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Climate Change

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## Report on the individual review of the annual submission of Belgium submitted in 2018\*

### Note by the expert review team

#### *Summary*

Each Party included in Annex I to the Convention must submit an annual greenhouse gas inventory covering emissions and removals of greenhouse gas emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2018 annual submission of Belgium, conducted by an expert review team in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol”. The review took place from 24 to 29 September 2018 in Brussels.

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\* In the symbol for this document, 2018 refers to the year in which the inventory was submitted, not to the year of publication.

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## Contents

	<i>Paragraphs</i>	<i>Page</i>
Abbreviations and acronyms .....		3
I. Introduction .....	1–6	5
II. Summary and general assessment of the 2018 annual submission.....	7	6
III. Status of implementation of issues and/or problems raised in the previous review report .....	8	8
IV. Issues identified in three successive reviews and not addressed by the Party .....	9	18
V. Additional findings made during the individual review of the 2018 annual submission.....	10	19
VI. Application of adjustments.....	11	44
VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol .....	12	44
VIII. Questions of implementation .....	13	44
<b>Annexes</b>		
I. Overview of greenhouse gas emissions and removals for Belgium for submission year 2018 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Belgium in its 2018 annual submission.....		45
II. Information to be included in the compilation and accounting database .....		49
III. Additional information to support findings in table 2 .....		51
IV. Documents and information used during the review.....		52

## Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AAU	assigned amount unit
AD	activity data
Annex A sources	source categories included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	“Guidelines for review under Article 8 of the Kyoto Protocol”
C	carbon
CH <sub>4</sub>	methane
CM	cropland management
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CP	commitment period
CPR	commitment period reserve
CRF	common reporting format
DETIC	Belgian-Luxembourg association for producers and distributors of cosmetics, detergents, cleaning products, adhesives and sealants, biocides and aerosols
DOC	degradable organic carbon
DOM	dead organic matter
EF	emission factor
EMAV	Flanders ammonia emission model
ERT	expert review team
ERU	emission reduction unit
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
Frac <sub>GASM</sub>	fraction of applied organic nitrogen fertilizer material and of urine and dung nitrogen deposited by grazing animals that volatilizes as ammonia and nitrogen oxides
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
KP-LULUCF activities	activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LULUCF	land use, land-use change and forestry
N	nitrogen
N <sub>2</sub> O	nitrous oxide

NA	not applicable
NE	not estimated
Nex	nitrogen excretion
NH <sub>3</sub>	ammonia
NIR	national inventory report
NO	not occurring
NO <sub>x</sub>	nitrogen oxides
OFFREM	off-road emissions
PFC	perfluorocarbon
PPSR	previous period surplus reserve
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF <sub>6</sub>	sulfur hexafluoride
SIAR	standard independent assessment report
UNFCCC Annex I inventory 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 greenhouse gas inventories”
UNFCCC review guidelines	“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>

## I. Introduction<sup>1</sup>

1. This report covers the review of the 2018 annual submission of Belgium organized by the secretariat in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1 and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention” (decision 13/CP.20). The review took place from 24 to 29 September 2018 in Brussels and was coordinated by Ms. Claudia do Valle (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Belgium.

Table 1

### Composition of the expert review team that conducted the review of Belgium

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Mr. Newton Paciornik	Brazil
Energy	Mr. Ralph Harthan	European Union
IPPU	Mr. David Kuntze	Germany
Agriculture	Ms. Marta Alfaro	Chile
LULUCF	Mr. Atsushi Sato	Japan
Waste	Mr. Igor Ristovski	North Macedonia
Lead reviewers	Mr. Kuntze Mr. Paciornik	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2018 annual submission in accordance with the Article 8 review guidelines. The ERT notes that the individual inventory review of Belgium’s 2017 annual submission did not take place in 2017 owing to insufficient funding for the review process.

3. The ERT has made recommendations that Belgium resolve the findings related to issues,<sup>2</sup> including issues designated as problems.<sup>3</sup> Other findings, and, if applicable, the encouragements of the ERT to Belgium to resolve them, are also included.

4. 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.

5. Annex I shows annual GHG emissions for Belgium, including totals excluding and including the LULUCF sector, indirect CO<sub>2</sub> emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected, by gas, sector and activity for Belgium.

6. Information to be included in the compilation and accounting database can be found in annex II.

<sup>1</sup> At the time of publication of this report, Belgium had submitted its instrument of ratification of the Doha Amendment; however, the Amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the Amendment.

<sup>2</sup> Issues are defined in decision 13/CP.20, annex, paragraph 81.

<sup>3</sup> Problems are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

## II. Summary and general assessment of the 2018 annual submission

7. Table 2 provides the assessment by the ERT of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2

### Summary of review results and general assessment of the inventory of Belgium

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3 and/or 5<sup>a</sup></i>	
Dates of submission	Original submission: 13 April 2018 (NIR), 13 April 2018, Version 2 (CRF tables), 15 April 2018 (SEF-CP1-2017 and SEF-CP2-2017)  Revised submission: 28 September 2018 (NIR)  Unless otherwise specified, the values from the latest submission are used in this report	
Review format	In country	
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	1. Have any issues been identified in the following areas:  (a) Identification of key categories  (b) Selection and use of methodologies and assumptions  (c) Development and selection of EFs  (d) Collection and selection of AD  (e) Reporting of recalculations  (f) Reporting of a consistent time series  (g) Reporting of uncertainties, including methodologies  (h) QA/QC  (i) Missing categories/completeness <sup>b</sup>  (j) Application of corrections to the inventory	No  Yes I.7, I.17, I.18, L.1, L.4, L.11, L.12, L.14, L.17  Yes E.10, E.20, E.21, E.22, I.6, A.7, L.15, W.5  Yes I.15, I.18, I.19, A.6, A.9, L.16, KL.10  No  Yes I.15, L.11  No  QA/QC procedures were assessed in the context of the national system (see para. 2 in this table)  Yes L.8, KL.4  No
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	The Party did not report "NE" for any insignificant categories
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes
Supplementary information	2. Have any issues been identified related to the national system:	

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3 and/or 5<sup>a</sup></i>		
under the Kyoto Protocol	(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	No	
	(b) Performance of the national system functions	Yes	G.8, G.11
	3. Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry	Yes	G.6
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	
	4. Have any issues been identified related to reporting of information on ERUs, CERs, AAUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR?	No	
	5. Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	6. Have any issues been identified related to the reporting of LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as follows:		
	(a) Reporting requirements in decision 2/CMP.8, annex II, paragraphs 1–5	Yes	KL.1, KL.8, KL.11, KL.13, KL.14, KL.15, KL.16, KL.17
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14	No	
(c) Reporting requirements of decision 6/CMP.9	Yes	KL.4	
(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	No		
CPR	Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	No	G.3
Adjustments	Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	The Party does not have a previously applied adjustment

<i>Assessment</i>		<i>Issue or problem ID#(s) in table 3 and/or 5<sup>a</sup></i>
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No
Questions of implementation	Did the ERT list any questions of implementation?	No

<sup>a</sup> The ERT identified additional issues and/or problems in all sectors and for KP-LULUCF activities that are not listed in this table but are included in table 3 and/or 5.

<sup>b</sup> Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

### III. Status of implementation of issues and/or problems raised in the previous review report

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 20 June 2017.<sup>4</sup> For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2018 annual submission and provided the rationale for its determination, which takes into consideration the publication date of the previous review report and national circumstances.

Table 3

#### Status of implementation of issues and/or problems raised in the previous review report of Belgium

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	National system (G.5, 2016) (G.5, 2015) Transparency	Report planned improvements in accordance with paragraph 50 of the annex to decision 24/CP.19.	Not resolved. No additional information has been provided in section 9.2 of the NIR (p.258). The description is very short and refers back to the sectoral parts of the NIR and the information on planned improvements in the sectoral parts is also very limited. The ERT noted that the Party does not follow the outline proposed in the UNFCCC Annex I inventory reporting guidelines for reporting recalculations and improvements.
G.2	QA/QC and verification (G.1, 2016) (G.1, 2015) (12, 2014) (13, 2013) Transparency	Ensure that any improvements to the QA/QC procedures are reflected in the QA/QC plan.	Resolved. Belgium has reported a new QA/QC plan that reflects improvements to the QA/QC procedures.

<sup>4</sup> FCCC/ARR/2016/BEL. The ERT notes that the individual inventory review of Belgium's 2017 annual submission did not take place in 2017. As a result, the latest published ARR reflects the findings of the review of the Party's 2016 annual submission.

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
<b>Energy</b>			
E.1	1. General (energy sector) – solid, liquid and gaseous fuels (E.2, 2016) (E.2, 2015) (23 and 26, 2014) (24, 2013) Consistency	Improve the consistency between the regional and federal energy balances.	Resolved. Belgium improved the consistency between the regional and federal energy balances, although the transparency of the information in the NIR should be improved (see ID#s E.13, E.14 and E.15 in table 5). The Party explained during previous reviews that the difference between the federal and regional energy balances is especially high for oil products. The Party described in its NIR (section 3.2.1, p.77) the efforts made up to 2017 to implement the reporting obligation for oil products. The NIR describes the progress under the ENOVER consultative group on the proposals for data collection for transport and heating petroleum products at the regional level: legislation was approved in 2016 and 2017 to ensure reporting obligations on the allocation of delivery for the distributors of gasoil and suppliers to petrol stations. Surveys have also been sent to public filling stations. During the review, Belgium provided more information on those surveys (see ID# E.13 in table 5) and informed the ERT that the results will be evaluated for the next annual submission. In addition, the Party reported in the NIR (p.77) that under the working group (established in 2003) procedures have been in place since 2008 to help divide federal oil statistics into regional data (this work is ongoing); and that in 2014–2015 a harmonization of the end uses of solid fossil fuels led to an increase in the number of companies reporting statistics at the federal level. However, no further explanation of the companies and sectors concerned or of the results and limitations of this harmonization was provided. The ERT also noted that, while the working group is included in the energy charts illustrating the flow and consolidation of data across the three regions of Belgium (NIR, annex 5, pp.337–339), an explanation of how the working group ensures the harmonization of data between the regional and federal energy balances is not included in the NIR (see ID# E.15 in table 5). Further explanation was provided by Belgium during the review of other actions that helped to improve the consistency of the federal and energy balances for the following sources: electricity, renewable energy, natural gas, solid fossil fuels and heat (see ID#s E.13 and E.14 in table 5).
E.2	1. General (energy sector) – solid, liquid and gaseous fuels (E.3, 2016) (E.3, 2015) (23, 2014) Transparency	Clearly document in the NIR any remaining differences between the regional and federal energy balances and provide explanations for these differences.	Not resolved. It is still unclear which differences remain between the federal and regional energy balances. During the review the Party recognized that additional explanatory text or a table needs to be provided in the NIR (sections 3.1.1 and 3.2.1) to clarify the relationship between the federal and regional energy balances for the different types of energy sources and to document and explain the remaining differences (see ID#s E.3 and E.7 below). The ERT noted that the information in the NIR (section 3.2.1, p.76) on the reasons for the differences between the reference approach (which uses the federal energy balance data) and the sectoral approach (which uses the regional energy balance data) could be used to help the Party to identify the remaining differences.

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
E.3	Fuel combustion – reference approach – solid, liquid and gaseous fuels – CO <sub>2</sub> (E.4, 2016) (E.4, 2015) (25, 2014) Transparency	Provide an explanation for each year of the time series for which the difference between the reference approach and the sectoral approach exceeds 2 per cent.	Resolved. The Party has provided in its NIR (section 3.2.1, p.74) a reference approach corrected for the off-gases produced in blast furnaces, showing that the difference between the “corrected reference approach” and the sectoral approach has been reduced considerably. Further information on the main differences is provided on page 76 of the NIR (see ID# E.16 in table 5).
E.4	Comparison with international data – solid, liquid and gaseous fuels – CO <sub>2</sub> (E.5, 2016) (E.5, 2015) (26, 2014) (27, 2013) Consistency	Improve the consistency between the energy balances and the energy statistics reported internationally to Eurostat and IEA.	Resolved. The federal energy balance, which is used for the reference approach, also serves as the basis for meeting the Party’s international reporting obligations to IEA and Eurostat. According to the NIR (section 3.2.1, p.74) the entire time series for the reference approach have been revised according to the most recent statistics available, as provided to IEA and Eurostat. Annex 8 to the NIR includes the national energy balance as available on the Eurostat website. A cross-check carried out by the ERT of IEA data with data provided in the CRF tables for the reference approach also confirmed the general consistency of the two data sets.
E.5	Comparison with international data – liquid fuels (E.10, 2016) (E.10, 2015) Comparability	Reallocate other petroleum products from other liquid fossil to other oil in the reference approach (CRF table 1.A(b)) for the complete time series.	Resolved. Belgium reallocated other petroleum products from other liquid fossil fuels to other oil in the reference approach in the 2018 submission for the entire time series. Corresponding values in CRF table 1.A(b) match the values in the comparison tables produced by IEA.
E.6	Comparison with international data – solid fuels (E.11, 2016) (E.11, 2015) Comparability	Include production of other bituminous coal in the reference approach (CRF table 1.A(b)).	Resolved. Production of other bituminous coal has been included in the reference approach (CRF table 1.A(b)) in the 2018 submission for the entire time series.
E.7	1.A Fuel combustion – sectoral approach – all fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.12, 2016) (E.12, 2015) Transparency	Include the regional and national energy statistics in the NIR in a similar format and explain in more detail how AD are allocated to the CRF categories.	Not resolved. Belgium has not provided information on the aggregation of regional energy balances into the federal energy balance or a table showing the correspondence between the regional energy balances and the CRF tables. Although no additional information has been provided in the NIR (compared with that in the previous submission), the ERT noted that the NIR (p.73) provides some explanation of how the federal energy balance and the regional energy balance data are allocated to the CRF categories, which could help the Party to explain how AD are allocated to the CRF categories. In addition, during the review, the Party explained the relationship between the regional energy data used and the AD reported in the CRF tables. For the Walloon Region, the Walloon Air Pollutant Inventory software is used, which includes ‘snapcodes’ that correspond to CRF categories. Also, each ‘snapcode’ corresponds to a line in the energy balance of the Walloon Region. For the Flemish Region, the energy balance is set up consistently with the CRF categories. The Party informed the ERT during the review that in the next NIR it will add an allocation table for each region (Wallonia, Flanders and Brussels-Capital) that will show the links between each CRF code and each

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
E.8	1.A.2.a Iron and steel – solid fuels – CO <sub>2</sub> (E.6, 2016) (E.6, 2015) (29, 2014) (32, 2013) Transparency	Review and, if necessary, revise the low IEFs for solid fuels in iron and steel, and, in order to improve transparency, revise the description in the NIR of the category-specific QA/QC activities performed by explaining the links between the plant-specific AD from the EU ETS, the regional energy balances and the AD reported in the CRF tables.	line of the energy balance. The ERT believes that resolving this issue will help the Party to identify the remaining differences between the regional and federal energy balances (see ID# E.2 above).  Resolved. The CO <sub>2</sub> IEF for solid fuels in iron and steel still varies significantly over the time series, from 238.73 t/TJ in 2008 to 39.61 t/TJ in 2012. The Party explains in the NIR (section 3.2.7.2, p.101) that variations in the IEF for solid fuels are due to varying shares of coke oven gas and blast furnace gas used for combustion in boilers in Wallonia (for which the IPCC default EF values are 44.40 t CO <sub>2</sub> /TJ for coke oven gas and 260.00 t CO <sub>2</sub> /TJ for blast furnace gas). AD for coke oven gas, blast furnace gas and coke oven coke in boilers and the corresponding EFs were shown to the ERT during the review. The ERT also checked the Eurostat database and confirmed the reductions in coke oven gas and blast furnace gas between 2008 and 2009 and in blast furnace gas between 2011 and 2012. In the NIR the Party states that the last blast furnace in the Walloon Region closed in 2012, which led to a significant drop in the IEF in 2011–2012. The Party also included in the NIR (table 4.7, p.156) the allocation of emissions between the energy and IPPU sectors before and after the 2015 submission.
E.9	1.A.3.b Road transportation – liquid fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (E.13, 2016) (E.13, 2015) Transparency	Include in the NIR a description of how gasoline consumption for road transportation in the national energy statistics is corrected to account for off-road transportation.	Not resolved. The Party has reported in the 2018 NIR (section 3.2.8.2.1, p.109) the same explanations as in the 2016 NIR: that the gasoline consumption from the federal energy balance is corrected to remove off-road consumption (by 2–3 per cent) and that consumption for off-road activities is estimated using the OFFREM model. The NIR includes a cross reference to category 1.A.3.e (other transportation) for further information on the OFFREM model (section 3.2.8.2.5, p.114). However, the ERT noted that this section does not explain how the OFFREM model is used to estimate gasoline consumption for off-road transport under category 1.A.3.e. The Party also refers to off-road transport under categories 1.A.2.g.vii (p.106), 1.A.4 (p.117) and 1.A.5 (p.125), but the ERT considers that the description still does not make clear how AD for off-road transport are identified for these categories and whether or not the OFFREM model is used for all regions in Belgium. In addition, the Party refers to a document in annex 3 to the NIR, stating that “a complete detailed description about the methodology used can be found in annex 3 of this report in the Quality Management System of the greenhouse gas inventory in the Flemish region (technical procedure of the quality management system VMM/EIL/GP/5.003)”. However, the ERT noted that this document was not submitted in one of the official languages of the United Nations (see ID# G.9 in table 5). During the review, Belgium explained that the emissions from non-road machinery and vehicles in different economic sectors are calculated using the OFFREM model (a tier 3 model). Fuel consumption by non-road machinery and vehicles is also calculated using the OFFREM modelling approach.

ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
E.10	1.A.3.b Road transportation – liquid fuels – CO <sub>2</sub> (E.14, 2016) (E.14, 2015) Accuracy	Collect country-specific carbon contents of gasoline and gas/diesel oil used in road transportation and use these data to calculate the CO <sub>2</sub> emissions from road transportation.	OFFREM uses sales data for different types of mobile machinery and lifetime for different types of machinery to estimate the active fleet. The total fuel consumption of on-road machinery and vehicles is then estimated considering the size of the active fleet, assumptions on average use (annual operating hours) and the fuel consumption per hour of operation for the different types of machinery. This calculated fuel consumption is used to correct the amount of gasoline in the national statistics (energy balance). The Party explained that this more detailed description will be included in its next NIR.  Addressing. Belgium continues to use the default CO <sub>2</sub> EFs from the COPERT model (see NIR, section 3.2.8.2.1, p.109). During the review, the Party explained that no information on carbon content and net calorific values is available in Belgium from the fuel suppliers, and the collection of country-specific EFs is not feasible unless a corresponding requirement for carbon content of fuels is imposed by European regulation (e.g. the EU fuel quality directive). Furthermore, Belgium informed the ERT that this issue was also discussed during the reviews of the EU effort-sharing decision in 2017 and 2018, and, in the follow-up to those reviews, the Belgian Petrol Federation was repeatedly requested to provide country-specific values. However, no values are provided unless they are mandated by EU obligation. The Party further explained that this issue is also being dealt with in a special working group at the European level. Therefore, for its estimations, Belgium used COPERT values in line with those of the Netherlands, which has the most recent data, especially for gasoline. The ERT notes that the Netherlands has developed a country-specific CO <sub>2</sub> EF for road transportation.
E.11	1.B.1.a Coal mining and handling – solid fuels – CH <sub>4</sub> (E.15, 2016) (E.15, 2015) Completeness	Calculate the CH <sub>4</sub> emissions from abandoned coal mines for the complete time series and include these emissions in the CRF tables. Alternatively, include information in the NIR to demonstrate that these emissions are insignificant in accordance with paragraph 37(b) of the annex to decision 24/CP.19.	Resolved. CH <sub>4</sub> emissions from abandoned coal mines have been estimated for the complete time series using the tier 1 methodology from the 2006 IPCC Guidelines (see NIR, section 3.3.1.2.1, p.128).
E.12	1.B.1.a Coal mining and handling – solid fuels – CH <sub>4</sub> (E.15, 2016) (E.15, 2015) Transparency	Include a description of this source in the NIR, including an explanation of the total number of abandoned coal mines and the number of coal mines that are still gassy.	Resolved. Belgium included the required information in the NIR (section 3.3.1.2, pp.127–128): all abandoned coal mines in the Flemish Region were flooded by groundwater after closure so there are no corresponding emissions; in the Walloon Region, there are still some gassy abandoned mines.

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
<b>IPPU</b>			
I.1	2.B.9 Fluorochemical production – PFCs (I.8, 2016) (I.8, 2015) (39, 2014) Transparency	Explain that the fugitive emissions are from a single chemical plant and occur when the waste gas incinerator used for abatement is out of order, which happens frequently, and also as a result of changes in the product mix of the plant.	Resolved. Belgium included the requested information in the NIR (section 4.3.2.6, pp.152 and 153). The large inter-annual variation occurs because when the thermal oxidizer is in shutdown the continuous processes are stopped but the batch processes connected to the oxidizer may still operate. This, together with changes in the product mix of the plant, explains the large inter-annual variations observed across the entire time series.
I.2	2.C.1 Iron and steel production – CO <sub>2</sub> (I.14, 2016) (I.14, 2015) Transparency	Include information in the NIR to describe the allocation of emissions from the iron and steel industry between the energy and IPPU sectors.	Addressing. Belgium reported in the NIR (p.155) that the biggest change in allocation, in comparison with that in previous submissions, is the move of emissions from solid fuels (coke gas, blast furnace gas, coke grid and anthracite) used for both energetic and process purposes from category 1.A.2.a to category 2.C.1.a. The other process emissions of the integrated steel plant (use of limestone in sinter factory) remain allocated in the same way as in previous submissions (under category 2.C.1.d). The Party included information describing the allocation of emissions between categories 2.C.1 and 1.A.2.a for the Flemish Region (NIR, table 4.7, p.156). However, no information is provided in the NIR on the allocation between categories 2.C.1 and 1.A.1.a. The ERT is of the view that the Party could include a table in the NIR showing the allocation of emissions by category including information on fuels and process emissions between the IPPU and energy sectors.
I.3	2.C.1 Iron and steel production – CO <sub>2</sub> (I.14, 2016) (I.14, 2015) Transparency	Transparently describe in the NIR any recalculations that are made.	Resolved. The NIR (section 4.4.5, p.161) includes an explanation of the recalculations performed for the 2018 submission for category 2.C.1.
I.4	2.D.3 Other (non-energy products from fuels and solvent use) – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (I.15, 2016) (I.15, 2015) Comparability	Ensure the correct notation key “NO” is used to report emissions from solvent use.	Resolved. Belgium continues to report the notation key “NA” instead of “NO”. However, the ERT noted that Belgium reports emissions of non-methane volatile organic compounds (15.28 kt in 2016) for solvent use under category 2.D.3. Therefore, the category does occur in Belgium. According to paragraph 37(c) of the UNFCCC Annex I inventory reporting guidelines, “NA” is used for activities under a given source or sink category that do occur within the Party but do not result in emissions or removals of a specific gas. Therefore the ERT considers that the correct notation key for reporting the CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O emissions is “NA”.
<b>Agriculture</b>			
A.1	3.B Manure management – N <sub>2</sub> O (A.12, 2016) (A.12, 2015) Transparency	Report the correct manure Nex rate for mules, asses and poultry in CRF table 3.B(b) and the NIR.	Resolved. The ERT verified that the total N excreted (kg N/year) reported in CRF table 3.B(b) for mules, asses and poultry corresponds to the total animal population per animal category and the respective Nex rate reported. The Nex rates reported by Belgium in CRF table 3.B(b) are 35 and 0.59 kg N/head/year for mules and asses, and poultry, respectively. For poultry, the national value reported in CRF table 3.B(b) corresponds

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			to a national weighted average in relation to the proportion of animals per animal waste management system, and its relationship to national totals (NIR, tables 5.17 and 5.18, pp.191 and 194). For mules and asses, a national value is used because this is a non-significant animal category.
A.2	3.B Manure management – N <sub>2</sub> O (A.13, 2016) (A.13, 2015) Transparency	Provide accurate information in the NIR on the method used for estimating direct N <sub>2</sub> O emissions from manure management.	Addressing. No additional information has been provided in the NIR. However, the ERT noted that the methodology used to estimate N <sub>2</sub> O emissions from manure management is correctly provided in the NIR (section 5.3, table 5.13, p.186). The methodology includes using a tier 2 approach (based on region-specific Nex data and the proportion of animals per type of animal waste management system, as in CRF table 3.B(a)s2), to estimate direct N <sub>2</sub> O emissions for categories 3.B.2.1 to 3.B.2.4 (NIR tables 5.17 and 5.18, pp.191 and 194). The Party used default IPCC EFs, but as Nex and proportion of manure management for each animal waste management system are used, it is considered a tier 2 method. However, the Party should provide a more detailed description of the method used. For example, the ERT noted that the reference to the tier 1 method used for solid, dry lot, pit storage below animal confinements and poultry manure on page 190 of the NIR refers to the EF, and therefore, Belgium uses a tier 2 approach for AD and Nex and a tier 1 approach for the EF. The ERT notes that a more detailed explanation and a cross reference between these two sections (pp.187 and 190) are needed to resolve this transparency issue.
A.3	3.D.b.2 N leaching and run-off – N <sub>2</sub> O (A.15, 2016) (A.15, 2015) Comparability	Report the correct amount of leaching and run-off of N to ensure that the IEFs reflect the actual EF used for the estimates of N <sub>2</sub> O emissions from agricultural soils.	Resolved. Belgium reported in CRF table 3.D the correct AD for amount of leaching and run-off of N for the entire time series, and therefore the correct IEF (EF5 = 0.0075) is reflected in CRF table 3.D. The Party also updated the NIR (see section 5.4.2 and table 5.30, p.205).
A.4	3.I Other carbon-containing fertilizers – CO <sub>2</sub> (A.17, 2016) (A.17, 2015) Completeness	Report CO <sub>2</sub> emissions from other carbon-containing fertilizers.	Resolved. Belgium continues to report this category as “NO” in CRF table 3.G-I. During the review, the Party explained that it had checked statistical data from the International Fertilizer Association, which is the main source for this information. According to this source, the other fertilizers used in Belgium comprise calcium nitrate, sodium nitrate, ammonium chloride and magnesium ammonium nitrate, so no other carbon-based fertilizers are used in the country (see ID# A.11 in table 5).

## LULUCF

L.1	4. General (LULUCF) – all gases (L.8, 2016) (L.8, 2015) Accuracy	Correctly apply and reference the section of the 2006 IPCC Guidelines used to derive removal and emission estimates for all gases in the LULUCF sector and indicate clearly	Not resolved. The estimations of carbon stock changes in DOM for land converted to forest land and GHG emissions from grassland fires were still based on the methodologies provided in the IPCC good practice guidance for LULUCF (see ID# L.4 below). In addition, some of the reference numbers for equations referred to equations in the IPCC good practice guidance for LULUCF instead of the 2006 IPCC Guidelines (e.g
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ID#	Issue and/or problem classification <sup>a, b</sup>	Recommendation made in previous review report	ERT assessment and rationale
		the tier methods used for specific estimates.	equations 3.3.3 and 3.4.8 for mineral soil carbon stock changes, NIR p.222). During the review, Belgium indicated that it will correct this issue in its next submission.
L.2	4.A.1 Forest land remaining forest land (L.1, 2016) (L.1, 2015) (61, 2014) CO <sub>2</sub> Accuracy	Implement a higher-tier method for the Flemish and Brussels-Capital Regions for estimating carbon stock change in living biomass, as soon as possible.	Resolved. Belgium has developed a forest inventory for the Flemish Region and, in the 2018 submission, for both the Walloon and Flemish Regions it applied the carbon stock change method to estimate carbon stock change in living biomass in forest land (NIR, pp.211 and 214). According to the Party, a tier 1 (gain-loss) method is used for the Brussels-Capital Region, based on data observed in beech forest in the Walloon Region (NIR, p.214). However, the ERT noted that according to the 2006 IPCC Guidelines (volume 4, p.4.12) the use of a country-specific net annual increment based on data observed in beech forest in the Walloon Region (75 per cent of the Brussels forest is beech) corresponds to a tier 2 gain-loss method. Therefore, the ERT considers this accuracy issue to be resolved, but raised a new transparency issue (see ID# L.9 in table 5).
L.3	4.A.1 Forest land remaining forest land – CO <sub>2</sub> (L.10, 2016) (L.10, 2015) Accuracy	Provide revised estimates for DOM emissions and removals for the entire time series.	Resolved. Belgium revised the estimates and reported no carbon stock changes in deadwood and litter (DOM pools) for the entire time series; therefore no transition period needs to be applied. The ERT acknowledges that this estimation is in line with the tier 1 method in the 2006 IPCC Guidelines (volume 4, chapter 4.2.2.1, p.4.20). For the litter pool, Belgium provided a clear explanation in the NIR that litter carbon stock is assumed to be in stable state over the period (section 6.2.2.1.B, p.217). For the deadwood pool, noting that the explanation of the method in the NIR was not appropriate, the ERT raised a new transparency issue (see ID# L.9 in table 5).
L.4	4.A.2 Land converted to forest land – CO <sub>2</sub> (L.11, 2016) (L.11, 2015) Accuracy	Estimate carbon stock changes in the DOM pool using the tier 1 approach outlined in the 2006 IPCC Guidelines and, if appropriate, include a justification as to why emissions or removals from carbon stock changes in the DOM pool are insignificant as defined in paragraph 37 of the annex to decision 24/CP.19.	Addressing. Belgium reports values for carbon stock changes in deadwood and litter in CRF table 4.A, and no longer reports a notation key. The Party reported in the NIR (p.219) that the estimation of carbon stock changes in the DOM pool was consistent with the tier 1 method in the 2006 IPCC Guidelines. However, the ERT noted that the method used to estimate carbon stock change still follows the IPCC good practice guidance for LULUCF (see ID# KL.4 below).
L.5	4.B.1 Cropland remaining cropland – CO <sub>2</sub> (L.12, 2016) (L.12, 2015) Consistency	Provide, along with the estimates of soil organic carbon emissions or removals from cropland remaining cropland, a transparent description of the approaches used.	Resolved. Belgium revised its country-specific EF (–0.066 t C/ha per year) for mineral soils in cropland remaining cropland in the Walloon Region in accordance with the recommendation made in the previous review report, and also updated the explanation in the NIR (table 6-9, p.223).
L.6	4.B.2 Land converted to cropland – CO <sub>2</sub> (L.5, 2016) (L.5,	Separately describe the processes causing the	Not resolved. Belgium has not separately described in the NIR the drivers of the increase in the total area of cropland over time. During the review, Belgium

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	2015) (66, 2014) Transparency	increasing area of cropland.	explained that the increase in the total cropland area is mainly linked to the conversion of grassland to cropland, which is often linked to the EU Common Agricultural Policy, but the exact drivers have not yet been identified. In addition, Belgium explained that the increase in the orchard area reported in the NIR was considered an internal land-use change within cropland. The ERT notes that there are also methodological aspects that affect the increasing trend of land converted to cropland in the period 1990–2008, and considers this important information to explain the increasing area of cropland (see ID# L.11 in table 5).
L.7	4.G HWP – CO <sub>2</sub> (L.13, 2016) (L.13, 2015) Accuracy	Correctly apply the 2006 IPCC Guidelines and transparently provide the AD and parameters used to estimate HWP emissions or removals.	Resolved. Belgium revised its estimation of HWP, including revision of the AD using the 2006 IPCC Guidelines (volume 4, chapter 12) and the Kyoto Protocol Supplement (chapter 2.8). New information was also provided in the new section 6.5 (p.228) of the NIR and in CRF table 4.G.s2.
L.8	4.G HWP – CO <sub>2</sub> (L.14, 2016) (L.14, 2015) Completeness	Estimate HWP from historical inflows since 1900 using the average value of the timber harvest for the first five years for which AD are available or by extrapolation of the data for HWP inflows for 2000–2014 as outlined in the 2006 IPCC Guidelines (chapter 12).	Addressing. Belgium revised the HWP estimation (see ID# L.7 above) but the carbon stock changes for the HWP pool for 1990–1999 were not implemented and were reported as “NO, NE”. During the review, Belgium clarified that AD for HWP recently became available from FAOSTAT (the database of the Food and Agriculture Organization of the United Nations) for the period from 1961 to 1999, but were reported for Belgium and Luxembourg together, and so the Party is working to prepare appropriate HWP AD for Belgium in order to report the HWP estimates for the whole time series in its next submission.
<b>Waste</b>			
W.1		No issues were identified in the previous review report.	
<b>KP-LULUCF</b>			
KL.1	General (KP-LULUCF) – all gases (KL.5, 2016) (KL.5, 2015) Transparency	Update the relevant sections in the NIR to reference the applicable methods from the 2006 IPCC Guidelines applied and the relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol used to estimate emissions and removals.	Not resolved. Belgium has not fully updated the relevant sections in chapter 10 of the NIR to reference correctly the applicable methods from the 2006 IPCC Guidelines. In addition, the ERT noted that the Party has not fully updated the information in line with the elements and structure contained in decision 2/CMP.8, annex II (see ID# KL.8 below and ID#s KL.11, KL.14, KL.15, KL.16 and KL.17 in table 5).
KL.2	General (KP-LULUCF) – CO <sub>2</sub> (KL.7, 2016) (KL.7, 2015) Consistency	Provide a summary of any methodological inconsistencies that may trigger a technical correction to the FMRL.	Not resolved. Belgium did not provide the required information. During the review, the Party clarified that there is a plan to implement a technical correction to the FMRL and that it will add to its submission information on the methodological inconsistencies that may trigger a technical correction.

