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Report on the individual review of the annual submission of Belgium submitted in 2022*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases 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 review of the 2022 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 10 to 15 October 2022 in Bonn.

* In the symbol for this document, 2022 refers to the year in which the inventory was submitted, not to the year of publication.

Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category 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
CER	certified emission reduction
CH_4	methane
CM	cropland management
CNG	compressed natural gas
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
COPERT	software tool for calculating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
DC	degradable organic component
dm	dry matter
DOC	degradable organic carbon
DOM	dead organic matter
EEA	European Environment Agency
EF	emission factor
EMAV	ammonia emission model for Flanders
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
EMMOSS	Emission Model for Shipping and Rail
ERT	expert review team
ERU	emission reduction unit
ETS	emissions trading scheme
EU	European Union
EU ETS	European Union Emissions Trading System
Eurostat	statistical office of the European Union
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
$Frac_{GASM}$	fraction of applied organic nitrogen fertilizer materials 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

IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
Kyoto Protocol Supplement	*2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*
LULUCF	land use, land-use change and forestry
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
Nex	nitrogen excretion
NF_3	nitrogen trifluoride
NIR	national inventory report
NO	not occurring
PFC	perfluorocarbon
PPSR	previous period surplus reserve
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
SIAR	standard independent assessment report
VOC	volatile organic compound
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	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction

1. This report covers the review of the 2022 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" (annex to decision 13/CP.20). The review took place from 10 to 15 October 2022 in Bonn and was coordinated by Claudia do Valle, Sohel Pasha and Nalin Srivastava (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Belgium.

Table 1
Composition of the expert review team that conducted the review for Belgium

Area of expertise	*Name*	*Party*
Generalist	Mark Hunstone	Australia
	Mayra Rocha	Brazil
Energy	Maya Fukuda	Japan
	Haakon Marold	Australia
	Victoria Novikova	Belarus
	David O'Toole	Australia
IPPU	Valentina Idrissova	Canada
	Thapelo Clifford Mohale Letete	South Africa
	Takuji Terakawa	Japan
Agriculture	Michael Anderl	Austria
	Giovanna Lunkmoss de Christo	Brazil
	Britta Maria Hoem	Norway
LULUCF and KP-LULUCF	Andrea Brandon	New Zealand
	Oksana Butrym	Ukraine
	Iordanis Tzamtzis	Greece
Waste	Takefumi Oda	Japan
	Sirintornthep Towprayoon	Thailand
Lead reviewers	Mark Hunstone	
	Mayra Rocha	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2022 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3. The ERT has made recommendations that Belgium resolve identified findings, including issues[1] designated as problems.[2] Other findings, and, if applicable, the encouragements of the ERT to Belgium to resolve related issues, are also included in this report.

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.

[1] Issues are defined in decision 13/CP.20, annex, para. 81.
[2] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

5. Annex I presents the annual GHG emissions of Belgium, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.

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

II. Summary and general assessment of the Party's 2022 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2022 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 2022 annual submission of Belgium

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Date of submission	Original submission: NIR, 14 April 2022; CRF tables (version 1), 14 April 2022; SEF tables CP1 and CP2, 18 May 2022 Revised submissions: NIR, 23 May 2022; CRF tables (version 2), 23 May 2022 Unless otherwise specified, values from the most recent submission are included in this report		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	L.5
	(c) Development and selection of EFs?	Yes	E.5, E.10, A.2, A.5, L.18, L.19, L.20, KL.10, KL.11
	(d) Collection and selection of AD?	Yes	L.3
	(e) Reporting of recalculations?	No	
	(f) Reporting of a consistent time series?	Yes	I.18, A.10
	(g) Reporting of uncertainties, including methodologies?	No	
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories, or completeness?[b]	Yes	E.6, I.5, L.4, KL.7
	(j) Application of corrections to the inventory?	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?	No	I.5
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	I.19, L.7
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	

Assessment			*Issue/problem ID#(s) in table 3 or 5[a]*
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies 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	
	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 the 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	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	Yes	KL.2, KL.7
	(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?	No	
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	No	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	NA	Belgium does not have a previously applied adjustment
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 assessing 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	

[a] Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.
[b] 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 recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 19 August 2021,[3] and had not been resolved by the time of publication of the report on the review of the Party's 2020 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

Table 3
Status of implementation of recommendations included in the previous review report for Belgium

ID#	*Issue/problem classification[a, b]*	*Recommendation from previous review report*	*ERT assessment and rationale*
General			
G.1	Archiving (G.9, 2020) Transparency	Provide the required information under the UNFCCC Annex I inventory reporting guidelines, paragraphs 50(j) and 27(a), including the archiving elements defined in the latter and the details on archiving provided to the ERT during the review.	Addressing. Belgium reported in its NIR (sections 1.6.1.2, 1.6.1.3 and 1.6.1.4, pp.44–45) additional information on the archiving of inventory data. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided a consistent description of archiving procedures across the three regions of Belgium. The ERT considers that this recommendation could be resolved through the provision of information on the archiving of the following for all Belgian regions: (1) all disaggregated EFs and AD; (2) documentation on how EFs and AD have been generated and aggregated for the preparation of the inventory; (3) internal documentation on QA/QC procedures, and external and internal reviews; (4) documentation on annual key categories and key category identification; and (5) planned inventory improvements.
G.2	Follow-up to previous reviews (G.2, 2020) (G.4, 2018) Transparency	Report in the NIR on the Party's response to the review process by including a description of how each recommendation from previous review reports has been or will be addressed.	Resolved. Belgium reported in its NIR (section 9.2.3, p.301) a description of how each recommendation from previous review reports has been or will be addressed.
G.3	National registry (G.7, 2020) (G.6, 2018) KP reporting adherence	Establish a PPSR account in accordance with decision 1/CMP.8.	Resolved. Belgium reported in its NIR (section 11.6, p.368) that the PPSR account has been established and the international transaction log has been notified; this was confirmed by the ERT.
G.4	National system (G.4, 2020) (G.8, 2018) KP reporting adherence	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.	Addressing. The ERT noted that in the NIR (section 1.2, pp.22–25) the names and responsibilities of some of the stakeholders have been updated since the previous submission following changes to the national system, but the annual process for improving the inventory is not described in detail. During the review, the Party clarified that it has not yet included in the NIR a description that clearly states how each region contributes to inventory improvement activities.

[3] FCCC/ARR/2020/BEL. The ERT notes that the report on the review of Belgium's 2021 annual submission has not been published yet owing to insufficient funding for the review process. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2020 annual submission.

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
G.5	NIR (G.3, 2020) (G.1, 2018) (G.5, 2016) (G.5, 2015) Transparency	Report planned improvements in accordance with paragraph 50 of the UNFCCC Annex I inventory reporting guidelines.	Addressing. Belgium provided some additional information in its NIR (section 9.2, p.341, and under the individual sectoral chapters) on its planned improvements. However, the Party has not yet provided information on the likely implementation dates of each identified improvement, together with the estimated effort and complexity.
G.6	NIR (G.5, 2020) (G.9, 2018) Convention reporting adherence	Submit any additional documents included in the annexes to the NIR in one of the official languages of the United Nations.	Not resolved. Belgium did not submit all additional documents included in the annexes to the NIR in an official language of the United Nations. The ERT noted that some of the documents included in annex 3 to the NIR were written in Dutch, as in previous submissions. During the review, the Party clarified that for the last few years, studies carried out for improving the inventory have contained an extensive summary in English, but currently there is neither a budget nor personnel to retroactively translate the additional documents included in the annexes to the NIR.
G.7	QA/QC and verification (G.6, 2020) (G.11, 2018) Transparency	Update the information in section 1.6 of the NIR to reflect the new QA/QC plan and the improvements to QA/QC procedures.	Resolved. Belgium updated the information in its NIR (section 1.6, p.41) to reflect the new QA/QC plan and the improvements to QA/QC procedures.
G.8	QA/QC and verification (G10, 2020) Transparency	Where tier 3 methods and/or models are used in the inventory, add in the NIR information on the work done to verify the methods and/or models and a summary of the relevant findings and conclusions.	Not resolved. Belgium did not include in its NIR information on the approaches used to verify the methods and/or models with a summary of the relevant findings and conclusions. During the review, the Party informed the ERT that the additional document to the NIR, "Annex 3 -QMS" for the Flemish Region, gives a detailed description of the methodologies used to estimate emissions for all sectors and tier levels. However, the ERT notes that the document provided is not in one of the United Nations official languages and the Party did not include in the NIR a clear and concise description of specific efforts to verify tier 3 methods and models or a summary of relevant findings and conclusions.
G.9	Uncertainty analysis (G.12, 2020) Convention reporting adherence	Review and revise the uncertainties associated with AD, EFs and modelled or measured emissions in all methods that have been updated or moved to higher-tier methods and emission recalculations, and then update the approach 1 and approach 2 uncertainty analyses accordingly, reporting the results in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraph 42.	Resolved. Belgium applies only approach 1 uncertainty analysis in its inventory. The Party has revised the uncertainties associated with AD, EFs and modelled or measured emissions in all methods that have been updated or moved to higher-tier methods in its NIR (annex 2, p.422).
Energy			
E.1	1. General (energy sector) – solid, liquid and gaseous fuels (E.1, 2020) (E.2, 2018) (E.3, 2016) (E.3, 2015)	Clearly document in the NIR any remaining differences between the regional and federal energy balances and provide explanations for these differences.	Resolved. Belgium outlined in its NIR (section 3.2.1, p.77) the main differences between the results of the reference approach and the sectoral approach in the national inventory. The Party also included in the NIR an allocation table for each region (the Walloon, Flemish and Brussels-Capital Regions) that shows the links between each CRF category and each line of the regional energy balances (see ID# E.3 below). In addition,

