United Nations

FCCC/ARR/2013/SVN

Framework Convention on Climate Change

Distr.: General
13 May 2014

English only

Report of the individual review of the annual submission of Slovenia submitted in 2013*

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

GE.14-60874

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Contents

I. Introduction and summary

1. This report covers the review of the 2013 annual submission of Slovenia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 16 to 21 September 2013 in Ljubljana, Slovenia, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Michael Strogies (Germany); energy – Mr. Fernando Farias (Chile); industrial processes and solvent and other product use – Mr. Stanford Mwakasonda (United Republic of Tanzania); agriculture – Ms. Britta Maria Hoem (Norway); land use, land-use change and forestry (LULUCF) – Mr. Atsushi Sato (Japan); and waste – Mr. Qingxian Gao (China). Mr. Strogies and Mr. Gao were the lead reviewers. The review was coordinated by Ms. Xuehong Wang (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), a draft version of this report was communicated to the Government of Slovenia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2012 annual review report of Slovenia was published after the submission of the Party's 2013 annual submission.

3. In 2011, the main greenhouse gas (GHG) in Slovenia was carbon dioxide (CO_2), accounting for 82.9 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by methane (CH_4) (10.1 per cent) and nitrous oxide (N_2O) (5.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.3 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 (9.7 per cent), the industrial processes sector (5.2 per cent), the waste sector (2.9 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 19,509.39 Gg CO_2 eq and decreased by 2.8 per cent between the base year[2] and 2011. The ERT concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable, but the ERT recommends that the Party improve the transparency of the NIR.

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

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

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1986 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol 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 2011

			Gg CO_2 eq							*Change (%)*
		Greenhouse gas	*Base year[a]*	*1990*	*1995*	*2000*	*2008*	*2009*	*2010*	*2011*	*Base year–2011*
Annex A sources		CO_2	16 355.79	14 791.98	15 011.07	15 213.50	17 998.95	16 061.10	16 136.41	16 177.69	–1.1
		CH_4	2 173.54	2 118.02	2 042.63	2 118.43	2 042.79	2 007.19	1 998.01	1 966.24	–9.5
		N_2O	1 387.99	1 265.26	1 324.72	1 426.01	1 138.99	1 139.24	1 109.82	1 103.15	–20.5
		HFCs	31.76	NA, NO	31.76	40.87	187.91	195.80	207.41	217.15	584.3
		PFCs	106.48	NA, NO	106.48	105.61	20.91	7.43	13.68	28.61	–73.1
		SF_6	12.72	NA, NO	12.72	15.74	16.68	15.92	16.54	16.54	30.0
KP-LULUCF	Article 3.3[b]	CO_2					126.66	271.56	306.46	232.84	
		CH_4					NO	NO	NO	NO	
		N_2O					NA, NO	NA, NO	NA, NO	NA, NO	
	Article 3.4[c]	CO_2	NA				–11 559.76	–11 563.90	–11 576.06	–11 577.81	NA
		CH_4	NA				0.34	0.84	0.38	1.17	NA
		N_2O	NA				0.06	0.15	0.07	0.21	NA

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1986 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2011

			Gg CO_2 eq							*Change (%)*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2008*	*2009*	*2010*	*2011*	*Base year–2011*
Annex A		Energy	16 103.23	14 415.83	14 919.30	15 058.38	17 497.71	15 877.72	15 966.30	15 982.70	–0.7
		Industrial processes	1 181.41	1 317.65	1 001.68	1 062.82	1 327.05	972.15	980.04	1 014.36	–14.1
		Solvent and other product use	81.90	43.40	17.25	42.73	27.59	31.00	30.38	49.29	–39.8
		Agriculture	2 210.95	2 134.13	2 041.87	2 133.48	1 963.01	1 994.73	1 954.92	1 900.73	–14.0
		Waste	490.79	532.00	549.28	622.74	590.89	551.08	550.24	562.31	14.6
		LULUCF	NA	–9 055.98	–8 970.72	–9 901.23	–9 702.99	–9 672.76	–9 651.70	–9 618.74	NA
		Total (with LULUCF)	**NA**	**9 387.02**	**9 558.66**	**9 018.93**	**11 703.26**	**9 753.92**	**9 830.18**	**9 890.65**	**NA**
		Total (without LULUCF)	**20 068.29**	**18 443.00**	**18 529.38**	**18 920.15**	**21 406.25**	**19 426.68**	**19 481.88**	**19 509.39**	**–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	NO	
		Deforestation					126.66	271.56	306.46	232.84	
		Total (3.3)					**126.66**	**271.56**	**306.46**	**232.84**	
	Article 3.4[d]	Forest management					–11 559.36	–11 562.91	–11 575.61	–11 576.43	
		Cropland management	NA				NA	NA	NA	NA	NA
		Grazing land management	NA				NA	NA	NA	NA	NA
		Revegetation	NA				NA	NA	NA	NA	NA
		Total (3.4)	**NA**				**–11 559.36**	**–11 562.91**	**–11 575.61**	**–11 576.43**	**NA**

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

[a] "Base year" for refers to the base year under the Kyoto Protocol, which is 1986 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[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 national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2013 annual inventory submission was submitted on 11 April 2013 (the common reporting format (CRF) tables) and 15 April 2013 (the NIR). Revised versions of the CRF tables were submitted on 14 May 2013. The 2013 annual submission contains a complete set of CRF tables for the period 1986–2011 and an NIR. Slovenia also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2013. The annual submission was submitted in accordance with decision 15/CMP.1.

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

2. Overall assessment of the inventory

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

Table 3
The expert review team's overall assessment of the annual submission

		General findings and recommendations
The expert review team's (ERT's) findings on completeness of the 2013 annual submission		
Annex A sources[a]	Complete	Mandatory: none
		Non-mandatory: "NE" is reported for CO_2 emissions from other in the reference approach, potential emissions of HFCs from refrigeration and air-conditioning equipment, foam blowing and fire extinguishers, potential emissions of SF_6 from electrical equipment, potential emissions of SF_6 imported and exported in products, CO_2 and N_2O emissions from degreasing and dry cleaning, CO_2 emissions from chemical products, manufacturing and processing, N_2O emissions from aerosol cans, CH_4 emissions from poultry, recovery of CH_4 emissions from industrial wastewater
Land use, land-use change and forestry[a]	Not complete	Mandatory: CO_2 emissions and removals in some subcategories under cropland remaining cropland, CO_2 emissions from organic soils on

		General findings and recommendations
		cropland and grassland and N_2O emissions from the mineralization of soils are reported as not occurring ("NO"), but are considered by the ERT to be not estimated ("NE") (see para. 54 below)
		Non-mandatory: "NE" is reported for CO_2 emissions and removals from all pools in wetlands remaining wetlands, CH_4 and N_2O emissions from drainage of soils and wetlands – peatland
KP-LULUCF	Not complete	Mandatory: N_2O emissions from the mineralization of soils under deforestation are reported as "NO", but are considered by the ERT to be "NE" (see para. 82 below)
The ERT's findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	See paragraphs 10 and 37 below
The ERT's findings on verification and quality assurance/quality control (QA/QC) procedures in the 2013 annual submission	Not sufficient	The ERT noted several inconsistencies, in relation to almost all categories, between the information on methods applied and emission factors used included in the common reporting format (CRF) tables and in the national inventory report (NIR). The ERT recommends that Slovenia enhance the effective implementation of tier 1 QC checks (see paras. 10, 11, 16, 35, 54, 67 and 76 below and table 5)
The ERT's findings on the transparency of the 2013 annual submission	Generally sufficient	The ERT recommends that Slovenia improve the transparency of the inventory by ensuring that the notation keys are used correctly and that the information is consistent between the NIR and the CRF tables for all sectors (see para. 3 above and paras. 11, 13, 33, 49, 52, 54, 55, 66, 73, and 74 below)

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the 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*, or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

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

Inventory planning

9. The NIR described the national system for the preparation of the inventory. The Slovenian Environment Agency (ARSO) under the Ministry of Agriculture and Environment is the single national entity responsible for the national GHG inventory. During the review, the ERT found that ARSO houses a very small inventory team (in practice, there are only two experts in the core team), which is responsible for the Slovenian GHG inventory across all sectors, except for the inventory for the LULUCF sector, the responsibility for which has been outsourced to the Slovenian Forestry Institute. In addition to administering the reporting to the UNFCCC, the two core experts are also responsible for meeting other reporting requirements (i.e. those under the United Nations Economic Commission for Europe (UNECE) Convention on Long-range Transboundary Air Pollution, and the European Union (EU) regulation on national emission ceilings). Insufficient resources (both human and financial) have been allocated to supporting the work of the small inventory team. Even though the team has worked very efficiently and effectively with a high level of professionalism on the national GHG inventory, which has so far ensured its quality, the vulnerability of the national system poses challenges to the long-term sustainability of the system. The vulnerability of the national system is elaborated on in paragraphs 10–12 below.

10. Owing to the very limited resources and support available, a coordinated and systematic quality assurance/quality control (QA/QC) plan is not in place at the moment. Although Slovenia maintains a quality manual, it has not implemented a QA/QC plan in practice. QC is carried out in many cases by the small inventory team with very limited resources. The workload and time pressure experienced by the team (see para. 9 above) have resulted in a great number of inconsistencies between the NIR and the CRF tables, which have been identified by the ERT. The QA/QC of the LULUCF sector inventory is conducted completely independently and the ERT did not find a systematic overall QA/QC system in place. In some cases (e.g. in the case of the LULUCF and agriculture sectors), the ERT found that, owing to the lack of coordination among various agencies, there is inconsistency and insufficient accuracy in the use of activity data (AD). This raises the question of whether the single national entity is effectively performing its role of ensuring an overall coordinated collaboration among various institutions in preparing the national GHG inventory.

