



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

**Note by the secretariat**

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





United Nations

**FCCC**/ARR/2013/BEL



Framework Convention on  
Climate Change

Distr.: General  
8 July 2014

English only

---

**Report of the individual review of the annual submission of  
Belgium 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.

## Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction and summary .....	1–5	3
II. Technical assessment of the annual submission.....	6–102	7
A. Overview .....	6–20	7
B. Energy.....	21–37	12
C. Industrial processes and solvent and other product use .....	38–53	17
D. Agriculture.....	54–67	21
E. Land use, land-use change and forestry.....	68–76	23
F. Waste .....	77–85	25
G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol.....	86–102	27
III. Conclusions and recommendations .....	103–104	30
A. Conclusions .....	103	30
B. Recommendations.....	104	31
IV. Questions of implementation .....	105	37
 Annexes		
I. Background data on recalculations and information to be included in the compilation and accounting database .....		38
II. Documents and information used during the review.....		44
III. Acronyms and abbreviations .....		46

## I. Introduction and summary

1. This report covers the review of the 2013 annual submission of Belgium, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 23 to 28 September 2013 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Karin Kindbom (Sweden) and Mr. Newton Paciornik (Brazil); energy – Ms. Olia Glade (New Zealand), Mr. Ralph Harthan (Germany), Ms. Yuriko Hayabuchi (Japan) and Ms. Carmen Meneses Lopez (Bolivarian Republic of Venezuela); industrial processes and solvent and other product use – Mr. Predrag Novosel (Montenegro) and Mr. Jos Olivier (Netherlands); agriculture – Mr. Bernard Hyde (Ireland), Mr. Jacques Kouazoude (Benin) and Mr. Asaye Ketema (Ethiopia); land use, land-use change and forestry (LULUCF) – Mr. Sandro Federici (San Marino) and Ms. Valentyna Slivinska (Ukraine); and waste – Ms. Maryna Bereznytska (Ukraine) and Ms. Violeta Hristova (Bulgaria). Mr. Federici and Ms. Kindbom were the lead reviewers. The review was coordinated by Mr. Roman Payo (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 Belgium, 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 Belgium was published after the submission of the 2013 annual submission.

3. In 2011, the main greenhouse gas (GHG) in Belgium was carbon dioxide (CO<sub>2</sub>), accounting for 86.8 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> equivalent (CO<sub>2</sub> eq), followed by nitrous oxide (N<sub>2</sub>O) (5.9 per cent) and methane (CH<sub>4</sub>) (5.4 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 1.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.2 per cent of total GHG emissions, followed by the industrial processes sector (9.4 per cent), the agriculture sector (7.9 per cent), the waste sector (1.3 per cent) and the solvent and other product use sector (0.2 per cent). Total GHG emissions amounted to 120,308.10 Gg CO<sub>2</sub> eq and decreased by 16.9 per cent between the base year<sup>2</sup> and 2011. The ERT concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

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

---

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

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

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

Table 1

**Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by gas, base year<sup>a</sup> to 2011**

		<i>Gg CO<sub>2</sub>eq</i>								<i>Change (%)</i>	
		<i>Greenhouse gas</i>	<i>Base year<sup>a</sup></i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>Base year<sup>a</sup>–2011</i>
Annex A sources		CO <sub>2</sub>	119 096.48	119 096.48	124 427.72	125 256.16	120 537.51	108 257.72	114 878.25	104 472.11	–12.3
		CH <sub>4</sub>	9 831.46	9 831.46	9 414.18	8 432.58	6 668.24	6 582.81	6 641.39	6 476.50	–34.1
		N <sub>2</sub> O	10 876.74	10 876.74	11 720.56	11 036.40	7 465.32	7 671.04	8 268.19	7 068.14	–35.0
		HFCs	451.73	NA, NO	451.73	943.28	1 821.60	1 882.52	1 936.25	1 996.06	341.9
		PFCs	2 335.24	1 753.32	2 335.24	360.90	201.87	115.78	85.44	178.99	–92.3
		SF <sub>6</sub>	2 205.16	1 662.49	2 205.16	111.52	91.19	97.15	111.15	116.30	–94.7
KP-LULUCF	Article 3.3 <sup>b</sup>	CO <sub>2</sub>					241.98	223.95	212.36	200.37	
		CH <sub>4</sub>					NE, NO	NE, NO	NE, NO	NE, NO	
		N <sub>2</sub> O					2.06	2.23	2.41	2.59	
	Article 3.4 <sup>c</sup>	CO <sub>2</sub>	NA				NA	NA	NA	NA	NA
		CH <sub>4</sub>	NA				NA	NA	NA	NA	NA
		N <sub>2</sub> O	NA				NA	NA	NA	NA	NA

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

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

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

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

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

Sector	Gg CO <sub>2</sub> eq								Change (%)	
	Base year <sup>a</sup>	1990	1995	2000	2008	2009	2010	2011	Base year <sup>a</sup> – 2011	
Annex A	Energy	112 375.42	112 375.42	116 461.41	116 993.79	111 417.63	101 934.63	108 155.67	97 698.27	-13.1
	Industrial processes	17 354.84	15 778.52	19 229.18	15 664.55	13 893.53	11 235.53	12 224.79	11 288.60	-35.0
	Solvent and other product use	213.41	213.41	200.18	213.52	212.00	211.58	211.20	211.13	-1.1
	Agriculture	11 440.21	11 440.21	11 531.62	10 671.68	9 394.44	9 494.66	9 560.48	9 496.92	-17.0
	Waste	3 412.92	3 412.92	3 132.19	2 597.30	1 868.12	1 730.62	1 768.53	1 613.18	-52.7
LULUCF	NA	-913.71	-717.76	-681.79	-1 224.65	-1 320.86	-1 357.23	-1 268.35	NA	
<b>Total (with LULUCF)</b>	<b>NA</b>	<b>142 306.78</b>	<b>149 836.83</b>	<b>145 459.05</b>	<b>135 561.08</b>	<b>123 286.16</b>	<b>130 563.45</b>	<b>119 039.75</b>	<b>NA</b>	
<b>Total (without LULUCF)</b>	<b>144 796.81</b>	<b>143 220.48</b>	<b>150 554.59</b>	<b>146 140.84</b>	<b>136 785.73</b>	<b>124 607.03</b>	<b>131 920.68</b>	<b>120 308.10</b>	<b>-16.9</b>	
Other <sup>b</sup>	NA	NO	NO	NO	NO	NO	NO	NO	NO	NA
KP-LULUCF	Article 3.3 <sup>c</sup>									
	Afforestation and reforestation					-261.32	-272.79	-284.31	-295.86	
	Deforestation					505.36	498.97	499.08	498.82	
	<b>Total (3.3)</b>					<b>244.04</b>	<b>226.18</b>	<b>214.77</b>	<b>202.96</b>	
	Article 3.4 <sup>d</sup>									
	Forest management					NA	NA	NA	NA	
	Cropland management	NA				NA	NA	NA	NA	NA
Grazing land management	NA				NA	NA	NA	NA	NA	
Revegetation	NA				NA	NA	NA	NA	NA	
<b>Total (3.4)</b>	<b>NA</b>				<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	

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

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

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

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

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



## II. Technical assessment of the annual submission

### A. Overview

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

6. The 2013 annual inventory submission was submitted on 15 April 2013; it contains a complete set of common reporting format (CRF) tables for the period 1990–2011 and an NIR. Belgium 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. Belgium officially submitted revised emission estimates on 8 November 2013 in response to the list of potential problems and further questions raised by the ERT (see paras. 43, 58, 62 and 67 below). The values used in this report are the values submitted by Belgium on 8 November 2013.

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

#### 2. Overall assessment of the inventory

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

Table 3

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

<i>General findings and recommendations</i>		
The expert review team's (ERT's) findings on completeness of the 2013 annual submission		
Annex A sources <sup>a</sup>	Not complete	Mandatory: SF <sub>6</sub> emissions from electrical equipment manufacturing (for the period 1990–2008); SF <sub>6</sub> emissions from electrical equipment disposal (for the period 1990–2009) (see para. 49)
		Non-mandatory: CO <sub>2</sub> emissions from asphalt roofing; CO <sub>2</sub> emissions from road paving; N <sub>2</sub> O emissions from fire extinguishers and from aerosol cans
Land use, land-use change <sup>a</sup> and forestry	Not complete	Mandatory: carbon stock changes in living biomass and organic soils for cropland (see paras. 71 and 72); carbon stock changes in organic soils for grassland (see para. 74)
		Non-mandatory: none

<i>General findings and recommendations</i>		
KP-LULUCF	Not complete	CO <sub>2</sub> emissions from liming in deforestation (see para. 93)
The ERT's findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	The information on recalculations is incomplete (see para. 10). For consistency across regions, see paragraph 70
The ERT's findings on verification and quality assurance/quality control procedures in the 2013 annual submission	Not sufficient	The consistency in QA/QC procedures applied among Belgium regions needs to be improved (see para. 13). The description of QA/QC procedures for the waste sector is insufficient (see para. 79)
The ERT's findings on the transparency of the 2013 annual submission	Generally sufficient	The ERT has identified categories where there is room for further increasing the transparency of descriptions in the NIR of methods/EFs/AD (see paras. 22, 33, 42, 48, 51, 64, 70, 78, 80, 89 and 91). For many categories the Party, during the review, provided information that clarifies methodology issues and data sources used. The ERT recommends that Belgium include the additional information in its NIR

*Abbreviations:* AD = activity data, Annex A sources = sources included in Annex A to the Kyoto Protocol, EFs = emission factors, 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, NE = not estimated, NIR = national inventory report, QA/QC = quality assurance/quality control.

<sup>a</sup> The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default EFs 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*).

10. Belgium presents in chapter 9 of the NIR (recalculations and improvements) an explanation of the recalculations undertaken, including the improvements in response to recommendations made in previous review reports as well as an overview of planned improvements. In general, the Party provides an assessment of the impact of the recalculations, but this is usually only in relation to each region. The ERT recommends that Belgium provide an overall assessment of the impact of each recalculation undertaken at the national level and not only the regional impact. The Party is encouraged to include a table in the NIR including each recalculation undertaken, the reason for the recalculation and the numerical assessment of the impact of the recalculation for Belgium as whole. Moreover, the ERT recommends that Belgium improve the transparency of its reporting in relation to the recalculations undertaken, providing in the sectoral sections of the NIR detailed information on the changes (data, methods and emission factors (EFs)), and reasons for the recalculations (see paras. 23, 33, 39, 53 and 55 below).