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
	(23, 2014) Transparency		the Party included in the NIR a "corrected reference approach" showing the effect of off-gases produced in the blast furnaces and combusted/encoded in categories 1.A.2.a (iron and steel) or 1.A.1.a (public electricity and heat production). The ERT considers that this information is enough to demonstrate the main differences remaining between the regional and federal energy balances. The ERT noted that the Party reported in its NIR (p.77) on the working group set up to improve harmonization of the regional and federal energy balances; the work of the working group is in progress.
E.2	Fuel combustion – reference approach – solid, liquid and gaseous fuels – CO_2 (E.5, 2020) (E.16, 2018) Transparency	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 under ID# E.16 of the 2018 review report.	Addressing. Belgium has updated the values for the corrected reference approach in NIR figure 3.6 (p.75) since its 2020 submission. However, it has not added a clearer explanation of how the corrected reference approach was calculated, in particular regarding the treatment of the consumption of off-gases in the IPPU sector. During the review, the Party made a reference to the explanation provided in the NIR (p.74) that "solid fuels are mainly located under industrial processes (iron and steel sector) in the regional approach, contrary to the reference approach, and that in order to preserve the simplicity of the reference approach, quantities of coke delivered for the iron and steel and non-ferrous metals industries should be excluded from total carbon. The effect of this will be reflected as the difference between the reference approach and sectoral approach when the comparison is made. Belgium includes also "pulverized coal" used as reductant". However, the ERT considers that the explanation provided does not sufficiently clarify the following two points: (1) solid fuels, including pulverized coal used as reductant, allocated to the IPPU sector are deducted from the reference approach; and (2) solid fuels used for industrial processes in the sectoral approach are converted to derived gases 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. In response, the Party explained that: (1) solid fuels, including pulverized coal used as a reductant, allocated to the IPPU sector are deducted from the reference approach, which means that all quantities of coke delivered and other reductants for the iron and steel and non-ferrous metals industries are excluded from the total carbon accounted for in the comparison between the reference and sectoral approaches in CRF table 1.A(c); and (2) some solid fuels used for industrial processes (iron and steel and non-ferrous metals industries) are, however, converted to derived gases and used for energy purposes. As a consequence, combustion emissions appear under energy in the sectoral approach while all these quantities have been removed from "Apparent energy consumption" in CRF table 1.A(c). Therefore, to avoid that "the effect of this will be reflected as a difference between the reference approach and sectoral approach when the comparison is made", Belgium added these off-gas emissions and energy in its corrected reference approach provided in the NIR (p.75) in order to permit a fair comparison between the reference and sectoral approaches.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			The ERT considers that as a matter of transparency the explanation above should be included in the NIR to provide a clearer explanation of how the corrected reference approach was calculated.
E.3	1.A Fuel combustion – sectoral approach – all fuels – CO_2, CH_4 and N_2O (E.9, 2020) (E.7, 2018) (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.	Resolved. Belgium included in its NIR (section 3.2.5.1, p.84) an allocation table for each region (the Walloon, Flemish and Brussels-Capital Regions) that shows the links between each CRF category and each line of the regional energy balances. The Party included in the NIR (annex 8, p.447), the regional and national energy statistics in a similar format and a similar level of detail, which allows the comparison of energy consumption in energy balances and AD in CRF tables.
E.4	1.A.2.c Chemicals – other fossil fuels – CH_4 (E.15, 2020) Comparability	Correct the CH_4 IEF to 1.0 kg/TJ for the entire time series and provide clear information in the NIR about each region's AD allocation under this subcategory.	Resolved. Belgium provided during the review a spreadsheet with the calculation of CH_4 emissions showing the CH_4 EF (1.0 kg/TJ) applied to the Walloon Region. The Party explained that CH_4 emissions for the Flemish and Walloon Regions are reported under category 1.A.2.c. However, the AD of the Flemish Region are allocated to category 2.B.8.b (ethylene production) because in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 1, box 1.1), off-gas CO_2 emissions and emissions from recovered fuels from cracking units and some other processes (non-energy use) should be reported under category 2.B.8.b. The fact that only the AD of the Walloon Region are reported under category 1.A.2.c, while CH_4 emissions relates only to the Walloon and Flemish Regions, caused the extreme outlier for the CH_4 IEF in CRF table 1.A(a)s2 (1,823.63 kg CH_4/TJ for 2020). The Party included in the NIR (section 3.2.7, p.113) an explanation of the AD, the CH_4 and N_2O emissions and the related EFs for the three regions. The Party also confirmed during the review that the error identified during the previous review, namely that the CH_4 IEF for one plant in the Walloon Region was incorrect (2.5 kg/TJ instead of 1.0 kg/TJ), has been corrected in this submission.
E.5	1.A.3.b Road transportation – liquid fuels – CO_2 (E.12, 2020) (E.10, 2018) (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_2 emissions from road transportation.	Not resolved. Belgium applied the COPERT model and used its default CO_2 EFs (based on the *EMEP/EEA air pollutant emission inventory guidebook 2019*) for all fuels used in road transportation (NIR section 3.2.8.2.1, pp.122–123). The ERT noted that the CO_2 EF for diesel is constant (74.24 t CO_2/TJ) for the entire time series and for gasoline it ranges from 71.98 to 72.23 t CO_2/TJ. These values are in the upper range of the default values in the 2006 IPCC Guidelines and therefore there is no underestimation of emissions. However, in accordance with the 2006 IPCC Guidelines, CO_2 emissions in road transportation should be calculated on the basis of fuels sold in the country and the CO_2 EF should be based on the carbon content of the fuel. For key categories, a tier 2 approach should be used and therefore the country-specific carbon content and net calorific value of the fuels should be estimated. The ERT noted that the Party reported in the NIR (p.122) that this issue is dealt with at the European level through Working Group I of the Climate Change Committee, where a special working group tries to establish European values.

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
E.6	1.A.3.b.iii Heavy-duty trucks and buses – gaseous fuels – N_2O (E.16, 2020) Completeness	Report N_2O emissions for subcategory 1.A.3.b.iii or demonstrate that they are below the significance threshold described in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines when reporting "NE" in this subcategory.	Not resolved. Belgium reported N_2O emissions as "NE" for subcategory 1.A.3.b.iii in CRF table 1A(a)s3. In its NIR (p.304) and CRF table 9, Belgium explained that it reported "NE" because there is no N_2O EF for heavy-duty trucks and buses available in COPERT 5.5.1, which was used to estimate emissions for road transportation. However, Parties should follow the methodology of the 2006 IPCC Guidelines if methods are available. If emissions are insignificant, the Party may provide justification based on the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. Default N_2O EFs are available in table 3.2.2 of the 2006 IPCC Guidelines (vol. 2, chap. 3, p.3.21). Using the upper value of default N_2O EF from this table for natural gas (77 kg/TJ) as a conservative approach, the ERT calculated the potential N_2O emissions for this source, which resulted in 0.28 kt CO_2 eq, well below the threshold of significance for Belgium (53.22 kt CO_2 eq) for the application of adjustments.
E.7	1.A.3.b.iii Heavy-duty trucks and buses – gaseous fuels – CO_2 and CH_4 (E.17, 2020) Transparency	Include in the NIR an explanation of why only a few buses from public transportation operators are using natural gas for experimental purposes in Belgium leading to "NO" being reported for CO_2 and CH_4 emissions in CRF table 1.A(a) (sheet 3); and estimate and report emissions for all years when natural gas was used in buses used for public transportation.	Addressing. Belgium reported in its NIR (section 9.2.3, p.304) the status of implementation of the previous review recommendations. Regarding this issue, the Party indicated why "NO" was reported for CO_2 and CH_4 emissions for 1990–1992 and 2011–2015 in CRF table 1.A(a)s3, providing the following explanation: "the Party confirmed that only a few buses from public transportation operators used natural gas for experimental purposes during 1993–2010. Since 2016, new experiences occur, and Belgium expects a new development in this segment in the future with also CNG heavy duty trucks". The ERT considers that this explanation justifies the reporting of "NO" for those years. However, the Party should include this explanation in the NIR, under the road transportation sector, to explain the consistency of the time series and the reporting of "NO" for some years for this category.
E.8	1.A.3.c Railways – liquid fuels – CO_2 (E.13, 2020) (E.21, 2018) Accuracy	Revise the EF used for estimating CO_2 emissions from railways using the appropriate calorific values and explain why the IEF values are lower than the IPCC default values.	Resolved. Belgium revised CO_2 estimates for liquid fuels for railways and there is no underestimation of emission in the later years of the time series. The Party is now using the default CO_2 EF from the 2006 IPCC Guidelines, namely 74.10 t CO_2/TJ, for the entire time series instead of the previous lower EF ranging from 72.83 to 72.50 t CO_2/TJ for 2013–2020.
E.9	1.A.3.d Domestic navigation – liquid fuels – CH_4 (E.18, 2020) Transparency	Include in the NIR the rationale for using a CH_4 IEF value for gas/diesel oil under subcategory 1.A.3.d domestic navigation that is lower than the 2006 IPCC Guidelines default value (vol. 2, chap. 3, p.3.50).	Resolved. Belgium included in its NIR (section 3.2.8.2.4, p.127) the rationale for using a CH_4 IEF for gas/diesel oil under subcategory 1.A.3.d that is lower than the 2006 IPCC Guidelines default values; that is, that it uses the default IPCC CH_4 EF value for the Walloon and Brussels-Capital Regions, but for the Flemish Region it uses the EMMOSS model. This model brought about a lower EF for CH_4 compared with the 2006 IPCC Guidelines default EF (7 kg CH_4/TJ) because it calculates the CH_4 emissions using a fraction of the emissions of VOC, which are calculated depending on the different classes of construction years and engines of the boats (g/kWh power of the engines). The methodology is based on the emission registration and monitoring shipping protocol applied in the Netherlands. During the review, the Party explained that the fraction of the emissions of VOC used is 0.04 and clarified that a study is under way to develop a

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			completely new model to calculate emissions from inland navigation and marine navigation in the Flemish Region, which it plans to use for future submissions.
E.10	1.A.4 Other sectors – solid, liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.14, 2020) (E.22, 2018) Accuracy	Make efforts to develop country-specific EFs for gaseous and liquid fuels for the key categories under category 1.A.4 and explain in the NIR the reasons for not using country-specific EFs for solid fuels for the key categories under category 1.A.4.	Addressing. Belgium has been using country-specific CO_2 EFs for gaseous fuels for all regions under category 1.A.4 since the 2020 submission. However, country-specific EFs for solid and liquid fuels are not used for the key categories under category 1.A.4. The Party explained in its NIR (section 3.9.2, p.134) that so far no country-specific EFs could be found and that further investigation is required. The Party also did not include in the NIR the reasons for not using country-specific EFs for solid fuels for the key categories under category 1.A.4, as it provided in the 2018 review: "that, owing to the large variability in carbon content and the limited amount used in stationary combustion under 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".
E.11	1.B.2.c Venting and flaring – gaseous fuels – CH_4 (E.19, 2020) Transparency	Include in the NIR an explanation of the venting activities around the transport of gas from Norway into Belgium and of why the related CO_2 emissions from venting (reported under subcategory 1.B.2.c.ii) were reported as "NO" in CRF table 1.B.2.	Resolved. Belgium included in the NIR (section 3.3.2.2.4, p.144) the required explanation; that is, that CO_2 emissions under category 1.B.2.c.ii (venting) were reported as "NO" in CRF table 1.B.2 because the pretreatment of gas, which causes CO_2 emissions from separation and diffusion of CO_2 in raw natural gas at the natural gas production site, is performed in Norway and the venting gas always meets the standards for the distribution network in Belgium.
IPPU			
I.1	2.A.4 Other process uses of carbonates – CO_2 (I.19, 2020) Completeness	Report CO_2 emissions for subcategory 2.A.4.d other for 1990–1992.	Resolved. Belgium reported CO_2 emissions for subcategory 2.A.4.d for 1990–2020 in CRF table 2(I).A-Hs1.
I.2	2.B.1 Ammonia production – CO_2 (I.3, 2020) (I.7, 2018) Accuracy	Report the amount of CO_2 recovered in CRF table 2(I).A-Hs1.	Resolved. Belgium reported in CRF table 2(I).A-Hs1 the amount of CO_2 recovered from 1992 onward and used the notation key "IE" for 1990 and 1991. In addition, the Party included in the NIR (section 4.3.2.1, p.163) an explanation of how the CO_2 recovered was accounted for in other sectors (LULUCF and transport).
I.3	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N_2O (I.20, 2020) Consistency	Correct the inconsistency in the time series by accurately reporting estimated emissions from caprolactam production for 1990–1996	Resolved. Belgium explained during the review that the value for N_2O emissions reported for 1990–1996 was discussed during the past year with the sole Belgian company involved in the process; the company confirmed the trend to be accurate. In its NIR (section 4.3.2.3, p.164), the Party clarified that the emission values were provided by the company, which confirmed the reported emissions for 1990–1996.
I.4	2.B.8 Petrochemical and carbon black production – CO_2 (I.5, 2020) (I.9, 2018) Transparency	(1) Include in the NIR a 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	(1) Resolved. Belgium included in its NIR (section 4.3.2.6, pp.165–166) a detailed description of the reporting of emissions for subcategories 2.B.8.b occurring in the Flemish Region and 2.B.8.g occurring in the Walloon Region. The Party described the various petrochemicals produced, as well as the number of naphtha cracking facilities, the importance of this sector in comparison with other EU countries (9.5 per cent of total