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
KL.3	General (KP-LULUCF) – CO <sub>2</sub> (KL.8, 2016) (KL.8, 2015) Transparency	Include information on how land that was accounted for under activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the first commitment period continues to be accounted for in the second commitment period.	Resolved. The relevant information is included in the NIR (section 10.2.4).
KL.4	AR – CO <sub>2</sub> (KL.12, 2016) (KL.12, 2015) Completeness	Undertake a numerical evaluation (e.g. using a tier 1 approach from the 2006 IPCC Guidelines) of litter and deadwood stock changes in forest types elected under afforestation, or provide examples showing that these pools are not sources.	Not resolved. Belgium reported carbon stock changes in the litter and deadwood pools as “NO” in accordance with the methodology provided in the IPCC good practice guidance for LULUCF. During the review, Belgium indicated that it will apply a carbon gain estimation using country-specific stocks of litter and deadwood for its next submission.
KL.5	FM – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O (KL.11, 2016) (KL.11, 2015) Accuracy	Enter the correct margin for emissions associated with wildfires for land under FM in CRF table 4(KP-1)B1.3.	Resolved. The margin (7.8 kt CO <sub>2</sub> eq) was correctly reported in CRF table 4(KP-1)B.1.3.
KL.6	FM – CO <sub>2</sub> (KL.13, 2016) (KL.13, 2015) Accuracy	Revise the estimates for litter and deadwood carbon stock changes using the 2006 IPCC Guidelines and the Kyoto Protocol Supplement, and include the correct estimates in the annual submission.	Resolved. The Party revised the estimates for litter and deadwood using a tier 1 method in accordance with the 2006 IPCC Guidelines. The ERT noted that the Party applied the same method for forest land remaining forest land, as explained in the NIR (chapter 10, p.272) (see ID# L.3 above). However, the ERT also noted that the implementation of this methodology requires additional information to be included in chapter 10 of the NIR, and therefore raised follow-up issues (see ID#s KL.16 and KL.17 in table 5).
KL.7	HWP – all gases (KL.6, 2016) (KL.6, 2015) Transparency	Provide information on how HWP inflows from domestically produced harvests are derived, with tables showing production, import and export of different sawnwood and wood-based products.	Resolved. Belgium revised the HWP estimation (see ID# L.7 above) and provided information on production, export and import for three default HWP categories (sawnwood, wood panels and paper, and paperboard) in CRF table 4.Gs2. In addition, table 6.10 of the NIR (section 6.5.2, p.229) provides data on production and export for paper and paper board. The ERT considers this sufficient to provide an overview of HWP inflows from domestically produced harvests.
KL.8	HWP – CO <sub>2</sub> (KL.9, 2016) (KL.9, 2015) Transparency	Include, in the annual submission, information confirming that there were no HWP accounted for in the first commitment period on the basis of instantaneous oxidation.	Not resolved. Belgium did not report in its NIR the information required by decision 2/CMP.8, annex II, paragraph 2(g)(iv). During the review, Belgium confirmed that there was no harvesting of elected afforestation lands in the first commitment period and that FM under Article 3, paragraph 4, of the Kyoto Protocol was not elected. Therefore, no HWP needs to be excluded from the accounting in the second commitment period. Belgium also informed the ERT

<i>ID#</i>	<i>Issue and/or problem classification<sup>a, b</sup></i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
			during the review that it will include the required information in its next submission.
KL.9	HWP – CO <sub>2</sub> (KL.10, 2016) (KL.10, 2015) Yes. Transparency	Include, in the NIR, transparent information on how emissions from harvests from deforestation are estimated.	Addressing. Belgium stated in the NIR (section 6.5.2, p.228) that emissions from deforestation are estimated on the basis of instantaneous oxidation. However, the Party did not refer to equation 2.8.1 of the Kyoto Protocol Supplement to explain how the carbon in harvests from deforestation is excluded from the carbon inflow to the HWP pool.
KL.10	HWP – CO <sub>2</sub> (KL.14, 2016) (KL.14, 2015) Yes. Accuracy	Revise estimates for HWP pools using the 2006 IPCC Guidelines and the Kyoto Protocol Supplement, and include the correct estimates in the annual submission.	Addressing. Carbon stock changes in the HWP pool were estimated using the methodology provided in the Kyoto Protocol Supplement for 2000 onward, including the years of the second commitment period. During the review Belgium clarified that it is working to complete its estimate of HWP for the whole time series (see ID# L.8 above). The ERT notes that completion of this work will improve the accuracy of the HWP estimation for the second commitment period.

<sup>a</sup> References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue and/or problem was raised. Issues are identified in accordance with paragraphs 80–83 of the UNFCCC review guidelines and classified as per paragraph 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with paragraph 69 of the Article 8 review guidelines, in conjunction with decision 4/CMP.11.

<sup>b</sup> The review of the 2017 annual submission of Belgium did not take place in 2017 and, as such, the 2017 annual review report was not available at the time of this review. Therefore, the recommendations reflected in table 3 are taken from the 2016 annual review report. For the same reason, the year 2017 is excluded from the list of years in which the issue has been identified.

#### IV. Issues identified in three successive reviews and not addressed by the Party

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2018 annual submission of Belgium, and have not been addressed by the Party.

Table 4

##### Issues identified in three successive reviews and not addressed by Belgium

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed<sup>f</sup></i>
General	No issues identified	
Energy		
E.2	Clearly document in the NIR any remaining differences between the regional and federal energy balances and provide explanations for these differences	3 (2014–2018)
IPPU	No issues identified	
Agriculture	No issues identified	

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed<sup>a</sup></i>
LULUCF		
L.6	Separately describe the processes causing the increasing area of cropland	3 (2014–2018)
Waste	No issues identified	
KP-LULUCF	No issues identified	

<sup>a</sup> The review of the 2017 annual submission of Belgium did not take place during 2017. Therefore, the year 2017 is not taken into account when counting the number of successive years in table 4. In addition, as the reviews of the 2015 and 2016 annual submissions were held in conjunction with each other, they are not considered successive years and 2015/2016 is considered as one year.

## V. Additional findings made during the individual review of the 2018 annual submission

10. Table 5 contains findings made by the ERT during the individual review of the 2018 annual submission of Belgium that are additional to those identified in table 3.

Table 5  
**Additional findings made during the individual review of the 2018 annual submission of Belgium**

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?<sup>a</sup> If yes, classify by type</i>
General			
G.3	CPR	<p>Belgium calculated its CPR (reported in section 11.4 of the NIR) using the value for total emissions reported in the previously published annual review report (2016 submission) and not the value in the most recently submitted inventory. According to decision 11/CMP.1, annex, paragraph 6, a Party should demonstrate the value of the CPR in the NIR by calculating its value considering 90 per cent of its assigned amount and 100 per cent of eight times the total emissions reported in its most recently reviewed inventory (in this case the values reported in the 2018 submission) and maintain in its national registry whichever is lowest.</p> <p>The ERT recommends that Belgium demonstrate its CPR in the NIR in accordance with decision 11/CMP.1, annex, paragraph 6, by calculating 100 per cent of eight times the total emissions reported in its most recently submitted inventory.</p>	Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
G.4	Follow-up to previous reviews	<p>Belgium did not systematically report in the NIR on the changes made to the inventory in response to recommendations made during the review process (in accordance with para. 50(h) and (i) of the UNFCCC reporting guidelines).</p> <p>The ERT recommends that Belgium report in the NIR on its response to the review process by including a description of how each recommendation from previous review reports has been or will be addressed. The ERT encourages Belgium to include this information in a table in chapter 9 (recalculations and improvements) of its NIR.</p>	Transparency
G.5	Key category analysis	<p>Belgium reported a key category analysis (level assessment (for 1990, 2015 and 2016) and trend assessment (1990–2015 and 1990–2016), with and without LULUCF). The ERT noted that the level of disaggregation is too high for some categories (e.g. energy). The 2006 IPCC Guidelines (volume 1, table 4.1) provide a good basis for the disaggregation. Deviation from this table is encouraged only on the basis of national circumstances (particularly significance of subcategories, regional distribution of subcategories). During the review, Belgium explained that the disaggregation level chosen reflects the need to differentiate between regions and their priorities, because some categories occur in just one region. The ERT notes, however, that too much disaggregation may lead to a failure to identify a key aggregated category.</p> <p>The ERT encourages Belgium to further assess the level of disaggregation of its key category analysis taking into consideration the suggested disaggregation level in the 2006 IPCC Guidelines (volume 1, table 4.1) and its national circumstances.</p>	Not an issue/problem
G.6	National registry	<p>The ERT noted from the SIAR (2016) that Belgium had not established a PPSR account and that the implementation of the PPSR functionality had been foreseen for version 8.1 of the EU registry software, which was scheduled for release at the end of the third quarter of 2016. However, the ERT noted that the Party has not yet established its PPSR (in accordance with decision 1/CMP.8). In response to a question raised by the ERT, Belgium confirmed that</p>	Adherence to the reporting guidelines under Article 7,

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		<p>its PPSR account has not yet been created in the Kyoto Protocol registry and explained the following: “Since 16 November 2016 the EU Registry provides the technical possibility to open a PPSR account. However, prior to opening it, the PPSR account type must be first introduced into the EU legislative framework. This was done by the annex of Commission Delegated Regulation (EU) 2015/1844. This provision, however, will become applicable, according to Article 2 of the Delegated Regulation, on ‘the date of publication by the Commission in the Official Journal of the European Union of a communication on the entry into force of the Doha Amendment to the Kyoto Protocol’”.</p> <p>The ERT recommends that Belgium establish its PPSR account in accordance with decision 1/CMP.8.</p>	<p>paragraph 1, of the Kyoto Protocol</p>
G.7	National registry	<p>The ERT noted that the SIAR contains no recommendations in the summary of findings section. However, in section 4.2 (recommendations to address identified problems) it includes a recommendation for the Party to keep the two public websites referenced in NIR section 11.3 (<a href="https://www.climateregistry.be/en/links-reports/links-reports.htm#KYOTO">https://www.climateregistry.be/en/links-reports/links-reports.htm#KYOTO</a> and <a href="https://unionregistry.ec.europa.eu/euregistry/BE/public/reports/publicReports.xhtml">https://unionregistry.ec.europa.eu/euregistry/BE/public/reports/publicReports.xhtml</a>) updated and consistent.</p> <p>The ERT recommends that Belgium address this recommendation from section 4.2 of the SIAR.</p>	Transparency
G.8	National system	<p>Belgium submitted as additional information to the NIR an updated version (from April 2017) of its national system report. However, the ERT noted that the updated information related to the changes in the institutional arrangements (contained in the national system report) was not reflected in the NIR (section 1.2, p.25). In addition, the Party did not include sufficient detail in the NIR on the annual process of inventory planning, including the decision process related to improvements. During the review, Belgium explained that the changes introduced to its national system were mostly related to the responsibilities attributed to institutional bodies, which do not affect the functions of the national system.</p> <p>The ERT recommends that Belgium update section 1.2 of the NIR to reflect the changes introduced in the national system, including the responsibilities attributed to institutional bodies, and describe in more detail the annual process of improving the inventory.</p>	<p>Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol</p>
G.9	NIR	<p>In its 2018 submission, Belgium submitted as part of its NIR several documents in annex 3 to the NIR, some of which are written in Dutch. The UNFCCC Annex I inventory reporting guidelines state in paragraph 60 that “the NIR shall be submitted in one of the official languages of the United Nations” and that “Parties are encouraged to submit an English translation of the NIR to facilitate its use by the expert review teams”.</p> <p>The ERT recommends that Belgium submit any additional documents included in the annexes to the NIR in one of the official languages of the United Nations.</p>	<p>Adherence to the UNFCCC Annex I inventory reporting guidelines</p>
G.10	NIR	<p>The ERT noted that, for many categories, the information provided in the NIR on methods and data is not sufficient for the ERT to understand how the estimates were produced (see all transparency issues in the sectoral parts of this report). During the review, the Party provided the ERT with additional information clarifying these issues.</p>	Not an issue/problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		Specific recommendations for improving transparency made during the review are included under the respective sectoral analysis ID#s in this report. If, when implementing the recommendations, Belgium finds that the main body of the NIR becomes too big, one solution would be to include additional information in annex 3 to the NIR with clear cross references between the main body of the NIR and the additional information in annex 3.	
G.11	QA/QC and verification	Belgium reported a new QA/QC plan of April 2017 reflecting improvements to the QA/QC procedures (see ID# G.2 in table 3). However, the information included in section 1.6 of the NIR still refers to the QA/QC plan of April 2010.  The ERT recommends that Belgium update the information in section 1.6 of the NIR to reflect the new QA/QC plan and the improvements to QA/QC procedures.	Transparency
G.12	Recalculations	Belgium reported in the sectoral sections of the NIR the recalculations performed for the inventory, explaining the reasons for recalculations, the methodologies applied and the implications for the sectoral emission trends. However, it did not include a discussion on the impact that the recalculations had on the national emission trend.  The ERT encourages Belgium to include in the NIR a discussion on the impact of each recalculation on the trend in total emissions at the national level. The ERT encourages Belgium to include in section 9 (recalculations and improvements) of its NIR a table with descriptions of the recalculations, the reasons for the recalculations and their impact.	Not an issue/problem
G.13	Uncertainty analysis	Belgium reported an approach 1 uncertainty analysis in annex 2 to the NIR. In its general assessment of the results (NIR, section 1.7) Belgium recognized that the results of the uncertainty analysis are highly influenced by N <sub>2</sub> O emissions, which have a high uncertainty. The ERT agrees and notes that, in addition, the uncertainty of N <sub>2</sub> O emissions has an asymmetrical probability distribution, which leads to an overestimation of uncertainty using the tier 1 approach.  The ERT encourages Belgium to develop an approach 2 (Monte Carlo) uncertainty analysis, or at least a hybrid approach, using approach 2, for those categories that have high uncertainty and an asymmetrical probability distribution function to increase the accuracy of the uncertainty calculation.	Not an issue/problem
Energy			
E.13	1. General (energy sector) – solid, liquid and gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	In response to a question raised by the ERT related to ID# E.1 in table 3, Belgium provided information updating the NIR (section 3.2.1, p.77), explaining the latest developments in improving consistency between the regional and federal energy balances. The Party explained that in 2015 an initial survey was sent out to public filling stations, to be completed on a voluntary basis. In 2016, the survey was repeated and an additional survey for private filling stations was conducted. In 2017 and 2018, surveys for public filling stations were once again carried out but introducing the notion of sampling. The methodology for surveying public filling stations is now mature with coherent results for four years (with the totals for Belgium being similar to the petroleum balance totals). The results for 2017 (2018 survey) are still being analysed but preliminary data are good, while the 2014 data (2015 survey) are	Yes. Transparency