11. The insufficient application of QA/QC procedures to the inventory has a significant effect on the transparency of the Party's annual submission. This issue has been raised repeatedly in previous review reports. For example, there are quite a number of discrepancies between the data presented in the NIR and the corresponding data reported in the CRF tables for all sectors and categories (in most cases the data presented in the NIR are wrong). In some cases, sections of the NIR (e.g. the section on fluorinated gases (F-gases) in the industrial processes chapter of the 2013 NIR) have not been updated, even though new data sets have been presented in the CRF tables. In addition, there is a lack of detail in the NIR to substantiate the use of methodologies, and the presentation of information in the NIR needs to be improved (e.g. some figures in the NIR are stand-alone figures, without further explanations provided).

12. In addition, the ERT found that the national system is to some extent based on personal communications in terms of data collection and the common understanding of the necessity of data provision, instead of relying on the institutional arrangements that should be in place to ensure the sustainability of the system. This poses a challenge to ensuring the

quality of the data being collected and may undermine the quality of the Slovenian GHG inventory overall.

13. The ERT considered that Slovenia's national system does not fully meet the mandatory requirements defined in the annex to decision 19/CMP.1 for the following aspects listed below. These aspects of the national system need to be improved significantly, especially in the light of the review of the last year of the first commitment period, which will take place in 2014 and will require a higher level of transparency in terms of accounting:

(a) Ensure sufficient capacity for the timely performance of the functions defined in these guidelines for national systems;

(b) Define and allocate specific responsibilities in the inventory development process, processing and archiving, and QA/QC;

(c) Elaborate an inventory QA/QC plan which describes specific QC procedures;

(d) Identify key source categories following the methods described in the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) (chapter 7, section 7.2);

(e) Provide a quantitative estimate of inventory uncertainty for each source category and for the inventory in total, following the IPCC good practice guidance;

(f) Implement general inventory QC procedures (tier 1) in accordance with its QA/QC plan following the IPCC good practice guidance;

(g) Archive inventory information for each year, including internal documentation on QA/QC procedures, external and internal reviews, and planned inventory improvements.

14. At the end of the review week, the ERT raised the issue of the national system in the list of potential problems and further questions raised by the ERT. It recommended that Slovenia provide evidence that the needed improvements will be addressed, including a clear statement that the national system will have the resources available to implement the necessary measures to address the above-detailed problems within the deadlines given and a plan of action for implementing such measures.

15. In response to the list of potential problems and further questions raised by the ERT, Slovenia provided an action plan, with related activities, signed by Slovenia's Minister of Agriculture and Environment. The action plan includes the establishment of a control team of, in total, 13 experts (representatives from the Ministry of Agriculture and Environment, the Slovenian Environment Agency, the Slovenian Forest Institute and the Agricultural Institute of Slovenia) with the following main tasks:

(a) Development of a QA/QC plan in accordance with the IPCC good practice guidance;

(b) Development of an inventory improvement plan;

(c) Implementation of general inventory QC procedures (tier 1);

(d) Enhanced collaboration with the inventory team during the elaboration of the emission inventories;

(e) Provision of a QA/QC manager;

(f) Preparation of an expert framework for improved elaboration of the LULUCF inventory.

16. The immediate start of the work of this team in accordance with fixed deadlines for the tasks, as well as the availability of the necessary resources, were ensured by the signature of the Slovenian minister for Agriculture and Environment. The improvements were in line with the outline recommendations by the ERT included in the Saturday Paper. The ERT considers that the action plan forms a good basis for resolving the potential problems it identified during the 2013 review. The ERT strongly recommends that Slovenia strenuously carry out its action plan in order to ensure that results are available in time to be included in the next annual submission. The ERT also strongly recommends that Slovenia report on the outcome of the action plan, and the specific results of all of the QA/QC checks carried out, in the NIR of its next annual submission.

Inventory preparation

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

Table 4
Assessment of inventory preparation by Slovenia

		General findings and recommendations
Key category analysis		
Was the key category analysis performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	Slovenia reported a key category analysis, both level and trend, including and excluding LULUCF
Approach followed?	Tier 1	
Were additional key categories identified using a qualitative approach?	No	The ERT recommends that the Party include the qualitative approach (described in the IPCC good practice guidance, chapter 7.2.2) in the performed key category analysis
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	No	The ERT recommends that the Party include activities under Article 3, paragraphs 3 and 4, in the key category analysis
Does the Party use the key category analysis to prioritize inventory improvements?	No	The ERT recommends that the Party include the results of the key category analysis in the process of planned QA/QC activities (action

		General findings and recommendations
		plan) to prioritize improvement activities. The ERT also recommends that Slovenia provide an overview of those results in its NIR
Are there any changes to the key category analysis in the latest submission?	Yes	Compared with the previous annual submission, changes have taken place: CO_2 emissions from wetlands have been identified as a key category. The ERT recommends that the Party include in the NIR a description of the changes in the results of the key category analysis compared with the results in the previous annual submission
Assessment of uncertainty analysis		
Approach followed?	Tier 1	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	The ERT noted that the uncertainty analysis is based mostly on default IPCC uncertainty values for associated emission factors and on expert judgement for the activity data used In the LULUCF sector, the uncertainties for net emissions and removals from wetlands, settlements and other land are not estimated
Quantitative uncertainty (including LULUCF)	Level = 33.5% Trend = 4.5%	
Quantitative uncertainty (excluding LULUCF)	Level = 6.8% Trend = 2.7%	

Abbreviations: ERT = expert review team, LULUCF = land use, land-use change and forestry, NIR = national inventory report, QA/QC = quality assurance/quality control.

Inventory management

18. Slovenia has a centralized archiving system that is not completely sufficient. The system includes the archiving of emission factors (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. The archiving system is not entirely structured. All information is available, but where and in what format the information is archived varies widely, and the information can only be accessed by colleagues involved who have personal expert knowledge. The ERT recommends that Slovenia implement a structured process to regulate where information is archived and implement a file-name

system for that information. During the review, the ERT was provided with the requested additional archived information.

4. Follow-up to previous reviews

19. Owing to the very limited resources available (see para. 10 above), recommendations made in previous review reports have been only partly implemented, in a process that depends on the resources available. The ERT strongly recommends that Slovenia undertake the recommended activities.

20. The ERT noted that most of the recommendations made in the previous review report have not been addressed in the Party's 2013 annual submission, owing to the late finalization of the 2012 annual review report for Slovenia, which was published in July 2013. In response to questions raised by the ERT during the review, Slovenia provided information on the status of improvement measures initiated following recommendations made in previous review reports. The ERT recommends that Slovenia fully implement the recommendations made in previous review reports. In particular, the ERT reiterates the recommendations made in previous review reports that Slovenia:

(a) Improve transparency (see paras. 11, 33, 37, 49, and 52 below);

(b) Provide better justifications for the selection of country-specific parameters and improve their use (see paras. 29, 31, 35, 36, 50, and 52 below);

(c) Improve the allocation of emission estimates (see paras. 28 and 30 below);

(d) Improve the uncertainty estimates (see para. 78 below);

(e) Explain the differences between the reference and sectoral approaches and between the data reported in the inventory and those reported to the International Energy Agency (IEA) for the years 1992 and 1999 (see paras. 26 below);

(f) Improve the reporting in the CRF tables (see para. 48 below);

(g) Improve the completeness of its reporting (see para. 42 below).

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

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

B. Energy

1. Sector overview

22. The energy sector is the main sector in the GHG inventory of Slovenia. In 2011, emissions from the energy sector amounted to 15,982.70 CO_2 eq, or 81.9 per cent of total GHG emissions. Since 1986, emissions have decreased by 0.7 per cent. The key drivers for the fluctuation in the emissions from the energy sector include: 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 in the period 2009–2011. The most significant changes between 1986 and 2011 were observed for emissions from manufacturing industries and construction, which decreased by 61.3 per

cent, and for emissions from transport, which increased by 181.4 per cent. Within the sector, 39.2 per cent of the emissions were from energy industries, followed by 35.7 per cent from transport, 12.2 per cent from the category other sectors and 10.7 per cent from manufacturing industries and construction. Fugitive emissions from solid fuels accounted for 2.1 per cent while fugitive emissions from oil and natural gas accounted for 0.2 per cent of emissions. The remaining 0.02 per cent of emissions were from other (energy).

2. Reference and sectoral approaches

23. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 24–28 below.

Table 5
Review of reference and sectoral approaches

	Paragraph cross-references
Difference between the reference approach and the sectoral approach	Energy consumption: –1.4 PJ, –0.69% CO_2 emissions: 26.7 Gg CO_2, 0.17%
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes
Are differences with international statistics adequately explained?	Yes
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes

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

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

24. The ERT noted that, for the period 1986–2011, the differences in the estimates of CO_2 emissions between the approaches are generally less than 2 per cent, with the exception of 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 in the estimates for those two years exceed 2 per cent. The ERT encourages Slovenia to examine the causes of the differences between the reference and sectoral approaches that exceed 2 per cent and report thereon in its NIR.