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		cracking facilities, the importance of this sector in comparison with other EU countries and the other products generated during ethylene production. (2) Provide in the NIR information on how the emissions are calculated for the Flemish and Walloon Regions for subcategories 2.B.8.b and 2.B.8.g, including the EFs used for the plants.	capacity in Europe) and the other products generated during ethylene production. The Party also provided a description relating to subcategories 2.B.8.c, 2.B.8.d and 2.B.8.f. The ERT considers this information sufficient. (2) Resolved. In its NIR (sections 3.2.3 and 3.2.5), Belgium referred to a study conducted in 2003 to estimate non-energy use in the Flemish Region, which allowed annual data collection from chemical producers until 2016, specifically for subcategory 2.B.8.b. Emissions for category 2.B.8.g are reported only for the Walloon Region for the production of vinyl chloride, maleic anhydride and phthalic anhydride; from 1990 to 2001, the CO_2 EF was constant for the three sources and was chosen after a discussion with the respective plants; since 2002, the plants have provided information annually on the production and the CO_2 emissions linked with this production. During the review, Belgium confirmed that for confidentiality reasons there are ongoing discussions with the industry to further improve transparency for category 2.B.8.
I.5	2.B.8 Petrochemical and carbon black production – CO_2 and CH_4 (I.21, 2020) Completeness	Estimate and report CH_4 emissions for category 2.B.8.c ethylene dichloride and vinyl chloride monomer in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3.9.2.1, p.3.69) or include information in the NIR to demonstrate that these emissions are insignificant in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines and use the correct notation key ("NE").	Addressing. Belgium did not estimate CH_4 emissions for category 2.B.8.c (ethylene dichloride and vinyl chloride monomer) and the notation key "NE" is reported in CRF table 2(I).A-Hs1. The Party explained in its NIR (section 4.3.2.6, p.166) that according to producers, ethylene, hydrogen chloride or chlorine gas were used as raw material for the production of ethylene dichloride and vinyl chloride monomer, which suggests that CH_4 emissions were below the threshold of significance specified in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. In addition, the off-gases of the process installations were burned in the tail gas incinerator, and the emission values of the organic parameters were smaller than the limits of detection. However, the Party did not provide a quantitative estimation to justify exclusion in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. During the review, Belgium confirmed that measured CH_4 emissions from the tail gas incinerator were below the determination limit (<0.8 mg/Nm^3) and below the detection limit (<0.4 mg/Nm^3) and that it will provide a quantitative estimation in its next submission. The ERT noted that the CH_4 emissions reported for this category by other Parties are negligible in all cases, with the CH_4 EF ranging from 0.006 to 0.023 kt CH_4/t product, well below the threshold of significance for Belgium (53.22 kt CO_2 eq). The ERT considers that this issue is not fully addressed because the Party does not justify the use of "NE" in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.
I.6	2.B.8 Petrochemical and carbon black production – CO_2 and CH_4 (I.21, 2020) Comparability	Correctly report CH_4 emissions for category 2.B.8.d ethylene oxide as "IE".	Resolved. Belgium reported CH_4 emissions under category 2.B.8.d (ethylene oxide) as "IE" in CRF table 2(I).A-Hs1 and explained in CRF table 9 that the emissions were included in category 2.B.10.

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I.7	2.B.10 Other (chemical industry) – CO_2 (I.7, 2020) (I.11, 2018) Comparability	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.	Resolved. Belgium continued to report emissions from ethylene oxide, ethylene dichloride and other petrochemical products under category 2.B.10 in CRF table 2(I).A-Hs1. The Party explained in its NIR (section 4.3.2.6, p.165) that, for confidentiality reasons, emissions could not be disaggregated. During the review, Belgium confirmed that discussions are being held with companies, but the emissions could not be reallocated. The ERT agrees with the confidentiality justification and considers this issue as resolved.
I.8	2.B.10 Other (chemical industry) – CO_2 (I.22, 2020) Comparability	Estimate emissions from ethylene dichloride and vinyl chloride monomer and those from carbon black by using production data and default or plant-specific EFs and report them separately under the corresponding subcategories.	Resolved. Belgium explained in the NIR (section 4.3.2.6, p.166), that CO_2 emissions from the production of ethylene dichloride and vinyl chloride monomer (category 2.B.8.c) and of carbon black (category 2.B.8.f) were reported under category 2.B.10, as AD could not be disaggregated for confidentiality reasons. The Party confirmed that there is only one carbon black plant in Belgium (in the Flemish Region). The ERT agrees with the Party and considers the issue as resolved.
I.9	2.C.5 Lead production – CO_2 (I.9, 2020) (I.12, 2018) Completeness	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-H (sheet 2) and correct the information in the documentation box.	Resolved. Belgium changed the notation key from "NO" to "IE" for CO_2 emissions under this category in CRF table 2(I)A-Hs2 and explained in a new section added to the NIR (section 4.4.2.2, p.175) that emissions from lead purification (secondary production) are reported under category 2.C.7 (other metal industry) because it is not possible to disaggregate AD and that this activity is only a small part of the total metal production of one company in the country (in the Flemish Region). The general method and EFs (direct reporting of emissions under EU ETS and/or reporting of AD and EFs from producers) are explained under category 2.C.7 (p.176) for four metal companies reported under the category (lead purification, copper production and melting and purification of precious metals). CRF table 9 also contains an explanation of the reporting of "IE" for categories 2.C.5 (lead production) and 2.C.7 (copper production and nickel production).
I.10	2.C.6 Zinc production – CO_2 (I.10, 2020) (I.13, 2018) Comparability	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.	Resolved. Belgium reallocated CO_2 emissions from zinc production (primary production) from category 2.C.7 to category 2.C.6 in CRF table 2(I)A-Hs2, with AD reported as confidential. The Party added a new section to the NIR (section 4.4.2.3, p.176) for zinc production and explained that emissions for the whole time series were provided by the plants. From 2013 onward, emission values were taken directly from EU ETS data.
I.11	2.C.7 Other (metal industry) – CO_2 (I.11, 2020) (I.14, 2018) Comparability	(1) 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. (2) Either explain why casting of iron and processing of metals are not reported under	(1) Resolved. Belgium included in the NIR (section 4.4.2.4, p.176) the required explanation, namely that AD were taken from EU ETS data and/or from individual plants (either emissions or production data and EFs). The Party also clarified that category 2.C.7 covers emissions from four plants that smelt copper and refine lead and precious metals.

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		category 2.C.1 or reallocate the emissions from category 2.C.7 to category 2.C.1.	(2) Resolved. Belgium reallocated CO_2 emissions from casting of iron to category 2.C.1.f (other – metal processing industry).
I.12	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.14, 2020) (I.17, 2018) Comparability	(1) Collect the AD and calculate emissions from chillers separately from those from industrial and commercial refrigeration. (2) Report emissions from all stationary air-conditioning equipment (chillers, split, multisplit, etc.) under stationary air conditioning following a tier 2a approach.	(1) Resolved. Belgium has collected AD and calculated emissions from chillers separately from industrial and commercial refrigeration since the 2019 submission and reported emissions under category 2.F.1.e (stationary air conditioning). The Party reported in the NIR (section 4.7.2.1, p.180) that stationary air conditioning includes chillers, movables and room air conditioners. (2) Resolved. Belgium reported the information in the NIR clarifying that for all stationary air-conditioning equipment the assembly emissions, the operation emissions and the disposal emissions were estimated separately (a tier 2a approach).
I.13	2.F.1 Refrigeration and air conditioning – HFCs (I.15, 2020) (I.18, 2018) Accuracy	Make efforts to collect data separately for commercial and industrial refrigeration applications following a tier 2a approach in accordance with the 2006 IPCC Guidelines.	Resolved. Belgium explained in its NIR (section 4.7.2.1, p.182) that AD for commercial and industrial refrigerators were aggregated owing to the lack of data and that a mass-balance approach was applied (tier 2b). Belgium justifies the use of the method based on the 2006 IPCC Guidelines (vol. 3, chap. 1.5.3, table 1.7, p.1.30) because the significant servicing component to maintain equipment would require too many data collection sources. The Party clarified that applying a tier 2a approach would imply a large number of assumptions about very uncertain parameters. The ERT agrees with the Party and considers this issue as resolved.
I.14	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.16, 2020) (I.19, 2018) Accuracy	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.	Resolved. Belgium explained in its NIR (section 4.7.2.1, p.180) that F-gases imported in products for commercial and industrial refrigeration are those from hermetic systems. During the review, the Party confirmed that F-gases imported in products for commercial and industrial refrigeration were handled in the same way as household refrigeration and therefore reported under category 2.F.1.b (domestic refrigeration), but that for the 2023 submission they would be reported in source category 2.F.1.a (commercial refrigeration). The ERT did not identify any underestimates in emissions resulting from the Party's reporting of F-gas emissions from these subapplications.
I.15	2.F.1 Refrigeration and air conditioning – HFCs and PFCs (I.17, 2020) (I.20, 2018) Transparency	Improve the description in the NIR of the lifetimes used for each subapplication under category 2.F.1 and 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.	Resolved. Belgium reported in NIR table 4.12 (section 4.7.2.1, p.184) the lifetimes for all subapplications reported under category 2.F.1. The Party also reported in its NIR (p.184) the reasons for using a lifetime of 12 years for transport refrigeration instead of the default value from the 2006 IPCC Guidelines (vol. 3, table 7.9, p.7.52).
I.16	2.H Other (IPPU) – CO_2 (I.23, 2020) Convention reporting adherence	(1) Correct the notation key for category 2.H.1 (pulp and paper) for 1990–2002 to "NO". (2) Report the AD for CO_2 emissions for category 2.H.2 (food and beverages industry).	(1) Resolved. Belgium corrected the notation key and CO_2 emissions for category 2.H.1 (pulp and paper) were reported as "NO" for 1990–2002 in CRF table 2(I).A-Hs2. (2) Resolved. Belgium continued to report AD as "NE" and CO_2 emissions as "IE" in CRF table 2(i).A-Hs2 for category 2.H.2 (food and beverages industry). During the review, the Party explained that reporting of AD for the food and beverages industry is complicated owing to the lack of data. In addition, the ERT noted that in CRF table 9, Belgium explained that CO_2 emissions for category 2.H.2 were reported under category

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			1.A.2.e. The ERT believes that given the nature of this non-mandatory category, the Party's reporting is acceptable.
Agriculture			
A.1	3. General (agriculture) (A.1, 2020) (A.5, 2018) Transparency	Include in the NIR detailed information on how planned improvements for the agriculture sector are listed and prioritized for the three regions.	Resolved. Belgium provided information on the improvement plans and the progress of their implementation for the Flemish Region for categories 3.A (p.206), 3.B (p.217) and 3.D (p.228). This includes the establishment of a working group on emissions to examine, inter alia, the parameters needed to obtain a year-specific EF for non-dairy cattle, the revision of the CH_4 emission model and the reduction in CH_4 emissions from enteric fermentation (cattle) up to 2030. The Party also reported that a project is ongoing to revise the N_2O model. The new integrated model will be an extension of the EMAV version 2.1 model and will calculate NH_3, N_2O and nitric oxide emissions. For categories 3.G and 3.H, the Party reported that there are no significant improvements planned for the next submission. There are also no planned improvements foreseen for the Walloon and Brussels-Capital Regions; however, the Party reported under the planned improvements for all categories that "small improvements are inherent to the inventory process and occur yearly", which the ERT considers covers all three regions.
A.2	3.A Enteric fermentation 3.B Manure management – CH_4 and N_2O (A.9, 2020) Accuracy	Determine the region-specific parameters (feeding situations, feed intake and digestibility of feed) for the Walloon and Brussels-Capital Regions in a similar manner to the planned study for the Flemish Region, and use them to estimate the emissions from enteric fermentation and manure management.	Not resolved. Belgium did not provide region-specific parameters for the Walloon and Brussels-Capital Regions or indicate whether a study is planned to determine these values. During the review, the Party confirmed that a study is being undertaken in the Flemish Region to revise all the parameters used for enteric fermentation and manure management. However, the results will only be available for the 2024 submission. The Party also clarified that the results will be shared with the other regions if the data and parameters from the study are applicable to them and that the methodology will also be updated for the Walloon and Brussels-Capital Regions. The ERT considers that this issue does not lead to an underestimation of emissions because the Party applies national values or default IPCC values for the region-specific parameters. The Party applies a tier 2 approach for cattle, as that is the only key category under this category, and revised the values of weight gains in the 2020 and 2021 submissions in response to a recommendation raised during previous reviews. The Party applies the feeding situation in accordance with table 10.5 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.17) and reporting on milk production is based on data provided by milk suppliers in the Flemish and Walloon Regions, with data from the latter region being used for the Brussel-Capital Region. The Party uses digestibility of feeding data from the Netherlands; the Party explained during the review that this is justified as the Netherlands is a neighbouring country with a comparable feeding situation and that those feeding situations were applied for all three regions of Belgium. High-quality forage is used in Belgium and the ERT notes that the values applied for digestibility of feed are in the range of the default IPCC values given in table 10.2 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.14).

