages Slovenia to make efforts to obtain these data and estimate the missing potential emissions of HFC-134a in the next annual submission, in order to improve the completeness of the inventory.

D. Agriculture

1. Sector overview

69. In 2010, emissions from the agriculture sector amounted to 1,962.87 Gg CO₂ eq, or 10.1 per cent of total GHG emissions. Since 1986, emissions have decreased by 11.5 per cent. The key driver for the fall in emissions is the decline in the livestock population, particularly cattle. Within the sector, 37.0 per cent of the emissions were from agricultural soils, followed by 33.9 per cent from enteric fermentation and 29.0 per cent from manure management. Altogether, 55.9 per cent of sectoral emissions were from CH₄, while 44.1 per cent were from N₂O.

70. The inventory for the agriculture sector is complete in terms of years, geographical coverage, categories and gases. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues do not occur in the country. The transparency of the inventory is generally sufficient. However, the ERT notes that there is room for improvement and recommends that Slovenia provide additional information on the methodologies and parameters used to estimate emissions from AWMS (see para. 75 below) and on the assumptions used to derive the time series of Nex rates for non-dairy cattle (see para. 76 below) in its next annual submission.

71. The ERT noted that Slovenia has made several improvements to the sector-specific QC procedures in the 2012 annual submission, including the comparison of: the country-specific CH₄ EFs for enteric fermentation for cattle and swine with the IPCC default EFs; the country-specific CH₄ EFs for manure management for cattle and swine with the IPCC default EFs and the EFs used by other European countries with similar climates; and the country-specific Nex values for cattle with the IPCC default values. The ERT commends Slovenia for implementing these QC measures.

72. Slovenia has made recalculations for the agriculture sector between the 2011 and 2012 annual submissions following changes in AD and EFs. The impact of these recalculations on the agriculture sector is a decrease in emissions of 0.002 per cent for 2009 and an increase of 0.006 per cent for 1986. The main recalculations took place in the following categories:

(a) Manure management (non-dairy cattle), due to a change in the parameter volatile solids excreted via faeces, resulting in a decrease in CH₄ emissions of 0.31 Gg CO₂ eq (or 0.1 per cent) for 2009;

(b) Agricultural soils (direct and indirect N₂O emissions): recalculations have been made for the entire time series. The amount of sewage sludge applied to agricultural soils has been updated for 2009, and Slovenia has reported the corresponding emission estimates for the period 1986–1999 for the first time in the 2012 annual submission. The impact of these recalculations is an increase in N₂O emissions of less than 0.1 per cent, for 2009, but a decrease of 0.74 Gg CO₂ eq, or 0.34 per cent, for 1986.

73. The ERT noted that the data on dairy cattle, non-dairy cattle, swine and poultry in the additional information table of CRF table 4.B(a) are incorrect. The values should be entered as percentages rather than as the quantity of manure N. The ERT recommends that

Slovenia provide correct values in CRF table 4.B(a) for all years of the time series in its next annual submission.

2. Key categories

Enteric fermentation – CH₄

74. Slovenia used a tier 2 approach to estimate CH₄ emissions from cattle. For swine, a tier 1 approach together with an IPCC default EF (1.5 kg CH₄ head⁻¹ year⁻¹) was applied for commercial farms; however, for swine on small family farms, a country-specific EF (2.33 kg CH₄ head⁻¹ year⁻¹) was used because of the differences in live weight. For all other animal categories, a tier 1 approach and default EFs were used. In response to a request made by the ERT during the review for additional information to support the use of a higher EF for swine on small family farms, Slovenia provided supporting documentation. Slovenia explained that the same issue had also been raised by the Technical Expert Review Team to the Directorate General for Climate Action of the European Commission, and that the Party had agreed to revise the emission estimates using the default EF of 1.5 kg CH₄ head⁻¹ year⁻¹ for all swine. The ERT welcomes the Party's decision and recommends that Slovenia revise the EF for enteric fermentation for swine on small family farms and provide the associated emission estimates in its next annual submission.

Manure management – CH₄ and N₂O

75. The ERT noted that Slovenia has estimated the Nex rate for cattle and swine using country-specific values (110.43 kg N/head/year for dairy cattle, 42.62 kg N/head/year for non-dairy cattle, and 11.95 kg N/head/year for swine), while for other animals the Party has used the IPCC default values. As recommended in the previous review report, Slovenia has provided, in the NIR of its 2012 annual submission, additional supporting data to verify the use of the country-specific Nex rates for swine and cattle. The ERT commends the Party for its efforts to improve the transparency of the documentation on its estimates.

76. Slovenia has provided some information on AWMS for dairy and non-dairy cattle and swine in the NIR; however, it is unclear how this information has been assembled to generate a matrix of AWMS (i.e. liquid, solid storage, pasture and paddock, and other for dairy and non-dairy cattle; and anaerobic lagoon, liquid, solid storage and other for swine) for the entire time series. In response to a question raised by the ERT during the review, the Party provided additional information on AWMS by livestock category together with the data and assumptions used. The ERT recommends that Slovenia provide this information and more transparent documentation on AWMS, including a table (i.e. AWMS by livestock category), in the NIR of its next annual submission.

77. In the NIR, Slovenia states that suckling cows excrete 78 kg N /head annually based on an average milk productivity of 2,400 kg/head/year and 35 kg N /head/year for other non-dairy cattle. However, it is unclear how Slovenia derived the time series of Nex values for non-dairy cattle, which varies from 35 kg N/head/year in 1986 to 42.6 kg N/head/year in 2010 (table 6.3.2 of the NIR). In response to a question raised by the ERT during the review, the Party explained that there were almost no suckling cows prior to 1990, given that they were not competitive because subsidies were allocated to farmers on the basis of units of product in Slovenia and not per unit of utilized agricultural area, as subsequently occurred. Those suckling cows which existed in the country prior to 1990 have been included under the category dairy cattle. The ERT recommends that Slovenia provide additional information in the NIR of its next annual submission to clarify how the time series of Nex values was obtained, in order to improve the transparency of the inventory.

Agricultural soils – N₂O

78. Slovenia has provided estimates of direct and indirect N₂O emissions associated with the use of sewage sludge applied to agricultural soils for the entire time series, in response to a recommendation in the previous review report. The Party used the sewage N content of agricultural soils of Austria to calculate the emission estimates. The ERT commends Slovenia for its efforts to improve the completeness of the emission estimates. However, the ERT reiterates the encouragement from the previous review report that Slovenia use a country-specific sewage N content.