25. The ERT noted that annex 4 to the Party's NIR ("CO_2 reference approach and comparison with sectoral approach, and relevant information on the national energy balance (NEB)") has not been fully updated, so there are inconsistencies between the main text of the NIR and that annex. For instance, the information on lubricants in annex 4 is not in line

with the information on lubricants presented in the main text of the NIR and in the CRF tables. The ERT recommends that an update of annex 4 be provided.

26. The ERT also noted that the apparent fuel consumption according to Slovenia's reference approach for all available years, except for 1990 and 1997, corresponds to the equivalent IEA data within 2 per cent. For 1990, 1991 and 1997, the differences in the estimated apparent fuel consumption between the reference approach and the IEA data are 7 per cent, 3 per cent and 3 per cent, respectively. In response to questions raised by the ERT during the review, Slovenia explained that the discrepancies are 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 reported in the CRF tables are more precise and rounded to 1 t). Slovenia also explained the differences between the reference and sectoral approaches in the last few years as follows: "Related to solid fuels, the difference in energy consumption is very low (0.1 per cent), while the difference in CO_2 emissions is much higher (1.5 per cent). The reason for this is that in the reference approach the default CO_2 EF has been used, while in the sectoral approach the plant-specific EF from the European Union Emissions Trading System (EU ETS) has been used since 2005 for all domestic coal and most imported coal". The ERT recommends that Slovenia use in the reference approach a CO_2 EF based on plant-specific data so that a numerical comparison between the reference and sectoral approaches can be performed without having to consider differences due to the sources of the CO_2 EFs as currently occurs.

International bunker fuels

27. In the reporting on jet kerosene, which is considered as bunker fuel for international aviation purposes, Slovenia separates the fraction that is used by the army and local police forces and in multilateral operations, allocating those fractions to national apparent consumption and multilateral operations, respectively. In this regard, there was an inconsistency between the CRF tables and the NIR for the inventory year 2011, since the separation was made in the data presented in the NIR but not in the corresponding CRF table. The ERT recommends that the data for 2011 in the CRF table be amended in accordance with the NIR data.

Feedstocks and non-energy use of fuels

28. 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. Slovenia confirmed that the non-energy use of liquefied petroleum gas occurs in the chemical industry in the country and that fuel oil is used in construction. The ERT reiterates the recommendation made in the previous review report that Slovenia include that information in its annual submission.

3. Key categories

Stationary combustion: solid, liquid, gaseous fuels – CO_2

29. The ERT noted that Slovenia applied IPCC default EFs to estimate CO_2 emissions from stationary combustion of liquid fuels, which is not in accordance with the IPCC good practice guidance. Moreover, in its NIR the Party indicates that there are no planned improvements regarding the use of country-specific or plant-specific EFs for the estimation of CO_2 emissions from liquid fuels. The ERT strongly reiterates the recommendation made in the previous review report that Slovenia develop country-specific CO_2 EFs for all fuels that have 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.

30. The ERT further noted that, according to CRF table 1.A(b) (reference approach), crude oil has not been imported or produced in the country since 2003. However, Slovenia has reported emission estimates for crude oil used in petroleum refining under energy industries for the years 2003–2011. In response to questions raised by the ERT during the previous review, the Party had explained that the reported emissions under petroleum refining for 2003 onwards were associated with support activities for oil and natural gas extraction. The ERT reiterates the recommendation made in the previous review report that Slovenia reallocate the 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).

31. The ERT noted that the net calorific values (NCVs) for liquid fuels used to estimate emissions from energy industries and manufacturing industries and construction (presented in tables 3.2.8 and 3.2.29 of the NIR) are, in most cases, lower than the IPCC default values, as was also noted in previous reviews. Despite the question raised by the ERT in the previous review in this regard, Slovenia has not provided an explanation for the selection of the NCVs. The ERT reiterates the recommendation made in the previous review report that the Party provide the rationale for the selection of the NCVs for liquid fuels.

32. The ERT noted that, for agriculture under the subcategory agriculture/forestry/fisheries, Slovenia has been using the same coefficient for the estimation of fuel consumption per hectare (ha) related to agricultural activities since 2000. Hence, the likely technological variations in the use of and features of the machinery used for agricultural purposes in the country have not been taken into consideration. The ERT encourages Slovenia to update that coefficient.

33. The ERT also noted that, although the subcategory other (manufacturing industries and construction) is the largest source of CO_2 emissions under manufacturing industries and construction, the information in the NIR on that subcategory is insufficient and hence there is a lack of transparency as to how the emission estimates for it were calculated. The ERT reiterates the recommendation made in the previous review report that Slovenia provide more detailed descriptions for the subcategory, including disaggregated AD and CO_2 emission estimates according to the specific types of industry included under the subcategory.

Road transportation: liquid fuels – CO_2

34. The ERT noted that, for the physical and chemical properties of liquid fuels used for transportation purposes, Slovenia still partly uses default values from the COPERT IV model and partly uses values collected under national legislation. Given the importance of this category in Slovenia's inventory, the ERT recommends that the Party start collecting information on the types and quantities of fuels most consumed for road transportation not collected under national legislation, either from local information sources or from neighbouring countries, in order to better reflect its national circumstances in cases where default values are still used.

Coal mining and handling: solid fuels – CH_4

35. The ERT noted that the EF used by Slovenia for the estimation of CH_4 emissions from mining activities for underground mines (ranging from 0.33 m^3 CH_4/t to 3.82 m^3 CH_4/t) reported under coal mining and handling is one of the lowest EFs of those used by reporting Parties (ranging between 1 m^3 CH_4/t and 45 m^3 CH_4/t for 2011) and is much lower than the default range (between 10 m^3 CH_4/t and 25 m^3 CH_4/t) provided in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. According to the Party's NIR, the country-specific CH_4 EFs are based on a study conducted by the Ecological Research Institute of Slovenia in 1999, which refers to the years 1986 and

1990–1996 (available in Slovenian only). However, the Party has not included further information on the study in its NIR. For 1997 onwards the average of the EFs for the previous years was used. The ERT reiterates the recommendation made in the previous review report that Slovenia provide additional information in the NIR on how the country-specific CH_4 EFs were developed and are currently used, including descriptions of the measurements performed (e.g. frequency, sampling and coverage of the mining pits), the verification and uncertainty of the EFs, and the changes in mining practices.

36. The ERT further noted that the Party did not provide information on the date of the closure of mines in the country or on the methods used to seal abandoned/closed mines. This lack of information was also noted in the previous review report. The ERT reiterates the encouragement for Slovenia to report such information in its NIR, as well as information on the size and depth of abandoned/closed mines, as it would be useful for the future estimation of any related emissions.

37. The ERT noted that, according to table 3.3.6 of the NIR, the estimates of CH_4 emissions from post-mining activities for 1986 and 1990 were between approximately three and six times higher than the estimates of emissions from mining activities. For the other years of the time series the estimates of emissions from post-mining activities amount to lower than half of the estimates of emissions from mining activities. To ensure the accuracy and time-series consistency of the emission estimates, the ERT reiterates the recommendation made in the previous review report that Slovenia provide an explanation for the differences in the estimated emissions from mining and post-mining activities in its NIR.

4. Non-key categories

Oil and natural gas: gaseous fuels – CH_4

38. The ERT noted that the implied emission factors for CH_4 emissions from natural gas transmission (203.07 kg CH_4/km pipeline for 2010) and distribution (129.52 kg CH_4/km pipeline for 2011) were much lower than the default EFs provided in the IPCC good practice guidance (between 2,100 kg CH_4/km and 2,900 kg CH_4/km for transmission and between 520 kg CH_4/km and 710 kg CH_4/km for distribution). In its NIR the Party states that the estimation of CH_4 emissions from natural gas transmission and distribution systems is based on EFs obtained from an article by the Fraunhofer Institute for Systems and Innovation Research.[3] The ERT recommends that the Party consider updating the information that it has on natural gas transmission and distribution systems, allowing it to recalculate the associated fugitive emissions, in order to improve the accuracy of the inventory.

39. The ERT further noted that Slovenia estimated increases in the last decade in the length of its service and distribution network of pipelines for natural gas using a 2006 study by the Economic Interest Association of Natural Gas Distributors. However, the increase in the consumption of natural gas between 2006 and 2011 in the country was lower than expected in the 2006 study, leading to an overestimation of the related fugitive emissions for the last years of the time series. The ERT recommends that Slovenia verify with more recent data the extrapolations made with regard to the length of the service and distribution network of pipelines for natural gas, and recalculate emissions, as necessary.

[3] Reichert J and Schoen M. 2000. *Methanemissionen durch den Einsatz von Gas in Deutchland von 1990 bis 1997 mit einem Ausblick auf 2010*. Karlsruhe: Fraunhofer Institute for Systems and Innovation Research.

C. Industrial processes and solvent and other product use

1. Sector overview

40. In 2011, emissions from the industrial processes sector amounted to 1,014.36 Gg CO_2 eq, or 5.2 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 49.29 Gg CO_2 eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have decreased by 14.1 per cent in the industrial processes sector, and decreased by 39.8 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 global financial crisis and the decreased emissions from industrial production in some categories. The shutdown of industrial branches over the last 20 years has also contributed to the fall. Within the industrial processes sector, 57.7 per cent of the emissions were from mineral products, followed by 23.0 per cent from consumption of halocarbons and SF_6, 19.2 per cent from metal production and 0.1 per cent from chemical industry.