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A.3	3.A Enteric fermentation 3.B Manure management – CH_4 and N_2O (A.10, 2020) Transparency	(1) Clarify the cause for the difference between the data used for the Walloon and Brussels-Capital Regions in order to justify the selection of the AD for estimating emissions from categories 3.A (enteric fermentation) and 3.B (manure management). (2) Demonstrate in the NIR that the livestock population estimated by using the Statbel "Belgian evolution" methodology based on the Belgian total rather than actual Statbel data accurately represents the livestock population in the Brussels-Capital Region.	(1) Resolved. Belgium included additional information in its NIR (section 5.1.4, p.196). According to the Party, in the Walloon Region, actual Statbel data are used, except for sheep and goats, for which more detailed livestock figures from the Walloon agriculture department are used. For the Brussels-Capital Region, Statbel values were used up to 2010. Since 2011, data derived from the methodology "Belgian evolution", as published by Statbel, have been used. The Party clarified that the use of derived data was necessary, because after the revision of the Statbel methodology in 2011 (consisting of the allocation of agricultural surfaces and livestock by operator headquarters, instead of where the activity effectively takes place), the livestock population in the Brussel-Capital Region would have increased significantly (e.g. for cattle, from 238 in 2010 to 872 in 2015). Since, according to the previous Statbel methodology, the cattle population recorded a decrease from 1990 to 2010, and taking into account the continuous increase in the human population, leaving less space for agricultural activities, the new Statbel numbers are considered not appropriate for estimating livestock in the region in an accurate manner. (2) Resolved. Belgium justified the use of the methodology from the "Belgian evolution" as published by Statbel as being the only possible way to continue to estimate emissions from agricultural activities in the Brussels-Capital Region (NIR, p.196).
A.4	3.A Enteric fermentation – CH_4 (A.11, 2020) Accuracy	Follow the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.13) in deriving weight gain factors and report on its progress in obtaining weight gain factors.	Resolved. Belgium applied the 2006 IPCC Guidelines and adjusted to zero (for the entire time series) the weight gain for dairy cattle, brood cows and non-dairy cattle more than two years old. The Party also reported on its progress in obtaining a weight gain parameter for the Flemish Region and clarified that the outcomes of the study are not yet clear and that the results will be incorporated in the 2024 annual submission. The Party also indicated that for the Walloon and the Brussels-Capital Regions, no region-specific data will be available in the near future and the default factors of the 2006 IPCC Guidelines will continue to be used.
A.5	3.A.1 Cattle – CH_4 (A.3, 2020) (A.7, 2018) Accuracy	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 the Flemish Region.	Addressing. Belgium did not use a country-specific EF that reflects changes in the productive system for all cattle subcategories across the entire time series for the entire country. The Party reported in its NIR (section 5.2.6, p.206) on the working group established in the Flemish Region to examine the parameters needed to obtain a year-specific EF for non-dairy cattle and on a study, which is foreseen to be finalized by the end of 2022. During the review, the Party clarified that the results of the study are planned to be implemented for the 2024 submission and that the results of the project in the Flemish Region will be shared among the regions and, if the results are applicable in all three regions, the methodology will be updated. The ERT considers that this issue does not lead to an underestimation of emissions because the Party applies a tier 2 methodology from the 2006 IPCC Guidelines for all the cattle subcategories that are key and applies the best available national data for animal characteristics (average animal weight, energy spent for weight gain or work, pregnancy rate, feed digestibility) for the non-dairy cattle groups for which annual data are not available (see ID# A.2 above).

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A.6	3.A.1 Cattle – CH_4 (A.12, 2020) Transparency	Provide in the NIR the details of the feeding situation of dairy cattle that was used for deriving activity coefficient values for the Walloon and Brussels-Capital Regions.	Resolved. Belgium included an explanation for the Walloon and Brussels-Capital Regions in the NIR (section 5.2.2, p.202) regarding the feeding situation, namely that a coefficient Ca of 8.5 per cent of the net energy for maintenance is used for most cattle, considering that those animal categories spend half of the time on pasture. However, 0 per cent is used for slaughter calves (under six months) and 7.5 per cent for dairy cows, which spend more time in a stable (i.e. 205 days in a stable).
A.7	3.B Manure management – N_2O (A.5, 2020) (A.2, 2018) (A.13, 2016) (A.13, 2015) Transparency	Provide accurate information in the NIR on the method used for estimating direct N_2O emissions from manure management.	Resolved. Belgium used a tier 2 approach for estimating AD and Nex values and a tier 1 approach for the EFs. The Party also explained in the NIR (section 5.3.2.2, pp.210–214) how Nex values were derived for the three regions and provided information on the proportion of manure management for each animal waste management system.
A.8	3.D.b.1 Atmospheric deposition – N_2O (A.7, 2020) (A.10, 2018) Transparency	To increase the transparency of the next annual submission and, considering that EMAV version 2.0 and related documentation are not written in an official United Nations language (they are in Dutch), include in the NIR detailed information on: (a) The assumptions and principles used in EMAV version 2.0 to estimate the country-specific EF for gaseous losses for the Flemish Region; (b) How results from the model are subject to QC by the Flemish Region; (c) How data are included in the inventory reporting; (d) How the detailed calculations of NH_3 emissions carried out by the Flemish Region are harmonized with results coming from the estimation of emissions for this subcategory by the Walloon and Brussels-Capital Regions.	(a) Resolved. Belgium included in the NIR (section 5.3.2.2, p.215) information about the EMAV 2.1 model and how the national $Frac_{GASM}$ factors are derived for the Flemish Region. In the NIR it is stated that the rate used for nitric oxide volatilization is 1.5 per cent and that it stays constant over the entire time series. During the review, the Party clarified that this factor is based on extensive field campaigns measuring nitric oxide emissions, representing the intensive Flemish Region agriculture. The EMAV 2.1 model gives the loss factors for NH_3; (b) Resolved. Belgium included in the NIR (p.215) information showing how QC of the data was carried out and implemented as part of the inventory reporting for the Flemish Region. Besides the QC checks described by the Party, an external validation of the model was carried out, a summary of which is presented in annex 3b, submitted as a document additional to the NIR (Annex3b_revision of the EMAV2.1 model_2020_english summary). The Party further clarified that the outcome of the validation will be prioritized and integrated into the model in the following years and revisions; (c) Resolved. Belgium reported in the NIR (p.215) that the model has been developed to follow the N flow throughout the individual farm and takes into account activities at the farm and during manure processing, emissions at different stages (indoor stabling, outdoor storage of manure, manure application to land and emissions from grazing animals), recent legislation and manure transport to and from the farm. It also calculates the NH_3 emissions from fertilizer use. In the NIR (p.215) it is also stated that the input data used by EMAV version 2.0 are very detailed and originate from the Manure Bank of the Flemish Land Agency; (d) Resolved. Belgium reported in the NIR (p.214) that the Belgian parameters for agriculture are established from a weighting of the regional parameters on the basis of the relevant AD. The Party also clarified that it is not possible to harmonize the methodologies from all the regions as each region uses its own methodology (in

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			compliance with the 2006 IPCC Guidelines); Belgian emissions are summations of the regional inventories, which applied different AD.
A.9	3.D.b.1 Atmospheric deposition – N_2O (A.13, 2020) Transparency	(1) Correct the information on the methodology in NIR table 5.13 from tier 1 to tier 2. (2) For the Flemish Region, provide in the NIR the missing information on the methodology used to estimate $Frac_{GASM}$ and, after the study to revise the N_2O model has been completed in 2021, provide the $Frac_{GASM}$ value for each animal category and each manure management system. (3) For the Walloon and Brussels-Capital Regions, report in the NIR the $Frac_{GASM}$ values as provided during the review.	(1) Resolved. Belgium corrected the information on the methodology from tier 1 to tier 2 in NIR table 5.13 (p.207) for indirect N_2O from manure management. (2) Addressing. Belgium provided in the NIR (section 5.3.2.2, p.215) information on the methodology used to estimate $Frac_{GASM}$ in the Flemish Region. However, the $Frac_{GASM}$ value for each animal category and each manure management system has not been reported in the NIR, since the revision of the N_2O model used in the Flemish Region has been delayed. During the review, the Party clarified that the completion of the study is now scheduled for the end of December 2022. The validated results for the $Frac_{GASM}$ values for each animal category and each manure management system are planned to be reported in the 2024 submission. (3) Resolved. Belgium included in the NIR a table with the $Frac_{GASM}$ values for the Walloon and Brussels-Capital Regions (NIR section 5.3.2.2, table 5.19, p.216).
LULUCF			
L.1	4. General (LULUCF) – all gases (L.1, 2020) (L.1, 2018) (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 the tier methods used for specific estimates.	Resolved. Belgium applied a tier 1 method for carbon stock changes in litter and deadwood pools in forest land remaining forest land, assumed to be in equilibrium in accordance with the 2006 IPCC Guidelines, provided carbon stock values of 1.90 t C/ha and 7.56 t C/ha for litter and deadwood pools respectively, and corrected the reference to the 2006 IPCC Guidelines (vol. 4, chap. 4.2.2.1) in its NIR (p.242). Furthermore, the Party applied the 2006 IPCC Guidelines for estimating emissions from wildfires in forest land remaining forest land (see ID# L.16 below).
L.2	4. General (LULUCF) – all gases (L.2, 2020) (L.9, 2018) Transparency	In order to maintain consistency between the applied methodologies and the explanation provided in the NIR, update the description in chapter 6 as follows: (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; (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 a stable state for the entire time series, in accordance with	(a) Resolved. Belgium explained in the NIR (p.238) that for each region the forest land remaining forest land area as estimated in the land-use matrix was used for estimating carbon stock changes with the stock-difference method in living biomass; (d) Resolved. Belgium provided an explanation in the NIR (p.243) that the carbon stocks in deadwood are assumed to be in a stable state for the entire time series, in accordance with the tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 4.2.2.1, p.4.20), and corrected the reference to the 2006 IPCC Guidelines (vol. 4, chap. 4.2.2.1) in its NIR (p.242), which corresponds to the forest land remaining forest land category; (e) Resolved. Belgium reported the average growth values for living biomass for the three regions (the Brussels-Capital, Flemish and Walloon Regions) for land converted to forest land (afforestation/reforestation) in NIR table 10.7 (p.354); (g) Not resolved. Belgium did not include information on the combustion factor used for biomass burning in forest land (category 4(V)) in the NIR. The ERT notes that the Party has updated the methodology and combustion factors used for biomass burning (from

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		the tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 4.2.2.1, p.4.20). 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 (vol. 4, chap. 4.3.2.1, method for land converted to forest land); (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; (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.	value 1) in forest land from the previous submission as it was identified during the review (see ID# L.16).
L.3	Land representation – all gases (L.3, 2020) (L.11, 2018) Accuracy	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.	Not resolved. Belgium did not estimate land-use change areas before 1990 and thus did not construct land-use conversion categories on the basis of 20 years' accumulation of land-use change areas for the entire time series. During the review, the Party repeated the explanation given in the previous review (2020) that no set of data using the same systematic and geolocated grid is available and that considering that the Party applies a 20-year transition time for soils, any change before 1990 would not have any effect on the inventory after 2010 and no impact on the LULUCF and KP-LULUCF accounting for the current commitment period. The Party also stated that for living biomass, the effect could only be an increase in removals, as deforestation is accounted for in the year of the deforestation while potential afforestation before 1990 could have an effect until 2009 and, in this context, the lack of a land-use matrix before 1990 does not result in an overestimation of removals or underestimation of emissions. The Party also informed the ERT that given the considerable amount of work needed to resolve this issue, it does not plan to apply this recommendation, as priority is given to other improvements in the inventory. The ERT notes that although the lack of land-use change area information before 1990 has no impact on the land-use matrix after 2009 (in accordance with the 2006 IPCC Guidelines default 20-year transition period) and consequently the second commitment period of the Kyoto Protocol, it nevertheless represents a failure to prepare a LULUCF GHG inventory in accordance with paragraph 4(e) of annex I to decision 24/CP.19 and the 2006 IPCC Guidelines for the entire time series, according to which inventories consistent with good practice are those that contain neither over- nor underestimates so far as can be judged, and in which uncertainties are reduced as far as practicable.