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		<p>less solid because some big filling stations did not respond to the first voluntary survey. The federal administration is now working on administrative data for private filling stations.</p> <p>The ERT recommends that Belgium update the NIR by including information on the progress made in improving the consistency of data on the consumption of petroleum products for transport fuel and heating and the results of the surveys applied to the public filling stations, including the impact of the improvement between the regional and federal energy balances.</p>	
E.14	1. General (energy sector) – solid, liquid and gaseous fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	<p>In addition to providing the information described in ID# E.13 above, the Party informed the ERT during the review that improvements to consistency on the consumption side (for electricity, renewable energy, natural gas, solid fossil fuels and heat) have been made. For the sources electricity and heat, renewable energy and waste, and natural gas, the regional energy balances are converted by each of the three regions into the same format used in the IEA and Eurostat tables. These are then used at the federal level to compile the national energy balance with a few adaptations (offshore wind energy and consumption of biofuels in road transport are added). With regard to solid fuels, although consumption is very limited in Belgium, the Party explained that a comparison is made of the federal and regional balances of the consumption data from the last remaining coking plant and blast furnace installation (see ID# E.16 below, which explains the differences between the reference and sectoral approach). Belgium further explained that an exercise comparing the sum of the regional balances and the federal balance is currently taking place at the federal level, and that revisions will be conducted in the near future using the relevant Eurostat and IEA annual questionnaire. However, the different calorific values within industrial sectors (which are impossible to report in the Eurostat and IEA tables since only one calorific value is requested for the whole industrial sector) and different definitions will still lead to differences between regional and federal data. The ERT is of the view that Belgium could better structure the information in the NIR to demonstrate the Party's process for improving consistency between the regional and federal energy balances (see ID# E.1 in table 3) and identifying the remaining differences (see ID#s E.2 and E.3 in table 3).</p> <p>The ERT recommends that Belgium describe in the NIR the process undertaken to improve the consistency of data (for electricity, renewable energy, natural gas, solid fossil fuels and heat) between the regional and federal level, and report on the exercise of comparison between the sum of the regional balances and the federal balance, including the limitations related to the reporting of calorific values.</p>	Yes. Transparency
E.15		<p>The ERT noted that the NIR (p.77) states that procedures have been in place since 2008 to help divide federal oil statistics into regional data (this work is ongoing); and that in 2014–2015 a harmonization of the end uses of solid fossil fuels led to an increase in the number of companies reporting statistics at the federal level. However, no further explanation of the respective procedures to help divide federal oil statistics into regional data and on the companies (and sectors) reporting statistics at the federal level was provided. The Party has also not provided in the NIR the results and limitations of the harmonization. The ERT also noted that the working group established in 2003 is included in the energy charts illustrating the flow and consolidation of data among the three regions (NIR, annex</p>	Yes. Transparency

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		5, pp.337–339), but the tasks of the working group to ensure the harmonization of the data between the regional and federal energy balances are not explained.	
		The ERT recommends that Belgium include in the NIR an explanation of the tasks carried out by the working group to ensure the harmonization of data between the regional and federal energy balances as shown in the flow charts. The ERT also recommends that the Party provide in the NIR a more detailed description and an evaluation of the impact of these actions on the improvement of consistency between the regional and federal energy balances related to the procedures in place since 2008 to divide federal oil statistics into regional data; and the harmonization of the end uses of solid fossil fuels (including the results and limitations of the harmonization).	
E.16	Fuel combustion – reference approach – solid, liquid and gaseous fuels – CO <sub>2</sub>	<p>Belgium provided in the NIR (section 3.2.1, p.74) a “corrected reference approach” to explain the reason for the main differences between the reference approach and the sectoral approach. The Party explained that the solid fuels allocated to the IPPU sector are deducted from the reference approach; however, for the sectoral approach some of the solid fuels used for industrial processes are converted to derived gases (such as blast furnace gas) and used for energy purposes and this amount thus appears as combustion emissions under energy in the sectoral approach. Therefore, in the corrected reference approach the off-gas emissions from the sectoral approach are added to the emissions estimated in the reference approach, thus reducing the difference between the two approaches (see ID# E.3 in table 3). During the review Belgium provided the ERT with a spreadsheet that explained how the corrected reference approach was calculated. The ERT noted that the values in the spreadsheet do not match the values in the NIR (figure 3.6, p.74). In response, the Party explained that the data in the spreadsheet are correct and that it will update the NIR for its next submission.</p> <p>The ERT recommends that Belgium update the values reported for the corrected reference approach in the NIR (figure 3.6) and explain more clearly how the corrected reference approach was calculated, in particular regarding the treatment of consumption of off-gases in the IPPU sector, in line with the explanation referred to in the paragraph above.</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
E.17	Comparison with international data – liquid fuels – CO <sub>2</sub>	<p>The ERT noted that the values reported for stock change of crude oil are equal in magnitude (4,179 TJ) but opposite in sign between the IEA data and CRF table 1.A(b) for 2016 (i.e. the CRF table reports a stock increase, while a stock decrease was reported to IEA). During the review the Party explained that there was an error in the CRF table.</p> <p>The ERT recommends that Belgium revise the values for stock change of crude oil reported in CRF table 1.A(b).</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
E.18	Comparison with international data – gaseous fuels – CO <sub>2</sub>	<p>The ERT noted that the imports and exports of natural gas reported in CRF table 1.A(b) are systematically 0.5 per cent lower than those reported to IEA. For example, for 2016, imports are 3,132 TJ lower in CRF table 1.A(b), while exports are 121 TJ lower. During the review the Party clarified that for CRF table 1.A(b) (column K) a conversion factor of 0.995 was used, but the correct value is 1.</p> <p>The ERT recommends that Belgium report revised values of imports and exports of natural gas, including a revised conversion factor, in CRF table 1.A(b).</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines

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E.19	Comparison with international data – biomass – CO <sub>2</sub>	<p>The ERT noted that imports of waste (non-biomass fraction) are reported as “NO” in CRF table 1.A(b). However, the IEA reported in its statistics a value for non-biomass fraction for 2016 (171 TJ). During the review the Party explained that this was an error in the CRF tables.</p> <p>The ERT recommends that Belgium report imports of waste (non-biomass fraction) in CRF table 1.A(b).</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
E.20	1.A.1.b Petroleum refining – liquid fuels – CO <sub>2</sub>	<p>The ERT noted that the CO<sub>2</sub> IEFs for liquid fuels in petroleum refining for 1991 (56.42 t/TJ), 1992 (51.71 t/TJ) and 1993 (50.56 t/TJ) are below the IPCC default values (57.6–97.5 t/TJ). These years are also outliers for the trend in the CO<sub>2</sub> IEF over the whole time series. During the review the Party explained that the AD for liquid fuels for 1991–1993 are too high because there is no disaggregation for ‘own use’ by refineries, but only a total value for ‘own use’ for the transformation sector. However, CO<sub>2</sub> emissions are reported correctly. The Party stated that it will carry out an interpolation for between 1990 and 1994 in order to obtain more realistic values for 1991–1993.</p> <p>The ERT acknowledged the Party’s explanation and recommends that Belgium include revised AD for liquid fuels used in petroleum refining and a corresponding explanation in its next submission.</p>	Yes. Consistency
E.21	1.A.3.c Railways – liquid fuels – CO <sub>2</sub>	<p>The ERT noted that the CO<sub>2</sub> IEFs for liquid fuels for railways for 2014 (72.21 t/TJ), 2015 (72.18 t/TJ) and 2016 (72.18 t/TJ) are lower than the IPCC default values (72.60–74.80 t/TJ). During the review Belgium explained that for the Flemish Region emissions are calculated using a constant EF of 72.56 t/TJ for the entire time series, but this value is not reflected in the CRF tables because of a difference in timing between the (earlier) publication of the Flemish energy balance and the calculation of emissions. The Party further explained that updated energy data will be reported in the 2019 submission. However, looking at the trend in the IEF across the entire time series in CRF table 1.A(a)s3 for this category, the ERT noted that the value is higher than or equal to 72.75 t CO<sub>2</sub>/TJ for almost all years 1990–2012, with the exception of 2010 and 2011. After 2012, the values decrease, to below 72.25 t CO<sub>2</sub>/TJ for 2014–2016. In response to a question raised by the ERT, Belgium explained that there is a difference between the calorific values used for the energy balance and for the inventory, and provided a spreadsheet with an updated calculation, where the IEF values (71.85 t/TJ in 2016) do not include outliers but are still below the IPCC default value. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate in emissions.</p> <p>The ERT recommends that the Party revise the EF used for estimating CO<sub>2</sub> emissions from railways using the appropriate calorific values and explain why the IEF values are lower than the IPCC default values.</p>	Yes. Accuracy
E.22	1.A.4 Other sectors – all fuels – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	<p>During the review Belgium explained to the ERT that emissions for category 1.A.4 are estimated using a tier 2 methodology for the Flemish Region and a tier 1 methodology for the Walloon and Brussels-Capital Regions. However, the ERT noted from the key category analysis presented by the Party in the NIR (section 1.5.1, p.38) that several subcategories under category 1.A.4 are key categories. According to the 2006 IPCC Guidelines, it is good practice to move to higher tiers for key categories. During the review, the Party explained that it has no country-specific EFs for gaseous, liquid or solid fuels. For gaseous and liquid fuels, fuel suppliers, refineries and federal services were regularly contacted for several years to determine country-specific values, without any significant</p>	Yes. Accuracy

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		<p>results (see ID# E.10 in table 3). For gaseous fuels, Belgium will analyse the possibility of using an EF derived from EU ETS data, if it can be confirmed that the EF is also applicable to the gas distributed in the residential and commercial sector. With regard to solid fuels, the Party explained that, owing to the large variability in carbon content and the limited amount used in these subcategories in Belgium, the use of any country-specific value is likely to increase uncertainty, so the IPCC default factor appears to be the best available data.</p> <p>The ERT recommends that Belgium make efforts to develop a country-specific EF for gaseous and liquid fuels for the key categories under category 1.A.4. The ERT also recommends that Belgium explain in the NIR its reasons for not using a country-specific EF for solid fuels for the key categories under category 1.A.4.</p>	
IPPU			
I.5	2.A.3 Glass production – CO <sub>2</sub>	<p>The ERT noted from the NIR (table 4.3, p.144) that for the Walloon Region the EF for flat glass production was constant for 1990–2002 (143 kg CO<sub>2</sub>/t) and after that inter-annual variation can be observed, in 2002–2003 (–4.5 per cent), 2003–2004 (+13.6 per cent), 2005–2006 (–14.0 per cent), 2007–2008 (+5.6 per cent), 2008–2009 (–7.3 per cent) and 2014–2015 (+10 per cent). During the review, Belgium explained that this is because since 2003 the data for CO<sub>2</sub> emissions and AD (amount of carbonate) for flat glass production have come directly from three different plants in Wallonia and the EFs are calculated using that information (as in NIR table 4.3). The inter-annual variation and the reduction in the EF observed between 2002 (143 kg CO<sub>2</sub>/t) and 2016 (132 kg CO<sub>2</sub>/t) are due to differences in the amount of raw materials used in these plants.</p> <p>The ERT recommends that Belgium include in the NIR explanations of the reasons for the inter-annual variation and reduction in the CO<sub>2</sub> EF for flat glass production between 2002 and 2016.</p>	Yes. Transparency
I.6	2.A.3 Glass production – CO <sub>2</sub>	<p>In addition to the explanation provided in response to ID# I.5 above, Belgium clarified that the constant EF for flat glass production for 1990–2002 (143 kg CO<sub>2</sub>/t) is based on a weighted average EF estimated using data for 2003–2009 (that come directly from three different plants in Wallonia). In response to a question raised by the ERT, the Party provided a spreadsheet and informed the ERT that a mistake occurred in the AD from one flat glass plant for 2004 and 2005 and therefore the EF calculated for the two years was higher than for the other years, which caused a mistake in the weighted average EF applied for 1990–2002 (and an overestimation of emissions for those years). The correct weighted average EF to be applied for 1990–2002 is 137.3 kg CO<sub>2</sub>/t.</p> <p>The ERT recommends that Belgium correct the weighted average EF and recalculate emissions from flat glass production for the period 1990–2002.</p>	Yes. Accuracy
I.7	2.B.1 Ammonia production – CO <sub>2</sub>	<p>The ERT noted that Belgium reported the notation key “NA” for CO<sub>2</sub> recovery in CRF table 2(I).A-Hs1. However, the NIR (section 4.3.2.1, p.150) explains that in the Flemish Region the recovery part of the CO<sub>2</sub> is transported internally to the nitrophosphoric installation and effectively measured by flow measurements. This CO<sub>2</sub> is used as raw material in the production of nitrophosphoric acid and afterwards for the production of lime. The produced lime is mainly used on-site as a raw material for the production of fertilizers. The company involved highlights that the use of CO<sub>2</sub> from the production of ammonia, which occurs at the same site as the production of fertilizers, to</p>	Yes. Accuracy

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		<p>produce lime results in a reduction in the emissions of CO<sub>2</sub>. Emissions of CO<sub>2</sub> from the application of such lime products are reported in the LULUCF sector. The ERT further noted that for the Walloon Region all CO<sub>2</sub> emissions are allocated to ammonia production. During the review the ERT and Belgium confirmed that the recovery of CO<sub>2</sub> from ammonia production does occur in the country but it was not reported in CRF table 2(I)-A-Hs1.</p> <p>The ERT recommends that Belgium report the amount of CO<sub>2</sub> recovered in CRF table 2(I)-A-Hs1.</p>	
I.8	2.B.2 Nitric acid production – N <sub>2</sub> O	<p>Belgium reported in the NIR (section. 4.3.2.2, p.151) that, for the Flemish Region, a small amount of N<sub>2</sub>O emissions from the production of nitrophosphoric acid is reported under nitric acid production. In response to a question raised by the ERT on why emissions from nitrophosphoric acid are not reported under category 2.B.10 (other), Belgium explained that the AD needed to calculate emissions from nitrophosphoric acid only became available for the complete time series during 2017, and the emissions will be reallocated for the next submission.</p> <p>The ERT recommends that Belgium reallocate N<sub>2</sub>O emissions from nitrophosphoric acid production from category 2.B.2 to category 2.B.10.</p>	Yes. Comparability
I.9	2.B.8 Petrochemical and carbon black production – CO <sub>2</sub>	<p>The ERT noted that category 2.B.8 is a key category; however, the NIR (section 4.3.2.5, p.152) does not provide a transparent description of data sources, how data are collected and how the emissions are calculated. In response, Belgium explained that the largest share of the emissions in this category is from the Flemish Region (more than 99 per cent in 2016) and reported under category 2.B.8.b (ethylene production). The remaining emissions are from the Walloon Region and are reported under category 2.B.8.g (other non-specified). The Party explained that the Flemish Region has four naphtha cracking facilities at three industrial locations. In addition to ethylene, these facilities produce propene, benzene, polymers and other products that are also reported under category 2.B.8.b. Within Europe, the cities of Antwerp, Geleen, Moerdijk, Terneuzen (all four in the Flemish Region) and Tarragona (Spain) are the most important production locations for the cracking of crude oil into raw materials for plastics, medicines, pesticides and food. Antwerp has the biggest cracking installation in Europe. For the Flemish Region, the emissions reported under category 2.B.8.b are those of the rest- and off-gases (other fuels) in chemical industry. These are mainly emissions from the recovered fuels generated by the naphtha cracking process: mainly naphtha (largest part) and liquefied petroleum gas (smallest part) for the production of ethylene. Until 2012 these energy consumption data as well as the estimated emissions of CO<sub>2</sub> were obtained via a confidential survey carried out by the chemical industry in cooperation with the Flemish Institute for Technological Research. The survey gathered data on the purchased quantity of fuels (distinguishing between the use as raw material and the energetic use); the self-produced energy fuels and the amount of fuel sold; and the corresponding emissions of CO<sub>2</sub> from self-produced rest-fuels and non-energetic CO<sub>2</sub>. Since 2013 the data have been reported via the EU ETS.</p> <p>The Party further explained that for the Walloon Region the emissions reported under category 2.B.8.g are from three sources: production of vinyl chloride, production of maleic anhydride and production of phthalic anhydride. The production of phthalic anhydride stopped in 2007 and the production of maleic anhydride in 2009. The CO<sub>2</sub> EF is constant for 1990–2001 for the three sources and it was chosen following discussion with the respective plants. The ERT noted that the average EF used for category 2.B.8.g ranges from 0.15 t CO<sub>2</sub>/t in 1990 to 0.033 t CO<sub>2</sub>/t in</p>	Yes. Transparency