2. Key categories

Cement production – CO_2

41. The ERT noted that Slovenia used the tier 2 method from the IPCC good practice guidance to estimate emissions from cement production. There is no category-specific QA/QC procedure for cement production described in the NIR. According to the NIR, data on clinker production and plant-specific EFs for the two cement factories in Slovenia have been checked annually by independent verifiers. Responding to a question raised by the ERT during the review as to why the trend graph of clinker production does not track cement production, the Party explained that cement has been produced not only from domestically produced clinker but also from imported clinker. The ERT agreed that this was a reasonable explanation for the observed trends. The ERT recommends that Slovenia perform category-specific QA/QC for this key category and encourages the Party to explain its importation of clinker in its next annual submission.

Limestone and dolomite use – CO_2

42. The ERT noted the inclusion, since the previous annual submission, of emissions estimates for dolomite used in the production of bricks and ceramics, and mineral wool, and the manufacture of dyes and pigments. It was noted in the NIR that the uncertainty of the AD stands at 20 per cent. During the review, the ERT enquired as to whether there have been any surveys to determine whether all limestone and dolomite use in the country has been accounted for, and it was informed that nothing has been undertaken in that regard. The ERT reiterates the recommendations made in previous review reports regarding improvements in completeness in relation to this category, and encourages the Party to make further improvement by increasing the accuracy of the AD in order to reduce its 20 per cent uncertainty. Understanding that there might still be limestone and dolomite use in the country that is not yet accounted for, the ERT recommends that the Party undertake a survey that will enable it to complete the emission estimation for this category.

Aluminium production – CF_4 and C_2F_6

43. According to the NIR, Slovenia used the tier 2 method to calculate PFC emissions for the period 2005–2011, using EFs that are calculated annually. The ERT noted that the methodology used is more in line with the tier 3 method from the IPCC good practice guidance, rather than the tier 2 approach indicated in the NIR. The ERT recommends that Slovenia correctly report the method used to estimate PFC emissions from aluminium production and include an explanation of how EFs are determined in accordance with the IPCC good practice guidance.

Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6

44. The ERT noted the continued improvement of the estimation of emissions from consumption of halocarbons and SF_6, including the use of national data on medicine containing HFC-134a sold in Slovenia, as recommended in the previous review report. The ERT commends the Party for this improvement. The ERT also noted that, in its NIR, Slovenia reports its use of F-gases from 1993, inferring that some equipment and appliances using such gases will have come to the end of their lifetime, thus necessitating the estimation of emissions from disposal. However, the NIR and CRF tables only include estimates of emissions from the disposal of mobile air-conditioning equipment. Therefore, the ERT requested that the Party explain the reasons for the exclusion of emissions from disposal of other equipment and appliances, which are currently reported in the CRF tables as not occurring ("NO") without further explanation provided in the NIR.

45. In response to the question raised by the ERT during the review, the Party provided information on the adoption of the 2006 EU regulation on F-gases (Regulation (EC) No. 842/2006) in order to improve the prevention of leaks from equipment containing F-gases as well as to replace F-gases in some applications where environmentally superior alternatives are cost-effective. F-gas emissions from disposal are covered in Article 4 of that EU regulation. The regulation also requires that when a refillable or non-refillable F-gas container reaches the end of its life, the person utilizing the container for transport or storage purposes shall be responsible for putting in place arrangements for the proper recovery of any residual gas it contains to ensure its recycling, reclamation or destruction. The Party explained that, as an EU member State, it had to ratify the regulation to ensure that no F-gases are released into the air during the installation, operation, maintenance, decommissioning or disposal of equipment. The ERT recommends that the Party provide information on the implementation and enforcement of the EU regulation on F-gases in its NIR, including details on the recovery and destruction of F-gases from decommissioned equipment.

46. The ERT noted that the Party reported in its NIR that no SF_6-emitting electrical equipment has been disposed of in Slovenia. In response to a request by the ERT during the review for clarification of that statement, the Party explained that there are no emissions from the disposal of such equipment due to the recovery of the remaining SF_6 gas in electrical equipment. The ERT recommends that the Party provide a clear explanation for this in the NIR in order to improve the transparency of the reporting.

D. Agriculture

1. Sector overview

47. In 2011, emissions from the agriculture sector amounted to 1,900.73 Gg CO_2 eq, or 9.7 per cent of total GHG emissions. Since 1986, emissions have decreased by 14.0 per cent. The key drivers for the fall in emissions are the fall in the dairy cattle and swine populations and the decrease in the usage of solid storage due to the trend for larger cattle farms. Within the sector, 37.3 per cent of the emissions were from agricultural soils, followed by 34.4 per cent from enteric fermentation. The remaining 28.3 per cent were from manure management.

2. Key categories

Manure management – CH_4 and N_2O

48. 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 provided in the wrong unit. The values should have been entered as percentages. In response to questions raised by the ERT

during the review, the ERT was informed that this was due to technical errors while entering the numbers in the CRF Reporter. The ERT reiterates the recommendation made in the previous review report that Slovenia provide correct values in CRF table 4.B(a) for all years of the time series. The ERT also recommends that the Party strengthen the QC of the data entry in the CRF Reporter from the database and ensure enough time is allowed to check the final CRF tables.

49. Slovenia has provided some information in the NIR on how the estimates of the use of animal waste management systems (AWMS) for dairy and non-dairy cattle and swine were developed. However, there is a lack of transparency as to how information was assembled to generate a matrix of AWMS for the entire time series. The ERT reiterates the recommendation made in the previous review report that Slovenia provide more transparent documentation with additional information on the methodologies and parameters used to estimate emissions from AWMS, including a table on AWMS by livestock category.

50. The AWMS matrix reported in the inventory is based on farm structure. Expert estimates provided by the Agricultural Institute of Slovenia are used to allocate storage systems used by farms depending on the number of animals kept for each animal category. Generally, small farms are expected to use mainly solid manure storage systems and large farms use mainly liquid manure storage systems. The ERT was informed during the review that a survey on the usage of AWMS in Slovenia was performed by the Statistical Office of the Republic of Slovenia (SORS) in 2010, but the results have not yet been applied in the inventory. For cattle, the survey results on usage of AWMS differed markedly from the AWMS matrix reported in the inventory. For pigs and poultry, the results of the survey were more in line with the AWMS matrix in the inventory. The SORS data are based on a survey carried out by Eurostat (the statistical office of the EU), which is repeated every 10 years, and Slovenia has data for 2000 and 2010. Regular survey data on actual manure management practices are to be preferred over results based partly on expert judgement. The ERT recommends that Slovenia use the survey results adjusted for potential data selection errors in the inventory for the AWMS matrix.

51. In response to questions raised by the ERT during the review, the ERT was informed that SORS publishes statistics on pasture times for cattle every 10 years, but that data for 2010 have not yet been applied in the inventory. Pasture data for 1990 and 2000 obtained from the SORS survey have been used in the inventory, and for the years in between the pasture data have been interpolated. For the years after 2000 the estimate for 2000 obtained from the SORS survey has been kept constant. The ERT strongly recommends that Slovenia apply the available pasture data for 2010 in its next annual submission and interpolate the pasture data for the years 2001–2009, accordingly.

52. According to the NIR, suckling cows excrete 78 kg nitrogen (N)/head/year and other non-dairy cattle 35 kg N/head/year. The nitrogen excretion (Nex) rates for non-dairy cattle vary between 35 kg N/head/year and 42.6 kg N/head/year. Explanations of the reasons behind the trends in the population data for suckling cows and other non-dairy cattle are not included in the NIR, but were provided during the review. In NIR table 6.3.2 the title should be “non-dairy cattle” and not “non-dairy cows”. According to the NIR (page 169), the value for sows and pregnant gilts is 36 kg N/head/year and for fattening pigs is 14 kg N/head/year, but the country-specific Nex rates for swine vary between 12 and 13 kg N/head/year. During the review, Slovenia explained that piglets were included in the calculation of Nex rates for all groups of swine, which results in a lower Nex rate. The development of Nex values is not transparently described in the NIR; therefore, the ERT reiterates the recommendation made in the previous review report that Slovenia provide additional information in order to clarify how the time series of Nex values for non-dairy cattle was obtained. The ERT also recommends that the Party improve the description of

the development of the Nex values for swine, in order to improve the transparency of the inventory.

E. Land use, land-use change and forestry

1. Sector overview

53. In 2011, net removals from the LULUCF sector amounted to 9,618.74 Gg CO_2 eq. Since 1986, net removals have increased by 4.6 per cent. The key driver for the rise in removals is the increasing growing stock of forest. Within the sector, net removals of 12,041.16 Gg CO_2 eq were from forest land, followed by net emissions of 744.52 Gg CO_2 eq from settlements, 633.40 Gg CO_2 eq from grassland and 453.19 Gg CO_2 eq from other land. Cropland accounted for net emissions of 433.39 Gg CO_2 eq. The remaining net emissions of 157.93 Gg CO_2 eq were from wetlands.

54. CO_2 emissions from organic soils on cropland and grassland and N_2O emissions from the mineralization of soils have been reported as "NO". However, these are considered by the ERT to be not estimated because the relevant emissions of other GHGs are reported (see paragraphs 56 and 57). The notation key for not applicable ("NA") is reported in some cells of the CRF tables where "NO" is considered to be more appropriate, such as for CO_2 emissions from organic soils on land converted to cropland. The ERT recommends that Slovenia improve its use of notation keys and resolve the inconsistency between the data reported in the CRF tables and in the NIR.