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

#### Inventory planning

11. The NIR and additional information provided by the Party during the review described the national system for the preparation of the inventory. The Belgian Interregional Environment Agency (IRCEL-CELINE) has overall responsibility for the national inventory (NIR page 19). Other agencies and organizations are also involved in the

preparation of the inventory. Belgium is a federal state comprising three regions: the Brussels-Capital region, the Flemish region and the Walloon region, each of which prepares its own regional inventory. The regional agencies responsible for methodological choice, the selection of activity data (AD) and EFs, quality assurance/quality control (QA/QC) activities and the archiving of all inventory-related information are: Brussels Environment, the Flemish Environment Agency and the Walloon Agency for Air and Climate. IRCEL-CELINE combines the three regional inventories into the national inventory. The ERT noted that data, methodologies or emission estimates are developed at the national level for three areas of the inventory:

(a) For the LULUCF sector (and the information related to KP-LULUCF), the AD, including the land-use matrix, are prepared by Gembloux Agro-Bio Tech University for all regions (NIR page 25);

(b) ECONOTEC consultants in collaboration with the Flemish Institute for Technological Research prepare the Party's fluorinated gas (F-gas) emission estimates for production of halocarbons and SF<sub>6</sub>, and consumption of halocarbons and SF<sub>6</sub>, under the authority of the National Climate Commission;

(c) For the road transport sector, the reference approach is used for CO<sub>2</sub> emissions and it is only available at the national level.

12. The National Climate Commission is responsible for the formal approval of the inventory prior to its submission to the UNFCCC secretariat (NIR page 19). The Working Group on Emissions of the Coordination Committee for International Environmental Policy, consisting of representatives of the three regions and of the federal public services, coordinates the preparation of the inventory to ensure the consistency of the reported data, taking into account the specific characteristics of each region. The ERT noted that, owing to the federal structure of the country, Belgium has had difficulty in resolving the issues identified in previous review reports in relation to: the methodological consistency between the three regional inventories; the consistency and transparency of the reporting at the sectoral level; and the coordination of the QA/QC activities at the regional and national levels. The ERT recognizes and commends Belgium for the efforts to overcome these difficulties through the established working groups. Furthermore, in response to questions raised by the ERT during the review, Belgium explained that starting with the present submission, each sectoral chapter of the NIR now falls under the responsibility of one regional expert for overall consistency, as recommended in the previous review report. The ERT recommends that Belgium continue to put in place the procedures for improving the transparency and consistency of the inventory and report these actions in its NIR.

13. Belgium has included information on its QA/QC procedures in the NIR and has provided its national QA/QC plan as a separate document in its 2013 annual submission, 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). The plan outlines the responsibilities for the QA/QC procedures at the national and regional levels and the types of tier 1 QC checks performed for the three regional inventories and for the national inventory. Recommendations made in previous review reports have identified the need to improve the QC procedures to ensure consistency with regard to the practices and results of the regional inventory compilers and to ensure that these are fully in line with the IPCC good practice guidance and the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines). The ERT identified that no improvements in the QA/QC procedures have been reported in the 2013 annual submission. The ERT reiterates the recommendation made in previous review

reports that Belgium improve its QA/QC procedures and that it report those improvements in its NIR.

Inventory preparation

14. Table 4 contains the ERT’s assessment of Belgium’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 Belgium**

<i>General findings and recommendations</i>		
<i>Key category analysis</i>		
Was the key category analysis performed in accordance with the IPCC <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> (hereinafter referred to as the IPCC good practice guidance) and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	
Approach followed?	Tier 1	The ERT encourages Belgium to use approach 2 in addition to approach 1
Were additional key categories identified using a qualitative approach?	Yes	Belgium identified forest land converted to settlements using qualitative criteria, but these criteria were not described in the NIR. During the review, Belgium provided the criteria used. The ERT recommends that Belgium include these explanations in the NIR
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	Deforestation was the only category identified as key. However, Belgium has identified land converted to forest land as a key category (NIR pages 258 and 270, and CRF table 7). The ERT recommends that Belgium determine whether afforestation/reforestation should also be considered a key category
Does the Party use the key category analysis to prioritize inventory improvements?	No	No information is provided in the NIR. The ERT recommends that Belgium include this information
Are there any changes to the key category analysis in the latest submission?	No	
<i>Assessment of uncertainty analysis</i>		
Approach followed?	Tier 1	

*General findings and recommendations*

Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	
Quantitative uncertainty (including LULUCF)	Level = 5.6% Trend = 2.4%	See paragraph 15
Quantitative uncertainty (excluding LULUCF)	Not provided	The ERT encourages Belgium to perform and report the uncertainty analysis without the LULUCF sector, as was done in the previous annual submission

*Abbreviations:* ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

15. In the NIR, the Party reports a trend uncertainty of 2.5 per cent on page 46 but a value of 2.4 per cent on page 288. In response to a question raised by the ERT during the review, Belgium indicated that the correct value is 2.4 per cent. The ERT recommends that Belgium address this inconsistency and improve its QA/QC procedures to minimize inconsistencies in the NIR.

#### Inventory management

16. It is reported in the NIR that Belgium has an archiving system. Following the institutional structure of the country in the three regions, archiving of the information is decentralized, with the disaggregated EFs and AD, and documentation on how these factors and data have been generated, as well as internal documentation on QA/QC procedures, being kept at the regional level. Only the aggregated information is centralized at IRCEL-CELINE, together with documentation on annual key categories and key category identification and planned inventory improvements. The ERT reiterates the encouragement made in previous review reports that Belgium establish a centralized archiving system.

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

17. The ERT noted that chapter 9 of the NIR provided information on the improvements carried out in response to the recommendations made in the 2012 annual review report, even though the report was not yet published at the time of the 2013 annual submission. The ERT commends Belgium for this approach and acknowledges that not all recommendations made in the previous review report could be implemented. However, the ERT noted that Belgium does not systematically describe in the NIR how each recommendation made in previous review reports has been taken into consideration. The ERT therefore encourages Belgium to include a table in chapter 9 of the NIR showing how each recommendation has been considered and the related improvements implemented or planned.

18. The ERT noted that many recommendations in the previous review report have been addressed in the 2013 annual submission, including:

- (a) Reporting the full list of net calorific values (NCVs) used in the energy sector (see para. 22 below);
- (b) Including in the NIR the full regional energy balances for the latest reported year (see para. 22 below);

- (c) Establishing a working group to improve the harmonization of the regional and federal energy balances (see para. 24 below);
- (d) Reallocating the emissions of the flaring activities in the chemical industry in the Flemish region from other (chemical industry) to waste incineration (see para. 82 below);
- (e) Disaggregating the agriculture categories in the uncertainty analysis;
- (f) Harmonizing the approach used for the estimation of CH<sub>4</sub> emissions from municipal wastewater treatment plants (see para. 83 below);
- (g) Reporting CH<sub>4</sub> emissions from organic waste composting in the Brussels-Capital region (see para. 85 below).

19. However, the ERT also noted that many recommendations, even some reiterated in previous review reports, have not yet been implemented. The ERT recommends that Belgium fully implement the recommendations made in all previous review reports. In particular, the ERT recommends that Belgium:

- (a) Include in the NIR the full national energy balance for the latest reported year (see para. 22 below);
- (b) Provide relevant justification and quantified information on the recalculations (see para. 23 below);
- (c) Include in the NIR the relevant explanations of the differences in emissions in the CRF tables and the data reported to the European Union Emissions Trading System (EU ETS) (see para. 31 below);
- (d) Provide more detailed information on methodologies and sources for AD and EFs used for the emissions that are reported in an aggregated manner in the industrial processes sector (see para. 42 below);
- (e) Estimate emissions in the agriculture sector for all three regions using appropriate methods that are relevant to national circumstances, in accordance with the IPCC good practice guidance (see paras. 56, 57, 60, 63 and 65 below);
- (f) Report the carbon stock gains and losses for living biomass in the cropland remaining cropland category in the LULUCF sector (see para. 71 below).

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

20. 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**

21. The energy sector is the main sector in the GHG inventory of Belgium. In 2011, emissions from the energy sector amounted to 97,698.27 CO<sub>2</sub> eq, or 81.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 13.1 per cent. The key drivers for the fall in emissions are: the lower consumption of solid fuels in the iron and steel industry due to a change from basic oxygen furnaces to electric arc furnaces; the switch from solid fuels to gaseous fuels in public electricity and heat production; and the technological improvements in the combined heat and power installations. Within the sector, 27.7 per cent of the emissions were from transport, followed by 25.1 per cent from

other sectors, 24.1 per cent from manufacturing industries and construction and 22.6 per cent from energy industries. The remaining emissions were from fugitive emissions from fuels (0.5 per cent, mainly from oil and natural gas) and from other (fuel combustion) (0.1 per cent).

22. In response to recommendations made in the previous review report, Belgium has reported the full list of NCVs used in its calculations for the energy sector in its NIR (page 290, annex 4) and it has included the full regional energy balances for the latest reported year in its NIR (pages 306–312, annex 8). However, the ERT noted that Belgium has not reported the full national energy balance despite the recommendations made in previous review reports. In response to a question raised by the ERT during the review regarding the national energy balance, Belgium provided the ERT with spreadsheets showing the full national energy balance for the latest reported year. The ERT commends Belgium for including the regional balances and the full of list of NCVs and reiterates the recommendation that the Party further enhance the transparency of the NIR by including the full national energy balance for the latest reported year, outlining the final energy consumption by sector.

23. The ERT noted that Belgium has not reported clear descriptions of the main reasons underpinning the recalculations or the quantification of the effects on the emissions in the NIR. The ERT strongly reiterates the recommendation made in the previous review report that Belgium provide relevant justification and quantified information on the recalculations at the level of estimate.

24. In its NIR (pages 64–65, section 3.2.1), Belgium has reported that a working group was established to improve the harmonization of the regional and federal energy balances and that its intention in 2013 is to set up the regulation for mandatory reporting of the regional delivery figures of fuel. In response to a question raised by the ERT during the review regarding progress on the improvement of the consistency between the regional and federal energy balances, Belgium explained that the federal department of energy (the Federal Public Service for Economy, Small and Medium Enterprises, Self-Employed and Energy) plans to start with an extended reporting obligation for oil products in 2014 because the difference between regional and federal balances is especially high for oil products. The regional energy balances are set up using the bottom-up approach by actual energy consumption based on information received from several sources, including distribution network operators, surveys in the institutional and commercial sector, surveys in the industry and information from sectoral federations. On the other hand, the federal energy balance is set up using a top-down approach based on information received from suppliers that have the obligation to report to the federal government. The ERT recommends that the Party make efforts to implement these activities to improve the consistency between the regional and federal energy balances.

## **2. Reference and sectoral approaches**

25. 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 26 and 27 below.

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

26. The reference approach is based on the federal energy balance, whereas the sectoral approach is based on the regional energy balances of the Flemish, Walloon and Brussels-Capital regions. There are significant discrepancies in both fuel consumption and CO<sub>2</sub> emissions for the different fuels. In 2011, CO<sub>2</sub> emissions from liquid fuels calculated using the reference approach were 10.9 per cent higher than those calculated according to the

sectoral approach. For solid fuels, CO<sub>2</sub> emissions calculated using the reference approach were 7.8 per cent lower than those calculated according to the sectoral approach. CO<sub>2</sub> emissions from gaseous fuels were 11.8 per cent higher according to the reference approach than those calculated using the sectoral approach. Belgium has reported additional explanations of the reasons for these differences as part of a discussion about allocation under the industrial processes sector and non-energy use of fuels in its NIR (pages 63–64). The ERT commends Belgium for the efforts undertaken and reiterates the recommendation made in the previous review report that the Party complete the harmonization of the different data sources and reduce the differences between the reference and sectoral approaches.