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		<p>2016 (with a peak of 0.21 t CO<sub>2</sub>/t in 2006), but the NIR does not include information on the value of the EF used for each of the three sources. The Party also explained that, since 2002, the CO<sub>2</sub> emission and production data have been provided annually by the plants.</p> <p>The ERT recommends that Belgium include in the NIR detailed description of the reporting of emissions for subcategories 2.B.8.b (ethylene production) and 2.B.8.g (other non-specified) in Belgium, including the number of naphtha cracking facilities, the importance of this sector in comparison with other EU countries and the other products generated during ethylene production. The ERT also recommends that the Party provide in the NIR information on how the emissions are calculated for the Flemish and Walloon Regions for categories 2.B.8.b and 2.B.8.g, including the EFs used for the plants.</p>	
I.10	2.B.8 Petrochemical and carbon black production – CO <sub>2</sub>	<p>Belgium reported in the NIR (section 4.3.2.5, p.152) that emissions from carbon black (category 2.B.8.f) are reported under category 2.B.10 (other) because of confidentiality issues as there is only one carbon black plant in Belgium (in the Flemish Region). However, the ERT noted that no information is included in the NIR about the method, data collection, sources of the emissions and how these are calculated. In response, the Party explained that emissions relating to this company have been reported via the EU ETS since 2014, when a second production line became operational, owing to an obligation under the EU ETS to report only on plants generating above 20 MWhth. Before 2014 the emissions were reported by the company via the confidential survey conducted by the chemical federation in cooperation with the Flemish Institute for Technological Research, and emissions of CO<sub>2</sub> were estimated and calculated by the company via an input–output mass balance (carbon black feedstocks = oil ‘IN’ and carbon black ‘OUT’).</p> <p>The ERT recommends that Belgium include in the NIR information on how the data under category 2.B.8.f (carbon black) are collected, and the assumptions and methodology used to estimate emissions for before and after 2014.</p>	Yes. Transparency
I.11	2.B.10 Other (chemical industry) – CO <sub>2</sub>	<p>Belgium reported in the NIR (section 4.3.2.7, p.153) that, for the Flemish Region, emissions from ethylene oxide, ethylene dichloride and other petrochemical products are allocated under category 2.B.10. However, the ERT noted that according the 2006 IPCC Guidelines (volume 3, chapter 1.1, p.1.6) these emissions should be allocated to category 2.B.8 (petrochemical and carbon black production). During the review Belgium explained that, owing to confidentiality issues, it is not possible to make the distinction between emissions from the different product processes using the available EU ETS data. However, a reallocation of emissions from category 2.B.10 to 2.B.8 is possible.</p> <p>The ERT recommends that Belgium reallocate the emissions from ethylene oxide, ethylene dichloride and other petrochemical products from category 2.B.10 to category 2.B.8 (petrochemical and carbon black production) and update the relevant information in the NIR accordingly.</p>	Yes. Comparability
I.12	2.C.5 Lead production – CO <sub>2</sub>	<p>Belgium reported the notation key “IE” in CRF table 2(I)A-Hs2 for CO<sub>2</sub> emissions from lead production. The ERT noted that in the documentation box the Party reported that emissions for category 2.C.5 (lead production) are reported under category 2.C.7 (other non-specified). In the NIR (section 4.4.2.2, p.161) the Party stated that the</p>	Yes. Comparability

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I.13	2.C.6 Zinc production – CO <sub>2</sub>	<p>emissions reported in category 2.C.7 mainly originate from the non-ferrous sector in the Flemish Region. Since 2013 these emissions are completely taken from the EU ETS reporting. Before 2013 the data were reported by the individual plants involved. However, during the review Belgium explained that the notation key “IE” is incorrect and that it will report “NO” in its next submission because there is no lead production in Belgium. However, the ERT checked the <i>2014 Minerals Yearbook</i> and noted that there is secondary lead production in Belgium (see ID# I.14 below).</p> <p>The ERT recommends that Belgium confirm whether primary or secondary lead production occurs in the country and either report the emissions under category 2.C.5 (clarifying the method and EFs applied) or, in case there is no lead production, report the correct notation key “NO” in CRF table 2(I)A-Hs2 and correct the information in the documentation box.</p> <p>Belgium reports the notation key “IE” in CRF table 2(I)A-Hs2 for CO<sub>2</sub> emissions from zinc production. The ERT noted that in the documentation box the Party reported that emissions for category 2.C.6 (zinc production) are included under category 2.C.7 (other non-specified). In the NIR (section 4.4.2.2, p.161) the Party stated that the emissions reported in category 2.C.7 mainly originate from the non-ferrous sector in the Flemish Region. Since 2013 these emissions are completely taken from the EU ETS reporting. Before 2013 the data were reported by the individual plants involved. However, during the review Belgium explained that the notation key “IE” is incorrect and that it will report “NO” in its next submission because there is no zinc production in Belgium. However, the ERT checked the <i>2014 Minerals Yearbook</i> and noted that there is secondary zinc production in Belgium (see ID# I.14 below).</p> <p>The ERT recommends that Belgium confirm whether primary or secondary zinc production occurs in the country and either report the emissions under category 2.C.6 (clarifying the method and EFs applied) or, in case there is no zinc production, report the correct notation key “NO” in CRF table 2(I)A-Hs2 and correct the information in the documentation box.</p>	Yes. Comparability
I.14	2.C.7 Other (metal industry) – CO <sub>2</sub>	<p>Belgium reported in the NIR (section 4.4.2.2, p.161) that, for the Flemish Region, emissions reported under category 2.C.7 mainly originate from the non-ferrous sector (see ID#s I.12 and I.13 above). However, the NIR does not include further explanation of the sources of AD and method applied. During the review Belgium explained that emissions under category 2.C.7 come from five companies in the Flemish Region and relate to the following processes: (1) secondary copper melting, (2) lead refining and refining of precious metals resulting in intermediary products further processed by other companies or used in the construction industry, (3) production of copper (small emissions, up to 1.5 kt CO<sub>2</sub> eq), (4) casting of iron and processing of metals and (5) roasterie (i.e. the reforming of zinc concentrate to zinc oxide). The first two companies are responsible for approximately 80 per cent of the CO<sub>2</sub> emissions in this category. The Party further explained that, since 2013, the emission data have been obtained from the EU ETS. The ERT notes that the information provided by Belgium on this issue confirms that secondary production of zinc and lead do take place in the country (see ID#s I.12 and I.13 above).</p>	Yes. Comparability

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I.15	2.D.2 Paraffin wax use – CO <sub>2</sub>	<p>The ERT recommends that Belgium include in the NIR an explanation of the sources of AD considered for category 2.C.7 and clarify the method and EFs applied for calculating emissions. The ERT also recommends that Belgium either explain why casting of iron and processing of metals are not reported under category 2.C.1 or reallocate the emissions from category 2.C.7 to 2.C.1.</p> <p>Belgium reported in the NIR (section 4.5.2.2, p.162) that paraffin wax consumption has not been reported in the national energy statistics since 2009 and therefore emission estimates for 2009–2016 are constant (6.34 kt) and calculated on the basis of the average annual paraffin wax consumption for 2003–2008. In response to a question raised by the ERT regarding whether the Party has checked other sources of data (e.g. production, import and export statistics), Belgium responded that it will investigate which steps are needed to ensure the consistency of the time series.</p> <p>The ERT recommends that Belgium investigate other sources of data for paraffin wax use and report on its efforts and progress in the NIR. The ERT believes that futures ERTs should consider this issue further to ensure that there is not an underestimate of emissions for this category.</p>	Yes. Consistency
I.16	2.F.1 Refrigeration and air conditioning – HFCs	<p>Belgium reported in the NIR (section 4.7.2.1, p.165) that the country has four car manufacturers. However, the ERT noted that the NIR does not make clear how the F-gas emissions from filling in the car manufacturing industry are calculated. During the review the Party explained that all car manufacturers are consulted to collect the necessary data on F-gas consumption and emissions.</p> <p>The ERT recommends that Belgium include in the NIR information on how the AD for F-gas emissions from filling in the car manufacturing industry are collected and clarify the method and EF used.</p>	Yes. Transparency
I.17	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	<p>Belgium reported in the NIR (section 4.7.2.1, p.165) that no distinction is made between industrial refrigeration, commercial refrigeration and stationary air-conditioning installations, because it is not possible to disaggregate the consumption data between these applications owing to the presence of intermediary wholesalers and the fact that no inventory of installations is available. Therefore all emissions are reported under commercial refrigeration. In response to a question raised by the ERT on why data are not collected separately, Belgium clarified that, for stationary air conditioning, although emissions are still reported as aggregated data, emissions from split, multisplit, heat pumps and movable air conditioners are already calculated separately for each of the types of equipment. Only the data for chillers, based on total sales, are collected as aggregated data (with industrial and commercial refrigeration). However, Belgium explained that it is planning to calculate the emissions from chillers separately and will be able to report stationary air-conditioning installations using a tier 2a approach for its next submission. The ERT noted that emissions from chillers can be calculated based on F-gas consumption.</p> <p>The ERT recommends that Belgium collect the AD and calculate emissions from chillers separately from those from industrial and commercial refrigeration. The ERT also recommends that Belgium report emissions from all stationary</p>	Yes. Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		air-conditioning equipment (chillers, split, multisplit, etc.) under stationary air conditioning following a tier 2a approach.	
I.18	2.F.1 Refrigeration and air conditioning – HFCs	<p>Belgium reports emissions from stationary air conditioning, commercial and industrial refrigeration aggregated and using a tier 1a approach (see ID# I.17 above). However, the ERT noted that category 2.F.1 is a key category and therefore, in addition to stationary air conditioning (see ID# I.17 above), commercial and industrial refrigeration should also be reported using a tier 2 approach in accordance with the 2006 IPCC Guidelines (volume 3, chapter 7.1.2.2, p.7.16). During the review the Party explained that emissions from commercial and industrial refrigeration are reported in aggregate because they are from a large variety of equipment types, sizes and refrigerant mixes and therefore the emissions are calculated from the total supply of refrigerant, which cannot be disaggregated.</p> <p>While the ERT acknowledges the national circumstances of Belgium, it recommends that the Party make efforts to collect data separately for commercial and industrial refrigeration applications following a tier 2a approach in accordance with the 2006 IPCC Guidelines.</p>	Yes. Accuracy
I.19	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	<p>The ERT noted that the NIR does not include information on how Belgium considers the amount of F-gases imported in products for commercial and industrial refrigeration. During the review Belgium acknowledged that F-gases imported in products are not accounted in the inventory for commercial and industrial refrigeration and therefore a potential underestimation could be occurring in the inventory estimates. During the review the ERT developed an Excel spreadsheet to check the threshold of emissions and verify the applicability for inclusion of this issue in the list of potential problems and further questions raised by the ERT. In that regard, the ERT compared the values for industrial and commercial refrigeration with the emissions reported by other Parties considering the number of inhabitants and concluded that, although Belgium did not account for F-gases imported in products from commercial and industrial refrigeration, its emission estimates for this category seem to be higher than expected when compared with those of other countries, indicating that an overestimation might be occurring. The ERT is of the view that as soon as the Party implements the recommendations made in relation to ID#s I.17 and I.18 above, the accuracy of the inventory will improve. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate of emissions for this category.</p> <p>The ERT recommends that Belgium collect data (at the subapplication level) for F-gases imported in products for commercial and industrial refrigeration and check the overall methodology applied for F-gases to ensure that emissions are neither over- nor underestimated.</p>	Yes. Accuracy
I.20	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	<p>Belgium reported in the NIR (section 4.7.2.1, p.165) that it uses a lifetime of 15 years for all cooling installations; however, it was not clear to the ERT for which sources this lifetime was assumed. During the review the Party informed the ERT that the lifetime of 15 years is used for stationary air conditioning and commercial, domestic and industrial refrigeration, and that a lifetime of 12 years is used for transport refrigeration. The ERT noted that according to the 2006 IPCC Guidelines (volume 3, table 7.9, p.7.52) the default lifetime for transport refrigeration (tier 2a method) ranges from six to nine years. In response, Belgium explained that for refrigerated trucks (transport</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		<p>refrigeration) the same lifetime of trucks with air conditioning is used and that it uses statistics on the number of new trucks each year to estimate the size of the stock and also statistics on the total size of the stock.</p> <p>The ERT recommends that Belgium improve the description in the NIR of the lifetimes used for each subapplication under this category. The ERT also recommends that the Party justify in the NIR the reasons for using a lifetime of 12 years for transport refrigeration instead of the default value from the 2006 IPCC Guidelines.</p>	
I.21	2.G.3 N <sub>2</sub> O from product uses – N <sub>2</sub> O	<p>Belgium reports in the NIR (section 4.8.2.3, p.170) that AD (average European consumption obtained from DETIC) for calculating N<sub>2</sub>O emissions from aerosol cans are available for 2012 only and that the AD are extrapolated for the entire time series using an assumption regarding the number of inhabitants. In response to a question raised by the ERT on why the AD are available for 2012 only, Belgium indicated that the emissions for this category are very low (approximately 8 kt CO<sub>2</sub> eq), and that currently it is discussing with DETIC to try to obtain more information on data for this category.</p> <p>The ERT encourages Belgium to investigate possible sources of AD for calculating N<sub>2</sub>O emissions from aerosol cans.</p>	Not an issue/problem
I.22	2.H Other (industrial processes and product use) – CO <sub>2</sub>	<p>Belgium reported under category 2.H.1 emissions from pulp and paper industry. The ERT noted that in the NIR (section 4.9.2, p.171) the Party explained that emissions of CO<sub>2</sub> come from the combustion of sludge and from the decomposition of sodium bicarbonate, and that the combustion of sludge is the largest source of these emissions; however, it is not clear to the ERT whether the combustion of sludge reported in this category is being used for energy purposes. During the review the Party explained that emissions reported under category 2.H.1 are related to process emissions (20,611 kt CO<sub>2</sub> in 2016) from the carbon content of the raw materials used in the paper industry, as follows:</p> <p>(a) The use of sodium bicarbonate as an additive for cleaning the flue gas that decomposes after adding hydrochloric acid to CO<sub>2</sub>, water and sodium chloride;</p> <p>(b) Sludge that contains calcium carbonate (ash component) and that is decomposing at high temperature into CO<sub>2</sub> and calcium oxide. This calcium oxide can be used for ground stabilization and therefore emissions are reported under category 2.H.1.</p> <p>The Party further explained that, in addition to these process emissions, the company reports emissions from energetic use of the fossil fraction from the sludge that is used in the fluidized bed furnace for autogeneration of energy (electricity and steam). These emissions are therefore allocated under category 1.A.2.d.</p> <p>The ERT recommends that Belgium include in the NIR a description of the process emissions reported under category 2.H.1 and information on how and where the emissions from energetic use of the fossil fraction of sludge are reported.</p>	Yes. Transparency