55. The ERT noted that some parts of the NIR, such as section 7.4.2.1, organic soils and parts of sections 7.4.2.2. and 7.5.2.1 have not been updated since the previous annual submission and did not correctly reflect the relevant methodologies and data that were used for the 2013 annual submission and reported in the CRF tables. The ERT also noted that some methodologies, data and underlying assumptions are missing, such as information on why loss of living biomass does not occur during the land conversion to forest land and information on how the mineral soil carbon stocks of settlements and other land are established. The ERT considers that there is a lack of transparency and completeness of the information provided in the NIR. The ERT recommends that Slovenia improve the quality of the information reported in the NIR and enhance QA/QC activities for all categories.

56. The base data used to determine the land representation in the LULUCF sector are provided in the agricultural land-use map (ALUM) established by the Ministry of Agriculture, Forestry and Food of Slovenia. The method of land representation is in line with approach 3 from the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) and the ALUM land-use categories are allocated to the six land-use categories under the Convention. The results of two ALUM surveys carried out in 2002 and 2012 were used for analysis and were applied to the period from 1986 to 2002, assuming the same annual land-use changes in that period. For some of the land-use changes reported in the LULUCF inventory, Slovenia did not use the results of the ALUM land matrix and assumed that they were "NO" because they were considered uncommon in Slovenia. Slovenia has recalculated the ALUM land-use change matrix (which was based on information from ALUM 2007) since its previous annual submission by reflecting new information from ALUM 2012, and it changed the representative year for ALUM 2002 from 1998 to 2002. In response to a question raised by the ERT during the review, Slovenia explained that the above-mentioned recalculation was considered to represent more reliable land-use changes in the country. Slovenia also provided further explanation of, and the improvement plan for, the issue of the potential overestimation of areas of various land-use changes derived from ALUM data, as indicated in the NIR. The ERT welcomes the efforts made by Slovenia

since its previous annual submission and recommends that the Party continue to improve the land-use representation.

57. Slovenia applied a tier 2 method to estimate carbon stock changes in mineral soils due to land-use changes, with average carbon stocks derived from country-specific research and soil sampling surveys in Slovenia. For the land remaining categories, Slovenia applied a tier 1 method for the mineral soil organic carbon and litter pools, assuming that there is no change in carbon stock in those pools. Slovenia has reported information on some preliminary research on soil carbon stock change in the NIR and, during the review, provided additional information on ongoing work on the soil carbon stock of forest land and additional sampling on non-forest land. The ERT welcomes the efforts made by Slovenia and recommends that the Party continue its work on soil for the estimation of soil carbon stock changes for its future annual submissions. In addition, the ERT recommends that Slovenia examine whether the country-specific average soil carbon stocks of cropland and grassland are considered suitable as values before or after applying land-use factors. The ERT further recommends that the Party include information on the soil carbon stock values for settlements and other land uses for its estimations in relation to land-use conversion to settlements and other land in the NIR.

2. Key categories

Forest land remaining forest land – CO_2

58. Slovenia has reported forest land remaining forest land and land conversion categories as key categories in the LULUCF sector. Forest land remaining forest land is the largest key category in the whole GHG inventory and a tier 3 stock change method was applied for estimating removals from the living biomass carbon pool, with two NFI data sets for 2000 and 2007. The information on QC measures applied to the national forest inventory (NFI) data has been provided. In response to a question raised by the ERT during the review, Slovenia provided additional information about the ongoing work on the forest inventory system in Slovenia, the Forest and Forest Ecosystem Condition Survey in 2012 (FECS2012). Slovenia explained that the results of the forest inventory will be reflected in the LULUCF inventory of its next annual submission, including the recalculation of the growing stock of forest, dead wood carbon stock change and the growing stock of some non-forest land. The ERT welcomes the effort made by Slovenia and recommends that the Party recalculate the estimates for the categories to which the FECS2012 data will apply for the whole time series from 1986 to the most recent year.

59. Carbon stock is estimated by multiplying the average living biomass carbon stock per area by the area of forest land remaining forest land. The Party informed the ERT during the review that the average living biomass carbon stock per area is calculated from the growing stock of forest land remaining forest land only. The ERT recommends that Slovenia demonstrate the growing stock of forest land remaining forest land does not includes the data of young forest stands, which are classified as land converted to forest land.

Land converted to forest land – CO_2

60. Slovenia has not calculated losses of carbon stock from living biomass existing in previous land uses and has reported them as “NA” or “NO”. In response to a question raised by the ERT during the review, Slovenia explained that conversion to forest land only occurs through a natural regeneration process of abandoned land and that no clearing of living biomass existing in previous land uses is assumed to occur. The ERT recommends that Slovenia include an explanation of that assumption in the NIR of its next annual submission.

3. Non-key categories

Cropland remaining cropland – CO_2

61. Slovenia has established four subcategories: annual cropland remaining annual cropland; perennial cropland remaining perennial cropland; and conversion of cropland between annual and perennial crops. In the CRF tables, estimates of carbon stock changes in living biomass and mineral soils on perennial cropland converted to annual cropland have been reported, while the other three subcategories have been reported as "NO" or "NA", although estimation methods for cropland "annual to perennial" and "perennial remaining perennial" have been provided in the NIR. The ERT recommends that Slovenia estimate the appropriate carbon stock changes in living biomass and mineral soils under cropland remaining cropland.

Cropland and grassland – CO_2

62. Slovenia has reported the area of organic soils on cropland and grassland as "NO" under the LULUCF sector, while the area of cultivated histosols and the associated N_2O emissions are reported under the agriculture sector. The ERT noted that this is an inconsistency in reporting between the agriculture and LULUCF sectors and recommends that Slovenia estimate CO_2 emissions from organic soils on cropland and grassland in a manner consistent with the estimation of the use of the area of organic soils under the agriculture sector.

N_2O emissions from disturbance associated with land-use conversion to cropland – N_2O

63. N_2O emissions from disturbance associated with land-use conversion to cropland have been reported as "NO" in the relevant CRF table, while loss of carbon stock due to land-use conversion to cropland has been estimated. The ERT recommends that Slovenia estimate N_2O emissions from disturbance associated with land-use conversion to cropland and report thereon. In addition, Slovenia has explained that the carbon/nitrogen (C/N) ratio is under revision. The ERT welcomes the ongoing effort of Slovenia in that regard and encourages it to include updated information on the C/N ratio.

Wildfires – CH_4 and N_2O

64. Slovenia has recalculated the estimates of emissions from wildfires in accordance with the change in the country-specific parameter "mass of available fuel". The ERT considers that the change in the parameter has improved accuracy, but noted that the use of a constant value for the parameter for the entire time series may not reflect the feature of a continuous increasing trend in the growing stock of forest land in Slovenia. The ERT recommends that Slovenia explore the use of a methodology that reflects that trend in the parameter, or provide information to support the adequacy of using a constant value for the parameter for the entire time series.

F. Waste

1. Sector overview

65. In 2011, emissions from the waste sector amounted to 562.31 Gg CO_2 eq, or 2.9 per cent of total GHG emissions. Since 1986, emissions have increased by 14.6 per cent. The key drivers for the rise in emissions are the increase in the amount of disposed municipal waste in the past and the application of the first-order decay (FOD) method with country-specific methane correction factor and degradable organic carbon (DOC). Within the sector, 65.2 per cent of the emissions were from solid waste disposal on land, followed by 33.9 per cent from wastewater handling. The remaining 0.9 per cent of emissions were from waste incineration.

66. In general, Slovenia has provided most of the required information on the waste sector in the NIR. However, the ERT noticed that the overview of the waste sector in the NIR is not sufficient and there is some room for improving the transparency of the NIR. For instance, there is insufficient information on the methodology used to estimate emissions from waste incineration. There is also insufficient information on the data source for waste allocation, the overall situation with waste treatment and the assumptions applied when choosing country-specific values. The ERT recommends that Slovenia include such information to enhance transparency.

67. Slovenia did not provide sufficient information on category-specific QA/QC procedures in the NIR. Also, the ERT noticed some inconsistencies between the CRF tables and the NIR. For example, the description of AD in the text of the NIR (e.g. the land filled rate is 69.4 per cent) is different from the waste management detailed in table 8.1.4 (e.g. waste disposal rate is 58.0 per cent). The ERT recommends that Slovenia enhance its category-specific QA/QC procedures by checking the relevant figures in the CRF tables and the relevant description in the NIR.

2. Key categories

Solid waste disposal on land – CH_4

68. Emissions from solid waste disposal on land have been calculated using the IPCC FOD method with IPCC default values and country-specific data. It is good practice to choose a country-specific methane conversion factor based on both the actual waste treatment situation in Slovenia and on expert judgement. The ERT found that there is insufficient information in the NIR to justify the use of an MCF of 0.90 for 1977, increased by 0.01 annually from 1977 to 1986, given that the MCF remained constant before and after this period. The ERT recommends that the Party provide further information in its NIR to justify the use of the MCF.

69. Slovenia has provided the time series of AD on landfilled waste in table 8.1.1 to table 8.1.3 for three time periods in the NIR (i.e. the periods 1964–1994, 1995–2000 and 2001–2010). The ERT noticed that the data sources in the tables are quite different. Specifically, the data source for municipal solid waste in table 8.1.1 is the waste generation amount based on population and waste generation rate, whereas the data for municipal solid waste in tables 8.1.1 and 8.1.3 are actual data on waste disposal amount from ARSO. The ERT recommends that the Party synchronize its use of data and improve the description of the AD and parameters.