79. Slovenia states in the NIR that mineral fertilizers used for balcony plants, gardens and lawns are not included in the estimates of N₂O emissions from mineral fertilizers. In response to a question raised by the ERT during the review, Slovenia explained that statistical data on the use of synthetic fertilizers in agriculture do not include mineral fertilizers for gardens, balcony plants, the wood industry and hay production. The Party also informed the ERT that the amount of synthetic N fertilizers used for non-agricultural purposes is less than 1 per cent. The ERT encourages the Party to collect the necessary information on the use of mineral fertilizers, calculate the corresponding emission estimates and report these emissions in the NIR of its next annual submission.

E. Land use, land-use change and forestry

1. Sector overview

80. In 2010, net removals from the LULUCF sector amounted to 8,490.89 Gg CO₂ eq. Since 1986, net removals have increased by 11.6 per cent. The key driver for the rise in removals is the increase in the growing stock of forests. Within the sector, net removals of 11,137.16 Gg CO₂ eq were from forest land, followed by net emissions of 1,696.53 Gg CO₂ eq from cropland and net emissions of 606.69 Gg CO₂ eq from settlements. Grassland accounted for net emissions of 343.04 Gg CO₂ eq. The LULUCF sector currently offsets 43.5 per cent of total GHG emissions.

81. Slovenia has made recalculations for the LULUCF sector between the 2011 and 2012 annual submissions due to the availability of updated data on forest fires and the correction of errors regarding the calculation of N₂O emissions from disturbance associated with land-use conversion to cropland across the entire time series. The impact of these recalculations on the LULUCF sector is a decrease in net removals of 0.8 per cent for 2009 and a decrease of 1.1 per cent for 1986. The main recalculations took place in the following categories:

(a) Net removals from forest land: an increase of 0.1 per cent for 2009, due to the reduction in CO₂, CH₄ and N₂O emissions from forest fires;

(b) Net emissions from cropland: an increase of 5.0 per cent for 2009, due to the increase in N₂O emissions from disturbance associated with land-use conversion to cropland.

82. The inventory for the LULUCF sector is generally complete, incorporating estimates for all required gases and pools, and for most categories. Slovenia does not estimate emissions from the categories that are not mandatory. In the NIR, the Party explained that the fertilization of forests and the drainage of soils and wetlands are not commonly practised in Slovenia and are therefore reported as “NO”. The ERT noted that small areas of land conversion to and from wetlands and other land, as well as conversions from settlements to other land-use categories, are reported in the CRF tables, but that the associated carbon stock changes are reported as “NA” or “NO”. Slovenia explained in the NIR that, based on expert judgement, these land conversions do not actually occur in the

country. These small areas are reported, even though they are assumed that they do not exist, to ensure a consistent land area representation throughout the time series. Slovenia reported in the NIR that it will provide a revised time series of land use that should eliminate these inconsistencies in its 2013 annual submission. The ERT welcomes the planned improvement and reiterates the recommendation in previous review reports that Slovenia provide updated information on land use and land-use change areas and on the emissions and removals from those areas in its next annual submission.

83. Slovenia has used Agricultural Land-Use Maps (ALUMs) established by the Ministry of Agriculture, Forestry and Food to determine the land representation. The method used involves geographically explicit land-use mapping techniques in line with approach 3 of the IPCC good practice guidance for LULUCF. Two surveys were conducted, one in 2002 and another in 2008, representing land use for the years 1998 and 2007, respectively. The map for 1998 represents 21 land-use categories. For the 2007 map, those categories were extended to 27. The ALUM land-use categories are further allocated to the six land-use categories under the Convention reporting. The land-use areas are interpolated between 1998 and 2007 and are extrapolated backwards to 1986 and forwards to 2010. A land-use change matrix indicating the average annual land-use changes and a table indicating the areas of the six land-use categories for every year from 1986 to 2010 is provided in the NIR. As pointed out in the previous review report and also mentioned in the NIR of the 2012 annual submission, there are small differences between the total of all categories of ALUMs and the total area of Slovenia. These differences were balanced by small-scale land-use changes in the land-use change matrix that do not exist in reality. Slovenia reported in the NIR, and also explained during the review in response to a question raised by the ERT, that it will provide revised land-use data in its 2013 submission to eliminate such differences. The ERT welcomes the planned improvement and reiterates the recommendation in the previous review report that Slovenia provide updated land-use data in its next annual submission.

84. As also mentioned in the previous review report, Slovenia has reported large fluctuations in net CO₂ emissions and removals from forest land, cropland, grassland and settlements between 2000 and 2001. In response to a question raised by the ERT during the review, the Party explained that data from the NFI conducted in 2012 and smaller surveys of other land uses will be available in 2013. These data will help to improve the quality of the estimates of emissions and removals, including the clarification or the correction of the reported large fluctuations between 2000 and 2001. Slovenia is planning to provide the updated estimates in its 2014 annual submission. The ERT welcomes the Party's efforts and the planned improvements. It reiterates the recommendation in the previous review report that Slovenia report on any progress made in relation to the newly collected data in its next annual submission, and provide definitive data and completed updates of estimates in its 2014 annual submission.

85. Slovenia has reported in its NIR that the area of organic soils is assumed to be constant based on expert judgement. Emissions from organic soils under grassland are reported under cropland. All CO₂ emissions from liming activities are reported under cropland, while the notation key "IE" is used to report emissions from grassland. Slovenia has reported in its NIR that the data on organic soils will be revised and synchronized with data on the agriculture sector. In addition, more complete and accurate information on liming is being prepared, which is now estimated based on expert judgement to be, on average, 100,000 Mg limestone and dolomite. The ERT welcomes these efforts and the planned improvements and recommends that Slovenia provide information on the area and emission estimates for organic soils under all relevant land uses and land-use changes, as well as data on liming or background information that supports the expert judgement used, and report the improved estimates in its next annual submission.