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L.4	4.A.2.1 Cropland converted to forest land – CO_2 (L.12, 2020) Completeness	Include in the NIR a clear explanation of why the carbon stock change in DOM for cropland converted to forest land was reported as "NO" for 1990–2009, while estimated values for other pools (living biomass and mineral soils) were provided.	Not resolved. Belgium continued to report "NO" for 1990–2009 and estimates from 2010 onward for carbon stock changes in deadwood and litter in cropland converted to forest land, although annual changes for this category occurred in 1990–2009 and carbon stock changes in the living biomass and mineral soil pools were reported during the same period. The Party did not provide in the NIR (or CRF table 4.A) a clear explanation for the use of "NO". During the review, the Party clarified that it has never made a calculation of the DOM pool in land converted to forest land for the Flemish Region and this is why "NO" was reported for Belgium for 1990–2009 and that an explanation will be added in the next NIR. The ERT considers that the recommendation has not been resolved because the Party neither estimated carbon stock changes in DOM in land converted to forest land for 1990–2009 as it did for the other pools nor included a justifiable explanation in the NIR for reporting "NO" for the same period.
L.5	4.A.2.3 Wetlands converted to forest land – CO_2 (L.6, 2020) (L.14, 2018) Accuracy	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 converted peatlands.	Not resolved. Belgium applied the mineral soils estimation method for the wetlands converted to forest land subcategory (NIR section 6.1.1, table 6.2, p.232, and section 6.2.2.2, p.245). During the review, the Party clarified that the recommendation was not implemented, stating that in the Flemish Region there is only a small area of organic soils that are located in grassland remaining grassland and cropland remaining cropland and there are no land-use changes occurring on organic soils. In the Walloon Region, the conversion of wetlands to forest land is limited to one single point on the grid, where the conversion occurred on mineral soils. The ERT considers that the recommendation has not been resolved because the Party neither applied the organic soils estimation method instead of the mineral soils estimation method for this land-use change nor alternatively provided in the NIR the information provided during the review, namely that no wetlands conversions to forest land occur on organic soils.
L.6	4.B.1 Cropland remaining cropland – CO_2 (L.7, 2020) (L.15, 2018) Accuracy	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 orchards using the country-specific annual increment with the total area of orchards in the growing period for the entire time series.	Resolved. Belgium continued to use an average annual increment value (0.7265 t C/ha/year) based on carbon stock values published in the 2018 German NIR (NIR, pp.247) instead of a country-specific value and it applied the 10-year growing period for orchard trees to reach a stable state based on country-specific information (NIR, p.248). In the case of an increase in the orchard area, the annual increment value is applied for 10 years, after which carbon stock changes are assumed to be zero. During the review, the Party clarified that no better country-specific data for an annual increment were identified and that the increment value from Germany is considered to be the best available information so far, considering also that cropland remaining cropland has not been identified as a key category in the GHG inventory. The ERT accepts the explanation provided by Belgium for the use of the increment value from Germany given that the cropland remaining cropland category has not been identified as a key category in the GHG inventory.
L.7	4.B.2 Land converted to cropland – CO_2 (L.8, 2020) (L.6, 2018)	Separately describe the processes causing the increasing area of cropland.	Not resolved. Belgium did not separately describe in its NIR the drivers of the increase in the total area of cropland over time. During the review, the Party clarified that the reasons for the increase in the cropland area have not been clearly identified and,

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	(L.5, 2016) (L.5, 2015) (66, 2014) Transparency		considering that the land-use matrix has been updated since 2018, it would reassess whether the finding is still relevant. Furthermore, the Party noted that the cropland area has been increasing only during recent years (2016–2020) in Belgium as a whole and for the whole time series in the Flemish Region, with the latter being attributed to the conversion of cropland from grassland. The ERT notes that the previous recommendation refers to the increasing area of land converted to cropland throughout the time series and not to the total cropland area, and that there is still an increasing trend in land converted to cropland over time, and in particular both for the area of grassland converted to cropland (104.16 kha in 2020 from 4.27 kha in 1990) and settlements converted to cropland (1.27 kha in 2020 from 0.02 kha in 1990), as reported in CRF table 4.B, although to a different magnitude.
L.8	4.B.2.1 Forest land converted to cropland – CO_2 (L.13, 2020) Transparency	(1) Complete the land transition matrix of the Flemish Region for all years of the time series. (2) Provide in the NIR a clear explanation for reporting carbon stock change (gains) in living biomass during all years of the time series except 2010–2012 as "NO", while reporting carbon stock changes in other pools for all years.	(1) Addressing. Belgium completed the land transition matrix for the Flemish Region for the full time series; however, the ERT could not evaluate this accordingly because the Party did not include in its NIR information on how the land transition matrix of the Flemish Region for all years of the time series was completed. During the review, Belgium explained that the land transition matrix for the Flemish Region was made for 1989, 2009, 2012 and 2015. Between these years the areas have been interpolated. From 2016 onward, an extrapolation was made on the basis of the trend between 2009 and 2015. The ERT considers that the Party should include information in the NIR on how the land transition matrix for all years was completed. (2) Resolved. Belgium reported carbon stock gains in living biomass as "NO" for the whole time series by correcting the CRF tables, including for 2010–2012, in which carbon gains were reported in the previous submission. The ERT considers that this element of the recommendation is no longer relevant.
L.9	4.C.2.1 Forest land converted to grassland – CO_2 (L.14, 2020) Transparency	(1) Complete the land transition matrix of the Flemish Region for all years of the time series. (2) Provide in the NIR a clear explanation for reporting carbon stock change (losses) in living biomass in forest land converted to grassland as "NO" for 2013–2015, while reporting carbon stock changes in other pools for all years.	(1) Addressing. See ID# L.8 above. (2) Resolved. Belgium reported carbon stock losses in living biomass in forest land converted to grassland for the entire time series, including 2013–2015, thus the previous recommendation about providing an explanation for using "NO" for 2013–2015 for carbon stock losses in living biomass is no longer relevant.
L.10	4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils – CH_4	(1) Report the same organic soil area of cropland in CRF table 4(II) as reported in CRF table 4.B to ensure that the area is consistent across CRF tables.	(1) Not resolved. Belgium did not ensure consistency in the area of organic soils in cropland remaining cropland between CRF table 4(II) and CRF table 4.B by reporting the same area in both CRF tables. More specifically, Belgium reported 1.90 kha organic soils in CRF table 4.B and "NO" for cropland drained organic soils in CRF table 4(II) for the entire time series. During the review, the Party explained that the issue will be addressed in future submissions.

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	(L.15, 2020) Transparency	(2) Explain in the NIR that CH_4 emissions from drainage are assumed to be insignificant in Belgium.	(2) Not resolved. No explanation was included in the NIR regarding CH_4 emissions from drainage being assumed to be insignificant in Belgium, although in the NIR (p.312) Belgium indicated that the issue has been addressed. During the review, Belgium acknowledged that the issue has not been addressed.
L.11	4(III) Direct N_2O emissions from N mineralization/ immobilization – N_2O (L.10, 2020) (L.17, 2018) Transparency	Report "NO" in CRF table 4(III) for N_2O emissions under subcategory 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.	Addressing. Belgium continued to estimate and report direct N_2O emissions from N mineralization of soils associated with loss of soil organic matter under wetlands converted to forest land in CRF table 4(III) and did not provide any explanation in the NIR. During the review, the Party clarified that in the Flemish Region, because the soil organic carbon for forest land is lower than in wetlands, there are carbon losses as a result of wetlands converted to forest land (0.27 kha in 2020) and consequently N_2O emissions from N mineralization associated with loss of soil organic matter. The ERT agrees that if a land-use change results in carbon loss in mineral soils, associated N_2O emissions from N mineralization of soils occur. The ERT considers that the recommendation has not yet been fully resolved because the Party has not explained in the NIR how this small area of land is treated in the inventory (see also ID# L.5 above).
L.12	4(III) Direct N_2O emissions from N mineralization/ immobilization – N_2O (L.16, 2020) Convention reporting adherence	Correct the areas for forest land remaining forest land in CRF table 4(III) so that they correspond to the areas included in the estimate of direct N_2O emissions from N mineralization and those reported in CRF table 4.A.	Not resolved. Belgium reported in CRF table 4(III) an area of 686.00 kha for forest land remaining forest land for 2018, which is the same as the area reported in CRF table 4.A for the same year. However, no direct N_2O emissions from N mineralization/immobilization associated with loss/gain of soil organic matter were reported in CRF table 4(III) and instead the notation key "NO" was used. During the review, the Party clarified that there was no area subject to management change under forest land remaining forest land that would result in a carbon loss. The ERT notes that this is confirmed by the use of the notation key "NA" in CRF table 4.A.1 for mineral soils. The ERT also notes that in accordance with footnote 3 to CRF table 4(III), for lands remaining in the same land-use category, the area subject to management changes should be reported. The ERT considers that the recommendation has not yet been addressed because the Party has not reported correctly the area in CRF table 4(III) for forest land remaining forest land, either by using the notation key "NO" when no carbon stock change occurs in the area subject to management changes or by reporting the area subject to management change only (if carbon stock change occurs).
L.13	4(III) Direct N_2O emissions from N mineralization/ immobilization – N_2O (L.17, 2020) Convention reporting adherence	Correct the areas and recalculate the net carbon stock change in soils for grassland remaining grassland in CRF table 4.C so that they correspond to the areas included in the estimate of direct N_2O emissions from N mineralization and reported in CRF table 4(III).	Addressing. Belgium corrected the areas and recalculated the net carbon stock change in mineral soils in grassland remaining grassland in CRF table 4.C for the whole time series. As a result, the mineral soil pool is a net source of emissions for the entire time series, while it was a net sink of removals in the 2020 submission. Furthermore, Belgium reported a larger area of grassland remaining grassland in CRF table 4(III) than in CRF table 4.C.1, by 0.62 ha for the entire time series (e.g. 550.86 kha in CRF table 4(III) versus 550.24 kha in CRF table 4.C in 2020). During the review, the Party explained that the difference in the areas reported in the CRF tables resulted from the mistaken inclusion of the total Flemish Region area, including organic soils. Nevertheless, the ERT notes that in accordance with footnote 3 to CRF table 4(III), for

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			land remaining in the same land-use category, the area subject to management changes should be reported. The ERT considers that the recommendation has not been fully addressed because the Party has not correctly filled in CRF table 4(III) for grassland remaining grassland by reporting the area subject to management changes only.
L.14	4(III) Direct N_2O emissions from N mineralization/ immobilization – N_2O (L.18, 2020) Transparency	Estimate the indirect N_2O emissions from N mineralization associated with loss of soil organic matter resulting from change of land use for land uses other than cropland, in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 11.2.2.1, p.11.19), and include the estimation in the annual submission. In addition, correctly allocate indirect N_2O emissions from all land-use categories in the LULUCF sector.	Addressing. Belgium reported in CRF table 4(IV) indirect N_2O emissions from N mineralization associated with loss of soil organic matter resulting from land-use changes and for land uses other than cropland remaining cropland for the whole time series. However, Belgium has not reported additional information in the NIR to allow the assessment of the correct allocation of indirect N_2O emissions from all land-use categories in the LULUCF sector (given that in CRF table 4(IV) only aggregated emissions are reported). During the review, the Party provided the ERT with additional information (in an Excel file) with indirect N_2O emissions from all land-use categories disaggregated per land remaining in the same land use and land converted to another land-use subcategory for which such emissions occur in the country. The ERT considers that the recommendation has not been fully addressed because the Party has not reported in the NIR the additional information provided during the review, namely the allocation of indirect N_2O emissions from all LULUCF sector categories.
L.15	4(V) Biomass burning – CO_2, CH_4 and N_2O (L.19, 2020) Transparency	Provide in the NIR an explanation on the use of notation keys in CRF table 4(V). In addition, correct the notation key "NA" to "NO" for emissions from wildfires in forest land remaining forest land for 2004 and 2008–2010 in CRF table 4(V).	Resolved. Belgium explained in its NIR (p.244) that "NO" was reported in CRF table 4(V) for the years in which fires did not occur in Belgium. The Party also corrected the notation key from "NA" to "NO" in CRF table 4(V) for CO_2, CH_4 and N_2O emissions from wildfires in forest land remaining forest land for 2004 and 2008–2010.
L.16	4(V) Biomass burning – CH_4 and N_2O (L.20, 2020) Transparency	Apply equation 2.27 from the 2006 IPCC Guidelines (vol. 4, chap. 2.4, p.2.42) and parameters provided therein and recalculate the CH_4 and N_2O emissions from wildfires for forest land remaining forest land.	Addressing. Belgium continued to report in its NIR (pp.244–245) that equation 2.27 from the 2006 IPCC Guidelines (vol. 4, chap. 2.4, p.2.42) was applied for estimating emissions from wildfires in forest land remaining forest land; however, it did not update the NIR with information on the parameters used to estimate CH_4 and N_2O emissions, namely the country-specific average biomass stock and the CH_4 and N_2O EFs. The ERT noted that the AD for wildfires have not been recalculated from the previous submission; however, the reported emissions for CH_4 and N_2O were lower on average by approximately 79 per cent and 98 per cent respectively in the current submission. During the review, the Party clarified that the fuel available for combustion ranged between 126 and 134 t dm/ha for above-ground biomass in forest (based on NFI data) and for Fagnes the value of 11.5 t dm/ha was used (2006 IPCC Guidelines, vol. 4, chap. 2, table 2.4, p.2.45, for shrubland/calluna heath); the combustion factors applied were 0.45 for forest (for 'all other temperate forest') and 0.71 for Fagnes (for 'shrubland/calluna heath'), from the 2006 IPCC Guidelines (vol. 4, chap. 2, table 2.6, p.2.48); the EFs for CH_4 and N_2O were 4.7 g kg/dm and 0.26 g kg/dm for forest (for 'extra tropical forest') and 2.3 g kg/dm and 0.21 g kg/dm for Fagnes ('savannah and grassland') respectively from the 2006 IPCC Guidelines (vol. 4, chap. 2, table 2.5, p.24).