Table 5  
**Review of reference and sectoral approaches**

		<i>Paragraph cross-references</i>
Difference between the reference approach and the sectoral approach	Energy consumption: –4.68 PJ, –0.3%  CO <sub>2</sub> emissions: 1,203.85 Gg CO <sub>2</sub> eq, 1.3%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	See paragraph 26
Are differences with international statistics adequately explained?	No	See paragraph 27
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	See paragraph 28
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	See paragraph 29

*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”.

27. The federal energy balance, used for the reference approach, also serves as the basis for meeting the Party’s international reporting obligations to the International Energy Agency (IEA) and Eurostat, the statistical office of the European Union (EU). However, the ERT noted discrepancies for coal between the reference approach and the IEA and Eurostat data. In response to a question raised by the ERT during the review, Belgium explained that the reasons for the discrepancies for coal are the different calorific values used for the different types of hard coal products and lignite. Belgium also explained that in the Belgian energy balance, anthracite, coking coal and other bituminous coal are aggregated and converted to energy units using the same conversion factor (29.31 GJ/t), but different conversion factors are sent to Eurostat for each product; in the CRF tables, only anthracite is aggregated with other bituminous coal but coking coal has the same conversion factor (29.31 GJ/t). Belgium further explained that, for lignite, the conversion factor sent to Eurostat seems to be wrong and it will be corrected (e.g. for 2011, Eurostat received a factor of 8.37 GJ/t while the energy balance used 21.56 GJ/t). The Party also explained that the corrected data will be reported to IEA and Eurostat, and will also be sent to the



inventory compilers in the Belgian regions. The ERT noted also that there are discrepancies for stock changes of liquid fuels and aviation bunkers (they are still not reported to IEA). The ERT recommends that Belgium review and if necessary revise its reporting in the CRF tables and to IEA to improve the consistency between the reference approach, the IEA data and Eurostat data and also recommends that the Party transparently describe and justify any remaining differences in the NIR.

*International bunker fuels*

28. No problems were identified.

*Feedstocks and non-energy use of fuels*

29. No problems were identified.

### 3. Key categories

Stationary combustion: liquid, solid and gaseous fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O<sup>3</sup>

30. The ERT noted that Belgium uses plant-specific data (from the EU ETS) to report the majority of emissions from energy industries and manufacturing industries and construction for the period 2005–2011. In response to questions raised by the ERT during the review, Belgium provided, as an example, part of a monitoring plan. Belgium explained that it will be difficult to provide specific information on the methodologies, EFs, NCVs and oxidation factors of the plants under the EU ETS in the NIR as these data can be different for each plant (each plant has its own emissions trading permit and a monitoring plan, as required by the EU ETS). The Party also explained that the monitoring plan is confidential. The ERT recommends that Belgium provide in the NIR the relevant EU ETS plant-specific data (aggregated if confidentiality is an issue) and transparent information on the coverage of EU ETS emissions for the period 2005–2012 and explain how the consistency of the time series is ensured when using different data sources for different periods.

31. Belgium has reported in its NIR (page 79) that the emissions from petroleum refining, which occur only in the Flemish region, are completely in line with the emissions reported under the EU ETS. In response to a question raised by the ERT during the review, Belgium explained that the difference between the emissions reported under the EU ETS and those reported in the CRF tables for this category is mainly caused by three factors: the emissions from a naphtha-cracking installation are included under oil refineries under the EU ETS, whereas these emissions are reported under chemicals (manufacturing industries and construction) in the CRF tables because, although the unit is physically situated at the site of the neighbouring refinery, the unit is still owned by the petrochemical company (which has two other naphtha-cracking units) and is therefore considered to be part of the chemical industry in all environmental reporting; the emissions from one combined heat and power installation, which is a joint venture between an oil refinery and a heat and power producer, are included under oil refineries under the EU ETS but are reported under public electricity and heat production in the CRF tables; and the emissions from flaring in oil refineries, reported under oil refineries in the EU ETS, are reported under venting and flaring in the CRF tables. The ERT reiterates the recommendation made in the previous review report that Belgium include in the NIR the relevant explanations of the differences in emissions in the CRF tables and the EU ETS.

---

<sup>3</sup> Not all emissions related to all fuels and gases under this category are key categories. However, since the calculation procedures for the issues related to this category are discussed as a whole, the individual fuels and gases are not assessed in separate sections.

32. The ERT found that Belgium has reported a relatively low CO<sub>2</sub> implied emission factor (IEF) for solid fuels in iron and steel (62.29 t CO<sub>2</sub>/TJ for 2010 and 63.90 t CO<sub>2</sub>/TJ for 2011, as reported in CRF table 1.A(a), compared with the IPCC default range of 94.60–106.70 t/TJ). In response to a question raised by the ERT during the review, Belgium explained that the Flemish region has revised the AD to exclude the blast furnace gas (BFG) sold to electricity producers and, as a consequence, the IEF in the category for solid fuels is higher than in the previous submission (53.22 t CO<sub>2</sub>/TJ for 2010). However, the ERT noted that the IEF remains lower than the IPCC default range. The ERT strongly recommends that Belgium review, and if necessary revise, the low IEFs for solid fuels in iron and steel and provide an explanation in the NIR. The ERT also recommends that Belgium report AD and emissions from the BFG sold to electricity producers under public electricity and heat production, and not under iron and steel.

33. The NIR (section 3.2.9.5, page 98) indicates that CH<sub>4</sub> and N<sub>2</sub>O emissions from sea fishing in the category agriculture/forestry/fisheries have been recalculated to make them consistent with the CO<sub>2</sub> emissions. In response to questions raised by the ERT during the review, Belgium explained that the emissions of CO<sub>2</sub> of all fishing boats in Belgium are based on the Flemish energy balance data (the Walloon and Brussels regions are landlocked) and reported in the category agriculture/forestry/fisheries. It provided the ERT with the Flemish energy balance data on CO<sub>2</sub> emissions from sea fishing (the estimates of CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions are consistent with total energy consumption). The ERT commends Belgium for improving the estimation of CH<sub>4</sub> and N<sub>2</sub>O emissions and recommends that the Party improve the transparency of the information on this recalculation and explain in detail which emissions are reported under the category agriculture/forestry/fisheries and which under the category navigation, and how the consistency of the estimates (AD and methodologies) is ensured in each category.

34. The ERT noted that Belgium has reported CH<sub>4</sub> and N<sub>2</sub>O emissions from gaseous fuels under petroleum refining as “NO” (not occurring) in CRF table 1.A(a), even though the Party has reported AD and CO<sub>2</sub> emissions in the same table. In response to a question raised by the ERT during the review, Belgium explained that the notation key should be “IE” (included elsewhere) and that CH<sub>4</sub> and N<sub>2</sub>O emissions are estimated and reported under several categories, as indicated on page 79 of the NIR. The ERT recommends that Belgium report estimates for CH<sub>4</sub> and N<sub>2</sub>O emissions from gaseous fuels under petroleum refining. If this is not possible, the ERT recommends that the Party report these emissions as “IE” and explain clearly where the emissions are reported. The ERT also noted that CH<sub>4</sub> emissions from liquid fuels are reported as “IE” while estimates for CO<sub>2</sub> and N<sub>2</sub>O emissions are reported. The ERT recommends that Belgium report estimates for CH<sub>4</sub> emissions for liquid fuels.

#### **4. Non-key categories**

##### Civil aviation: liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

35. Belgium has recalculated the GHG emissions for this category to include some kerosene uses previously reported under international bunkers (NIR pages 66 and 91). The ERT noted that the Party has not estimated N<sub>2</sub>O emissions from cruising for the Flemish region and strongly recommends that the Party estimate these emissions. In response to a question raised by the ERT during the review regarding the result of a consultation with Belgocontrol in relation to obtaining the AD to estimate emissions from civil aviation and performing the QA activities, Belgium explained that it is difficult to make the split between international and domestic flights in the fuel statistics in the Flemish region, but that the Party received AD on all flights in Belgium from Belgocontrol and plans to start a study to optimize the calculation of emissions from civil aviation. The ERT commends Belgium for these planned improvements and recommends that the Party make efforts to

make use of additional sources and to collaborate with Belgocontrol or Eurocontrol (or both) to improve the emission estimates.

Road transportation: liquid fuels – CH<sub>4</sub> and N<sub>2</sub>O

36. The NIR (pages 25, 27, 29, 73 and 89–90) indicates that CH<sub>4</sub> and N<sub>2</sub>O emissions from liquid fuels for road transportation are based on the estimates from the regional models (based on COPERT), corrected according to the ratio between the fuel used (data from regional statistics) and the fuel sold (data from federal statistics) to get consistency with the methodology used to calculate the CO<sub>2</sub> emissions (based on national statistics and not on the results of the regional models). In response to a question raised by the ERT during the review regarding the input parameters for the regional models used to estimate CH<sub>4</sub> and N<sub>2</sub>O emissions, Belgium provided the ERT with detailed input parameters used by one region (Wallonia), indicating that the same parameters are used in the models for the other regions. The ERT recommends that the Party provide, in its NIR, additional information on how CH<sub>4</sub> and N<sub>2</sub>O emissions are estimated at the regional level and aggregated, including the corrections to improve consistency with the CO<sub>2</sub> emission estimates and the method and input parameters for the models.

Solid fuel transformation: solid fuels – CO<sub>2</sub>

37. The ERT noted that Belgium has reported CO<sub>2</sub> emissions from solid fuel transformation as “NO” in CRF table 1.B.1, even though the Party has reported the AD and CH<sub>4</sub> emissions for this category in the same table. In response to a question raised by the ERT during the review, Belgium explained that these CO<sub>2</sub> emissions are negligible based on a scientific article.<sup>4</sup> The ERT agreed with this explanation and recommends that Belgium include in the NIR the information provided during the review and include a brief explanation in the documentation box to the CRF table.

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

### 1. Sector overview

38. In 2011, emissions from the industrial processes sector amounted to 11,288.60 Gg CO<sub>2</sub> eq, or 9.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 211.13 Gg CO<sub>2</sub> eq, or 0.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 35.0 per cent in the industrial processes sector, and decreased by 1.1 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 use of N<sub>2</sub>O abatement catalyst in nitric acid plants; the decrease in production of iron and steel; and the installation of a fluoride recovery system in the most important source of HFC emissions (an electrochemical synthesis unit). Within the industrial processes sector, 45.1 per cent of the emissions were from mineral products, followed by 29.7 per cent from chemical industry, 18.8 per cent from consumption of halocarbons and SF<sub>6</sub> and 4.9 per cent from metal production. The remaining 1.5 per cent were from production of halocarbons and SF<sub>6</sub>. For the solvent and other product use sector, Belgium has reported only N<sub>2</sub>O emissions from the use of N<sub>2</sub>O for anaesthesia.