86. Slovenia has provided in its NIR uncertainty estimates for the NFI data and for some selected values under cropland and grassland. The Party has also provided information on QC measures applied to the NFI data and to measurements of soil samples. Further, Slovenia has reported in the NIR that it will provide complete uncertainty values for cropland and grassland. The ERT welcomes the Party's efforts to improve the quality of the inventory and reiterates the recommendation in the previous review report that Slovenia estimate the missing uncertainties, incorporate the associated activities in its QA/QC plan for all reported categories and provide information on these activities in its next and subsequent annual submissions.

87. Slovenia frequently uses the notation key "NA" to report activities (e.g. in CRF tables 5.A, 5.B, 5.C, 5.D, 5.E, 5.F and 5(V)) where the notation keys "NE", "NO" or "IE" might be more appropriate. According to 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 after referred to as the UNFCCC reporting guidelines), the notation key "NA" should only be used for activities that do not result in emissions or removals of a specific gas. In most cases, the Party has shaded such cells in the CRF tables. The ERT recommends that Slovenia review the application of the notation key "NA" and report the appropriate notation keys in its next annual submission.

2. Key categories

Forest land remaining forest land – CO₂

88. Data on dead wood is available from the NFI for 2007 only. Therefore, the carbon stock changes in dead wood for each year of the time series are estimated by a ratio of 5.7 per cent between the growing stock and the stock of dead wood determined from the NFI data for 2007. In the previous review report, the ERT recommended that Slovenia explore and use more accurate methodologies for the estimation of the carbon stock changes in dead wood. In response to that recommendation, the Party explained in its NIR that new data on dead wood are being gathered as part of the NFI for 2012 and that relevant data will be available in 2013. Further, Slovenia explained that, based on those data, it will explore more appropriate methods for the estimation of the carbon stock changes in dead wood for the years prior to 2007. The ERT welcomes the Party's efforts and planned improvement, and recommends that Slovenia apply an appropriate method in accordance with the IPCC good practice guidance for LULUCF, report on any progress made in its next annual submission, and complete and report updated estimates in its 2014 annual submission, at the latest.

89. Slovenia has applied a tier 1 method to estimate the carbon stock changes in litter and soil, assuming that there is no change in carbon stock in these pools. A preliminary study of data for the years 1996–2006 showed a slight but not significant increase in the carbon stock of litter. Slovenia explained in its NIR that it will proceed with an analysis of existing historical and archived soil and litter data and additional soil sampling, and that it plans to provide improved estimates and make recalculations. In response to a question raised by the ERT during the review, the Party further explained that it would be possible to estimate the soil carbon stocks for different forest types. The ERT welcomes the planned improvement and recommends that Slovenia provide information on any progress made and apply a higher-tier method to provide estimates on the carbon stock changes in litter and soil in its next annual submission. Further, the ERT encourages Slovenia to evaluate soil data for different forest types in order to estimate the carbon stock changes following changes in forest management, in its next annual submission.

Land converted to forest land – CO₂

90. Slovenia has reported in the CRF tables a higher IEF (5.29 Mg C per ha) for the growth of living biomass than would result from the details reported in table 7.3.8 of the NIR. Further, Slovenia assumes no losses from the carbon stock in living biomass and no changes in dead organic matter (both are reported as “NA” in the CRF tables). Noting that, particularly in the case of a conversion from perennial cropland to forest land, losses of living biomass and of dead organic matter are expected, the ERT recommends that Slovenia check the estimates of the growth of living biomass and provide adjusted information on this growth in its next annual submission. The ERT further reiterates the recommendation in the previous review report that the Party report the losses from living biomass and from dead organic matter in its next annual submission.

Cropland remaining cropland – CO₂

91. Slovenia has estimated the carbon stock changes in living biomass from perennial crops and the changes in the soil carbon stock from conversions between annual and perennial crops using a tier 2 method described in its NIR. However, the ERT noted that in CRF table 5.B for cropland, only the total carbon stock changes are reported and no specific information is provided on perennial crops. The ERT reiterates the recommendation made in previous review reports that Slovenia report the areas of perennial and annual crops and the associated carbon stock changes from conversions between those crop types as separate subcategories in CRF table 5.B for cropland in its next annual submission, in order to increase transparency.

92. The ERT further noted an inconsistency between the data on the area of perennial crops for the years prior to 1980 and after 1986 and a lack of data between these two data sets. In response to a question raised by the ERT during the review, Slovenia explained that it is planning to resolve this inconsistency by revising the land-use change matrix. The ERT welcomes the Party’s efforts and encourages Slovenia to provide information on the progress made and to include a consistent time series of the area of perennial crops in its next annual submission.

Land converted to settlements – CO₂

93. Slovenia explained in its NIR that it applies the same equation as for other land-use changes to estimate emissions from changes in carbon stocks through the conversion of other land uses to settlements. However, the ERT found that the Party did not provide information on how the emissions from dead organic matter are estimated. In response to a question raised by the ERT during the review, Slovenia explained that it applied the same method as that used for land converted to grassland, assuming that the carbon stock of dead organic matter is emitted during the year of conversion. The ERT reiterates the recommendation in the previous review report that Slovenia complete the information in the NIR by providing information on the values for carbon stocks applied to estimate emissions from the relevant pools under this category in its next annual submission.

3. Non-key categoriesN₂O emissions from disturbance associated with land-use conversion to cropland – N₂O

94. In the previous review report, the ERT recommended that Slovenia correct the discrepancies between the estimates reported in the NIR and in CRF table 5(III) for N₂O emissions from disturbance associated with land-use conversion to cropland and the applied carbon:nitrogen (C:N) ratio of 15.6, which is different from that recommended in the IPCC good practice guidance for LULUCF (C:N ratio of 15). The ERT commends Slovenia for the correction of the differences between the NIR and the CRF tables. However, the ERT

notes that the Party still uses the ratio of 15.6 for the C:N ratio, which is derived from expert judgement. The ERT recommends that Slovenia provide information that supports the expert judgement used or apply the default value from the IPCC good practice guidance for LULUCF in its next annual submission.

F. Waste

1. Sector overview

95. In 2010, emissions from the waste sector amounted to 577.46 Gg CO₂ eq, or 3.0 per cent of total GHG emissions. Since 1986, emissions have increased by 17.7 per cent. The key driver for the rise in emissions is the increase in the urban population served by solid waste disposal sites (SWDS) and domestic wastewater treatment systems. Within the sector, 61.7 per cent of the emissions were from solid waste disposal on land, followed by 37.4 per cent from wastewater handling. The remaining 0.9 per cent were from waste incineration.