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			With regard to the impact of the recalculations, Belgium explained that there was a mistake in the previous estimates that resulted in higher emissions compared with the area affected. The ERT considers that the recommendation has not yet been fully addressed because the Party has not included in the NIR the above-mentioned parameters, which were provided during the review and which have been used in estimating emissions from wildfires in forest land remaining forest land.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.1, 2020) (W.2, 2018) Transparency	Include a table in the NIR showing the different waste fractions used to calculate DOC values for the period 1950–2016.	Resolved. Belgium included a table in its NIR (section 7.2.2.2, table 7-2, p.267) showing the waste fractions used to calculate DOC values for 2008–2020 in the Flemish Region. The ERT considers that the information is sufficiently transparent to enable the calculation of DOC and the recommendation is fully addressed.
W.2	5.C.1 Waste incineration – CO_2 (W.7, 2020) Transparency	Report in the NIR mass units for the AD for the entire time series for the Flemish Region instead of energy units, as it has already done for the Walloon and Brussels-Capital Regions.	Resolved. Belgium included a table in its NIR (table 7-7b, p.279) with the amount of waste incinerated in mass units for the Flemish Region.
W.3	5.C.1 Waste incineration – N_2O (W.8, 2020) Transparency	Conduct research on the discrepancy between the data on the amount of waste incinerated used by the Party in its calculations and Eurostat data, with the aim of verifying the AD used in category 5.C.1, and report on the results of the research in the NIR.	Not resolved. Belgium did not conduct research on the discrepancy between the data on the amount of waste incinerated used by the Party and Eurostat data. The Party included this issue in the planned improvements (NIR section 7.4.6, p.286) and explained that it will investigate the potential inconsistencies in future submissions.
W.4	5.C.1 Waste incineration – N_2O (W.9, 2020) Transparency	Provide in the NIR detailed information on sewage sludge incineration for the three regions and an explanation for why incineration of municipal solid waste includes sewage sludge.	Resolved. Belgium included in its NIR (section 7.4.2.1, pp.276–277) detailed information on sewage sludge incineration for the three regions. The Party explained that incineration of municipal solid waste includes sewage sludge in the Walloon Region because the methodology used to estimate N_2O emissions is based on stack measurements and therefore N_2O emissions coming from the AD of municipal solid waste or sludge incinerated cannot be distinguished. In the Walloon Region there is only one municipal waste incineration plant and the global N_2O EF for this plant was 10 g/t waste incinerated in 2018. The Party clarified that this N_2O EF is quite stable from year to year.
W.5	5.D.1 Domestic wastewater – N_2O (W.6, 2020) (W.7, 2018) Transparency	Include information in the NIR and in CRF table 5.D on the amount of sludge removed from wastewater and the associated N_2O emissions.	Resolved. Belgium has reported, since the 2019 submission, in CRF table 5.D, the amount of sludge removed (kt DC/year) and the N in effluent (kt N/year) for domestic wastewater from 1994 onward. The original recommendation asked the Party to provide information on the amount of sludge removed for use in the agriculture sector. In this regard, the Party reported in the NIR information on the N removed in sludge and applied in agriculture, landfill, incineration and storage (table 7-12, p.289).

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W.6	5.D.1 Domestic wastewater – CH_4 (W.10, 2020) Transparency	Provide details of the methodology used to estimate CH_4 emissions from wastewater treatment by septic tanks and from wastewater discharge for the whole of Belgium (all three regions), and in particular for the Walloon Region, where a new methodology will be implemented for the 2021 annual submission, as indicated during the review.	Resolved. Belgium included in its NIR (section 7.5.2, p.286) details of the methodology used to estimate CH_4 emissions for this category (from septic tanks and wastewater discharge) for the three regions. Specifically, for the Walloon Region, for which CH_4 emissions had been revised during the previous review, the Party included a sufficient description of the methodology implemented (p.287).
KP-LULUCF			
KL.1	General (KP-LULUCF) – all gases (KL.3, 2020) (KL.11, 2018) KP reporting adherence	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).	Resolved. Belgium included information in its NIR (pp.255–258) on the methodology applied to estimate the HWP contribution. More specifically, the Party applied methodologies and the equations suggested in sections 2.8.3 and 2.8.4 of the Kyoto Protocol Supplement (equations 2.8.1, 2.8.2, 2.8.3, 2.8.4 and 2.8.5), following the production approach, for the three default commodities, namely sawnwood, wood-based panels, and paper and paperboard, together with data from FAOSTAT. The ERT notes that by applying the methodologies suggested by the Kyoto Protocol Supplement, only the HWP contribution from HWP in use is estimated, and thus HWP in solid waste disposal sites and from wood harvested for energy are implicitly excluded (i.e. accounted on the basis of instantaneous oxidation). Furthermore, the application of equations 2.8.1 and 2.8.2 ensure the estimation of the annual fraction of feedstock for HWP commodities production from the domestic forest harvest.
KL.2	General (KP-LULUCF) – all gases (KL.5, 2020) (KL.13, 2018) Transparency	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.	Addressing. Belgium reported in its NIR (section 10.2.3, p.348) that a single boundary for the total country is applied for KP-LULUCF activities, under Article 3, paragraph 3, and Article 3, paragraph 4, of the Kyoto Protocol, explaining that this is justified by the small size and limited ecological and climatic variability of the country. The ERT accepts the justification provided by Belgium. However, the Party does not include specific information on the reporting method applied for the KP-LULUCF activities related to decision 2/CMP.8, annex II, paragraph 2(b), in the NIR. During the review, the Party clarified that it applied the reporting method I, in accordance with the Kyoto Protocol Supplement (p.2.15). The ERT considers that the recommendation has not been fully addressed because the Party has not included information on the reporting method applied in the NIR. The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this was not included in the list of potential problems and further questions raised by the ERT.
KL.3	General (KP-LULUCF) – all gases (KL.6, 2020) (KL.14,	Structure the information in chapter 10 of the NIR to ensure that it includes the	Resolved. Belgium provided information in its NIR (p.358) that where activities under Article 3, paragraphs 3–4, of the Kyoto Protocol started after 2013, emissions and removals from these activities are reported since the year of the onset of the activities, and that the starting year of the activities is derived from the land-use matrix. The ERT

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	2018) KP reporting adherence	information specified in decision 2/CMP.8, annex II, paragraph 2(d).	notes that Belgium has submitted the necessary information in CRF tables NIR-2, 4(KP-I)A.1, 4(KP-I)A.2, 4(KP-I)B.1, 4(KP-I)C, 4(KP-II)3 and 4(KP-II)4 for the inventory period 2013–2020, in which emissions and removals have been reported either from the beginning of the commitment period or the onset of the activity, whichever comes later, and, in the latter case, the year of the onset of the activity is also derived from the information reported in CRF table NIR-2. Thus, the ERT considers that the Party has reported the required information as specified in decision 2/CMP.8, annex II, paragraph 2(d).
KL.4	General (KP-LULUCF) – all gases (KL.7, 2020) (KL.15, 2018) KP reporting adherence	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).	Resolved. Belgium reported in its NIR (section 10.4.1, p.358) that natural forests do not exist in the country and consequently conversion of natural forests to planted forests does not occur. During the review, the ERT asked the Party to provide the definition of natural and planted forests according to Belgium circumstances in accordance with the Kyoto Protocol Supplement (section 1.2, p.1.6). The Party responded that for the national circumstances a natural forest would be a forest that remained in its original state, without human influence. The Party also informed the ERT that based on a study conducted by the University of Liège, the forests in Belgium were under high pressure in the nineteenth century (e.g. industrial development, extension of settlements) and many parts were replanted later in the twentieth century, thus some old forests are considered as 'subnatural' but not 'natural'. Considering that all forests in Belgium are managed and exploited, they are all considered as planted forest. The ERT notes that paragraph 5(d) in annex II to decision 2/CMP.8 is not relevant for Belgium.
KL.5	General (KP-LULUCF) – (KL.14, 2020) Comparability	Report the correct notation key ("NA") in CRF table NIR-2 for reporting activities not elected under Article 3, paragraph 4, of the Kyoto Protocol in the second commitment period of the Kyoto Protocol.	Resolved. Belgium reported "NA" in CRF table NIR-2 for activities not elected under Article 3, paragraph 4, of the Kyoto Protocol for all the years of the second commitment period of the Kyoto Protocol (2013–2020).
KL.6	General (KP-LULUCF) – (KL.15, 2020) KP reporting adherence	Provide the missing information on key categories in CRF table NIR-3 to improve the reporting on KP-LULUCF.	Resolved. Belgium reported the key categories and related information (e.g. gas, associated category in the inventory, type of assessment, significant subcategories/C pools) in CRF table NIR-3.
KL.7	AR – CO_2 (KL.8, 2020) (KL.4, 2018) (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.	Addressing. Belgium explained in its NIR (p.356) that following the tier 1 methodology of the 2006 IPCC Guidelines, it assumes that afforestation results in a linear accumulation of litter and deadwood carbon pools, starting from zero carbon stocks. At the same time, Belgium reported net carbon gains in deadwood and litter in land converted to forest land under the UNFCCC reporting for the whole time series. During the review, the Party informed the ERT that an example was included in the NIR (p.356) demonstrating that both carbon pools are not a source. The ERT noted, however, that such an example could not be found in the NIR and requested that the Party provide a numerical justification demonstrating that the deadwood and litter pools in AR are not a net source. The Party provided additional information (in an Excel file) with a numerical demonstration that the deadwood and litter pools are not a source. For this, Belgium