39. The ERT noted that reasons for the recalculations in the industrial processes sector are briefly described in the NIR and CRF table 8(a) and the types of changes (in AD, EF or methods) are specified in CRF table 8(b). The ERT recommends that Belgium use more

---

<sup>4</sup> Nishifuji N. et al. July 2011. “Characterization of Gas Generation during Coking Reaction and Continuous Monitoring of COG Using Gas Monitoring System” Nippon Steel Technical Report, No. 100.

transparent descriptions (e.g. replace “emissions optimized” with “revision of activity data” and “fine tuning of methodology” with “reallocations within and outside the category”).

40. The ERT noted that emissions and AD for soda ash and carbon black are reported as “NO” in CRF table 2(I)A-G. In response to a question raised by the ERT during the review, Belgium explained that there was a mistake in the notation keys of these categories and that the correct notation key should be “IE”. The ERT recommends that Belgium correct the notation keys for these categories and indicate where the emissions are allocated.

41. The ERT noted that transparency is generally improved in the industrial processes sector by providing additional information in the NIR in response to recommendations made in previous review reports. For example, Belgium improved the information on methodologies used in chemical industry for ammonia production, nitric acid production and other (chemical industry). The ERT commends Belgium for the improvements made for this category. However, some of the recommendations on transparency made in the previous review report have not been addressed yet. During the review, Belgium indicated that these will be addressed in the 2014 annual submission (e.g. see paras. 47 and 49 below).

42. Confidentiality continues to be a concern for transparency in this sector where the Party reports aggregated information for the AD and emissions for the key category other (chemical industry), which includes emissions from the production of maleic anhydride, caprolactam, ethylene oxide and acrylic acid. In response to a question raised by the ERT during the review, Belgium explained that it could only put more detailed information in the NIR when such information is no longer confidential, for example when part of the information is included in the EU ETS. The ERT reiterates the recommendation made in the previous review report that Belgium provide more detailed data on methodologies and data sources for the AD and EFs used for reporting the emissions from the category other (chemical industry), even for subcategories considered by the Party to be confidential.

## 2. Key categories

### Ammonia production – CO<sub>2</sub> and CH<sub>4</sub><sup>5</sup>

43. The ERT noted that Belgium uses the tier 1b methodology from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) to estimate CO<sub>2</sub> emissions from ammonia production. However, the ERT noted that Belgium, in addition, applied an oxidation factor of 99.5 per cent. The ERT considers that the use of this oxidation factor is not in line with the IPCC good practice guidance, and therefore concludes that CO<sub>2</sub> emissions from ammonia production are potentially underestimated. The ERT included this issue in the list of potential problems and further questions raised by the ERT during the review. In its response to this list, Belgium submitted revised estimates that do not include the oxidation factor. The ERT considers that the potential underestimation has been resolved. The ERT recommends that the Party include detailed information about this revision.

44. Belgium has reported CH<sub>4</sub> emissions from ammonia production for the complete time series (0.0006 Gg for 2011). The ERT commends the Party for reporting these estimates. In response to a question raised by the ERT during the review, Belgium explained that the estimates are based on an analysis made of the scrubber at the plant. The ERT recommends that the Party include this information and explain how these emissions are estimated.

---

<sup>5</sup> CH<sub>4</sub> emissions under this category are not key. However, since the issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

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

45. The ERT noted that inter-annual changes of the CO<sub>2</sub> IEF between 2009 (0.148 t/t), 2010 (0.110 t/t) and 2011 (0.066 t/t) are significant. The 2010 value is 26.0 per cent below the 2009 value and the 2011 value is 40.3 per cent below that of 2010. In response to a question raised by the ERT during the review, Belgium explained that the decrease in the IEF of CO<sub>2</sub> for these years is due to the installation of a recovery unit for converter gas that increased the efficiency of the process in the steel production company in the Flemish region in 2010. This recovery unit was operational only half-time in 2010 (the drop in emissions was also lower because of an increase in production in 2010 compared with 2009) and full-time in 2011. The ERT recommends that Belgium include this information in the NIR.

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

46. Belgium reported AD and HFC emissions for transport refrigeration, industrial refrigeration and stationary air-conditioning equipment as “IE” in CRF table 2(II).F. In the documentation box to that table, the Party indicates that these emissions are reported under commercial refrigeration. In response to a question raised by the ERT during the review, Belgium explained that emissions from transport refrigeration are calculated separately and will be reported separately from commercial refrigeration in its next annual submission. The ERT recommends that Belgium report emissions from transport refrigeration, industrial refrigeration and stationary air-conditioning equipment separately from commercial refrigeration in CRF table 2(II).F.

47. For semiconductor manufacture, under amount of gases filled into new manufactured products, Belgium has reported AD as “C” (confidential) for all F-gases in CRF table 2(II).F (for pentafluoroethane, AD are reported as “C” only in 2009 and as “NO” in other years where this activity does not occur) and has reported emissions of these gases from manufacturing. The NIR indicates that the emission estimates are obtained directly from the companies of the sector (NIR page 126). The ERT reiterates the recommendation made in the previous review report that the Party include information on the methodologies, AD and EFs used to estimate these emissions and on the QA/QC procedures, while, as appropriate, preserving the confidentiality.

48. Belgium has estimated disposal emissions from commercial refrigeration using a disposal EF of 50 per cent without justifying this choice. In response to a question raised by the ERT during the review, Belgium provided additional information (research studies, data from national statistics and assumptions) that justifies the use of the 50 per cent disposal EF. The ERT recommends that Belgium include the information provided during the review in the NIR, in order to increase transparency.

49. For electrical equipment, Belgium continues to report AD and SF<sub>6</sub> emissions from manufacturing for 1990–2008 as “NE” (not estimated) and AD and emissions from disposal for 1990–2009 as “NO” in CRF table 2(II).F. The ERT strongly reiterates the recommendation made in the previous review report that Belgium estimate and report AD and SF<sub>6</sub> emissions from manufacturing for 1990–2008 and from disposal for 1990–2009 or justify why these emissions do not occur.

50. The ERT noted that Belgium has estimated SF<sub>6</sub> emissions from electrical equipment from manufacturing for 2009–2011 on the basis of the quantity of SF<sub>6</sub> contained in the new equipment and using an EF of 1 per cent of leakage from the total SF<sub>6</sub> quantity. The ERT noted that Belgium has not justified this EF and that this factor is much lower than the default EFs provided in table 3.12 of the IPCC good practice guidance (6 per cent for installation emissions from electrical equipment in Europe after 1996 and 15 per cent for earlier years). In response to a question raised by the ERT during the review, Belgium explained that in Belgium there is no manufacturing of electrical equipment containing SF<sub>6</sub>.

and that the emissions reported are from the installation of new equipment on site. The Party also explained that, in a more recent study specifically on the subject,<sup>6</sup> which is referred to in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), installation emissions are included in the manufacturing EF, which is estimated at 3 per cent in 2003. Belgium considered that, as most of the manufacturing emissions occur at the production plant, it seems conservative to allocate one third of the emissions to the installation site (i.e. to consider an EF of 1 per cent for emissions during installation). The ERT recommends that the Party include this justification in the NIR.

51. Belgium estimated emissions from manufacturing of fire extinguishers based on an EF of 0.1 per cent taken from the literature, without providing any justification. In response to a question raised by the ERT during the review, Belgium explained that the EF is based on a study<sup>7</sup> and on consultations with the leading installer and filler of fire extinguishers in the country and with experts in Belgian companies. The ERT recommends that Belgium include, in the NIR, the information provided to the ERT during the review, in order to increase transparency, and additional information on the QA procedures applied to these emissions.

52. For other (consumption of halocarbons and SF<sub>6</sub>), Belgium reported SF<sub>6</sub> emissions only from double-glazed windows. The ERT noted that, according to the IPCC good practice guidance (page 3.63), applications in this category include: gas-air tracer in research and leak detectors; medical purposes; equipment used in accelerators, lasers and night vision goggles; applications utilizing its adiabatic property (e.g. tennis balls or shoe soles); and military applications. The IPCC good practice guidance provides a decision tree for identifying sources (fig. 3.8) and calculation methods for SF<sub>6</sub> emissions in this subcategory (equations 3.22 to 3.26). The ERT strongly recommends that Belgium conduct research in order to ensure the completeness of the reporting, and report the result of the research. If other sources of SF<sub>6</sub> are identified, the ERT strongly recommends that Belgium estimate and report these emissions.

### 3. Non-key categories

#### Solvent and other product use – N<sub>2</sub>O

53. In CRF table 3, Belgium has only reported N<sub>2</sub>O emissions for the category use of N<sub>2</sub>O for anaesthesia. Belgium has performed recalculations for the N<sub>2</sub>O emissions from this category, as indicated in CRF table 8(a), but this recalculation is not mentioned in the NIR. In response to a question raised by the ERT during the review, Belgium explained that the AD (number of hospital beds) for the Brussels-Capital region was recalculated for the entire time series using more precise data from the Brussels Institute for Statistics and Analysis. The ERT recommends that the Party explain this change in its NIR. The ERT also noted that number of hospital beds and the N<sub>2</sub>O IEF for use of N<sub>2</sub>O for anaesthesia are reported as “NE” in CRF table 3.A-D and therefore reiterates the recommendation made in the previous review report that Belgium replace the notation key by the appropriate figure in CRF table 3.A-D.

---

<sup>6</sup> Wartmann S and Harnisch J. 2005. *Reductions of SF<sub>6</sub> Emissions from High and Medium Voltage Electrical Equipment in Europe*. Final Report to CAPIEL, Ecofys 28 June 2005.

<sup>7</sup> Schwarz W. 2005. *Emissions, Activity Data and Emission Factors of Fluorinated Greenhouse Gases(F-gases) in Germany 1995-2002*. Research Report 201 41 261/01. Federal Environmental Agency (Umweltbundesamt). Available at <<http://www.oekorecherche.de/sites/default/files/publikationen/activity.pdf>>.

## D. Agriculture

### 1. Sector overview

54. In 2011, emissions from the agriculture sector amounted to 9,496.92 Gg CO<sub>2</sub> eq, or 7.9 per cent of total GHG emissions. Since 1990, emissions have decreased by 17.0 per cent. The key driver for the fall in emissions is a 36 per cent reduction in the number of agricultural and horticultural holdings with an associated decrease in the cattle and swine populations and in the amount of nitrogenous fertilizers applied to soils. Within the sector, 39.3 per cent of the emissions were from agricultural soils, followed by 38.0 per cent from enteric fermentation and 22.8 per cent from manure management.