96. Slovenia has made recalculations for the waste sector between the 2011 and 2012 annual submissions following changes in AD for 2009 and for the period 1986–2003. The impact of these recalculations on the waste sector is a decrease in emissions of 1.6 per cent for 2009 and an increase in emissions of 15.5 per cent for 1986. The main recalculations took place in the following categories:

(a) CH₄ emissions from domestic wastewater treatment for 2009, due to new data on the number of inhabitants included in secondary/tertiary wastewater treatment. This recalculation resulted in a decrease in emissions of 9.11 Gg CO₂ eq (or 1.6 per cent of total sectoral emissions);

(b) CH₄ emissions from industrial wastewater for the period 1986–2003, in order to ensure a consistent time series. The actual volume of wastewater was used for the calculation of the emissions instead of the production unit and default wastewater quantity per unit of product. This recalculation resulted in a decrease in emissions of 76.20 Gg CO₂ eq (or 15.5 per cent of total sectoral emissions) for 1986, and a decrease in emissions of 52.1 Gg CO₂ eq (or 7.3 per cent of total sectoral emissions) for 2003;

(c) CH₄ emissions from industrial wastewater treatment for 2009, due to the use of new AD from the pharmaceutical industry. This recalculation resulted in a decrease in emissions of 9.11 Gg CO₂ eq (or 1.6 per cent of total sectoral emissions).

97. Slovenia has reported all gases and categories included in the waste sector (i.e. solid waste disposal on land, wastewater handling and waste incineration), and has provided emission estimates for all years of the time series. The methodologies used by the Party follow those contained in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and are reported in the NIR and in the CRF tables. The Party provided improved emission estimates in the 2012 annual submission through the use of AD from actual measurements. No future planned improvements for the waste sector are reported in the NIR.

98. In general, the descriptions of the methodologies used for the estimation of emissions are complete and transparent. However, the ERT considers that there is still room to improve the transparency of the NIR regarding the choice of AD (see para. 101 below) and the inclusion of relevant AD in the NIR (see para. 105 below).

99. Slovenia has implemented specific QC checks by comparing: the country-specific values on the quantity of MSW generated and on waste composition with the IPCC default values; the emission levels with those in countries with similar circumstances; and the CH₄ recovery data gathered for tax purposes with SORS data. The ERT commends Slovenia for

its efforts in implementing these activities. However, the ERT identified inconsistencies in the information provided between the NIR and the CRF tables, as the emission trends for the waste sector shown in figure 8.0.1 of the NIR (page 234) are not consistent with those presented in the CRF tables. This figure needs to be updated to reflect the latest submission data, for example the recalculation of CH₄ emissions from industrial wastewater handling for the period 1986–2003. The ERT recommends that Slovenia strengthen its QC procedures to avoid such inconsistencies in its next annual submission.

100. On page 25 of the NIR, Slovenia explains that in 2011 a peer review for the waste sector was performed. However, on page 259 of the NIR, Slovenia states that a peer review of the wastewater handling category would be conducted if experts or institutions with adequate knowledge of this field could be found. During the review, in response to a question raised by the ERT as to whether a peer review for the waste sector was performed or not, the Party informed the ERT that the emission estimates for wastewater handling were reviewed, and that a peer review was conducted for the category solid waste disposal on land in 2011. The peer review was conducted by the National Institute of Chemistry (Laboratory for Environmental Sciences and Engineering). During the review, Slovenia provided the ERT with the peer review report, which states that no significant errors were found and that, consequently, no changes to the emission estimates for the waste sector were recommended. The ERT commends the Party for undertaking these activities and recommends that Slovenia provide more transparent and detailed information on the QA procedures implemented and on how the peer reviews lead to concrete improvements of the inventory, in its next annual submission.

2. Key categories

Solid waste disposal on land – CH₄

101. The emissions from solid waste disposal on land have been calculated using the first order decay method in accordance with the IPCC good practice guidance. Slovenia has reported the value of 0.1 instead of using the notation key “NO” for the oxidation factor, as per the recommendation in the previous review report. The ERT welcomes the efforts made by Slovenia in this regard.

102. The ERT noted that, in the NIR and in the CRF tables, Slovenia states that the quantity of MSW disposed in landfills in 2010 was 623,224 t, which is 14.7 per cent lower than the amount for 2009 and 25.1 per cent lower than the amount for 2008. However, in the NIR, Slovenia explains that the waste disposal rate for 2010 was only 3.5 per cent and 11.3 per cent less than for 2009 and 2008, respectively. In response to a question raised by the ERT during the review, the Party explained that the records of the quantity of MSW disposed from every SWDS were used to estimate the CH₄ emissions from solid waste disposal on land, while the waste disposal rate provided in the NIR is taken from national statistical data. The ERT considers that the Party is using the more accurate source of information, but notes that it is not transparently reported in the NIR. The ERT recommends that Slovenia improve the transparency of its reporting by including in the next annual submission the source of the information used to obtain the quantity of MSW disposed in SWDS.

103. The ERT noted that a methane correction factor (MCF) of 1 was used to estimate emissions from sludge in domestic and commercial wastewater disposed in waste disposal sites. However, an *c* of 0.1 was used to estimate emissions from sludge in industrial wastewater disposed in SWDS. Slovenia explained during the review that an MCF value of 0.1 for sludge handling for industrial wastewater was assumed as an average value, since it is estimated that about 10 per cent of sludge from industrial wastewater is disposed in SWDS, while the other 90 per cent is exported, incinerated or composted. Sludge from

domestic and commercial wastewater is mostly disposed in SWDS. The MCF value of 1 is relevant for the estimation of emissions from sludge disposed at waste disposal sites and is in accordance with the Revised 1996 IPCC Guidelines for managed SWDS. In response to a question raised by the ERT during the review, Slovenia agreed with the recommendation of the ERT that the Party review and update the information on the method used to derive the MCF values in the NIR of its next annual submission.

Wastewater handling – CH₄

104. Slovenia uses the IPCC default methodology to estimate CH₄ emissions from domestic and commercial wastewater and industrial wastewater using both IPCC default and country-specific parameters. Following a recommendation in the previous review report, the Party has improved the transparency of the reporting by including AD on domestic and commercial wastewater and industrial wastewater in the NIR. The ERT welcomes the efforts made by Slovenia to implement this recommendation in the previous review report.