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			applied 1.9 t C/ha and 7.56 t C/ha for litter and deadwood carbon stocks in equilibrium for forest land respectively, as described in the NIR (p.243), to simulate the growth rate over the 2006 IPCC Guidelines default 20-year transition period. The deadwood and litter carbon stocks in non-forest land were taken to be equal to zero. The ERT considers that the recommendation has not been fully addressed because the Party did not report in the NIR a numerical evaluation of litter and deadwood stock changes in forest types elected under afforestation or provide examples showing that these pools are not sources, as it did during the review. The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the list of potential problems and further questions raised by the ERT.
KL.8	N_2O emissions from N mineralization/ immobilization due to carbon loss/gain associated with land-use conversion and management change in mineral soils – N_2O (KL.16, 2020) Transparency	Explain the reason for the difference in areas reported in CRF tables 4(KP-1)A.1 and 4(KP-II)3 in the NIR to ensure transparency of the inventory.	Not resolved. Belgium continued to report different areas for AR between CRF table 4(KP-1)A.1 (35.02 kha in 2020) and CRF table 4(KP-II)3 (18.94 kha in 2020) for all the years of the second commitment period of the Kyoto Protocol, but no explanation of these differences was provided in the NIR. During the review, the Party clarified that in CRF table 4(KP-II)3 only the areas where carbon losses and consequently N_2O emissions from N mineralization associated with land-use conversion and management change in mineral soils occur are reported. The ERT considers that the recommendation has not been resolved because the Party did not report in the NIR the above-mentioned information it provided during the review. The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the list of potential problems and further questions raised by the ERT.
KL.9	N_2O emissions from N mineralization/ immobilization due to carbon loss/gain associated with land-use conversion and management change in mineral soils – N_2O (KL.17, 2020) Completeness	Estimate indirect N_2O emissions from N mineralization for deforestation activity in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 11.2.2.1, pp.11.19–11.20) and include the estimate in the annual submission.	Resolved. Belgium estimated and reported indirect N_2O emissions from N mineralization for deforestation activity in accordance with the 2006 IPCC Guidelines in CRF table 4(KP-II)3. It is noted that indirect N_2O emissions are reported aggregated with direct N_2O emissions from N mineralization in the same CRF table. The ERT noted that according to the reported information in CRF table 4(KP-II)3, the deforested area (mineral soils) was larger than the previous reviewed submission (2020) by approximately 20 per cent on average; the associated carbon stock losses are increased on average by approximately 15 per cent. However, the total N_2O emissions in CRF table 4(KP-II)3 are lower by 4.5 per cent on average than the previous submission, even though Belgium reported indirect N_2O emissions for the first time in the current submission. The ERT requested more information from the Party. During the review, Belgium responded that the decrease in total N_2O emissions in the current submission resulted from the correction of an error in the calculations made in the previous submission. In particular, the Party clarified that it applied an incorrect C/N ratio value (i.e. 10) in cases of deforestation instead of the country-specific value (i.e. 19.25). Additionally, Belgium separately provided the ERT with the estimates of direct and indirect N_2O emissions from N mineralization for each deforestation subcategory (e.g.

ID#	*Issue/problem classification*[a, b]	*Recommendation from previous review report*	*ERT assessment and rationale*
			forest land conversion to cropland, forest land conversion to settlements) and each of the three regions in the country in an Excel file. From the assessment of the country estimates, the ERT concludes that indirect N_2O emissions from N mineralization for the deforestation activity are included in the total estimates but identified an accuracy issue, which is noted in table 5 (see ID# L.19 in table 5).

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

[b] The report on the review of the 2021 annual submission of Belgium was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2020 annual review report. For the same reason, 2019 and 2017 are excluded from the list of review years in which issues could have been identified.

IV. Issues and problems identified in three or more 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 and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2022 annual submission of Belgium, and had not been addressed by the Party by the time of publication of this review report.

Table 4
Issues and/or problems identified in three or more successive reviews and not addressed by Belgium

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
General		
G.4	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.	3 (2018–2022)
G.5	Report planned improvements in accordance with paragraph 50 of the UNFCCC Annex I inventory reporting guidelines.	4 (2015/2016–2022)
G.6	Submit any additional documents included in the annexes to the NIR in one of the official languages of the United Nations.	3 (2018–2022)
Energy		
E.2	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 under ID# E.16 of the 2018 review report.	3 (2018–2022)
E.5	Collect country-specific carbon contents of gasoline and gas/diesel oil used in road transportation and use these data to calculate the CO_2 emissions from road transportation.	3 (2018–2022)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
E.10	Make efforts to develop country-specific EFs for gaseous and liquid fuels for the key categories under category 1.A.4 and explain in the NIR the reasons for not using country-specific EFs for solid fuels for the key categories under category 1.A.4.	3 (2018–2022)
IPPU	No issues identified.	
Agriculture		
A.5	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 the Flemish Region.	3 (2018–2022)
LULUCF		
L.2	In order to maintain consistency between the applied methodologies and the explanation provided in the NIR, update the description in chapter 6 as follows: (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.	3 (2018–2022)
L.3	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.	3 (2018–2022)
L.5	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 converted peatlands.	3 (2018–2022)
L.7	Separately describe the processes causing the increasing area of cropland.	5 (2014–2022)
L.11	Report "NO" in CRF table 4(III) for N_2O emissions under subcategory 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.	3 (2018–2022)
Waste	No issues identified.	
KP-LULUCF		
KL.2	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.	3 (2018–2022)
KL.7	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.	4 (2015/2016–2022)

[a] Reports on the reviews of the 2017, 2019 and 2021 annual submissions of Belgium have not yet been published. Therefore, 2017, 2019 and 2021 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

V. Additional findings made during the individual review of the Party's 2022 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2022 annual submission of Belgium that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2022 annual submission of Belgium

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
General			
G.10	Inventory planning	Belgium provided in its NIR (section 1.2, p.22) a description of the institutional arrangements for inventory preparation and planning. It is not clear from the description in the NIR regarding the national inventory system whether the Party has established and maintained the institutional, legal and procedural arrangements necessary to ensure the technical competence of the staff involved in inventory development in accordance with decision 24/CP.19, annex, paragraph 22(b), for all three regions of Belgium. During the review, the Party clarified that it is the responsibility of the regions to ensure that staff are sufficiently trained and qualified. To this end, the Party has an established procedure for the training of staff in the Flemish Region but there appear to be no equivalent procedures for the Walloon and Brussels-Capital Regions. For the Brussels-Capital Region, there is a step-by-step handover of technical competencies of staff involved in the inventory development. Before a staff member becomes a sectoral expert, it is ensured that they receive support from previous experts for at least one year or one inventory reporting cycle. Moreover, new staff from any Belgian region can count on the expertise of the experts of the two other regions when joining the Belgian supraregional working group of inventory compilers. There is no established procedure for the Walloon Region. The current staff have been in their posts for more than 10 years. Training is, however, offered during working hours on, for example, Microsoft Excel and Access applications and English. In addition, depending on their respective sectors, staff from all three regions undergo some international training or participate in workshops, such as those organized under the framework of the EU effort-sharing decision review process (e.g. for training on COPERT organized by EMISIA or on LULUCF organized by the Joint Research Centre). Despite the apparent differences in approaches to ensuring the technical competence of staff in the Belgian regions, the ERT is satisfied that the Party provides sufficient training and support to staff to ensure their technical competence. The ERT recommends that Belgium include in section 1.2 of the NIR information on how it ensures the ongoing technical competence of staff involved in inventory development through its national inventory arrangements in accordance with decision 24/CP.19, annex, paragraph 22(b), for each region, including the information provided during the review.	Yes. Transparency
Energy		No findings for the energy sector additional to those included in table 3 were made by the ERT during the review.	
IPPU			
I.17	2. General (IPPU) – CO_2	Belgium reported in its NIR for several categories (e.g. categories 2.A (mineral production) and 2.C (metal production)) that for 2008 or 2013 onward, depending on the category, emissions were taken from the EU ETS (verified emissions reported directly by producers), which represents a tier 3 methodology. For the pre-EU ETS	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		period, emissions were estimated based on plant data, which represents a tier 2 methodology. The ERT considers that such reporting may result in inconsistent time series of emissions reported for categories that used EU ETS data. During the review, the Party clarified that the consistency of the reported emissions in the complete time series was ensured by various means, such as trend analysis and an average EF calculated by the plant or estimated in consultations with the federations and companies involved and applied to the time series. In addition, industrial companies were contacted to confirm emissions through their annual obligatory environmental reporting. Deviations in reported emissions between EU ETS and annual emission reporting were explained by the fact that not all installations were EU ETS installations. The ERT believes that this information is very important in understanding the consistent reporting of emissions. The ERT recommends that Belgium include in the NIR information on how consistency of the time series is ensured between the pre-EU ETS period (where a tier 2 methodology was used) with the period when EU ETS data were used (from 2008 or 2013 onward, depending on the category).	
I.18	2.B.10 Other (chemical industry) – CO_2	Belgium explained in its NIR (section 4.3.2.8, p.168) that CO_2 emissions from titanium dioxide production were relocated from category 2.B.10 (other – chemical industry) to category 2.B.6 (titanium dioxide production), adding that only emissions for 2013 onward, when EU ETS data were available, were reported under category 2.B.6. For 1990–2012, emissions were reported under category 2.B.10. The ERT believes that such an approach in reporting creates inconsistent time series for both categories. During the review, the Party confirmed that CO_2 emissions from titanium dioxide for 1990–2012 were reported under category 2.B.10 and from 2013 onward were reported under category 2.B.6. Belgium explained that owing to confidentiality issues and lack of detailed information for the pre-EU ETS period (1990–2012), the Party was not able to disaggregate emissions for 1990–2012. The ERT notes that the Party could use proxy data and splicing techniques to perform the disaggregation and generate a consistent time series. The ERT recommends that Belgium report consistent time series for categories 2.B.6 and 2.B.10 for the whole period from 1990 onward in future submissions.	Yes. Consistency
I.19	2.B.10 Other (chemical industry) – CO_2	Belgium provided a key category analysis in its NIR (section 1.5.1, p.39) showing that category 2.B.10 was a key category, by both level and trend for CO_2 emissions in 2020. The ERT noted that according to NIR section 4.3.2.8 (pp.167–168), this category includes emissions from many production sources, mostly in the Flemish Region; for example, ethylene oxide (from category 2.B.8.d), ethylene dichloride and vinyl chloride monomer (from category 2.B.8.c), carbon black (from category 2.B.8.f) and acrylic acid from propylene, cyclohexanone from cyclohexane and para-xylene/meta-xylene. The ERT also noted that CO_2 emissions in this category (2.B.10) rose by more than 700 per cent between 1990 and 2020 (from 285 to almost 2,395 Gg). However, the drivers for the increase in emissions in the category were not described in the NIR to allow a better understanding of the trend in this key category. During the review, the Party explained that the sharp increase for 1990–2020 could be explained by the emissions reported in the Flemish Region, which is responsible for the largest part of these emissions. The Party clarified that emission estimates of about 30 companies were allocated to category 2.B.10; however, the biggest part of the reported emissions came from only a few companies that had gone through significant expansion during the period.	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The Party provided a description of the drivers for the increase in CO_2 emissions from these companies. One company's activities expanded significantly from 1990 onward, owing to increased production of ethylene oxide/ethylene glycol (1993 onward), acrylic acid (1995 and 2008 onward) and propylene oxide (2007 onward) and to an extension of its wastewater treatment plant and central steam boilers (no exact starting year currently known). A second company started its activities at the end of 2003, when its first steam reformer, for the production of hydrogen (and carbon monoxide), came into operation. In 2007, a second steam reformer came into operation. Fluctuations in emissions in this second company occurred over the years owing to fluctuations in production in line with customer demand. This company is responsible for 44 per cent of the increase in emissions. A third company also expanded its activities over the years, with two extra terephthalic acid production sites opened, in 1991 and 1999 respectively. A fourth company installed a regenerative thermal unit in 2000 (as a purification method for hydrocarbons), but that had a limited impact on the increase in CO_2 emissions. The ERT recommends that Belgium include in the NIR a description of the drivers for the significant rising trend in emissions for this key category for 1990–2020.	
Agriculture			
A.10	3.B Manure management – CH_4 and N_2O	Belgium reported in CRF table 3B(a)s2 and its NIR (table 5.17, p.211) an overview of the distribution of MMS for the different animal groups in the Flemish Region in 2020. This information is from the Department of Agriculture and Fisheries and is based on expert judgment combined with questionnaires. For the Walloon and Brussels-Capital Regions, distribution between MMS is given in NIR table 5.18 (p.214), and distribution between different storage systems and the fraction of livestock grazing have been constant since the Statbel census in 1996. During the review, the Party clarified that every five years the allocation between MMS in the Flemish Region is reconsidered. The last update was in 2016 (previous updates were in 1990, 1996, 2001, 2006, 2011 and 2016). No interpolation was made between years with updated MMS distribution information. The ERT noted that this is not in accordance with the UNFCCC Annex I inventory reporting guidelines because time-series consistency is not ensured. The ERT recommends that the Party interpolate values between the years with updated MMS distribution information in the inventory for the Flemish Region in its next submission, using the methods set out in the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3.3). The ERT also recommends that for the Walloon and Brussels-Capital Regions the Party collect updated values for the use of different MMS and for the fraction of livestock grazing for the significant animal groups, to better reflect changes over time.	Yes. Consistency
LULUCF			
L.17	4.C.1 Grassland remaining grassland – CO_2	Belgium reported in its NIR (section 6.3.2.1.B, p.250) that the 2006 IPCC Guidelines default EF (i.e. 2.5 t C/ha, for warm temperate climate zones) for managed organic soils was used. However, in CRF table 4.C the IEF reported were 1.52 t C/ha/year of carbon losses for 1990–2007 and –1.89 t C/ha/year from 2008 onward. During the review, the Party explained that the grassland area on organic soils in the Walloon Region is found in natural reserves and is not subject to drainage or tillage. The reported CO_2 emissions occur in grassland organic soils in the Flemish Region only and because aggregated areas on organic soils are reported in CRF table 4.C, the IEF is affected by the areas of organic soils that do not result in CO_2 emissions. Furthermore, Belgium provided the ERT with additional information on the areas of grassland remaining grassland in organic soils and the associated CO_2 emissions from	Yes. Comparability