55. The ERT commends Belgium for providing explanations of the recalculations undertaken in the NIR and CRF table 8(b). However, as different recalculations are performed in each regional inventory, the explanations are not sufficiently detailed to allow the ERT to assess the impact of the recalculations on total and sectoral emissions. The ERT recommends that Belgium provide information on the impact of the recalculations for the agriculture sector at both the regional and the national level.

56. The ERT notes that Belgium has recalculated emissions in all categories for the agriculture sector for the Brussels-Capital region using the methods, parameters and EFs from the Revised 1996 IPCC Guidelines. The ERT also notes that, for some categories, the other regions have estimated emissions using tier 2 methodologies with region-specific parameters. The ERT strongly reiterates the recommendation made in the previous review report that Belgium estimate emissions from all three regions using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance (e.g. see paras. 57 and 60 below).

### 2. Key categories

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

57. For the Flemish and Walloon regions, the ERT noted that CH<sub>4</sub> emissions from enteric fermentation in dairy and non-dairy cattle were estimated using a tier 2 method and that a tier 1 method was used for all other animals, in line with the IPCC good practice guidance. The ERT also noted that emissions from all livestock, including dairy and non-dairy cattle, in the Brussels-Capital region are estimated using the tier 1 methodology and EFs as described in the Revised 1996 IPCC Guidelines. The ERT strongly reiterates the recommendation made in the previous review report that Belgium estimate emissions from all three regions using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance. For example, using the CH<sub>4</sub> IEF for enteric fermentation from the Flemish or Walloon regional emission estimates when estimating emissions for the Brussels-Capital region may be more appropriate, and it would improve the internal consistency of the regional emission estimates for Belgium. The ERT also recommends that Belgium provide a justification for using a methodology for the Brussels-Capital region which is different from the methodologies used for the Walloon and Flemish regions (e.g. differences in agricultural production practices in the Brussels-Capital region).

58. The ERT noted that Belgium has not estimated net energy for pregnancy (NE<sub>p</sub>) for dairy cattle in both the Flemish and the Walloon region and net energy for lactation (NE<sub>l</sub>) for non-dairy cattle in the Walloon region (annex 3 to the NIR). The ERT also noted that NE<sub>p</sub> and NE<sub>l</sub> affect the estimation of gross energy (GE), as described in equation 4.11 of the IPCC good practice guidance. Not including NE<sub>p</sub> and NE<sub>l</sub> in the calculations is not in line with the IPCC good practice guidance and results in a potential underestimation of GE and, as a result, a potential underestimation of CH<sub>4</sub> emissions from this category, and

therefore the ERT included these issues in the list of potential problems and further questions raised by the ERT during the review. In response to this list, Belgium submitted revised estimates for enteric fermentation for dairy cattle for the Flemish and Walloon regions that included  $NE_p$ , and for non-dairy cattle for the Walloon region that included  $NE_i$ , in accordance with the IPCC good practice guidance. The ERT considers that the issues have been resolved. The ERT recommends that Belgium describe all performed methodological changes in the NIR.

59. The ERT noted that, in the estimation of net energy for growth ( $NE_g$ ) in the Flemish region, Belgium assumes that all cattle are castrates within the categories under one year, between one and two years old and more than two years old. The ERT considers that these cattle categories should include a proportion of female animals. Equation 4.3a of the IPCC good practice guidance includes a coefficient of 0.8 for females compared with a value of 1 for castrates. The ERT recommends that Belgium review the assumption that all cattle within the categories identified are castrates and assign the appropriate coefficients in the estimation of  $NE_g$  for the Flemish region.

#### Manure management – $CH_4$ and $N_2O$

60. For the Flemish and Walloon regions, the ERT noted that emissions from dairy and non-dairy cattle were estimated using a tier 2 method and that a tier 1 method was used for all other animals, in line with the IPCC good practice guidance. The ERT also noted that emissions from all livestock, including dairy and non-dairy cattle, in the Brussels region are estimated using the tier 1 methodology and EFs as described in the Revised 1996 IPCC Guidelines. The ERT strongly reiterates the recommendation made in the previous review report that Belgium estimate emissions from all three regions using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance. For example, the ERT suggests that using the  $CH_4$  IEF for emissions from manure management from the Flemish or Walloon regional emission estimates to emission estimates when estimating emissions for the Brussels-Capital region may be more appropriate, and it would improve the internal consistency of the regional emission estimates for Belgium. The ERT also recommends that Belgium provide a justification for using a methodology for the Brussels-Capital region which is different from the methodologies used for the Walloon and Flemish regions (e.g. differences in agricultural production practices in the Brussels-Capital region).

61. The ERT commends Belgium for providing further justification for the choice of methane conversion factors (MCFs) from the 2006 IPCC Guidelines used, as presented in table 6.14 of the NIR, in particular the justification for the applicability of these MCFs to the national circumstances.

62. The ERT noted that Belgium has not estimated  $NE_p$  for dairy cattle in both the Flemish and the Walloon region and  $NE_i$  for non-dairy cattle in the Walloon region (annex 3 to the NIR).  $NE_p$  and  $NE_i$  affect the estimation of GE as described in equation 4.11 of the IPCC good practice guidance and, as a result, the estimation of volatile solids (VS) excretion rate as described in equation 4.16 of the IPCC good practice guidance. Not including  $NE_p$  and  $NE_i$  in the calculations is not in line with the IPCC good practice guidance and results in a potential underestimation of GE and VS and, as a result, a potential underestimation of  $CH_4$  emissions from this category, and therefore the ERT included this issue in the list of potential problems and further questions raised by the ERT during the review. In response to this list, Belgium submitted revised estimates for manure management for dairy cattle for the Flemish and Walloon regions that included  $NE_p$  and for non-dairy cattle for the Walloon region that included  $NE_i$ , in accordance with the IPCC good practice guidance. The ERT considers that the issues have been resolved. The ERT recommends that Belgium describe all the performed methodological changes in the NIR.



63. The ERT notes that for the Brussels-Capital region, Belgium, in its estimates of N<sub>2</sub>O emissions for this category, uses the default values for nitrogen (N) excretion (N<sub>ex</sub>) as described in table 4-20 of the Reference Manual of the Revised 1996 IPCC Guidelines. The ERT strongly reiterates the recommendation made in the previous review report that Belgium provide estimates for the Brussels-Capital region using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance.

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

64. The ERT commends Belgium for improving the descriptions of the methodologies used to estimate direct and indirect N<sub>2</sub>O emissions from agricultural soils. In particular, the ERT noted the inclusion of tables 6.18 to 6.27 in the NIR describing the methodological approaches, AD and EFs in each of the three regions. To continue improving the transparency of the reporting, the ERT recommends that Belgium provide additional information on the use of a region-specific fraction of synthetic fertilizer N applied to soils that volatilizes as ammonia and nitrogen oxides for the Flemish and Walloon regions and fraction of livestock N excreted and deposited onto soil during grazing for the Flemish, Walloon and Brussels-Capital regions.

65. The ERT notes that the default N<sub>ex</sub> used for the Brussels-Capital region also affects the estimates of direct N<sub>2</sub>O emissions from agricultural soils, and therefore the ERT reiterates the recommendation made in paragraph 63 above.

66. The ERT noted that the area of cultivated histosols used in the estimation of N<sub>2</sub>O emissions for the Flemish region (25,200 ha, annex 3 to the NIR) differs from that reported in FAOSTAT (8,424 ha), the database of the Food and Agriculture Organization of the United Nations,<sup>8</sup> and from the area reported in CRF table 4.D (2,520 ha). In response to a question raised by the ERT during the review, Belgium indicated that the value in the NIR is wrong and that 2,520 ha was used in the calculations. The ERT strongly recommends that Belgium review the AD associated with cultivation of histosols, explain the differences in the area between CRF table 4.D and FAOSTAT and, if necessary, revise the emission estimates and explain any changes in the NIR and CRF table 8(b) (see paras. 72 and 74 below).

67. The ERT noted that, in the Walloon region, Belgium has not estimated the indirect emissions of N<sub>2</sub>O caused by atmospheric deposition from sewage sludge application to agricultural soils. This is not in line with the IPCC good practice guidance and results in a potential underestimation of N<sub>2</sub>O emissions from this category, and therefore the ERT included this issue in the list of potential problems and further questions raised by the ERT during the review. In response to this list, Belgium submitted revised estimates for indirect emissions of N<sub>2</sub>O from atmospheric deposition that included indirect emissions of N<sub>2</sub>O from the Walloon region, in accordance with the IPCC good practice guidance. The ERT considers that the issue has been resolved. The ERT recommends that Belgium describe all the performed methodological changes in the NIR.

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

### **1. Sector overview**

68. In 2011, net removals from the LULUCF sector amounted to 1,268.35 Gg CO<sub>2</sub> eq. Since 1990, net removals have increased by 38.8 per cent. The key drivers for the rise in removals are the increases in removals from forest land and from grassland, which more

<sup>8</sup> <<http://faostat3.fao.org/faostat-gateway/go/to/download/G1/GV/E>>.

than offset increasing emissions from cropland and settlements. Within the sector, forest land, grassland and wetlands resulted in net removals (3,792.93 Gg CO<sub>2</sub> eq, 76.61 Gg CO<sub>2</sub> eq and 22.43 Gg CO<sub>2</sub> eq, respectively) while cropland, settlements and other land resulted in net emissions (1,931.48 Gg CO<sub>2</sub> eq, 585.43 Gg CO<sub>2</sub> eq and 106.70 Gg CO<sub>2</sub> eq, respectively).

69. The ERT noted that Belgium has continued to report limited information regarding the methodologies used in the LULUCF sector. The ERT considers that this information is not fully transparent and does not allow the ERT to completely assess the extent to which the estimates are prepared in accordance with the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). As indicated in the previous review report, during the previous review the ERT and the Party discussed issues, in particular in relation to the methods used to monitor land-use changes. All of the questions raised by the ERT were adequately answered and the requested additional information was provided; however, such information has not been included in the NIR of the 2013 annual submission. Therefore the ERT reiterates the recommendation made in the previous review report that Belgium explain in greater detail the methods used to monitor land-use changes and to ensure the consistent representation of land.

## 2. Key categories

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

70. The NIR does not provide enough information to justify the difference in per hectare average carbon stock changes in mineral soils between the Walloon region and the Flemish region, which represents 23.0 per cent of Belgian forest land. The ERT reiterates the recommendation made in the previous review report that Belgium increase the transparency of the report by providing in the NIR background data and ancillary information to justify this difference.

### Cropland remaining cropland – CO<sub>2</sub>

71. Under this category, for living biomass, Belgium has reported the gains and losses of carbon stock as “NE” and “NO”, respectively, in CRF table 5.B. In addition, section 7.3.2.1 of the NIR indicates that the area of orchards has increased significantly since 1990 and, therefore, the subcategory is assumed to be a net sink. The ERT strongly reiterates the recommendation made in the previous review report that Belgium report the gains and losses for this carbon pool.