3. Non-key categories

Waste incineration – CO₂ and N₂O

105. In its 2012 annual submission, Slovenia has reported CO₂ and N₂O emissions from the incineration of biogenic and non-biogenic waste using a tier 1 approach. The non-biogenic waste was further disaggregated into MSW, clinical waste and hazardous waste. The AD were obtained from ARSO. In response to a recommendation in the previous review report, Slovenia has provided in the NIR the EFs used for the estimation of emissions from non-biogenic waste and the parameters considered in the calculation of the CO₂ EFs for solid biomass, such as the carbon content, the NCV and the combustion efficiency. The ERT welcomes the efforts made by Slovenia in this regard.

106. The ERT noted that the amount of biogenic waste incinerated decreased from 630 t in 2009 to only 31 t in 2010, but no clear explanation for this change is provided in the NIR. In response to a question raised by the ERT during the review, Slovenia confirmed that the reported amounts of incinerated waste are correct and that an important fraction of the biogenic waste is used as fuel to be incinerated. The ERT also notes that in the chapter of the NIR on the energy sector, the Party explains that biogenic waste combustion is reported under the category other fuels (fuel combustion). The ERT recommends that Slovenia improve the transparency of its reporting by including information on the amount of biogenic waste used as fuel in the NIR of its next annual submission.

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

107. Slovenia submitted estimates for deforestation under Article 3, paragraph 3, of the Kyoto Protocol and for forest management, which is the only elected activity under Article 3, paragraph 4, of the Kyoto Protocol, for the period 2008–2010. The Party has chosen commitment period accounting for the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Slovenia provided supplementary information as required by paragraphs 5–9 of the annex to decision 15/CMP.1. Afforestation and reforestation activities are reported as “NO” because in Slovenia only natural regeneration of forests occurs on

abandoned agricultural lands without any human intervention. Therefore, those areas are not considered as afforestation or reforestation. The Party used the notation key not reported (“NR”) to report changes in the litter and soil pools under forest management, as Slovenia assumes that there are no changes in these pools (see also para. 115 below). The Party did not include the factoring-out of effects caused by increased CO₂ concentration or N deposition in the calculation of the emission estimates. Organic soils are reported as “NO”, without clearly explaining that organic soils do not occur in forest areas. The ERT noted that, in the LULUCF chapter of the NIR, in explaining non-CO₂ GHG emissions from forest land, the Party indicated that the fertilization of forests and the drainage of soils are not common practice in Slovenia. The ERT also noted that transparent and verifiable information explaining that organic soils are not net sources of emissions is not provided in the NIR, although Slovenia reported that, according to the preliminary expertise for the period 1996–2006 (Kobal M., Simoncic P., 2011), carbon stocks in litter in forest land remaining forest land have been relatively stable, which confirmed the IPCC tier 1 assumption (i.e. the net emissions/removals from litter and soils is balanced and therefore equal zero (see also para. 115 below)). The ERT recommends that Slovenia provide AD and emission estimates for organic soils that are currently reported as “NO” or provide transparent and verifiable information that they are not a net source.

108. Slovenia has made recalculations for the KP-LULUCF activities between the 2011 and 2012 annual submissions in response to the 2011 annual review report and following a revision of the methodologies used for deforestation. The impact of these recalculations is a reduction in emissions from deforestation of 14.72 Gg CO₂ eq, or 4.4 per cent, for 2009 and a decrease of 2.5 Gg CO₂ eq, or 1.7 per cent, for 2008. The recalculations resulted in an increase in total removals from KP-LULUCF activities of 0.3 per cent for 2009 and of less than 0.1 per cent for 2008.

109. Slovenia used data from the forest management plans of SFS based on orthophotos and field work to report the AD for the KP-LULUCF activities. The Party explains in the NIR that the information from SFS is more appropriate as it is based on data from forest management plans that cover all forest land in Slovenia. Abandoned agricultural land is included only after it has been abandoned for more than 20 years and when it is accounted for in the forest management plans. Those plans are updated every year for one tenth of all forest management units. In the NIR, the Party has provided land-use change matrices based on this database for the years 2008–2010. The ERT found discrepancies between the land-use change matrices in the NIR (tables 11.2.1 to 11.2.3) and in table NIR-2 containing the land transition matrix. Table 11.2.3 of the NIR provides an area of deforested land and reports an increase in the area of land from other to forest management for 2010 which is not fully reflected in the area amounts reported for the beginning and the end of the inventory year 2010. In table NIR-2, no increase from other land is indicated. The areas and estimates of emissions and removals for deforestation under Article 3, paragraph 3, of the Kyoto Protocol deviate from those for forest land converted to other land uses under the Convention. Also, the areas and estimates for forest management under the Kyoto Protocol deviate from those for forest land remaining forest land under the Convention.

110. Slovenia explained in the NIR that the differences result from the different databases used for the Convention reporting (ALUMs) and for the Kyoto Protocol reporting (forest management plans). In response to a question raised by the ERT during the review, Slovenia informed the ERT that another reason for the discrepancies is the recent change in legislation (i.e. the new obligation to include naturally afforested areas on abandoned agricultural land in management plans). The Party stated in its NIR that it will provide harmonized data in its 2013 annual submission which should eliminate those discrepancies. The ERT welcomes the planned improvement and strongly reiterates the recommendation in the previous review report that Slovenia provide updated and consistent AD and estimates for deforestation and forest management in its next annual submission. The ERT

also recommends that the Party check any inconsistencies within the land-use change matrices and between the matrices and table NIR-2, and provide adjusted AD in its next annual submission.

111. Slovenia has reported deforestation and forest management as key categories. The Party has not provided uncertainty estimates for the KP-LULUCF activities but assumes that the estimates provided for forest land remaining forest land could also be applied to forest management. In response to a recommendation in the previous review report, Slovenia explained in the NIR that it will provide additional information on these issues in its 2013 annual submission. The ERT welcomes the planned improvement and reiterates the recommendation in the previous review report that Slovenia provide complete uncertainty estimates and explain how it will use this information in planning future inventory improvements in its next annual submission.