70. Slovenia has provided the fraction of degradable waste and DOC on the basis of country screening analyses. However, there is no information on such screening analyses provided in the NIR. The ERT noted that the waste composition in 2011 has changed dramatically from that in the previous year. For example, the DOC value in 2011 (5.60) decreased by 34.1 per cent compared with that for 2010 (8.50) and there is no explanation for the change provided in the NIR. The ERT therefore recommends that the Party report the survey data and sampling results.

71. Slovenia used the default value for methane generation rate from the IPCC good practice guidance, which is 0.05. According to the IPCC good practice guidance, if there are no data available for waste, the default value of 0.05 can be used. However, waste composition data are available in Slovenia (table 8.1.6 of the NIR) and hence a country-specific value should be developed. The ERT therefore encourages Slovenia to develop a country-specific methane generation rate using the available waste composition data as well as expert judgement.

3. Non-key categories

Wastewater handling – CH_4

72. Slovenia used the IPCC methodology to estimate CH_4 emissions from domestic and commercial wastewater and industrial wastewater using both IPCC default and country-specific parameters. The ERT noted that, in tables 8.2.3, 8.2.5 and 8.2.7 of the NIR, Slovenia provided the fraction of inhabitants covered by various types of domestic wastewater, the wastewater output of various industries, and the concentration of organic component in the wastewater, but the AD used in the emission calculation (i.e. biochemical oxygen demand (BOD) for domestic wastewater and chemical oxygen demand (COD) for industrial wastewater) were not provided in the NIR. The ERT recommends that Slovenia provide the total organic decomposable matter in domestic and commercial wastewater (i.e. BOD) and in industrial wastewater (i.e. COD).

73. The ERT noted that Slovenia assumed a value of 0.05 for the methane conversion factor for secondarily treated wastewater and a value of 0.8 for sludge treatment in calculating the estimated CH_4 emissions from domestic and commercial wastewater treatment. Furthermore, Slovenia assumed a methane conversion factor of 0.03 in calculating the estimated CH_4 emissions from industrial wastewater. The ERT recommends that Slovenia provide more transparent explanations in its NIR of the assumptions made in deriving these values.

Waste incineration – CO_2 and N_2O

74. Slovenia reported emissions from waste incineration, including emissions from biogenic waste, municipal solid waste, hazardous waste and clinical waste, following the IPCC methodology. However, there is insufficient description of the methodology provided in the NIR. For example, CO_2 emissions from biogenic waste was calculated using the default EF from the Revised 1996 IPCC Guidelines, but whether this emission is included in the total amount of emissions remains unclear. According to the Revised 1996 IPCC Guidelines, the CO_2 emissions from biogenic waste should not be included in the national total emissions estimates. The ERT recommends that Slovenia enhance the transparency of its reporting by providing such information in 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

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

Table 6
Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

		Findings and recommendations
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1?	Sufficient	The expert review team (ERT) recommends that Slovenia elaborate on the information that demonstrates that carbon pools are not net sources of emissions, as required by paragraph 6(e) of the annex to decision 15/CMP.1 (see para. 85 below)
Identify any elected activities	Activity elected:	

		Findings and recommendations
under Article 3, paragraph 4, of the Kyoto Protocol	forest management Years reported: 2008, 2009, 2010 and 2011	
Identify the period of accounting	Commitment period accounting	
Assessment of the Party's ability to identify areas of land and areas of land-use change	Sufficient	The ERT noted that reporting method 1 is applied for land subject to activities under Article 3, paragraphs 3 and 4 (chapter 4.2.2.2 of the good practice guidance for LULUCF.) It recommends that Slovenia provide this information as part of improving the reporting on forest area (see para. 78 below) in the national inventory report

76. Slovenia has reported almost all of the required supplementary information under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT noted that there are some mistakes in the reporting in the KP-LULUCF CRF tables, including in table NIR1 (the notation key for not reported was not used for not reported pools), in table NIR2 (the areas at the end of the previous year and at the beginning of the next year are not the same and there are small differences in the land matrix) and in table NIR3 (not all relevant key categories under the LULUCF sector were referred to), as well as some inconsistencies between the reported figures in the CRF tables and the NIR and the methodologies and/or data used as explained in the NIR. The ERT recommends that Slovenia improve the quality and accuracy of the information in the KP-LULUCF inventory and conduct QC checks, as recommended in relation to the LULUCF sector.

77. The methodologies and approaches used for estimating carbon stock changes and emissions resulting from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, deforestation and forest management were the same as those applied for the relevant categories in the LULUCF sector under the Convention, except for area data. Slovenia explained in its NIR and in response to questions raised by the ERT during the review that it is going to reflect the information from the 2012 NFI in the calculations in its next annual submission. The ERT noted this plan of improvement and strongly recommends that Slovenia recalculate all relevant carbon stock changes and emissions from deforestation and forest management for all years of the first commitment period, reflecting all relevant improvements that will be made in relation to the LULUCF sector, and provide clear information on how the estimation has improved in its next annual submission.

78. Slovenia has reported that deforestation and forest management were identified as key categories. Slovenia has assumed that the uncertainty estimates provided for forest land remaining forest land can also be applied to forest management and deforestation. The ERT noted that the data source for the areas reported for deforestation and forest management is not the same as that used for the calculation of the area of forest land remaining forest land. In response to a recommendation made in the previous review report, Slovenia explained in its NIR that it will provide additional information on these issues in its next annual submission. The ERT reiterates the recommendation made in the previous review report that Slovenia provide complete uncertainty estimates and explain how it will use the information in planning future inventory improvements in its next annual submission.

79. The ERT noted that the next annual submission is the final round of reporting the supplementary information on KP-LULUCF and the reported KP-LULUCF values for the

entire commitment period are accounted. The ERT strongly recommends that all of the necessary improvements be implemented in the Party's next annual submission.

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

Afforestation and reforestation – CO_2

80. Slovenia has reported afforestation and reforestation as "NO" because all land conversion to forest land occurs through the process of natural regeneration of agricultural lands in Slovenia and this process is not considered to be directly human-induced. Agricultural land that has been abandoned for more than 20 years, and which satisfies a specific forest definition, is defined as forest and is included in the area of forest management. The ERT considers that the approach taken by Slovenia is in line with the accounting and reporting rules set out in the relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) and the IPCC good practice guidance for LULUCF.

Deforestation – CO_2 and N_2O

81. Slovenia has established two subcategories under deforestation, namely land converted to cropland and land converted to settlements, while the LULUCF reporting under the Convention includes forest land converted to grassland, wetlands and other land categories as well. The ERT strongly recommends that Slovenia provide, in the NIR, further clarification of the adequacy of the subcategorization under deforestation when information from the forest management plan is used for detecting deforestation.

82. N_2O from mineralization associated with land-use conversion to cropland under deforestation has been reported as "NO". The ERT noted that part of the area of deforestation has been converted to cropland and the loss of carbon stock in mineral soils relating to that land-use conversion has been calculated and reported. Thus, the ERT considers that, in reality, the associated N_2O emissions have not been estimated, leading to an underestimation of emissions. The ERT recommends that Slovenia estimate and report those emissions in its next annual submission.

83. CO_2 emissions from liming under deforestation have been reported as "NO"; however, no information has been provided in the NIR or the CRF tables to support that reporting. As part of the area of deforestation has been converted to cropland, the ERT strongly recommends that Slovenia clarify the possibility of liming occurring in the area of deforestation used as cropland after the conversion, and either provide information explaining why the reporting of "NO" is appropriate or estimate and report emissions from lime application under deforestation.

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

84. Slovenia has explained in its NIR (pages 270 and 271) that the areas of deforestation and forest management were official data taken from the annual report on forests of the Slovenia Forest Service, which are based on the forest management plan of Slovenia and are not the same data used for land representation for the LULUCF sector under the Convention (ALUM data). During the review, Slovenia provided additional information on the consideration of the difference between, and adequacy of, the forest area and forest area-change data in the forest management plan and ALUM, and explained that the land-use change areas detected by ALUM are considered not realistic values and overestimated. The ERT considers that the use of forest area data from the forest management plan rather than from ALUM can provide more adequate estimations for the purpose of the accounting of KP-LULUCF. On the other hand, the ERT noted that the area of forest management reported in the CRF tables and in the NIR is the same as the area reported for forest land remaining forest land under the Convention. The ERT considers this to be inconsistent

reporting between the CRF tables and the NIR; using the area of forest land remaining forest land as the area of forest management is not appropriate because all land conversion to forest land is included in the area of forest management as well. The ERT took note of the Party's analysis of the potential underestimation of the area of forest management, which was explained during the review. The ERT recommends that Slovenia continue its efforts to improve the reporting on the area of forest management and provide consistent information on and explanation of the reliability of the data on the area of forest management in the NIR.

85. Slovenia has applied a tier 1 method to estimate net carbon stock changes in the litter and mineral soil carbon pools under forest management, assuming no change in those pools, and provided information in its NIR stating that those carbon pools are not considered to be net sources of emissions on the basis of preliminary research and analysis carried out in Slovenia. In response to questions raised by the ERT during the review, Slovenia provided additional information on soil surveys, the ongoing research of soil modelling and the plan for further work. Slovenia also explained that drainage of organic soils on forest land is not common practice in the country. The ERT considers that further research is required in order to estimate the carbon stock changes occurring on forest land and encourages the Party to make efforts in that regard. In addition, the ERT recommends that Slovenia elaborate on the information that demonstrates that carbon pools are not net sources of emissions, as required by paragraph 6(e) of the annex to decision 15/CMP.1.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

86. 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 standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[4] 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.