Agriculture

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
A.5	3. General (agriculture)	<p>Belgium reported in the NIR (section 9.2, p.261) that optimizing the regional inventories is a continuous task of all experts involved, and that Belgian experts each year list the planned improvements for the different sectors. The ERT noted, however, that no further improvements are planned for the agriculture sector related to categories 3.A (p.185), 3.B (p.196), 3.D (p.206), 3.G (p.206) and 3.H (p.207). It was not clear to the ERT how Belgium is ensuring the continuous improvement of the GHG inventory calculations for the agriculture sector if improvements are not foreseen in the near future. During the review, Belgium explained that the expert responsible for each region in Belgium prepares a priority list of improvements, including estimated costs, and submits the list to the head of the regional agency associated with the inventory calculations for that region. The head of the regional agency evaluates the list of improvements proposed for all sectors in its region and, depending on the urgency of the outcome and the available funding, makes a second prioritization of the inventory improvements. For 2019 no significant improvements were prioritized for the agriculture sector. The Party further explained that a study to perform an update of EMAV has recently been approved in Flanders, which will have an impact on categories 3.B and 3.D. In addition, the Party indicated that updates are undertaken during every inventory cycle and small improvements are therefore inherent to the inventory process and occur yearly. The Party also explained that improvements planned to the inventory for the Walloon Region are also included in the Brussels-Capital inventory for the agriculture sector, given the similarities in the agricultural systems.</p> <p>The ERT recommends that Belgium include in the NIR detailed information on how planned improvements for the agriculture sector are listed and prioritized for the three regions. The ERT encourages the Party to report on the study related to the update of EMAV as part of its reporting on the inventory improvement process.</p>	Yes. Transparency
A.6	3.A Enteric fermentation 3.B Manure management – CH <sub>4</sub> and N <sub>2</sub> O	<p>Belgium reported in the NIR (annex 9, table 9.1c, p.362) the evolution of the livestock numbers for the Brussels-Capital Region. The ERT noted that the swine population numbers are constant for 2011–2016 (3 heads), while the populations of sheep, goats and horses are constant for 2011–2012 (25, 18 and 46 heads, respectively) and for 2013–2016 (17, 25 and 51 heads, respectively). These animal populations are used to estimate emissions for categories 3.A.2 (sheep), 3.A.3 (swine), 3.A.4.a (goats) and 3.A.4.b (horses) using a tier 1 approach. In addition, the population of poultry, used to estimate emissions under category 3.B, was constant for 2011–2016 (652 heads).</p> <p>During the review, Belgium explained that these values are based on estimates because no statistical information is available for these animal categories for after 2010 for the Brussels-Capital Region. The Party also explained that these values are average values calculated as the result of the 2009 and 2010 population data registered and then extrapolated for the period leading up to 2016 (for swine), or by using the average of these two years for the 2011 and 2012 period and then using these new values to extrapolate the population numbers for the 2013–2016 period (for sheep, goats and horses). However, the ERT is of the view that the assumption used to extrapolate the AD produces an inconsistency in the time series (see the 2006 IPCC Guidelines, volume 1, chapter 5, p.5.12). Belgium recognized the limitations of the method used to estimate populations for these animal categories in the Brussels-Capital Region, and proposed estimating animal populations using the trend in each animal category at the national level, as a reflection of variations in the Walloon and Flemish Regions, given that overall national statistics are not available. The ERT agrees that this approach would better reflect the animal population numbers and highlights that</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		<p>the animal population for poultry should also be considered for estimates under category 3.B. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate of emissions.</p> <p>The ERT recommends that Belgium estimate animal populations (for poultry, swine, sheep, goats and horses) for the Brussels-Capital Region using the trend in each animal category at the national level, as a reflection of variations in the Walloon and Flemish Regions, and recalculate emissions for categories 3.A and 3.B.</p>	
A.7	3.A.1 Cattle – CH <sub>4</sub>	<p>Belgium reported in the NIR (section 5.2.1, p.184) that the EFs used to estimate CH<sub>4</sub> emissions from enteric fermentation for all cattle categories (except for dairy and brood cows) are constant over the entire time series. It was not clear to the ERT why these EFs were constant considering that a tier 2 methodology is used to estimate emissions from cattle production (NIR, table 5.6, p.181). During the review, Belgium explained that this decision was based on the lack of detailed information on the underlying parameters for cattle subcategories other than dairy cows and brood cows for the entire time series. The ERT acknowledges the Party's national circumstances but notes that the use of a constant CH<sub>4</sub> EF may result in an inaccurate estimation of emissions for the early years of the time series, because underlying animal characteristics used to estimate the country-specific EFs (such as average animal weight, energy spent for weight gain or work, pregnancy rate and feed digestibility) may not reflect the characteristics of the animal herd and management at that time (see the 2006 IPCC Guidelines, volume 4, chapter 10, p.10.27). Belgium further explained that, for the Flemish Region, a working group on emissions was set up in 2018 that will examine, among other things, the possibility of giving an evolution in time for some or all of the input data needed. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimate of emissions for this category.</p> <p>The ERT recommends that Belgium use a country-specific EF that reflects changes in the productive systems for all cattle subcategories across the entire time series for the entire country, and, until that is possible, report in the NIR on the progress made, including the progress under the working group in Flanders.</p>	Yes. Accuracy
A.8	3.A.4 Other livestock – CH <sub>4</sub>	<p>The ERT noted that in CRF table 3s1 Belgium reported the notation key “NO” for CH<sub>4</sub> emissions from poultry and explained in the NIR (section 5.2.1, p.181) that CH<sub>4</sub> emissions are not estimated because the 2006 IPCC Guidelines do not provide an EF for poultry. However, the ERT noted that the correct notation key in CRF table 3s1 should be “NE”, which is used for reporting activities that do occur in the country. During the review, Belgium acknowledged the incorrect use of the notation key.</p> <p>The ERT recommends that Belgium report the notation key “NE” in CRF table 3s1 for CH<sub>4</sub> emissions from enteric fermentation for poultry and include explanatory information in CRF table 9 accordingly.</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
A.9	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N <sub>2</sub> O	<p>Belgium reports emissions for this category using a tier 1 approach, using a total area of organic soils of 2,720 ha (as in CRF table 3.D) and the default IPCC EF (8 kg N/ha) (NIR, p.203). According to the NIR (section 6.3, p.224) the total area of organic soils is calculated by summing the 2,520 ha in the Flemish Region (1,899 ha cropland and 621 ha grassland) and the 400 ha (between 1990–2008) and 200 ha (since 2008) in the Walloon Region (grassland only). During the review, Belgium indicated that the 400 ha and 200 ha reported for the Walloon Region are part of a</p>	Yes. Accuracy

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A.10	3.D.b.1 Atmospheric deposition – N <sub>2</sub> O	<p>nature reserve and as such are not subject to agricultural management or drainage. The ERT noted that this is an overestimation of emissions as, in accordance with the 2006 IPCC Guidelines (volume 4, chapter 11, p.11.7), such an area is considered to be out of the scope of the cultivation of histosols.</p> <p>The ERT recommends that Belgium recalculate N<sub>2</sub>O emissions from cultivated organic soils using only the total area of organic soils subject to agricultural management or drainage.</p> <p>Belgium indicates in the NIR (section 5.3.2.2, p.194) that EMAV version 2.0 has been developed to calculate ammonia emissions from animal manure in the Flemish Region. The ERT noted that the use of the model results in a country-specific EF for indirect N<sub>2</sub>O emissions due to gaseous losses. Because of this, Frac<sub>GASM</sub> varies from 0.16 kg NH<sub>3</sub>-N+NO<sub>x</sub>-N/kg N excreted to 0.18 kg NH<sub>3</sub>-N+NO<sub>x</sub>-N/kg N excreted (NIR, p.195). Nevertheless, there is little documentation in the NIR on the input data, assumptions and methodology used by the model to estimate the country-specific EF. In addition, the ERT could not understand how QC of the data was carried out and implemented as part of the inventory reporting, and it was therefore unable to determine whether the information provided by the model for the Flemish Region was used correctly. Moreover, the Party did not provide details on how the calculations of ammonia emissions carried out by Flanders are harmonized with the results coming from the estimation of emissions for this category for the Walloon and Brussels-Capital Regions.</p> <p>During the review Belgium explained that EMAV version 2.0 is a conceptual model for the N flow throughout an individual farm and takes into account activities on the farm and during manure processing, emissions at different stages, recent legislation and manure transport to or from the farm. Belgium also explained that the input data used by EMAV version 2.0 are very detailed and originate from the Manure Bank of the Flemish Land Agency (see <a href="https://www.vlm.be/en/Paginas/What-does-the-Manure-Bank-do.aspx">https://www.vlm.be/en/Paginas/What-does-the-Manure-Bank-do.aspx</a>). Belgium further explained that QC checks are conducted at different stages of the calculation process, but could not provide examples at the time of the review, given that the inventory calculation process was closed. Belgium also explained that for harmonization at the national level weighted averages of regional parameters are used.</p> <p>To increase the transparency of the next submission, and considering that EMAV version 2.0 and related documentation are not written in an official United Nations language (they are in Dutch), the ERT recommends that Belgium include in the NIR detailed information on (1) the assumptions and principles used in EMAV version 2.0 to estimate the country-specific EF for gaseous losses for the Flemish Region; (2) how results from the model are subject to QC by the Flemish Region; (3) how data are included in the inventory reporting; and (4) how the detailed calculations of ammonia emissions carried out by the Flemish Region are harmonized with results coming from the estimation of emissions for this category by the Walloon and Brussels-Capital Regions.</p>	Yes. Transparency
A.11	3.J Other – CO <sub>2</sub> emissions from liming, urea application and other carbon-	<p>Belgium uses the notation key “NO” to report CO<sub>2</sub> emissions from other carbon-containing fertilizers in CRF table 3.G-I. During the review the Party explained that, according to the International Fertilizer Association, the main source of liquid fertilizers used in the country is urea ammonium nitrate, and that the category other fertilizers includes calcium nitrate, sodium nitrate, ammonium chloride and magnesium ammonium nitrate but no other carbon-containing fertilizers (see ID# A.4 in table 3). However, the ERT noted that this information is not clearly</p>	Yes. Transparency