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

Deforestation – CO₂

112. As noted in the previous review report, the net CO₂ emissions for each carbon pool under deforestation from 2008 to 2009 has more than doubled. The ERT further noted that there is a discrepancy between the estimates for 2008 and 2009 in CRF table 5(KP-I)A.2 for deforestation under Article 3, paragraph 3, of the Kyoto Protocol and table 11.1.1 of the NIR. In response to a recommendation made in the previous review report, Slovenia explained in the NIR that this issue will be checked and new information will be provided in the 2013 annual submission. The ERT welcomes this planned improvement and reiterates the recommendation in the previous review report that the Party provide relevant information to explain the increase and/or make a recalculation, if appropriate, in its next annual submission. The ERT further recommends that Slovenia compare the data in the NIR and in the CRF tables, in order to provide consistent information.

113. The ERT noted that in CRF table 5(KP-I)A.2 for deforestation under Article 3, paragraph 3, of the Kyoto Protocol, Slovenia has reported the net carbon stock changes in above-ground biomass for the various conversions of forest land to other land uses. The reported carbon stock changes in the pools vary significantly (e.g. the losses from living biomass range between 0.83 and 22.20 Mg C/ha). Further, under land converted to cropland and grassland, below-ground biomass is included in above-ground biomass (the Party has used the notation key “IE”), whereas the emission estimates for below-ground biomass are reported under land converted to settlements and other land. In response to a recommendation in the previous review report, Slovenia explained in the NIR that the values will be checked and revised in its 2013 annual submission. The Party further explained, in response to a question raised by the ERT during the review, that the reason for this issue is due to the different methodologies and purposes of gathering land-use data by the Ministry of Agriculture, Forestry and Food and by SFS, which are not yet harmonized. The ERT welcomes the Party’s efforts to improve the estimates and reiterates the recommendation in the previous review report that Slovenia provide revised estimates for deforestation in its next annual submission.

114. Slovenia has reported in CRF table 5(KP-I)A.2.1 the deforested areas that are otherwise subject to elected activities under Article 3, paragraph 4, of the Kyoto Protocol and in CRF table 5(KP-II)3 the Party has reported the N₂O emissions from disturbance associated with land-use conversion to cropland that is otherwise subject to elected activities under Article 3, paragraph 4, of the Kyoto Protocol. The ERT noted that such activities would be cropland management, grazing land management and revegetation. Since Slovenia has not elected these activities under Article 3, paragraph 4, of the Kyoto Protocol, these activities should be reported as “NA”. The ERT reiterates the

recommendation in the previous review report that Slovenia revise the reporting in these tables in its next annual submission.

115. In the previous review report, the ERT recommended that Slovenia provide detailed information on whether the system managed by SFS on deforestation covers the whole deforested land area for the entire time series. In the NIR, the Party confirmed that this information will be provided in its 2013 annual submission. The ERT reiterates the recommendation in the previous review report that Slovenia provide this information in its next annual submission.

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

Forest management – CO₂

116. As noted in the previous review report, Slovenia has applied the tier 1 methodology from the IPCC good practice guidance for LULUCF to estimate the net carbon stock changes in litter and mineral soils on areas under forest management, assuming no change in those pools. The Party explained in the NIR that the NFI provides data on growing stock, dead organic matter and soils, and that the results from the NFI survey carried out in 2012 will be available in 2013. Those data will provide additional information to enable the Party to apply a higher-tier method for these pools. Slovenia will therefore be able to provide updated results in its 2014 annual submission. The ERT reiterates the recommendation made in the previous review report that the Party estimate and report the carbon stock changes in litter and mineral soils on areas under forest management. The ERT strongly recommends that Slovenia provide such estimates in its 2014 annual submission at the latest, or provide verifiable information to demonstrate that these pools are not net sources, as required by paragraph 6(e) of the annex to decision 15/CMP.1, and in line with section 4.2.3.1 of the IPCC good practice guidance for LULUCF.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

117. Slovenia 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 SIAR on the SEF tables and the SEF comparison report.⁷ 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.

118. 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 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.

⁷ 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.

National registry

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

Calculation of the commitment period reserve

120. Slovenia has reported its commitment period reserve in its 2012 annual submission. Slovenia reported that its commitment period reserve has not changed since the initial report review (84,265,734 t CO₂ eq) as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure.

3. Changes to the national system

121. Slovenia reported that there have been no changes to its national system since the previous annual submission. The ERT concluded that Slovenia'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

122. Slovenia reported that there have been changes to its national registry since the previous annual submission. The Party described the following changes in its NIR:

(a) The inclusion of a new contact in the list of contact details. That person became an additional approved representative to authorise transactions;

(b) The upgrading of the Greta software to version 5.1.24 in January 2011 and its release for production in February 2011. The new version of the software includes a number of security improvements;

(c) A change to the list of publicly available information, which has been provided with specific reference to paragraphs 44–48 of the annex to decision 13/CMP.1.

123. The ERT concluded that, taking into account the confirmed changes to the national registry, Slovenia'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 (CMP).

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

124. Slovenia did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its 2012 annual submission. However, the ERT noted that the Party has expanded the information provided. The ERT recommends that Slovenia, in its next annual submission, report any changes in its information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1, annex, chapter I.H.

125. Slovenia included in the NIR a description of the actions taken under its Operational Programme for Reduction of Greenhouse Gas Emissions in order to minimize the adverse impacts on developing countries, in particular with regard to the efforts made to design its policies and measures in such a way as to have no, or minimum, adverse impacts, for example in relation to carbon leakage prevention. The Party described how, under the new government, this Programme will be updated and a new one will be prepared for the period beyond 2012. Slovenia also included a general description of the actions taken under the European Union Action Plan on Climate Change. In addition, the Party reported the measures undertaken for the period 2010–2012, such as establishing and joining some projects in the Balkan region, carried out within the framework of the ‘Fast-start Finance’ initiative and focused on energy reconstruction and heating systems, and on biomass, reforestation, capacity-building for enhanced data collection, the preparation of low-carbon strategies and participation in the Regional Programme for adaptation to Climate Change programme for South-Eastern European countries. The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent.