87. 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.

Calculation of the commitment period reserve

88. Slovenia has reported its commitment period reserve in its 2013 annual submission. It reported that its commitment period reserve has not changed since the initial report review (84,265,734 t CO_2 eq) as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure.

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

3. Changes to the national registry

89. Slovenia reported that there are changes in its national registry since its previous annual submission. The Party described the changes, specifically due to the centralization of the EU ETS operations into a single EU registry operated by the European Commission called the Consolidated System of European Union Registries (CSEUR), in its NIR (page 691). The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

90. The ERT noted that there were recommendations in the SIAR that had not been addressed related to the CSEUR, in particular recommendations related to the public availability of information on the website, reporting a description of the changes in the database structure and reporting test results. In response to questions raised by the ERT during the review, Slovenia provided further information on the changes to the national registry, including on those issues.

91. The ERT concluded that, taking into account the confirmed changes in the national registry, including the additional information provided to the ERT during the review, 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 CMP. With respect to the provision of information related to database structure specifically, the ERT encourages the Party to provide additional information in the NIR. The ERT recommends that Slovenia include all other additional information in response to the SIAR findings in its NIR, in accordance with decision 15/CMP.1, annex, chapter I.G.

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

92. 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 2013 annual submission. In response to a question raised by the ERT during the review, the Party confirmed that there are no changes between the activities reported in the 2012 and 2013 annual submissions (except a minor editorial change). The ERT concluded that, taking into account the clarification provided by the Party during the review, the information provided is complete and transparent. The ERT recommends that the Party report any changes in the information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

93. Slovenia included in its NIR a detailed description of the actions taken in order to minimize 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. 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 and the preparation of low-carbon strategies, and its participation in the Regional Programme for Adaptation to Climate Change for South-Eastern European countries.

III. Conclusions and recommendations

A. Conclusions

94. Table 7 summarizes the ERT's conclusions on the 2013 annual submission of Slovenia, in accordance with the Article 8 review guidelines.

Table 7
Expert review team's conclusions on the 2013 annual submission of Slovenia

		Paragraph cross-references
The expert review team (ERT) concludes that the inventory submission of Slovenia is complete (categories, gases, years and geographical boundaries) and contains both an NIR and CRF tables for 1990–2011		
Annex A sources[a]	Complete	
LULUCF[a]	Not complete	54
KP-LULUCF	Not complete	82
The ERT concludes that the inventory submission of Slovenia has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
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	Yes	
The Party's inventory is in accordance with the *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*	Yes	
Slovenia has reported information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	
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	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes (with urgent need for improvements)	13, 14, 16
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol	Yes	91

		Paragraph cross-references
Did Slovenia provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	92

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, CRF = common reporting format, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = 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, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

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

B. Recommendations

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

Table 8
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
Cross-cutting	Key category analysis	Include in the NIR a description of the changes in the results of the key category analysis compared with the results in the previous annual submission.	Table 4
		Include the qualitative approach (described in the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), chapter 7.2.2) in the performed key category analysis	Table 4
		Include activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the key category analysis	Table 4
	QA/QC	Include the results of the key category analysis in the process of planned QA/QC activities (action plan) to prioritize improvement activities, and also provide an overview of those results in the NIR	Table 4
	Inventory management	Implement a structured process to regulate where information is archived and implement a file-name system for that information	18
	Completeness	Include estimates of CO_2 emissions from organic soils on cropland and grassland and N_2O emissions from the mineralization of soils, currently reported as "NO", but considered by the ERT to be "NE"	Table 4
	Completeness	Include estimates of N_2O emissions from the mineralization of soils under deforestation, currently	82

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
		reported as “NO”, but considered by the ERT to be “NE”	
Energy	Reference and sectoral approaches	Update annex 4 to the NIR to avoid inconsistencies	25
		Use in the reference approach a CO_2 EF based on plant-specific data	26
	International bunker fuels	Correct the inconsistency between the CRF tables and the NIR for 2011 in relation to international aviation bunkers (the NIR data are correct)	27
	Feedstocks and non-energy use of fuels	Provide information on the allocation of the emissions from non-energy use of diesel oil and liquefied petroleum gas	28
	Stationary combustion: liquid fuels – CO_2	Develop country-specific CO_2 EFs for all liquid fuels that have a significant share in the fuel mix	29
		Reallocate emissions from petroleum refining to the subcategory manufacture of solid fuels and other energy industries	30
		Provide the rationale for the selection of the NCV for liquid fuels	31
		Improve the description of the sub-category according to the specific types of industry included under it	33
	Road transportation: liquid fuels – CO_2	Collect information on the types and quantities of fuels most consumed for road transportation not collected under national legislation	34
	Coal mining and handling: solid fuels – CH_4	Update the information on the validity of the CH_4 EF	35
		Provide an explanation for the differences in the estimated emissions from mining and post-mining activities	37
	Oil and natural gas: gaseous fuels – CH_4	Update reference with new research outcome	38
		Verify the extrapolation made on the length of the service and distribution network of pipelines for natural gas	39
Industrial processes and solvent and other	Cement production –	Perform category-specific QA/QC for this key category	41

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
product use	CO_2		
	Limestone and dolomite use – CO_2	Undertake a survey that will enable the completion of the emission estimation for this category	42
	Aluminium production – CF_4 and C_2F_6	Correctly report the methodology used for estimating PFC emissions from aluminium production and include an explanation of how EFs are determined in accordance with the IPCC good practice guidance	43
	Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6	Include information on the implementation and enforcement of the European Union regulation on F-gases (emissions from the installation, operation, maintenance, decommissioning or disposal of equipment), including clear details on the recovery and destruction of F-gases from decommissioned equipment	45
		Provide a clear explanation for the reason why there are no emissions from SF_6-emitting electrical equipment	46
Agriculture	Manure management – CH_4 and N_2O	Provide correct values in CRF table 4.B(a) for all years of the time series and strengthen the QC procedures for checking the data entries in the CRF Reporter from the database and ensure enough time to check the final CRF tables	48
		Provide more transparent documentation with additional information on the methodologies and parameters used to estimate emissions from AWMS , including a table (i.e. AWMS by livestock category) in the NIR	49
		Make efforts to adjust the SORS survey results to apply to the usage of AWMS in Slovenia by using other available farm data, and then use the survey results in the inventory for the AWMS matrix	50
		Implement the pasture data for 2010 in the inventory and interpolate them for the years 2001–2009	51
		Provide additional information in the NIR to clarify how the time series of Nex values for non-dairy cattle was obtained and improve the description of Nex values for swine in order to improve the transparency of the inventory	52
LULUCF	Sector overview	Improve the use of notation keys and resolve the inconsistency between the data reported in the CRF tables and in the NIR	54
		Improve the quality of the information reported in the NIR and enhance QA/QC activities for all reported categories	55

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
		Continue the improvement of the land-use representation	56
		Continue work on soils for the estimation of soil carbon stock changes	57
		Examine whether the country-specific average soil carbon stocks for cropland and grassland are considered suitable as values before or after applying land-use factors	57
		Include in the NIR information on the soil carbon stock values for settlements and other land uses for estimation in relation to land-use conversion to settlements and other land	57
	Forest land remaining forest land – CO_2	Recalculate the estimates for the categories to which the Forest Ecosystem Condition Survey 2012 data will apply for the whole time series from 1986 to the most recent year	58
		Demonstrate the growing stock of forest land remaining forest land does not include the data of young forest stands	59
	Land converted to forest land – CO_2	Include an explanation of the assumption that conversion to forest land only occurs through a natural regeneration process of abandoned land and that no clearing of living biomass in the previous land use type is assumed to occur	60
	Cropland remaining cropland – CO_2	Estimate the appropriate carbon stock changes in living biomass and mineral soils under cropland remaining cropland	61
	Cropland and grassland – CO_2	Estimate CO_2 emissions from organic soils on cropland and grassland in a manner consistent with the organic soil area used in the agriculture sector	62
	N_2O emissions from disturbance associated with land-use conversion to cropland – N_2O	Estimate and report N_2O emissions from disturbance associated with land-use conversion to cropland	63
	Wildfires – CH_4 and N_2O	Explore the possibility of a methodology reflecting the trend in growing stock in the parameter “mass of available fuel”, or provide information on the adequacy of using a constant value for the entire time series	64
Waste	Sector overview	Include information on the data source for waste allocation, the overall situation with waste treatment and the assumptions applied when choosing country-specific values	66