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	containing fertilizers – CO <sub>2</sub>	<p>stated in the NIR. Table 5.29 (p.204) indicates that N solution fertilizers accounted for 26 per cent of total N applied as fertilizer in 2016 in the Flemish Region, but no information is provided on the sources of N fertilizers included in this group or on the use of liquid fertilizers in the other regions of the country.</p> <p>The ERT recommends that Belgium include in the NIR a description of the main source of liquid fertilizers associated with the use of other fertilizers in all regions of the country, including information that no other carbon-based fertilizers are used in the country.</p>	
LULUCF			
L.9	4. General (LULUCF) – all gases	<p>Belgium has updated the description in chapter 6 of the NIR since the previous submission by including new methodological explanations based on the improvements made in the LULUCF sector. However, the ERT identified during the review that some relevant information explaining methodologies and data applied in estimating emissions was still not included in the NIR.</p> <p>Therefore, the ERT recommends that, in order to maintain consistency between the applied methodologies and the explanation provided in the NIR, Belgium update the description in chapter 6 as follows:</p> <ul style="list-style-type: none"> <li>(a) For the living biomass pool in forest land remaining forest land (category 4.A.1), explain that the area of forest land remaining forest land from the land-use matrix was used as the area data for the stock difference method applied;</li> <li>(b) For the living biomass pool in forest land remaining forest land (category 4.A.1), include a new table of volume per species in the forest inventories for the Flemish Region (see ID# L.2 in table 3);</li> <li>(c) For the living biomass pool in forest land remaining forest land (category 4.A.1), explain that the annual increment parameter of biomass for the gain–loss method applied for the Brussels-Capital Region was based on the net increment derived from the stock change approach applied for the Walloon Region (see ID# L.2 in table 3);</li> <li>(d) For the deadwood pool in forest land remaining forest land (category 4.A.1), explain that the carbon stock change in deadwood is assumed to be in stable state for the entire time series in accordance with the tier 1 method from the 2006 IPCC Guidelines (volume 4, chapter 4.2.2.1, p.4.20) (see ID# L.3 in table 3). In addition, correct the reference in the NIR (section 6.2.2.1.B, p.217) where the Party made reference to the wrong section of the 2006 IPCC Guidelines (volume 4, chapter 4.3.2.1, method for land converted to forest land);</li> <li>(e) For the living biomass pool in land converted to forest land (category 4.A.2), include information on the annual increment parameters for the Flemish and Walloon Regions;</li> </ul>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		<p>(f) For the DOM pool in land converted to cropland and grassland (categories 4.B.2 and 4.C.2), explain the methodologies applied in line with the tier 1 method from the 2006 IPCC Guidelines when using country-specific carbon stocks for DOM pools in forest land;</p> <p>(g) For biomass burning in forest land (category 4(V)), include an additional explanation that the combustion factor was assumed as 1.0 in the case of forest fire.</p>	
L.10	4. General (LULUCF) – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	The ERT noted that Belgium did not use the Wetlands Supplement. The ERT encourages the Party to use the Wetlands Supplement in preparing its inventories for future annual submissions.	Not an issue/problem
L.11	Land representation – all gases	<p>The ERT noted that Belgium calculates the areas of land conversion categories for the period from 1990 to 2008 by cumulating annual land conversion since 1990 (i.e. land conversion categories in 1990 = annual area conversion that occurred in 1990 (1 year); land conversion categories in 2006 = area of conversion since 1990 (17 years)), and so the land-use conversion categories of this period did not fully contain areas of land-use change that occurred over the past 20 years. The ERT noted that this method of calculation causes a linear increasing trend in area for all land-use conversion categories for the period from 1990 to 2008, and therefore the emissions and removals were estimated as a linear increasing trend, including for soil carbon stock change estimations (for all land-use conversion categories) and living biomass carbon gains estimation (for the category land converted to forest land). During the review Belgium explained that land-use change areas before 1990 were not estimated because no set of data using the same systematic and geolocated grid is available and a considerable amount of work would be needed to estimate past land-use changes. Belgium also explained that this revision would mainly affect the reporting on afforestation under the Kyoto Protocol and would decrease the emission estimates for before the commitment period (1990–2010, equal to the 20-year transition period), so there was no issue regarding any underestimation of the emissions in the commitment period, only a potential overestimation of net emissions for 1990–2010. The ERT acknowledges the Party’s national circumstances and recognizes the fact that the land-use change matrix is a tool for ensuring accurate estimates for KP-LULUCF activities during the commitment period; however, the current land-use change matrix does not ensure that emissions and removals for the time series 1990–2008 are neither over- nor underestimated in accordance with the UNFCCC Annex I inventory reporting guidelines.</p> <p>The ERT recommends that Belgium estimate land-use change areas before 1990 and construct land-use conversion categories on the basis of 20 years’ accumulation of land-use change areas for the whole time series.</p>	Yes. Accuracy
L.12	4.A.1 Forest land remaining forest land – CO <sub>2</sub>	The ERT noted that Belgium reported CO <sub>2</sub> emissions from biomass burning (wildfires) on forest land in CRF table 4(V) for 1990–2007 and for 2011. However, Belgium applied the stock difference method for the living biomass pool in forest land remaining forest land, which means that the reported CO <sub>2</sub> emissions in CRF table 4(V) from biomass burning that occurred in the years before the latest year of the forest inventory data (e.g. in 2011 for the Walloon Region) were implicitly included in the carbon stock changes that were estimated using the stock difference method reported in CRF table 4.A, and so also were implicitly double counted between CRF tables 4.A and 4(V).	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		The ERT recommends that Belgium use the notation key “IE” for reporting CO <sub>2</sub> emissions from biomass burning in wildfires in CRF table 4(V) for the years before the year of the latest forest inventory data.	
L.13	4.A.1 Forest land remaining forest land – CO <sub>2</sub>	<p>The carbon stock changes in living biomass under forest land remaining forest land in the Flemish Region were estimated using the stock difference method using the two points of the Flemish forest inventory data (see ID# L.2 in table 3). For the years before the first forest inventory cycle (i.e. before 1998) and the years after the second forest inventory cycle (i.e. after 2012), the carbon stock changes were linearly extrapolated by using the trend between 1998 and 2012. Therefore, the net annual increment of living biomass per area in the Flemish Region were shown as being the same for the whole time series. During the review, Belgium explained that no increase in harvest is observed in the recent years of the time series up to 2011 for the Flemish Region. Belgium also informed the ERT that it will collect more detailed data on harvest and age-class structure in order to include a more relevant explanation for supporting the assumption of stable increment.</p> <p>The ERT encourages Belgium to include in the NIR information that supports the assumption of stable increment in the Flemish Region for the time series if new forest inventory data will not be available soon (see ID# KL.18 below).</p>	Not an issue/problem
L.14	4.A.2.3 Wetlands converted to forest land – CO <sub>2</sub>	<p>The ERT noted that Belgium reported a small area of land-use change from wetlands to forest land for the whole time series (6,236.12 ha for 2016 in CRF table 4.A). The carbon stock change in soils associated with this land-use change was estimated by comparing the carbon stocks of soils before conversion (100 t C/ha for wetlands) and after conversion (110 t C/ha in the Walloon Region and 89.5 t C/ha in the Flemish Region) following the methodology for mineral soils (NIR, section 6.1.1, table 6.2, p.209, and section 6.2.2.2, p.219). During the review, Belgium indicated that most of this land-use change in both the Walloon and Flemish Regions is located in the fagnes (natural fens), where peatlands are converted to forest land. The ERT notes that this land-use change occurred on peatlands and so the methodology for organic soils must be applied.</p> <p>The ERT recommends that Belgium apply the organic soils estimation method instead of the mineral soils estimation method for this type of land-use change, taking into consideration the occurrence of drainage practices for these converted peatlands.</p>	Yes. Accuracy
L.15	4.B.1 Cropland remaining cropland – CO <sub>2</sub>	<p>Belgium estimated carbon stock changes of living biomass under cropland remaining cropland using a tier 2 method (stock difference method) by multiplying the average carbon stock of orchard per area (21.7 t C/ha) and the annual area changes of orchard derived from the total orchard areas over time, as shown in the NIR (figure 6.3, p.221). During the review, Belgium clarified that the assumption underlying this estimation method is that a newly planted orchard reaches a stable carbon state within a year of plantation and the years of growing phases are not taken into account. In response to a question from the ERT on how many years are usually needed for newly planted orchards to reach a steady state of living biomass, the Party recognized that some studies of Belgian orchards could provide this information and informed the ERT that it will investigate the time span for biomass growth for new orchard areas and reflect the information in the method applied to estimate emissions for its next submission.</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		The ERT recommends that Belgium investigate the growing phase for orchard trees and develop a country-specific annual increment parameter taking into account the average carbon stock of an orchard and the growing period necessary to reach a stable state; and estimate the carbon stock change of orchard using the country-specific annual increment with the total area of orchard in the growing period for the entire time series.	
L.16	4.C.1 Grassland remaining grassland – CO <sub>2</sub>	<p>Belgium estimated CO<sub>2</sub> emissions from organic soils using a tier 1 method, considering a total area of organic soils of 621 ha in the Flemish Region and 200 or 400 ha in the Walloon Region (NIR, section 6.3.2.1, p.224). During the review, Belgium explained that the “200 or 400 ha” of organic soils area of grassland in the Walloon Region were part of a nature reserve and as such were not subject to cultivation or drainage (see ID# A.9 in table 5). In that case, in accordance with the 2006 IPCC Guidelines (volume 4, chapter 2, p.2.35), CO<sub>2</sub> emissions do not need to be estimated for the Walloon Region for drained organic soils.</p> <p>The ERT recommends that Belgium estimate CO<sub>2</sub> emissions from drainage of organic soils under grassland remaining grassland for the Flemish Region only, but continue to report the total organic soils area for both the Flemish and Walloon Regions in CRF table 4.C and include a description in the NIR of how organic soils areas are treated or managed in the two regions.</p>	Yes. Accuracy
L.17	4(III) Direct N <sub>2</sub> O emissions from N mineralization/ immobilization – N <sub>2</sub> O	<p>Belgium reported in CRF table 4(III) direct N<sub>2</sub>O emissions from N mineralization of soils associated with loss of soil organic matter resulting from changes of land use or management of mineral soils for a small area of land under wetlands converted to forest land. As clarified in ID# L.14 above, most of this land-use change occurred on peatlands and therefore a methodology for organic soils should be applied. The ERT noted that the notation key “NO” should be reported in CRF table 4(III) because this land-use change is out of the scope of estimating N mineralization resulting from loss of soil organic carbon in mineral soils.</p> <p>The ERT recommends that Belgium report “NO” in CRF table 4(III) for N<sub>2</sub>O emissions under category 4.A.2.3 (wetlands converted to forest land) and explain in the NIR how this small area of land is treated in the inventory.</p>	Yes. Accuracy
Waste			
W.2	5.A Solid waste disposal on land – CH <sub>4</sub>	Belgium used the IPCC waste model to estimate emissions using the first-order decay tier 2 method, and provides information on total DOC in municipal solid waste in its NIR (section 7.2.2). The Party reported in the NIR (p.237) that the composition of municipal solid waste and industrial waste in Belgium changes over time, and therefore the evolution of DOC was taken into account in the calculations following the instructions provided in the IPCC waste model spreadsheet of the 2006 IPCC Guidelines (volume 5, chapter 3). Belgium also reported that it is using country-specific DOC values for the Flemish and Walloon Regions. However, the Party has not provided in the NIR information on the waste fractions used for calculating DOC values for the entire time series (1950–2016) and it is not clear whether the waste fractions changed over time (depending on the percentage in municipal solid waste). During the review the Party provided the IPCC waste model and informed the ERT that the percentages of waste fractions for calculating DOC values change over time.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
		The ERT recommends that the Party include a table in the NIR showing the different waste fractions used to calculate DOC values for the period 1950–2016.	
W.3	5.A.1.a Anaerobic – CH <sub>4</sub>	<p>The ERT noted that Belgium reported the notation key “NE” for the amount of CH<sub>4</sub> flared under category 5.A.1.a from 1993 to 2016 in CRF table 5.A. However, the Party reported in the same CRF table that 20.96 kt CH<sub>4</sub> are reported under energy recovered. The ERT also noted that the Party reported in the NIR (section 7.1, p.232) that emissions from municipal solid waste incineration are mainly allocated to the energy sector under category 1.A.1.a (public electricity and heat production). During the review the Party recognized that “IE” should be reported in CRF table 5.A and informed the ERT that it will correct the CRF table in the next submission.</p> <p>The ERT recommends that Belgium correct the notation key in CRF table 5.A from “NE” to “IE” for amount of CH<sub>4</sub> flared.</p>	Yes. Adherence to the UNFCCC Annex I inventory reporting guidelines
W.4	5.B.1 Composting – CH <sub>4</sub> and N <sub>2</sub> O	<p>The ERT noted that in the NIR (section 7.3.2, table 7.4, p.243) Belgium reported information on the amount of waste composted in the three regions for the period 1990–2016. It was not clear to the ERT how composting data were treated in the inventory for the Brussels-Capital Region for 1990–2001 and the Walloon Region for 1990–1996 because no corresponding values were provided for these years for these two regions. During the review the Party explained that no composting activities occurred in the referenced years in the two regions.</p> <p>The ERT recommends that Belgium explain in the NIR (e.g. in a footnote to table 7.4) that composting activities did not occur in the Walloon Region between 1990–1996 or in the Brussels-Capital Region between 1990 and 2001.</p>	Yes. Transparency
W.5	5.B.1 Composting – CH <sub>4</sub> and N <sub>2</sub> O	<p>The ERT noted that in the NIR (section 7.3.3) Belgium reported the uncertainty of the CH<sub>4</sub> and N<sub>2</sub>O EFs as 200 per cent. These EFs were obtained from the final report by DHV BV (2010) and the values of 0.75 kg CH<sub>4</sub> and 0.096 kg N<sub>2</sub>O/t waste were used after consultation with colleagues from the Netherlands who used these EFs as a result of measurements carried out since 2009 (see NIR, p.242). However, the ERT is of the view that composting presents an increasing emission trend: emissions from composting were not significant between 1990 and 2000 but an increasing trend can be observed since 2000 (e.g. CH<sub>4</sub> and N<sub>2</sub>O emissions increased by around 38 per cent between 2000 and 2016). In addition, the ERT notes that the EFs reported by the Party are lower than the IPCC default values (4 kg CH<sub>4</sub>/t and 0.34 kg N<sub>2</sub>O/t on a wet basis).</p> <p>The ERT recommends that Belgium either justify why the country-specific CH<sub>4</sub> and N<sub>2</sub>O EFs are appropriate to the national circumstances or estimate emissions using the IPCC default values. In case the Party justifies the use of the country-specific EF, the ERT recommends that the Party plan improvements in the near future (e.g. pilot projects or a study at composting plants) to reduce the uncertainty and improve the accuracy of the CH<sub>4</sub> and N<sub>2</sub>O EFs.</p>	Yes. Accuracy
W.6	5.D Wastewater treatment and discharge – CH <sub>4</sub>	The ERT noted that in the NIR (section 7.5.1, p.252) Belgium reported the amount of biogas from municipal wastewater treatment plants used for energy production. The Party reported values for the Brussels-Capital Region (6,665,000 m <sup>3</sup> biogas) and for the Walloon Region (804,000 m <sup>3</sup> biogas). However, no such information was reported for the Flemish Region, although 29 installations at wastewater treatment plants make use of biogas to produce	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		electricity there. During the review the Party informed the ERT that the amount of biogas used in the Flemish Region in 2016 was 0.532117 PJ, but no values in m <sup>3</sup> were provided.	
		The ERT recommends that Belgium include in the NIR information on the amount of biogas (in m <sup>3</sup> , as for the other regions) used to produce electricity in the Flemish Region.	
W.7	5.D.1 Domestic wastewater – N <sub>2</sub> O	The ERT noted that sewage sludge from domestic wastewater treatment is reported in the agriculture sector (section 5.4.1 of the NIR). However, the waste chapter of the NIR and CRF table 5.D do not contain any information on the amount of sludge removed for use in the agriculture sector. During the review, the Party confirmed that the amount of sludge spread on agricultural soils is removed from wastewater N <sub>2</sub> O emissions, and explained that for 2016 the total N applied to soils in the agriculture sector was equivalent to 1,414,511.73 kg N. The Party recognized that this information was not included in the reporting on the waste sector.	Yes. Transparency
		The ERT recommends that Belgium include information in the NIR and in CRF table 5.D on the amount of sludge removed from wastewater and the associated N <sub>2</sub> O emissions.	
KP-LULUCF			
KL.11	General (KP-LULUCF) – all gases	In line with the recommendation made in the previous review report (see ID# KL.1 in table 3), the ERT noted that Belgium did not include in chapter 10 of the NIR the required reporting specified in decision 2/CMP.8, annex II, paragraph 2(g)(vi) and (vii): information showing that CO <sub>2</sub> emissions from HWP in solid waste disposal sites and from wood harvested for energy purposes have been accounted for on the basis of instantaneous oxidation; and information showing that the emissions and removals resulting from changes in the HWP pool accounted for do not include imported HWP, irrespective of their origin.	Yes. Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
		The ERT recommends that Belgium structure the information in chapter 10 of the NIR to include the required reporting specified in decision 2/CMP.8, annex II, paragraph 2(g)(vi) and (vii).	
KL.12	General (KP-LULUCF) – all gases	Belgium identified in the NIR (section 10.1.1, p.259) its selection of single minimum values for tree crown cover, land area and tree height in its definition of forest for use in accounting for KP-LULUCF activities in its submission, in line with decisions 16/CMP.1, 2/CMP.7 and 2/CMP.8. The ERT noted that the Kyoto Protocol Supplement specifies that it is good practice to define a minimum width in conjunction with a minimum area of forest. During the review, Belgium clarified that the minimum width of 20 m had been considered when detecting its forest land area.	Yes. Transparency
		The ERT recommends that Belgium provide in the NIR information on minimum width of forest as an additional parameter of its forest definition.	
KL.13	General (KP-LULUCF) – all gases	Belgium did not make clear the reporting method used to identify the geographical boundaries of areas encompassing KP-LULUCF activities in chapter 10 of the NIR (section 10.2.3, p.263). During the review, Belgium confirmed that it applies for its KP-LULUCF activities reporting method 1 with a single national boundary (as in the	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>d</sup> If yes, classify by type
		<p>Kyoto Protocol Supplement). The ERT noted that the Kyoto Protocol Supplement (section 2.2.2) indicates that, unless the country is relatively small, it is good practice to define the boundaries of more than one geographical area. In response, the Party explained that a single national boundary has been used because Belgium is a small country with limited ecological and climate variability.</p> <p>The ERT recommends that Belgium include information on the applied reporting method and geographical boundary in the section of the NIR relating to decision 2/CMP.8, annex II, paragraph 2(b), and also provide the reason why using a single national boundary is appropriate in the case of Belgium.</p>	
KL.14	General (KP-LULUCF) – all gases	<p>In accordance with decision 2/CMP.8, annex II, paragraph 2(d), Parties shall provide information on anthropogenic GHG emissions by sources and removals by sinks resulting from activities under Article 3, paragraph 3, and FM reported since the beginning of the commitment period or the onset of the activity, whichever comes later. During the review, Belgium informed the ERT that areas of AR and deforestation that occurred after 2014 are included in the total area of AR and deforestation only since the year of onset of the activities and so the relevant emissions and removals are reported only since the onset of the activities (see ID# KL.1 in table 3).</p> <p>The ERT recommends that Belgium structure the information in chapter 10 of the NIR to ensure that it includes the information specified in decision 2/CMP.8, annex II, paragraph 2(d).</p>	Yes. Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KL.15	General (KP-LULUCF) – all gases	<p>In accordance with decision 2/CMP.8, annex II, paragraph 5(d), Parties shall report and account for all emissions arising from the conversion of natural forests to planted forests. The ERT noted that Belgium reported in its NIR (section 10.4.1, p.271) that no natural forest occurs in the country, and that the notation key “NO” was reported in the relevant cells of CRF table NIR 2.1. However, the Party has not structured the information in chapter 10 to make reference to the relevant reporting requirements in the decision (see ID# KL.1 in table 3).</p> <p>The ERT recommends that Belgium structure the information in chapter 10 of the NIR to include the required reporting specified in decision 2/CMP.8, annex II, paragraph 5(d).</p>	Yes. Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KL.16	FM – CO <sub>2</sub>	<p>In accordance with decision 2/CMP.8, annex II, paragraph 2(a), Parties shall include information on how inventory methodologies have been applied taking into account the 2006 IPCC Guidelines and the Kyoto Protocol Supplement. In section 10.3.1 of the NIR, the Party has provided an explanation of the methodologies applied for AR and deforestation but the methodology for FM was not clearly explained (see ID#s KL.1 and KL.6 in table 3).</p> <p>The ERT recommends that Belgium structure the information in chapter 10 of the NIR to include the reporting requirement specified in decision 2/CMP.8, annex II, paragraph 2(a), namely provide an explanation of the methodology applied for FM at the same level of detail as provided for AR and deforestation.</p>	Yes. Adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KL.17	FM – CO <sub>2</sub>	<p>In accordance with decision 2/CMP.8, annex II, paragraph 2(e), and decision 2/CMP.7, annex, paragraph 26, Parties shall account for all changes in carbon pools or, if these are not accounted for, provide verifiable information that demonstrates that the unaccounted pools were not a net source of anthropogenic GHG emissions. Belgium applied a tier 1 method and assumed litter and deadwood carbon stocks are stable over time under FM (see ID# KL.6 in table</p>	Yes. Adherence to the reporting guidelines under Article 7, paragraph

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? <sup>a</sup> If yes, classify by type
KL.18	FM – CO <sub>2</sub>	<p>3). However, the ERT noted that, when this tier 1 assumption of stable state of carbon stock is applied for KP-LULUCF activities, Parties must provide transparent and verifiable information that demonstrates that the pool is not a source in accordance with the provision set out in both of those decisions (see ID# KL.1 in table 3). During the review, Belgium explained that DOM pools in Belgium’s forest are not considered to be a net source of emissions from the aspect of FM practices as the residues tend to be left on-site in the forest in order to maintain the soil fertility. The ERT considers that the provided information is reasonable to verify that the DOM pools are not a net source in Belgium.</p> <p>The ERT recommends that Belgium structure the information in chapter 10 of the NIR to include the required reporting specified in decision 2/CMP.8, annex II, paragraph 2(e), namely by including information that DOM under FM is not considered a net source of emissions and by providing verifiable information.</p> <p>The carbon stock changes in living biomass under FM were reported as extrapolated estimates from the latest trend of carbon stock changes derived from the stock difference method from 2001 to 2011 for the Walloon Region and from 1998 to 2012 for the Flemish Region (see ID#s L.2 in table 3 and L.13 above). Thus, the reported estimates for 2013–2016 reflect only the FM practices undertaken before the second commitment period. The ERT noted that, in order to improve the accuracy of the estimates of carbon stock changes in living biomass under FM during the second commitment period, it is important to reflect the actual results of FM practices, including the amount of harvesting undertaken during the second commitment period. In the case of the stock difference method, including additional stock data from certain points during the second commitment period is the general solution to address this issue. In response to a question raised by the ERT, Belgium explained that new forest inventory surveys for the Walloon and Flemish Regions are ongoing and new data will be available in the near future.</p> <p>The ERT encourages Belgium to reflect the latest available forest inventory data in future submissions as much as possible by the end of the second commitment period, and to reduce the years subject to extrapolation during the second commitment period.</p>	<p>1, of the Kyoto Protocol</p> <p>Not a problem</p>

<sup>a</sup> Recommendations made by the ERT during the review are related to issues as defined in paragraph 81 of the UNFCCC review guidelines, or problems as defined in paragraph 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.