III. Conclusions and recommendations

A. Conclusions

126. Slovenia submitted its CRF tables on 12 April 2012 and submitted its NIR on 13 April 2012. On 25 May 2012 the Party submitted a revised NIR. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

127. The ERT concludes that the inventory submission of Slovenia has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete and Slovenia has submitted a complete set of CRF tables for the years 1986–2010 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases. Nevertheless, the ERT noted some gaps in the reporting. The Party did not estimate the carbon stock changes in litter and mineral soils on areas under forest management for the KP-LULUCF activities. Some of the categories for which IPCC methodologies are not available were reported using the notation key “NE”, particularly in the industrial processes and solvent and other product use sectors. Slovenia partially reported potential emissions of F-gases, but did not include the potential emissions from the gases contained in products for import and export. In addition, the Party did not estimate the emissions from wetlands remaining wetlands, settlements remaining settlements and other land remaining other land in the LULUCF sector.

128. 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.

129. Slovenia’s inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT considers that the transparency of the documentation on the category-level methodologies, AD, EFs and other parameters used to estimate emissions requires further improvement in order to provide justification of the factors selected, for example by providing references to

the sources of AD used and the rationale for selecting a methodology. The consistency of the time series for the areas of perennial crops, for the emissions from post-mining activities and for the emissions from each carbon pool for deforestation under the KP-LULUCF activities needs to be ensured.

130. Slovenia has made recalculations for the inventory between the 2011 and 2012 annual submissions in response to the recommendations made in the 2011 annual review report, following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the national totals is an increase in emissions of 0.2 per cent for 2009 and increase in emissions of 0.03 per cent for 1986. The main recalculations took place in the following sectors/categories:

(a) In the energy sector: CO₂, CH₄ and N₂O emissions from the Army were estimated for the first time in the 2012 annual submission for the period 1986–2007; CO₂ and N₂O emissions from public electricity and heat production category were recalculated for the year 2009; and CO₂, CH₄ and N₂O emissions from residential were recalculated for the years 2000–2009 (see para. 35 above);

(b) In the industrial processes sector: CO₂ emissions from limestone and dolomite were recalculated for the entire time series (1986–2009); CO₂ emissions from other (metal production) were recalculated for the period 2005–2009; HFC emissions from refrigeration and air-conditioning equipment were recalculated for the period 1997–2009; and SF₆ emissions from electrical equipment were recalculated for the period 2005–2009 (see para. 59 above);

(c) In the agriculture sector: CH₄ emissions from manure management (non-dairy cattle) and direct and indirect N₂O emissions from agricultural soils were recalculated for the entire time series (see para. 71 above);

(d) In the LULUCF sector: removals from forest land and emissions from cropland were recalculated for the whole time series (see para. 80 above);

(e) In the waste sector: CH₄ emissions from domestic wastewater treatment for 2009, CH₄ emissions from industrial wastewater for the period 1986–2003 and CH₄ emissions from industrial wastewater treatment for 2009 were recalculated (see para. 95 above).

131. Slovenia provided information related to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol as set out in paragraphs 5–9 of the annex to decision 15/CMP.1 and consistent with decision 16/CMP.1. However, the ERT identified areas that require further improvement, particularly in relation to the use of different databases for the Convention reporting (ALUMs) and for the Kyoto Protocol reporting (forest management plans), the reporting of the deforested land area for the entire time series and the estimation of the carbon stock changes in litter and mineral soils on areas under forest management (see paras. 108 and 115 above).

132. Slovenia has made recalculations for the KP-LULUCF activities between the 2011 and 2012 annual submissions in response to the 2011 annual review report and following a revision of the methodologies used to report deforestation (see para. 107 above). The impact of these recalculations on each KP-LULUCF activity for 2009 is a decrease in net emissions from deforestation of 14.72 Gg CO₂ eq (4.4 per cent) and a decrease of 2.5 Gg CO₂ eq (1.7 per cent) for 2008. These recalculations resulted in an increase in total net removals from the KP-LULUCF activities of 0.3 per cent for 2009 and of less than 0.1 per cent for 2008.

133. Slovenia 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.

134. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

135. 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.

136. Slovenia has reported information under chapter I.H of the annex to decision 15/CMP.1, “Minimization of adverse impacts in accordance with Article 3, paragraph 14” as part of its 2012 annual submission. The information is complete and transparent.

B. Recommendations

137. The ERT identifies issues for improvement as listed in table 6 below. Recommendations are for the next annual submission, unless otherwise specified.

Table 6
Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>	
Overview	Completeness	Estimates emissions from carbon stock changes under the elected KP-LULUCF activities, or make the necessary arrangements to provide verifiable information at the latest for the 2014 annual submission	10	
	Inventory planning	Improve the information on the inventory preparation and reporting processes	15	
		Perform and report the key category analysis including a disaggregation of CO ₂ emissions from stationary combustion by fuel type	16	
	Key categories	Use the key category analysis to select the estimation methods and QA/QC activities	17	
		Uncertainties	Use the uncertainty assessment to select the estimation methods and QA/QC activities	19
			Report any changes regarding the revision of the uncertainty estimates	20
	Time-series consistency	Improve the transparency of the reporting on the expert judgement used to derive the uncertainty estimates	21	
		Ensure time-series consistency for all categories	24	
	QA/QC	Improve time-series consistency, particularly regarding the use of different data sets and EFs over the time series	24	
		Include, in the NIR, information on the timetable of the implementation of its QC procedures	25	
		Strengthen the implementation of the QC procedures	26	
		Improve the description of how the category-specific QC checks are implemented, including the QA checks applied	27	

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		to the EU ETS data.	
	Transparency	Improve the transparency of the NIR	28
Energy	Overview	Improve the completeness of the reporting of the reference approach by estimating and reporting the emissions from fuels	36
	Reference and sectoral approaches	Examine the reasons for the difference in the apparent and total fuel consumption	38
		Further investigate the reasons for the differences between the reference approach and data from the International Energy Agency	39
	Feedstocks and non-energy use of fuels	Analyse and correct the inconsistencies in the reporting of the information on feedstocks and non-energy use of fuels	40
		Verify the consistency of the apparent consumption of petroleum coke reported in the CRF tables	41
		Provide information on the allocation of the emissions from non-energy use of diesel oil and liquefied petroleum gas	42
		Include, in the NIR, information on the use of waste oils to explain the decreasing trend of the fraction of carbon stored in lubricants	43
	Stationary combustion: solid and liquid fuels – CO ₂	Develop country-specific CO ₂ EFs for all fuels with a significant share in the fuel mix	44
		Reallocate the emissions from supporting activities for oil and natural gas extraction to the subcategory manufacture of solid fuels and other energy industries under the energy industries category	45
		Provide information on the net calorific values used for liquid fuels	46
		Improve the description of the methodology and data used to calculate the emission estimates for manufacturing industries and construction	47
	Road transportation : liquid fuels – CO ₂	Include information on the trend of the CO ₂ IEF for gasoline	48
	Coal mining and handling:	Provide an explanation for the differences in mining and post-mining activities in the NIR to ensure the accuracy	51