72. Belgium has reported the area and carbon stock changes for organic soils as “NO” in CRF table 5.B for all years in the time series. However, the Party reported AD and N<sub>2</sub>O emissions from cultivated organic soil (histosols) in the agriculture sector, CRF table 4.D.1 (see para. 66 above). Further, no organic soils are reported in the subcategory land converted to cropland. The ERT recommends that Belgium report organic soils and associated CO<sub>2</sub> emissions under cropland and, if appropriate, report estimates for AD, carbon stock changes and GHG emissions for organic soils under the two subcategories cropland remaining cropland and land converted to cropland.

73. Belgium has reported emissions from liming in cropland (CRF table 5(IV)) using expert judgement and data from neighbouring countries (NIR section 7.3.2.1.D). The ERT reiterates the recommendation made in the previous review report that the Party refine the emission estimates using country-specific data and report information on the methodologies and parameters used in the estimations.

Grassland – CO<sub>2</sub>

74. Similarly to that for cropland (see para. 72 above), Belgium has reported the area and carbon stock changes for organic soils for grassland remaining grassland and for land converted to grassland as “NO” in CRF table 5.C for all years in the time series. However, in FAOSTAT, organic soils and associated emissions are reported for Belgium. The ERT recommends that Belgium review its reporting and, if appropriate, report estimates of AD, carbon stock changes and GHG emissions for organic soils for grassland remaining grassland and land converted to grassland.

75. Belgium has reported emissions from liming in grassland in CRF table 5(IV) using expert judgement and data from neighbouring countries (NIR section 7.3.2.1.D). The ERT reiterates the recommendation made in the previous review report that the Party refine the emission estimates using country-specific data and report information on the methodologies and parameters used in the estimations.

**3. Non-key categories**Biomass burning – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

76. Belgium has reported GHG emissions from biomass burning for wildfires in land converted to forest land and in the conversions of forest land to cropland, grassland and wetlands as “NE” in CRF table 5(V). However, in the documentation box to that table, Belgium indicates that emissions from these categories have been reported under wildfires in forest land remaining forest land and grassland remaining grassland. The ERT recommends that Belgium use the notation key “IE” if the emissions are reported in another category (or “NO” if not occurring) and indicate in which category the emissions are included.

**F. Waste****1. Sector overview**

77. For 2011, emissions from the waste sector amounted to 1,613.18 Gg CO<sub>2</sub> eq, or 1.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 52.7 per cent. The key driver for the fall in emissions is the implementation of policies, measures and economic tools which resulted in the improvement of waste management practices and techniques at the national and regional levels in Belgium. Within the sector, 40.9 per cent of the emissions were from solid waste disposal on land, followed by 32.6 per cent from waste incineration and 24.9 per cent from wastewater handling. The remaining 1.6 per cent were from composting of organic waste under the category other.

78. Each of the Party’s regions has a specific approach to waste treatment and therefore estimates GHG emissions by different methods, but the information at the national level is not transparent. The ERT recommends that Belgium improve the transparency of the NIR by including information on regional waste treatment systems aggregated to the national level in the form of tables and a flow chart in the NIR.

79. The ERT noted that the description of the sector-specific QA/QC procedures is still insufficient and therefore reiterates the recommendation made in the previous review report that Belgium improve the description of QA/QC procedures, especially for key categories. In response to a question raised by the ERT during the review, the Party provided the ERT with a detailed description of the category-specific QA/QC procedures for CH<sub>4</sub> emissions from managed waste disposal on land and CO<sub>2</sub> emissions from waste incineration, the only key categories in the waste sector. The ERT recommends that Belgium include this information in the NIR.

## 2. Key categories

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

80. The estimation of CH<sub>4</sub> emissions from solid waste disposal on land were made by using two different approaches: for the Flemish region, a multiphase model (NIR pages 183–185) for the 16 active landfills (solid waste disposal sites) and a first-order decay (FOD) model for the closed landfills; and, for the Walloon region, another FOD model. There are no landfills in the Brussels-Capital region. The ERT considered that the transparency of the descriptions of the models in the NIR and the selection of the region-specific parameters is limited. In response to a question raised by the ERT during the review, Belgium provided the ERT with a table with the parameters used for each model, by region, using the same terminology so that the parameters could be compared between regions. The ERT reiterates the recommendation made in the previous review report that Belgium include this table in the NIR.

81. The ERT noted that Belgium has reported all parameters in the additional information table of CRF table 6.A as “NE”, except the total population and the time lag considered. In response to a question raised by the ERT during the review, Belgium explained that these parameters are available for each region but that a meaningful national average is difficult to calculate. The Party also explained that the parameters for each region would be reported in the 2014 annual submission. The ERT recommends that Belgium report the regional parameters in the NIR and include a reference to the section in the NIR where this issue is discussed in the documentation box to CRF table 6.A.

### Waste incineration – CO<sub>2</sub>

82. The ERT noted that, in response to a recommendation made in the previous review report, Belgium has reallocated the emissions from flaring activities in the chemical industry in the Flemish region from the category other (chemical industry) in the industrial processes sector to the category waste incineration in the waste sector. For the Walloon region, these emissions were already reported under waste incineration. The ERT commends Belgium for this improvement.

## 3. Non-key categories

### Wastewater handling – CH<sub>4</sub>

83. In response to a recommendation made in the previous review report, Belgium has harmonized the approach used for the estimation of CH<sub>4</sub> emissions from municipal wastewater treatment plants for the Flemish region, and the Party now assumes that all municipal wastewater is treated either aerobically or anaerobically with CH<sub>4</sub> recovery in all regions. The ERT commends the Party for this improvement.

84. The ERT noted that Belgium has reported all parameters included in the additional information tables to CRF table 6.B as “NE”. In response to a question raised by the ERT during the review, Belgium explained that these parameters are available for each region but that a meaningful national average is difficult to calculate. The ERT recommends that Belgium report the regional parameters in the NIR and include a reference to the section in the NIR where this issue is discussed in the documentation box to CRF table 6.B.

### Other (waste) – CH<sub>4</sub>

85. In response to an encouragement made in the previous review report, Belgium has estimated and reported CH<sub>4</sub> emissions from organic waste composting in the Brussels-Capital region. The ERT commends Belgium for this improvement.

## 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

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

Table 6

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

		<i>Findings and recommendations</i>
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1?	Not sufficient	See paragraph 89
Identify any elected activities under Article 3, paragraph 4, of the Kyoto protocol	Activities elected: none	
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	See paragraph 69

87. As explained in paragraph 69 above, during the previous review, Belgium provided enough information to demonstrate the consistency of its land representation. However, such information has not been included in the 2013 NIR. Therefore, the ERT reiterates the recommendation made in the previous review report that the Party report information that demonstrates the consistency of its land representation and in particular of areas reported under afforestation/reforestation and deforestation activities.

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

88. The ERT noted that Belgium has reported all AD and emissions from biomass burning as “NE” or “NO” for all activities under Article 3, paragraph 3, of the Kyoto Protocol in KP-LULUCF CRF table 5(KP-II)5. The ERT also noted that the NIR indicates that emissions from biomass burning have been significant in 2011 (NIR page 164) and that the Party assumed that all fires took place in forest land remaining forest land and not in areas of KP-LULUCF activities (NIR page 224). The ERT recommends that Belgium explain the basis for this assumption in its NIR or assign a portion of those emissions to afforestation/reforestation activities.

89. Belgium uses the same methodologies and data to estimate emissions and removals from the LULUCF sector under the Convention and from the KP-LULUCF activities under the Kyoto Protocol, as indicated in the KP-LULUCF chapter (chapter 10) of the NIR. However, as discussed in paragraph 69 above, the description of the LULUCF sector in the LULUCF chapter of the NIR (chapter 7) does not provide sufficient and transparent information on all of the methodologies applied and data used for the calculation of emissions and removals for the LULUCF sector, or their application to activities under Article 3, paragraph 3, of the Kyoto Protocol. The ERT noted that the information provided in chapter 10 of the NIR is less detailed than the information provided in chapter 7. The ERT strongly reiterates the recommendation made in previous review reports that Belgium improve the transparency of the information provided in its NIR, provide further information to satisfy the mandatory reporting element of paragraph 6(a) of the annex to

decision 15/CMP.1 and clearly specify, in the NIR, the methods used to report the emissions from each carbon pool under afforestation and reforestation, and deforestation.

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

90. Belgium has reported the carbon stock changes in dead wood and litter under afforestation and reforestation as “NO” (applying the assumptions of the tier 1 default method from the IPCC good practice guidance for LULUCF). Although the NIR does not contain transparent and verifiable information to demonstrate that these pools are not a net source of emissions, the ERT noted that paragraph 141 in the previous review report indicated that the information provided during the 2012 review demonstrated, in a transparent and verifiable way, that dead wood and litter are not a net source of emissions. The ERT also noted that the Party has country-specific data available to report this pool using a tier 2 method. Therefore, the ERT reiterates the encouragement made in the previous review report for Belgium to report estimates for these pools using the country-specific data available, in order to enhance the completeness of the reporting, and if this is not possible, the ERT strongly recommends that the Party include in its NIR the available verifiable information to demonstrate that these pools are not a net source of emissions.

91. Belgium has used different methodologies for each region to estimate carbon stock changes in living biomass and soils. Therefore, to improve transparency, the ERT strongly reiterates the recommendation made in the previous review report that Belgium disaggregate the reporting of afforestation and reforestation in the CRF tables according to the three regions.

92. Belgium has reported the losses in carbon stock in living biomass for afforestation and reforestation activities as “NO”. In response to a question raised by the ERT during the review, Belgium stated that the only living biomass on land converted to forest land could be orchards (cropland) converted to forest land. This may lead to the underestimation of emissions. The ERT recommends that Belgium estimate and report the carbon stock changes from biomass losses for any orchard land (reported as cropland) converted to forest land.

*Deforestation – CO<sub>2</sub>*

93. The ERT noted that Belgium has reported CO<sub>2</sub> emissions from liming in CRF table 5(IV) for the LULUCF sector. However, emissions from liming are reported as “NO” in KP-LULUCF CRF table 5(KP-II)4, even if there are deforested lands under cropland and grassland uses. The ERT strongly recommends that the Party report emissions from liming for deforestation.

**2. Information on Kyoto Protocol units**

Standard electronic format and reports from the national registry

94. Belgium has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.<sup>9</sup> The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

---

<sup>9</sup> The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party’s SEF tables with corresponding records contained in the ITL.

95. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism (CDM) registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

#### Calculation of the commitment period reserve

96. Belgium has reported its commitment period reserve in its 2013 annual submission. The Party reported that its commitment period reserve has not changed since the initial report review (606,595,975 t CO<sub>2</sub> eq) as it is based on the assigned amount and not the most recently reviewed inventory. However, the ERT noted that, based on the 15 April 2013 submission, five times the total GHG emissions for 2011 results in a lower value (600,857,567 t CO<sub>2</sub> eq). The ERT noted that, based on the submission of revised emission estimates by the Party during the course of the review of the 2013 annual submission of the total GHG emissions in its most recently reviewed inventory (120,308.10 Gg CO<sub>2</sub> eq), the commitment period reserve for the Party changed and the new commitment period reserve is reported as 601,540,484 t CO<sub>2</sub> eq. The ERT agrees with this figure. The ERT recommends that Belgium include accurate information on its estimation of the commitment period reserve in its next annual submission.