## **VI. Application of adjustments**

11. The ERT did not identify the need to apply any adjustments to the 2018 annual submission of Belgium.

## **VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol**

12. Belgium has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable to the 2018 review.

## **VIII. Questions of implementation**

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2018 annual submission.

## Annex I

### Overview of greenhouse gas emissions and removals for Belgium for submission year 2018 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Belgium in its 2018 annual submission

1. Tables 6–9 provide an overview of total GHG emissions and removals as submitted by Belgium.

Table 6  
**Total greenhouse gas emissions for Belgium, base year<sup>a</sup>–2016**  
 (kt CO<sub>2</sub>eq)

	<i>Total GHG emissions excluding indirect CO<sub>2</sub> emissions</i>		<i>Total GHG emissions including indirect CO<sub>2</sub> emissions<sup>b</sup></i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)<sup>c</sup></i>	<i>KP-LULUCF activities (Article 3.3 of the Kyoto Protocol)<sup>d</sup></i>	<i>KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								-2 499.00
Base year	145 963.27	148 396.96	NA	NA	NA		NA	
1990	144 220.33	146 654.02	NA	NA				
1995	152 394.37	154 744.61	NA	NA				
2000	147 894.21	149 784.10	NA	NA				
2010	131 175.85	132 712.35	NA	NA				
2011	120 745.69	122 057.80	NA	NA				
2012	118 189.81	119 279.99	NA	NA				
2013	118 481.29	119 691.09	NA	NA		779.69	NA	-2 426.95
2014	112 808.66	114 010.30	NA	NA		766.68	NA	-2 460.09
2015	116 402.19	117 584.43	NA	NA		753.87	NA	-2 464.30
2016	116 577.58	117 727.11	NA	NA		740.72	NA	-2 456.66

*Note:* Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.

<sup>a</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, SF<sub>6</sub> and NF<sub>3</sub>. Belgium has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

<sup>b</sup> The Party did not report indirect CO<sub>2</sub> emissions in CRF table 6.

<sup>c</sup> The value reported in this column refers to 1990.

<sup>d</sup> Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely AR and deforestation.

Table 7

**Greenhouse gas emissions by gas for Belgium, excluding land use, land-use change and forestry, 1990–2016**  
(kt CO<sub>2</sub> eq)

	<i>CO<sub>2</sub><sup>a</sup></i>	<i>CH<sub>4</sub></i>	<i>N<sub>2</sub>O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF<sub>6</sub></i>	<i>NF<sub>3</sub></i>
1990	120 484.40	12 197.20	10 159.33	NA, NO	2 191.05	NA, NO	1 622.04	NA, NO
1995	126 082.96	12 136.52	10 969.10	502.01	2 914.29	NA, NO	2 139.73	NA, NO
2000	126 794.79	11 008.01	10 259.75	1 131.39	446.11	NA, NO	144.06	NA, NO
2010	113 582.03	8 789.10	7 586.46	2 544.80	106.61	NA, NO	102.03	1.32
2011	104 158.64	8 523.26	6 382.00	2 653.83	225.50	NA, NO	112.09	2.48
2012	101 394.98	8 391.43	6 327.71	2 776.12	278.21	NA, NO	110.43	1.12
2013	101 970.44	8 242.25	6 180.34	2 749.47	431.59	NA, NO	115.75	1.24
2014	96 391.04	8 154.43	6 183.30	2 878.66	306.96	NA, NO	95.22	0.69
2015	100 229.49	8 106.56	6 022.14	2 834.10	299.93	NO, NA	91.36	0.85
2016	100 243.71	8 043.92	5 746.39	2 939.17	658.55	NO, NA	94.67	0.71
<b>Per cent change 1990– 2016</b>	<b>–16.8</b>	<b>–34.1</b>	<b>–43.4</b>	<b>NA</b>	<b>–69.9</b>	<b>NA</b>	<b>–94.2</b>	<b>NA</b>

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.

<sup>a</sup> Belgium did not report indirect CO<sub>2</sub> emissions in CRF table 6.

Table 8

**Greenhouse gas emissions by sector for Belgium, 1990–2016**  
(kt CO<sub>2</sub> eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	103 738.34	26 292.80	12 287.81	–2 433.69	4 335.07	NO
1995	107 695.92	30 183.47	12 362.57	–2 350.24	4 502.65	NO
2000	106 040.81	28 420.01	11 372.49	–1 889.89	3 950.80	NO
2010	98 523.94	21 456.66	10 229.37	–1 536.50	2 502.39	NO
2011	89 023.98	20 618.25	10 123.08	–1 312.11	2 292.48	NO
2012	88 105.98	19 047.49	9 915.22	–1 090.18	2 211.29	NO
2013	88 141.73	19 762.90	9 955.16	–1 209.80	1 831.30	NO
2014	82 429.07	19 767.76	10 159.92	–1 201.64	1 653.56	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2015	86 183.01	19 714.23	10 088.96	-1 182.24	1 598.23	NO
2016	85 869.04	20 466.60	9 897.06	-1 149.54	1 494.41	NO
<b>Per cent change 1990–2016</b>	<b>-17.2</b>	<b>-22.2</b>	<b>-19.5</b>	<b>-52.8</b>	<b>-65.5</b>	<b>NA</b>

*Note:* (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. (2) Belgium did not report indirect CO<sub>2</sub> emissions in CRF table 6.

Table 9

**Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year<sup>a</sup>–2016, for Belgium**  
(kt CO<sub>2</sub> eq)

	<i>Article 3.7 bis as contained in the Doha Amendment<sup>b</sup></i>		<i>Article 3.3 of the Kyoto Protocol</i>					<i>FM and elected Article 3.4 activities of the Kyoto Protocol</i>			
	<i>Land-use change</i>		<i>AR</i>	<i>Deforestation</i>	<i>FM</i>						
						<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>		
FMRL					-2 499.00						
Technical correction					NA						
Base year	NA					NA	NA	NA	NA	NA	NA
2013			-333.64	1 113.33	-2 426.95	NA	NA	NA	NA	NA	NA
2014			-370.94	1 137.63	-2 460.09	NA	NA	NA	NA	NA	NA
2015			-408.37	1 162.24	-2 464.30	NA	NA	NA	NA	NA	NA
2016			-445.92	1 186.64	-2 456.66	NA	NA	NA	NA	NA	NA
<b>Per cent change base year– 2016</b>						<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

*Note:* Values in this table include emissions on lands subject to natural disturbances, if applicable.

<sup>a</sup> Belgium has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol, and FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

<sup>b</sup> The value reported in this column refers to 1990.

2. Table 10 provides an overview of key relevant data for Belgium's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10

**Key relevant data for Belgium under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2018 annual submission**

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	Yes, for FM
3.5% of total base-year GHG emissions, excluding LULUCF	5 173.388 kt CO <sub>2</sub> eq (41 387.106 kt CO <sub>2</sub> eq for the duration of the commitment period)
Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for:	
1. AR in 2016	NA
2. Deforestation in 2016	NA
3. FM in 2016	NA
4. CM in 2016	NA
5. GM in 2016	NA
6. RV in 2016	NA
7. WDR in 2016	NA

## Annex II

### Information to be included in the compilation and accounting database

Tables 11–14 include the information to be included in the compilation and accounting database for Belgium. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table 11

#### Information to be included in the compilation and accounting database for 2016, including on the commitment period reserve, for Belgium

(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>CPR</b>	525 805 662			525 805 662
<b>Annex A emissions for 2016</b>				
CO <sub>2</sub>	100 243 709			100 243 709
CH <sub>4</sub>	8 043 918			8 043 918
N <sub>2</sub> O	5 746 386			5 746 386
HFCs	2 939 169			2 939 169
PFCs	658 551			658 551
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF <sub>6</sub>	94 665			94 665
NF <sub>3</sub>	715			715
<b>Total Annex A sources</b>	<b>117 727 113</b>			<b>117 727 113</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016</b>				
3.3 AR	–445 918			–445 918
3.3 Deforestation	1 186 638			1 186 638
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016</b>				
3.4 FM	–2 456 663			–2 456 663

Table 12

#### Information to be included in the compilation and accounting database for 2015 for Belgium

(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2015</b>				
CO <sub>2</sub>	100 229 490			100 229 490
CH <sub>4</sub>	8 106 557			8 106 557
N <sub>2</sub> O	6 022 140			6 022 140
HFCs	2 834 097			2 834 097
PFCs	299 932			299 932
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF <sub>6</sub>	91 363			91 363
NF <sub>3</sub>	850			850
<b>Total Annex A sources</b>	<b>117 584 429</b>			<b>117 584 429</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015</b>				

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
3.3 AR	-408 370			-408 370
3.3 Deforestation	1 162 242			1 162 242
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015</b>				
3.4 FM	-2 464 300			-2 464 300

Table 13

**Information to be included in the compilation and accounting database for 2014 for Belgium**  
(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2014</b>				
CO <sub>2</sub>	96 391 041			96 391 041
CH <sub>4</sub>	8 154 431			8 154 431
N <sub>2</sub> O	6 183 301			6 183 301
HFCs	2 878 662			2 878 662
PFCs	306 957			306 957
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF <sub>6</sub>	95 218			95 218
NF <sub>3</sub>	690			690
<b>Total Annex A sources</b>	<b>114 010 300</b>			<b>114 010 300</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014</b>				
3.3 AR	-370 943			-370 943
3.3 Deforestation	1 137 627			1 137 627
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014</b>				
3.4 FM	-2 460 091			-2 460 091

Table 14

**Information to be included in the compilation and accounting database for 2013 for Belgium**  
(t CO<sub>2</sub> eq)

	<i>Original submission</i>	<i>Revised estimate</i>	<i>Adjustment</i>	<i>Final</i>
<b>Annex A emissions for 2013</b>				
CO <sub>2</sub>	101 970 442			101 970 442
CH <sub>4</sub>	8 242 253			8 242 253
N <sub>2</sub> O	6 180 343			6 180 343
HFCs	2 749 466			2 749 466
PFCs	431 591			431 591
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF <sub>6</sub>	115 754			115 754
NF <sub>3</sub>	1 242			1 242
<b>Total Annex A sources</b>	<b>119 691 092</b>			<b>119 691 092</b>
<b>Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013</b>				
3.3 AR	-333 640			-333 640
3.3 Deforestation	1 113 330			1 113 330
<b>FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013</b>				
3.4 FM	-2 426 950			-2 426 950

## **Annex III**

### **Additional information to support findings in table 2**

#### **Missing categories that may affect completeness**

The categories for which methods are included in the 2006 IPCC Guidelines that were reported as “NE” or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory are the following:

- (a) CO<sub>2</sub> emissions from HWP for the period 1990–1999 (see ID# L.8 in table 3);
- (b) Emissions from litter and deadwood in land areas identified under AR (see ID# KL.4 in table 3).

## Annex IV

### Documents and information used during the review

#### A. Reference documents

##### Reports of the Intergovernmental Panel on Climate Change

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl>.

IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/kpsg>.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva, Switzerland: IPCC. Available at <http://www.ipcc-nggip.iges.or.jp/public/wetlands/>.

##### Annual review reports

Reports on the individual review of the 2013, 2014, 2015 and 2016 annual submissions of Belgium, contained in documents FCCC/ARR/2013/BEL, FCCC/ARR/2014/BEL, FCCC/ARR/2015/BEL and FCCC/ARR/2016/BEL, respectively.

##### Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at [https://unfccc.int/sites/default/files/resource/AGI%20report\\_2018.pdf](https://unfccc.int/sites/default/files/resource/AGI%20report_2018.pdf).

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DHV BV. 2010. *Update of emission factors for N<sub>2</sub>O and CH<sub>4</sub> for composting, anaerobic digestion and waste incineration*. Final report. Amersfoort, the Netherlands: DHV BV. Available at [http://www.emissieregistratie.nl/erpubliek/documenten/Lucht%20\(Air\)/Industrie%20en%20Energieopwekking%20\(Industry%20and%20Energy\)/Afval/DHV2010%20-%20Update%20emission%20factors%20N2O%20and%20CH4%20for%20Waste.pdf](http://www.emissieregistratie.nl/erpubliek/documenten/Lucht%20(Air)/Industrie%20en%20Energieopwekking%20(Industry%20and%20Energy)/Afval/DHV2010%20-%20Update%20emission%20factors%20N2O%20and%20CH4%20for%20Waste.pdf).

United States Geological Survey. 2017. *2014 Minerals Yearbook: Belgium and Luxembourg*. Available at <https://s3-us-west-2.amazonaws.com/prd-wret/assets/palladium/production/mineral-pubs/country/2014/myb3-2014-be-lu.pdf>.

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

Responses to questions during the review were received from Mr. Olivier Biernaux (Belgium Environmental Interregional Agency), Ms. Miet D'heer (Flemish Environmental Society, Department of Air, Environment and Communication), Mr. François Goor (Brussels Environment, Evaluation and Reporting Service) and Mr. André Guns (Walloon Agency for

Air and Climate), including additional material on the methodology and assumptions used. The following documents<sup>1</sup> were also provided by Belgium:

Campeneere, S. and Peiren, N. 2012. *Chapter 3: ILVO's Ruminant Respiration Facility, Melle, Belgium*. In: Pinares, C., and Waghorn, G. (eds). *Technical Manual on Respiration Chamber Designs*. Pp: 43-58. Ministry of Agriculture and Forestry, Wellington, New Zealand. Available at <http://www.globalresearchalliance.org>.

Niu, M., Kebreab, E., Hristov, A., Oh, J., Arndt, C., Bannink, A., Bayat, A., Brito, A.F., Boland, T., Casper, D., Crompton, L.A., Dijkstra, J., Maguy, E., Garnsworthy, P., Haque, M.N., Hellwing, A., Huhtanen, P., Kreuzer, M., Kuhla, B., Lund, P., Madsen, J., Martin, C., McClelland, S.C., McGee, M., Moate, P., Muetzel, S., Muñoz, C., O'Kiely, P., Peiren, N., Reynolds, C., Schwarm, A., Shingfield, K.J., Storlien, T.M., Weisbjerg, M.R. Yañez-Ruiz, D., Yu, Z. 2018. *Prediction of Enteric Methane Production, Yield, and Intensity in Dairy Cattle Using an Intercontinental Database*. *Glob. Change Biol.* 24:3368–3389.

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