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
		Enhance category-specific QA/QC procedures by checking the figures in the CRF tables and the description in the NIR	67
	Solid waste disposal on land – CH_4	Include additional information to justify the use of expert judgement in deriving the methane conversion factor Synchronize the use of data on landfilled waste and improve the description of the AD and parameters	68
		Report data on the fraction of degradable waste and degradable organic carbon based on a country screening analysis (e.g. the survey data and sampling results)	70
	Wastewater handling – CH_4	Provide the total organic decomposable matter in domestic and commercial wastewater and in industry wastewater	72
		Provide more transparent explanations of the assumptions made in deriving values for the methane conversion factor	73
	Waste incineration – CO_2 and N_2O	Enhance the transparency of the reporting by providing information on the methods used for the emission calculation for waste incineration, including emissions from biogenic waste, municipal solid waste, hazardous waste and clinical waste	74
KP-LULUCF	Sector overview	Elaborate on the information that demonstrates that carbon pools are not net sources	Table 6
		Improve the quality and accuracy of the information in the KP-LULUCF inventory and conduct QC checks, as recommended for the LULUCF sector	76
		Recalculate the estimates of all relevant carbon stock changes and emissions from deforestation and forest management for all years of the first commitment period, reflecting all relevant improvements that will be made in relation to the LULUCF sector, and provide clear information on how the estimation has improved	77
	Cross-cutting	Provide complete uncertainty estimates and explain how that information will be used in planning future inventory improvements	78
	Cross-cutting	Implement all of the necessary improvements needed for KP-LULUCF reporting	79
	Deforestation	Provide further clarification of the adequacy of the subcategorization under deforestation when information from the forest management plan is used to detect deforestation	81
	Deforestation –	Report N_2O emissions from mineralization associated	82

Sector	*Category*	*Recommendation*	*Paragraph cross-references*
	CO_2 and N_2O	with land-use conversion to cropland under deforestation	
		Clarify the possibility of the occurrence of liming practice in the area of deforestation used as cropland after conversion, and either provide information explaining why the reporting of "NO" is appropriate or estimate and report emissions from lime application under deforestation	83
		Continue efforts to improve the reporting on the area of forest management and provide consistent information on and explanation of the reliability of the data on the area of forest management in the NIR	84
	Forest management – CO_2	Elaborate on the information that demonstrates that carbon pools are not net sources of emissions, as required by paragraph 6(e) of the annex to decision 15/CMP.1	85
National system	QA/QC	Strenuously carry out the plan to ensure that results of improvement are available in time to be included in the next annual submission and report on the outcome of the action plan and the specific results of all of the QA/QC checks carried out in the NIR	16
	Inventory improvements	Fully implement the recommendations made in previous review reports	20
National registry	SEF reporting	Provide additional information on database structure in the NIR	91
Article 3, paragraph 14, of the Kyoto Protocol		Report any changes in the information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H	92

Abbreviations: AD = activity data, AWMS = animal waste management system, CRF = common reporting format, EF = emission factor, ERT = expert review team, F-gases = fluorinated gases, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, MCF = methane correction factor, NCV = net calorific value, NIR = national inventory report, NA = not applicable, NE = not estimated, Nex = nitrogen excretion, NO = not occurring, QA = quality assurance, QC = quality control, SORS = Statistical Office of the Republic of Slovenia.

IV. Questions of implementation

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

Annex I

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

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

	1986	*2010*	*1986*	*2010*	
Greenhouse gas source and sink categories	*Value of recalculation (Gg CO_2 eq)*		*Per cent change*		*Reason for the recalculation*
1. Energy	–10.7	–14.0	–0.1	–0.1	Changed AD and EF and methodological change
A. Fuel combustion (sectoral approach)	–10.7	–14.0	–0.1	–0.1	
1. Energy industries		–5.0		–0.1	
2. Manufacturing industries and construction					
3. Transport	–14.4	–6.4	–0.7	–0.1	
4. Other sectors	3.7	–2.5	0.2	–0.1	
5. Other					
B. Fugitive emissions from fuels					
1. Solid fuels					
2. Oil and natural gas					
2. Industrial processes		8.9	0	0.9	
A. Mineral products					
B. Chemical industry					
C. Metal production					
D. Other production					
E. Production of halocarbons and SF_6					
F. Consumption of halocarbons and SF_6		8.9		4.0	
G. Other					
3. Solvent and other product use					
4. Agriculture	–7.85	–7.95	–0.4	–0.4	Changed EF, AD and methodological change
A. Enteric fermentation	–4.32	–0.31	–0.6	–0.1	
B. Manure management	–3.53	–7.63	–0.5	–1.3	
C. Rice cultivation	NO	NO	NO	NO	
D. Agricultural soils	NO	–0.0004	NO	–0.0	
E. Prescribed burning of savannahs	NO	NO	NO	NO	
F. Field burning of agricultural residues	NO	NO	NO	NO	
G. Other	NO	NO	NO	NO	

Greenhouse gas source and sink categories	*1986*	*2010*	*1986*	*2010*	*Reason for the recalculation*
	Value of recalculation (Gg CO_2 eq)		*Per cent change*		
5. Land use, land-use change and forestry	–2 450	–565	25.7	13.7	Changed EF, AD, methodological change, error
A. Forest land	–2 662	342	15.1	8.1	
B. Cropland	–977	–1 311	–72.6	–74.6	
C. Grassland	393	–79	18.9	79.3	
D. Wetlands	157	141	100.0	100.0	
E. Settlements	193	36	17.6	21.9	
F. Other land	446	306	100.0	100.0	
G. Other	–2 450	–565	25.7	13.7	
6. Waste	NA	–27.21	NA	–5.5	Changed AD
A. Solid waste disposal on land	NA	NA	NA	NA	
B. Wastewater handling	NA	–27.21	NA	–18.0	
C. Waste incineration	NA	NA	NA	NA	
D. Other	NA	NA	NA	NA	
7. Other					
Total CO_2 equivalent without LULUCF	–18.6	–40.3	–0.1	–0.2	
Total CO_2 equivalent with LULUCF	–1 605.9	–1 201.1	–12.7	–40.3	

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

Table 10
Information to be included in the compilation and accounting database in t CO_2 eq for 2011, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	84 265 734			84 265 734
Annex A emissions for 2011				
CO_2	16 177 686			16 177 686
CH_4	1 966 243			1 966 243
N_2O	1 103 153			1 103 153
HFCs	217 150			217 150
PFCs	28 611			28 611
SF_6	16 542			16 542
Total Annex A sources	**19 509 385**			**19 509 385**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	NA, NO			NA, NO
3.3 Afforestation and reforestation on harvested land for 2011	NA, NO			NA, NO
3.3 Deforestation for 2011	232 841			232 841
Activities under Article 3, paragraph 4, for 2011[c]				
3.4 Forest management for 2011	–11 576 429			–11 576 429
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation in the base year				

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

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

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

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

Table 11
Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	16 136 407			16 136 407
CH_4	1 998 010			1 998 010
N_2O	1 109 823			1 109 823
HFCs	207 415			207 415
PFCs	13 682			13 682
SF_6	16 542			16 542
Total Annex A sources	**19 481 880**			**19 481 880**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	NA, NO			NA, NO
3.3 Afforestation and reforestation on harvested land for 2010	NA, NO			NA, NO
3.3 Deforestation for 2010	306 465			306 465
Activities under Article 3, paragraph 4, for 2010[c]				
3.4 Forest management for 2010	–11 575 613			–11 575 613
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation in the base year				

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

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

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

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

Table 12
Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	16 061 098			16 061 098
CH_4	2 007 194			2 007 194
N_2O	1 139 240			1 139 240
HFCs	195 801			195 801
PFCs	7 433			7 433
SF_6	15 919			15 919
Total Annex A sources	**19 426 685**			**19 426 685**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	NA, NO			NA, NO
3.3 Afforestation and reforestation on harvested land for 2009	NA, NO			NA, NO
3.3 Deforestation for 2009	271 560			271 560
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–11 562 906			–11 562 906
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation in the base year				

Abbreviation: Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable, NO = not occurring.

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

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

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

Table 13
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	17 998 954			17 998 954
CH_4	2 042 794			2 042 794
N_2O	1 138 994			1 138 994
HFCs	187 912			187 912
PFCs	20 915			20 915
SF_6	16 678			16 678
Total Annex A sources	**21 406 247**			**21 406 247**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	NA, NO			NA, NO
3.3 Afforestation and reforestation on harvested land for 2008	NA, NO			NA, NO
3.3 Deforestation for 2008	126 662			126 662
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–11 559 359			–11 559 359
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation in the base year				

Abbreviations: NA = not applicable, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

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

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

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

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

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

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

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

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

Status report for Slovenia 2013. Available at <http://unfccc.int/resource/docs/2013/asr/svn.pdf>.

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

FCCC/ARR/2012/SVN. Report of the individual review of the annual submission of Slovenia submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/svn.pdf>.

Standard independent assessment report, parts 1 and 2. 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 Ms. Tajda Mekinda-Majaron (Slovenian Environment Agency), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Slovenia:

J. Reichert and M. Schoen, 2000. *Methanemisionene durch den. Einsatz von Gas in Deutchland von 1990 bis 1997 mit einem Ausblick auf 2010*. Karlsruhe.

H. Menzi, R. Frick and R. Kaufmann, 1997. *Ammoniak-Emissionen in der Schweiz: Ausmass und technische Beurteilung des Reduktionspotentials.*

J. Verbick, 1999. *Emisije toplogrednih plinov v kmetijstvu – ocene in možnosti za zmanjšanje Ljubljana*.

J. Verbick, 2004. *Izpusti amoniaka v kmetijstvu – ocene za leto 2002 in napovedi do leta 2020.*

Umweltbundesamt GmbH, 2012. *Final report of the 2012 technical review of the greenhouse gas emission inventory of Slovenia*, Vienna.

[1] Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AD	activity data
ALUM	agricultural land-use map, NFI national forest inventory
AWMS	animal waste management system
BOD	biochemical oxygen demand
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
COD	chemical oxygen demand
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
FOD	first-order decay
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m^3	cubic metre
N	nitrogen
NFI	national forest inventory
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
Nex	nitrogen excretion
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joules)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change