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

97. Belgium reported that there are no changes in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

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

98. Belgium reported that there are changes in its national registry since the previous annual submission. The Party described the changes, specifically due to the centralization of the EU ETS operations into a single EU registry operated by the European Commission called the Consolidated System of European Union Registries (CSEUR), in chapter 13 of its NIR. The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry.

99. The ERT noted that the SIAR identified that Belgium is not fully reporting changes in the national registry related to changes of test results and changes of database structure. The ERT reiterated the recommendations made in the SIAR that following major changes the Party: provide the results of the tests and demonstrate compliance with the data exchange standards; and provide a data model which contains and describes all the entities required by the data exchange standards.

100. The ERT concluded that, taking into account the confirmed changes in the national registry, Belgium's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. The ERT recommends that Belgium include all other additional information in response to the SIAR findings in its NIR in accordance with decision 15/CMP.1, annex, chapter I.G.

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

101. Belgium 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 annual submission. However, the ERT identified that, although the information reported by the Party is basically the same, the list of projects in which the Belgian federal or regional governments (or both) are involved has changed, with the deletion of some projects and the inclusion of new ones. The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent. The ERT recommends that the Party report any changes in its information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1, annex, chapter I.H.

102. Belgium in the reported information highlights that it has suppressed subsidies supporting the use of coal and other fossil fuels for energy production and enhanced the promotion of biofuels in accordance with the European common policies, in particular regarding sustainability criteria. Belgium also reports how it takes advantage of flexibility mechanisms, particularly in its participation in CDM projects, presenting a list of CDM projects with which the Belgian federal and/or regional governments signed an emissions reduction purchase agreement.

**III. Conclusions and recommendations**

**A. Conclusions**

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

Table 7

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

	<i>Paragraph cross-references</i>	
The ERT concludes that the inventory submission of Belgium is complete (categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2011)		
Annex A sources <sup>a</sup>	Not complete	Table 3
LULUCF <sup>a</sup>	Not complete	Table 3
KP-LULUCF	Not complete	Table 3
The ERT concludes that the inventory submission of Belgium 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	No	89



Paragraph cross-  
references

The Party's inventory is in accordance with the <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i> , the <i>IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and the <i>IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>	No	56, 57, 59, 60, 63 and 65
Belgium has reported information on Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	Table 6
Belgium 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	96
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	99, 100
Did Belgium 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	101

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

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

## B. Recommendations

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

Table 8

### Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross- references</i>
Cross-cutting	Recalculations	Improve the transparency of the reporting in relation to the recalculations undertaken, providing in the sectoral sections of the NIR detailed information on the changes (data, methods and EFs), and reasons for the recalculations	10, 23, 33, 39, 53, 55

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
	Transparency and consistency	Taking into consideration the federal structure, continue to put in place the procedures for improving the transparency and consistency of the inventory and report these actions in the NIR	12
	QA/QC	Improve the QA/QC procedures and report those improvements in the NIR; address the inconsistencies identified	13, 15
	Key category analysis	Report on the criteria for qualitative analysis; determine whether afforestation/reforestation is a key category; include information on whether the key category analysis is used to prioritize inventory improvements	Table 4
	General	Address all recommendations made in previous review reports	19
Energy	Transparency	Include the full national energy balance for the latest reported year, outlining the final energy consumption by sector	22
	Consistency	Make efforts to implement the activities to improve the consistency between the regional and federal energy balances	24
	Reference and sectoral approaches, and international statistics	Complete the harmonization of the different data sources and reduce the differences between the reference and sectoral approaches; review and if necessary revise reporting in the CRF tables and to IEA to improve the consistency between the reference approach, the IEA data and Eurostat data, transparently describe and justify any remaining differences in the NIR	26, 27
	Stationary combustion: liquid, solid and gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Provide in the NIR the relevant EU ETS plant-specific data (aggregated if confidentiality is an issue) and transparent information on the coverage of EU ETS emissions for the period 2005–2012 and explain how the consistency of the time series is ensured when using different data sources for different periods	30
		For petroleum refining, include in the NIR the relevant explanations of the differences in emissions in the CRF tables and the EU ETS	31
		For solid fuels in iron and steel, review, and if necessary revise, the low IEFs and provide an explanation in the NIR; report AD and emissions from the blast furnace gas sold to electricity producers under public electricity and heat production, and not under iron and steel	32
		For sea fishing in the category agriculture/forestry/fisheries, improve the transparency of the information on the recalculation performed and explain in detail which emissions are reported under the category agriculture/forestry/fisheries and which under the category navigation, and how the consistency of the estimates (AD and methodologies) is ensured in each category	33
		Report estimates for CH <sub>4</sub> and N <sub>2</sub> O emissions from gaseous fuels under petroleum refining (if this is not possible, report these emissions as “IE” and explain clearly where the emissions are reported); report estimates for CH <sub>4</sub> emissions for liquid fuels	34

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
	Civil aviation: liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Estimate N <sub>2</sub> O emissions from cruising for the Flemish region; make efforts to make use of additional sources and to collaborate with Belgocontrol and/or Eurocontrol to improve the emission estimates for civil aviation	35
	Road transportation: liquid fuels – CH <sub>4</sub> and N <sub>2</sub> O	Provide, in the NIR, additional information on how CH <sub>4</sub> and N <sub>2</sub> O emissions are estimated at the regional level and aggregated, including the corrections to improve consistency with the CO <sub>2</sub> emission estimates and the method and input parameters for the models	36
	Solid fuel transformation: solid fuels – CO <sub>2</sub> table	Include in the NIR the information provided during the review and include a brief explanation in the documentation box to the CRF	37
Industrial processes and solvent and other product use	Transparency	Correct the notation keys for soda ash and carbon black and indicate where the emissions are allocated; provide more detailed data on methodologies and data sources for the AD and EFs used for reporting the emissions from the category other (chemical industry), even for subcategories considered by the Party to be confidential	40, 42
	Ammonia production – CO <sub>2</sub> and CH <sub>4</sub>	Include detailed information about the revision of the oxidation factor; explain how CH <sub>4</sub> emissions from the scrubber are estimated	43, 44
	Iron and steel production – CO <sub>2</sub>	Explain the decrease in the CO <sub>2</sub> IEF	45
	Consumption of halocarbons and SF <sub>6</sub> – HFCs and SF <sub>6</sub>	Report emissions from transport refrigeration, industrial refrigeration and stationary air-conditioning equipment separately from commercial refrigeration in CRF table 2(II).F	46
		For semiconductor manufacture, include information on the methodologies, AD and EFs used to estimate these emissions and on the QA/QC procedures, while, as appropriate, preserving the confidentiality	47
		Include the justification for using the 2006 IPCC Guidelines in the estimation of emissions from disposal of refrigeration equipment	48
		For electrical equipment, estimate and report AD and SF <sub>6</sub> emissions from manufacturing for 1990–2008 and from disposal for 1990–2009 or justify why these emissions do not occur	49
		Justify the estimations of SF <sub>6</sub> emissions from manufacturing of electrical equipment	50
For manufacturing of fire extinguishers, improve the transparency of the information on the EF and the QA procedures applied in the estimations	51		

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		For other (consumption of halocarbons and SF <sub>6</sub> ), conduct research in order to ensure the completeness of the reporting, and report the result of the research. If other sources of SF <sub>6</sub> are identified, estimate and report these emissions	52
	Solvent and other product use – N <sub>2</sub> O	For use of N <sub>2</sub> O for anaesthesia, explain the revision made to the AD and replace the notation key by the appropriate figure in CRF table 3.A-D for the number of hospital beds and the N <sub>2</sub> O IEF	53
Agriculture	Enteric fermentation – CH <sub>4</sub>	Estimate emissions from all three regions using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance; provide a justification for using a methodology for the Brussels-Capital region which is different from the methodologies used for the Walloon and Flemish regions	57
		Describe the methodological changes for NE <sub>p</sub> and NE <sub>l</sub>	58
		Review the assumption that all cattle within the categories identified are castrates and assign the appropriate coefficients in the estimation of NE <sub>g</sub> for the Flemish region	59
	Manure management – CH <sub>4</sub> and N <sub>2</sub> O	Estimate emissions from all three regions using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance; provide a justification for using a methodology for the Brussels-Capital region which is different from the methodologies used for the Walloon and Flemish regions	60
		Describe the methodological changes for NE <sub>p</sub> and NE <sub>l</sub>	62
		For nitrogen excretion, provide estimates for the Brussels-Capital region using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance	63
		Provide additional information on the use of a region-specific fraction of synthetic fertilizer nitrogen applied to soils that volatilizes as ammonia and nitrogen oxides; and fraction of livestock N excreted and deposited onto soil during grazing	64
	Agricultural soils – N <sub>2</sub> O	For nitrogen excretion, provide estimates for the Brussels-Capital region using appropriate and consistent methods that are relevant to national circumstances in accordance with the IPCC good practice guidance	65
		Review the AD associated with cultivation of histosols, explain the differences in the area between CRF table 4.D and FAOSTAT and, if necessary, revise the emission estimates and explain any changes in the NIR and CRF table 8(b)	66

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		Describe all the performed methodological changes concerning estimates for indirect emissions of N <sub>2</sub> O from atmospheric deposition that included indirect emissions of N <sub>2</sub> O from the Walloon region	67
LULUCF	General	Explain in greater detail the methods used to monitor land-use changes and to ensure the consistent representation of land	69
	Forest land remaining forest land – CO <sub>2</sub>	Increase the transparency of the report by providing in the NIR background data and ancillary information to justify the difference in per hectare average carbon stock changes in mineral soils between the Walloon region and the Flemish region	70
	Cropland remaining cropland – CO <sub>2</sub>	Report the gains and losses of carbon stock for living biomass	71
		Report organic soils and associated CO <sub>2</sub> emissions under cropland and, if appropriate, report estimates for AD, carbon stock changes and GHG emissions for organic soils under the two subcategories cropland remaining cropland and land converted to cropland	72
		For liming in cropland, refine the emission estimates using country-specific data and report information on the methodologies and parameters used in the estimations	73
	Grassland – CO <sub>2</sub>	Review the reporting and, if appropriate, report estimates of AD, carbon stock changes and GHG emissions for organic soils for grassland remaining grassland and land converted to grassland	74
		For liming in grassland, refine the emission estimates using country-specific data and report information on the methodologies and parameters used in the estimations	75
	Biomass burning – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Use the notation key “IE” if the emissions are reported in another category (or “NO” if not occurring) and indicate in which category the emissions are included	76
Waste	Transparency	Including information on regional waste treatment systems aggregated to the national level in the form of tables and a flow chart in the NIR; improve the description of QA/QC procedures, especially for key categories	78, 79
	Solid waste disposal on land – CH <sub>4</sub>	Include a table in the NIR with the parameters used for each model used to estimate emissions, by region, using the same terminology so that the parameters can be compared	80
		Report the regional parameters in the NIR and include a reference to the section in the NIR where this issue is discussed in the documentation box to CRF table 6.A	81
	Wastewater handling – CH <sub>4</sub>	Report the regional parameters in the NIR and include a reference to the section in the NIR where this issue is discussed in the documentation box to CRF table 6.B	84