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
	solid fuels – CH ₄	and time-series consistency of the emission estimates	
	Road transportation : gaseous and biomass fuels – CO ₂ , CH ₄ and N ₂ O	Include the methodology and background information used to estimate CH ₄ and N ₂ O emissions from biofuel consumption	53
		Correct the use of the notation keys for CO ₂ , CH ₄ and N ₂ O emissions from gaseous fuels	54
	Other transportation : gaseous fuels – CO ₂ , CH ₄ and N ₂ O	Reallocate CO ₂ , CH ₄ and N ₂ O emissions associated with fuel used in compressor stations from commercial/institutional to other transportation	55
	Oil and natural gas: gaseous fuels – CH ₄	Include background information on the EFs used to estimate emissions from natural gas transmission and distribution	56
		Improve the transparency of the reporting of the emission estimates for flaring and natural gas transmission	57
Agriculture	Sector overview	Provide additional information on the methodologies and parameters used to estimate emissions from AWMS and on the assumptions used to derive the time series of Nex rates for non-dairy cattle	69
		Provide correct values in the additional information table of CRF table 4.B(a) for dairy cattle, non-dairy cattle, swine and poultry	72
	Enteric fermentation – CH ₄	Revise the EF for enteric fermentation for swine on small family farms, and estimate emissions	73
	Manure management– CH ₄ and N ₂ O	Include information on the AWMS by livestock category together with the data and assumptions used in the NIR	75
		Provide documentation on the suckling cow population and on the time-series of nitrogen excretion values for non-dairy cattle	76
LULUCF	Sector overview	Update the information on land-use and land-use change areas	82 and 83
		Include information to explain the large inter-annual fluctuations in the emissions and removals from forest land, cropland, grassland and settlements between 2000	83

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		and 2001	
		Provide information on the area and emission estimates for organic soils under all relevant land uses and land-use changes, as well as data on liming	84
		Provide complete uncertainty estimates and incorporate the associated activities in a QA/QC plan for all reported categories	85
		Check the application of the notation key “NA” and report the appropriate notation keys	86
	Forest land remaining forest land – CO ₂	Use a method in accordance with the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> to estimate the carbon stock changes in dead wood	87
		Apply a higher-tier method to estimate the carbon stock changes in litter and soils	88
	Land converted to forest land – CO ₂	Revise the growth factor for and the estimates of losses from living biomass and dead organic matter	89
	Cropland remaining cropland – CO ₂	Report the conversions between perennial and annual cropland as separate subcategories	90
	Land converted to settlements – CO ₂	Provide information on the values for carbon stock applied to estimate emissions from the relevant pools under this category	92
	N ₂ O emissions from disturbance associated with land-use conversion to cropland – N ₂ O	Provide information that supports the expert judgement used to derive the carbon:nitrogen ratio	93
Waste	Sector Overview	Strengthen QC procedures to avoid inconsistencies	98
	Solid waste disposal on land – CH ₄	Provide more transparent and detailed information on the QA procedures implemented and on how the peer reviews lead to concrete improvements of the inventory	99
		Include the source of the information used to obtain the quantity of municipal solid waste disposed at solid waste disposal sites	101

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph reference</i>
		Review and update the information on the method used to derive the methane correction factor values	102
	Waste incineration – CO ₂ and N ₂ O	Include, in the NIR, data on the amount of biogenic waste used as fuel	105
Supplementary information required under Article 7 paragraph 1 of the Kyoto Protocol	Overview	Provide AD and emission estimates for organic soils, or provide transparent and verifiable information that they are not a net source	106
		Provide updated and consistent AD and emission estimates for deforestation and forest management	109
		Check any inconsistencies within the land-use change matrices and between the matrices and table NIR-2, and provide adjusted AD	
		Provide complete uncertainty estimates	110
	Deforestation – CO ₂	Explain or revise the inter-annual fluctuations in net CO ₂ emissions for each carbon pool from 2008 to 2009	111
		Provide revised estimates for deforestation	112
		Revise the reporting in Table 5(KP-I)A.2.	113
		Provide information on whether the system managed by the Slovenian Forest Service covers the whole deforested land area	114
	Forest management – CO ₂	Use a higher tier method to estimate the emissions from the litter and soil carbon pools or demonstrate that these pools are not a net source of emissions	115

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NIR = national inventory report, QA/QC = quality assurance/quality control, UNFCCC = United Nations Framework Convention on Climate Change.

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

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“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 Slovenia 2012. Available at <<http://unfccc.int/resource/docs/2012/asr/svn.pdf>>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2012. Available at <<http://unfccc.int/resource/webdocs/sai/2012.pdf>>.

FCCC/ARR/2011/SVN. Report of the individual review of the annual submission of Slovenia submitted in 2011. Available at <<http://unfccc.int/resource/docs/2012/arr/svn.pdf>>.

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Tajda Mekinda Majaron (Environmental Agency of the Republic of Slovenia), including additional material on the methodologies and assumptions used. The following documents¹ were also provided by Slovenia:

National Institute of Chemistry Laboratory for Environmental Sciences and Engineering. 2011. Peer Review of National Inventories of Greenhouse Gases Emissions for the Waste Sector (CRF sector 6).

“Methanemissionen durch den Einsatz von Gas in Deutschland von 1990 bis 1997 mit einem Ausblick auf 2010” from Fraunhofer Institute for Systems and Innovation Research ISI (available in German language).

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¹ Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
C	carbon
CH ₄	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
Gg	gigagram (1 Gg = 1,000 tonnes)
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)
km	kilometre
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m ³	cubic metre
MCF	methane correction factor
Mg	megagram (1 Mg = 1 tonne)
MSW	municipal solid waste
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NCV	net calorific values
NE	not estimated
Nex	nitrogen excretion
NIR	national inventory report
NO	not occurring
NR	not reported
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 ¹⁵ joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 10 ¹² joule)
UNFCCC	United Nations Framework Convention on Climate Change