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
KP-LULUCF	General	Report information that demonstrates the consistency of the Party's land representation and in particular of areas reported under afforestation/reforestation and deforestation activities	87
	General – biomass burning	Explain in the NIR the basis for the assumption that all fires took place in forest land remaining forest land and not in areas of KP-LULUCF activities or assign a portion of those emissions to afforestation/reforestation activities	88
	General	Improve the transparency of the information provided in the NIR, provide further information to satisfy the mandatory reporting element of paragraph 6(a) of the annex to decision 15/CMP.1 and clearly specify, in the NIR, the methods used to report the emissions from each carbon pool under afforestation and reforestation, and deforestation	89
	Afforestation and reforestation – CO <sub>2</sub>	For carbon stock changes in dead wood and litter, report estimates for these pools using the country-specific data available, and if this is not possible, include the available verifiable information to demonstrate that these pools are not a net source of emissions	90
		For carbon stock changes in living biomass and soils, disaggregate the reporting of afforestation and reforestation in the CRF tables according to the three regions	91
		Estimate and report the carbon stock changes from biomass losses for any orchard land (reported as cropland) converted to forest land	92
	Deforestation – CO <sub>2</sub>	Report emissions from liming for deforestation	93
National registry	General	Address the recommendations contained in the SIAR; include all other additional information in response to the SIAR findings in the NIR in accordance with decision 15/CMP.1, annex, chapter I.G	94, 99, 100
	Commitment period reserve	Include accurate information on the estimation of the commitment period reserve	96
Article 3, paragraph 14, of the Kyoto Protocol	General	Report any changes in the information provided under Article 3, paragraph 14, of the Kyoto Protocol in accordance with decision 15/CMP.1, annex, chapter I.H	101

*Abbreviations:* 2006 IPCC Guidelines = 2006 IPCC Guidelines for National Greenhouse Gas Inventories, AD = activity data, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, EF = emission factor, EU ETS = European Union Emissions Trading System, FAOSTAT = database of the Food and Agriculture Organization of the United Nations, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, 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, NE<sub>g</sub> =

net energy for growth,  $NE_l$  = net energy for lactation,  $NE_p$  = net energy for pregnancy, NIR = national inventory report, QA = quality assurance, QC = quality control, SIAR = standard independent assessment report.

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

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

## Annex I

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

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

<i>Greenhouse gas source and sink categories</i>	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		
<b>1. Energy</b>	267.06	-2 117.84	0.2	-1.9	AD and EFs
A. Fuel combustion (sectoral approach)	267.06	-2 118.91	0.2	-1.9	
1. Energy industries	-61.82	1.64	-0.2	0.006	
2. Manufacturing industries and construction	70.43	-81.70	0.2	-0.3	
3. Transport	327.43	221.85	1.6	0.8	
4. Other sectors	-68.98	-2 248.91	-0.2	-6.9	
5. Other		-11.80		-19.7	
B. Fugitive emissions from fuels		1.07		0.2	
1. Solid fuels					
2. Oil and natural gas		1.07		0.2	
<b>2. Industrial processes</b>	-12.93	-1 241.99	-0.1	-9.2	AD and EFs
A. Mineral products	413.17	195.59	7.7	4.2	
B. Chemical industry	2.11	-1 382.04	0.05	-24.0	
C. Metal production	-428.21	-189.45	-17.5	-17.2	
D. Other production					
E. Production of halocarbons and SF <sub>6</sub>					
F. Consumption of halocarbons and SF <sub>6</sub>		133.91		7.0	
G. Other					
<b>3. Solvent and other product use</b>		-2.77		-1.3	AD and EFs
<b>4. Agriculture</b>	-416.67	-481.58	-3.5	-4.8	AD and EFs
A. Enteric fermentation	92.85	114.79	2.2	3.2	
B. Manure management	-290.52	-254.74	-10.8	-10.4	
C. Rice cultivation					
D. Agricultural soils	-219.00	-341.63	-4.4	-8.4	
E. Prescribed burning of savannas					
F. Field burning of agricultural residues					
G. Other					
<b>5. Land use, land-use change and forestry</b>	332.91	-342.19	-26.7	33.7	AD and EFs



<i>Greenhouse gas source and sink categories</i>	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		
A. Forest land	332.11	-350.00	-9.6	10.0	
B. Cropland	1.58	3.90	0.1	0.2	
C. Grassland	-3.20	0.32	-0.4	-0.3	
D. Wetlands	0.01		0.03		
E. Settlements	2.40	2.89	1.0	0.5	
F. Other land	0.01	0.70	0.03	0.7	
G. Other					
<b>6. Waste</b>	-49.17	603.45	-1.4	51.8	AD and EFs
A. Solid waste disposal on land	-76.40	30.08	-2.8	4.8	
B. Wastewater handling	-7.91	-26.70	-1.5	-6.3	
C. Waste incineration	39.92	600.35	15.8	663.2	
D. Other	-4.78	-0.28	-68.7	-1.1	
<b>7. Other</b>					
<b>Total CO<sub>2</sub> equivalent without LULUCF</b>	-211.71	-3 240.73	-0.1	-2.4	
<b>Total CO<sub>2</sub> equivalent with LULUCF</b>	121.20	-3 582.92	0.1	-2.7	

*Abbreviations:* AD = change in activity data, EF = change in emission factor, LULUCF = land use, land-use change and forestry.

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

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Commitment period reserve</b>	606 595 975	601 540 484		601 540 484
<b>Annex A emissions for 2011</b>				
CO <sub>2</sub>	104 466 568	104 472 112		104 472 112
CH <sub>4</sub>	6 345 532	6 476 501		6 476 501
N <sub>2</sub> O	7 068 066	7 068 136		7 068 136
HFCs	1 996 061			1 996 061
PFCs	178 988			178 988
SF <sub>6</sub>	116 298			116 298
<b>Total Annex A sources</b>	120 171 513	120 308 097		120 308 097
<b>Activities under Article 3, paragraph 3, for 2011</b>				
3.3 Afforestation and reforestation on non-harvested land for 2011	-295 858			-295 858
3.3 Afforestation and reforestation on harvested land for 2011	NO			NO
3.3 Deforestation for 2011	498 819			498 819
<b>Activities under Article 3, paragraph 4, for 2011<sup>c</sup></b>				
3.4 Forest management for 2011				
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				

*Abbreviation:* NO = not occurring.

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

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

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

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

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2010</b>				
CO <sub>2</sub>	114 873 150	114 878 250		114 878 250
CH <sub>4</sub>	6 508 212	6 641 390		6 641 390
N <sub>2</sub> O	8 268 119	8 268 191		8 268 191
HFCs	1 936 254			1 936 254
PFCs	85 443			85 443
SF <sub>6</sub>	111 150			111 150
<b>Total Annex A sources</b>	<b>131 782 329</b>	<b>131 920 679</b>		<b>131 920 679</b>
<b>Activities under Article 3, paragraph 3, for 2010</b>				
3.3 Afforestation and reforestation on non-harvested land for 2010	-284 308			-284 308
3.3 Afforestation and reforestation on harvested land for 2010	NO			NO
3.3 Deforestation for 2010	499 078			499 078
<b>Activities under Article 3, paragraph 4, for 2010<sup>c</sup></b>				
3.4 Forest management for 2010				
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				

*Abbreviation:* NO = not occurring.

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

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

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

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

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2009</b>				
CO <sub>2</sub>	108 253 663	108 257 722		108 257 722
CH <sub>4</sub>	6 447 654	6 582 807		6 582 807
N <sub>2</sub> O	7 670 971	7 671 043		7 671 043
HFCs	1 882 522			1 882 522
PFCs	115 779			115 779
SF <sub>6</sub>	97 154			97 154
<b>Total Annex A sources</b>	<b>124 467 742</b>	<b>124 607 026</b>		<b>124 607 026</b>
<b>Activities under Article 3, paragraph 3, for 2009</b>				
3.3 Afforestation and reforestation on non-harvested land for 2009	-272 795			-272 795
3.3 Afforestation and reforestation on harvested land for 2009	NO			NO
3.3 Deforestation for 2009	498 975			498 975
<b>Activities under Article 3, paragraph 4, for 2009<sup>c</sup></b>				
3.4 Forest management for 2009				
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:* NO = not occurring.

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

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

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

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

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2008</b>				
CO <sub>2</sub>	120 532 636	120 537 513		120 537 513
CH <sub>4</sub>	6 532 864	6 668 239		6 668 239
N <sub>2</sub> O	7 465 246	7 465 319		7 465 319
HFCs	1 821 597			1 821 597
PFCs	201 874			201 874
SF <sub>6</sub>	91 188			91 188
<b>Total Annex A sources</b>	<b>136 645 406</b>	<b>136 785 730</b>		<b>136 785 730</b>
<b>Activities under Article 3, paragraph 3, for 2008</b>				
3.3 Afforestation and reforestation on non-harvested land for 2008	-261 320			-261 320
3.3 Afforestation and reforestation on harvested land for 2008	NO			NO
3.3 Deforestation for 2008	505 357			505 357
<b>Activities under Article 3, paragraph 4, for 2008<sup>c</sup></b>				
3.4 Forest management for 2008				
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				

*Abbreviation:* NO = not occurring.

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

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

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

## Annex II

### Documents and information used during the review

#### A. Reference documents

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

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

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

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

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

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

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

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

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

Status report for Belgium 2013. Available at <http://unfccc.int/resource/docs/2013/asr/bel.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/BEL. Report of the individual review of the annual submission of Belgium submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/bel.pdf>.

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

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

Responses to questions during the review were received from Mr. Olivier Biernaux (Belgian Interregional Environment Agency), including additional material on the methodologies and assumptions used.

## Annex III

### Acronyms and abbreviations

AD	activity data
BFG	blast furnace gas
C	confidential
CDM	clean development mechanism
CH <sub>4</sub>	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
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
GE	gross energy
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 10 <sup>9</sup> joule)
ha	hectare
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
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
MCF	methane conversion factor
N	nitrogen
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NE <sub>g</sub>	net energy for growth
NE <sub>l</sub>	net energy for lactation
NE <sub>p</sub>	net energy for pregnancy
Nex	nitrogen excretion
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 <sup>15</sup> joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report



t	tonne
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)
UNFCCC	United Nations Framework Convention on Climate Change
VS	volatile solids

---