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		drained organic soils disaggregated at the level at which the emissions were estimated, namely separately for each of the three Belgian regions. The ERT recommends that Belgium report areas of organic soils under grassland remaining grassland and the associated CO_2 emissions from drained organic soils under grassland remaining grassland in CRF table 4.C disaggregated by region (i.e. the Walloon, Flemish and Brussels-Capital Regions) for the entire time series or alternatively report this disaggregated information in the NIR, ensuring consistency with the aggregated information reported in CRF table 4.C.	
L.18	4.E.2.1 Forest land converted to settlements – CO_2	Belgium reported carbon stock gains in living biomass in forest land converted to settlements in CRF table 4.E. In particular, the reported carbon gains are 2.12 kt C/year (or –7.77 kt CO_2) for 2010–2012 and 1.20 kt C/year (or –4.40 kt CO_2) for 2013–2015 and 2019–2020. During the review, the Party explained that the carbon gains in living biomass from the deforestation events were mistakenly reported owing to an error in the compilation of the estimates from the Brussels-Capital Region. The ERT recommends that Belgium correct the estimates of carbon stock changes in living biomass in forest land converted to settlements by reporting "NO" for the carbon stock gains for the entire time series.	Yes. Accuracy
L.19	4(III) Direct N_2O emissions from N mineralization/ immobilization – 4(IV) Indirect N_2O emissions from managed soils – N_2O	Belgium reported in CRF table 4(III) and CRF table 4(IV) direct and indirect N_2O emissions from N mineralization associated with soil organic matter loss resulting from forest land conversions to other land uses (forest land conversion to cropland, grassland, wetlands and settlements). Since indirect N_2O emissions from this source are reported aggregated in CRF table 4(IV), the ERT requested additional information from the Party, namely disaggregated information per forest land conversion subcategory for each of the three regions in Belgium (see also ID# KL.9 in table 3). During the review, Belgium provided an Excel file that included disaggregated estimates of carbon stock changes from mineral soils and direct and indirect N_2O emissions from N mineralization associated with soil organic matter loss resulting from each of the forest land conversion subcategories above separately for each of the three regions, with all of them as reported in CRF tables 4(III) and 4(IV). The Party also explained that for estimating the net annual amount of N mineralized in mineral soils (F_{SOM} in equation 11.8 of the 2006 IPCC Guidelines (vol. 4, chap. 11)) it used a country-specific C/N ratio value of 19.25 for all forest land conversions, which was developed in all three regions based on measurements conducted within the regional forest inventory of the Walloon Region, and provided the relevant reference document (2015 forest inventory for the Walloon Region). Furthermore, the Party clarified that there are no region-specific data for C/N ratios other than for the Walloon Region. The ERT assessed the direct and indirect N_2O estimates provided by Belgium and noted that, based on the carbon stock changes in mineral soils in forest land conversions to other land uses reported by the Party, and using the country-specific C/N ratio (19.25) for all three regions, both direct and indirect N_2O emissions from N mineralization were underestimated by the Party for the entire time series. For example, direct and indirect N_2O emissions reported by the Party in 2020 amounted to 0.028 kt N_2O and 0.006 kt N_2O respectively, while the direct and indirect N_2O emissions as estimated by the ERT for the same year equalled 0.031 kt N_2O and 0.007 kt N_2O respectively. The ERT also notes that the Party did not provide evidence to support the representativeness of the region-specific C/N ratio for the Walloon Region for the other two regions. Similarly, since the same amount of N mineralized in mineral soils is applied for estimating direct and indirect N_2O emissions, the indirect N_2O emissions were also underestimated. During the review, the Party indicated that the differences identified between the	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		estimates of the Party and the ERT are both due to rounding and the mistaken use of the C/N ratio value in the Walloon Region, which resulted in the underestimation of emissions. The ERT recommends that Belgium provide evidence in the NIR that the region-specific C/N ratio (19.25) for estimating the net annual amount of N mineralized in mineral soils (F_{SOM} in equation 11.8 of the 2006 IPCC Guidelines (vol. 4, chap. 11)) is representative of the Brussels-Capital and Flemish Regions mineral soil conditions; otherwise, it recommends that the Party apply the region-specific C/N ratio (19.25) for both direct and indirect N_2O emissions resulting from forest land conversions to other land uses for the Walloon Region only and apply the 2006 IPCC Guidelines default C/N ratio of 15 (vol. 4, chap. 11, p.11.16) for the Flemish and Brussels-Capital Regions. The ERT also recommends that the Party correct the estimation for both direct and indirect N_2O emissions from N mineralization associated with soil organic matter loss resulting from forest land conversions to other land uses, ensuring that underestimation of emissions is avoided for the entire time series, and provide detailed information in the NIR separately for direct and indirect N_2O emissions for each forest land conversion subcategory for each of the three regions in Belgium.	
L.20	4(V) Biomass burning – N_2O and CH_4	In the context of responding to a previous recommendation, Belgium provided additional information during the review on the parameters used to estimate CH_4 and N_2O emissions from wildfires, namely the country-specific average biomass stock and the combustion factor values (see ID# L.16 in table 3). For the fuel available for combustion in grasslands, Belgium applied the 2006 IPCC Guidelines default value of 11.5 t dm/ha (vol. 4, chap. 2, table 2.4, p.2.45, for shrubland/calluna heath). For the combustion factor, the IPCC default of 0.71 (vol. 4, chap. 2, table 2.6, p.2.48, for shrubland/calluna heath) was used. The ERT notes that the IPCC default value of 11.5 t dm/ha for the fuel biomass consumption value represents the product of both the fuel mass available for combustion and the portion of the fuel burned (combustion factor), indicated as the product of M_B and C_f in equation 2.27 (2006 IPCC Guidelines, vol. 4, chap. 2); therefore, applying again the combustion factor (default value of 11.5 t dm/ha) on top of the default value of 11.5 t dm/ha results in an underestimation of emissions from biomass burning. During the review, the Party explained that this error will be fixed in the next submission. The ERT recommends that Belgium correct the N_2O and CH_4 emission estimates from biomass burning in the grassland category for all years in which wildfires occur by ensuring that the combustion factor is not applied twice in estimating the fuel biomass consumption.	Yes. Accuracy
Waste		No findings for the waste sector additional to those included in table 3 were made by the ERT during the review.	
KP-LULUCF			
KL.10	Deforestation – CO_2	The ERT notes that the issue listed in ID# L.18 above is also relevant to the KP-LULUCF activity deforestation. However, the ERT notes that the underestimation of emissions from deforestation activities during the second commitment period of the Kyoto Protocol is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (i.e. 53.22 kt CO_2 eq) for 2013–2015 and 2019–2020. The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the list of potential problems and further questions raised by the ERT.	Yes. Accuracy
KL.11	N_2O emissions from N mineralization/	The ERT notes that the issue listed in ID# L.19 above is also relevant to the KP-LULUCF activity deforestation. However, the ERT notes that the underestimation of N_2O emissions from N mineralization associated with soil	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
	immobilization due to carbon loss/gain associated with land-use conversion and management change in mineral soils – N_2O	organic matter loss resulting from deforestation activities during the second commitment period of the Kyoto Protocol is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (i.e. 53.22 kt CO_2 eq). The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the list of potential problems and further questions raised by the ERT.	

[a] Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines or problems as defined in para. 69 of the Article 8 review guidelines.

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments for the 2022 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. Table I.5 presents the accounting quantities for KP-LULUCF reported by Belgium and the final values agreed by the ERT. The final quantities of units to be issued and cancelled are presented in table I.6.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2022 annual submission.

Annex I

Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Belgium in its 2022 annual submission

1. Tables I.1–I.4 provide an overview of the total GHG emissions and removals as submitted by Belgium.

Table I.1
Total greenhouse gas emissions and removals for Belgium, base year–2020
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions and removals including indirect CO_2 emissions*[a]		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)*[b]	*KP-LULUCF (Article 3.3 of the Kyoto Protocol)*[c]	*KP-LULUCF (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–2 499.00
Base year[d]	144 484.42	147 420.55	NA	NA	NA		NA	
1990	142 750.63	145 686.76	NA	NA				
1995	151 311.86	153 593.38	NA	NA				
2000	147 197.80	148 879.16	NA	NA				
2010	133 287.74	133 645.77	NA	NA				
2011	122 847.37	123 133.69	NA	NA				
2012	120 090.76	120 361.60	NA	NA				
2013	119 542.68	120 458.32	NA	NA		179.17	NA	–1 864.51
2014	113 869.55	114 768.44	NA	NA		171.78	NA	–1 837.22
2015	118 107.40	118 955.47	NA	NA		164.84	NA	–1 780.21
2016	116 662.33	117 417.88	NA	NA		453.59	NA	–1 978.71
2017	116 465.76	117 097.88	NA	NA		456.53	NA	–1 863.70
2018	116 999.31	117 594.04	NA	NA		459.08	NA	–1 834.84
2019	115 976.03	116 448.18	NA	NA		444.97	NA	–1 709.12
2020	106 097.40	106 433.26	NA	NA		446.93	NA	–1 578.43

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

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

[b] The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

[c] Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

[d] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs, SF_6 and NF_3. Belgium has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

Table I.2
Greenhouse gas emissions and removals by gas for Belgium, excluding land use, land-use change and forestry, 1990–2020
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	120 292.64	11 517.60	10 063.17	NA, NO	2 191.05	NA, NO	1 622.30	NA, NO
1995	125 933.05	11 297.77	10 815.43	492.86	2 914.29	NA, NO	2 140.00	NA, NO
2000	126 719.53	10 217.41	10 200.28	1 151.43	446.11	NA, NO	144.40	NA, NO
2010	114 557.86	8 151.52	7 529.16	3 196.17	104.77	NA, NO	104.95	1.32
2011	105 020.12	7 916.44	6 326.11	3 602.16	157.05	NA, NO	109.34	2.48
2012	102 355.64	7 874.14	6 296.09	3 607.94	115.32	NA, NO	111.36	1.12
2013	102 666.43	7 723.21	6 135.23	3 679.96	134.93	NA, NO	117.32	1.24
2014	96 887.00	7 577.64	6 139.45	3 939.99	128.44	NA, NO	95.23	0.69
2015	101 061.72	7 589.98	5 991.07	4 075.48	143.74	NO, NA	92.63	0.85
2016	99 601.62	7 544.44	5 718.44	4 052.44	402.74	NO, NA	97.48	0.71
2017	99 126.28	7 386.82	5 895.38	4 408.09	179.17	NO, NA	101.51	0.63
2018	99 873.63	7 313.04	5 632.55	4 548.00	131.32	NO, NA	94.86	0.65
2019	99 432.62	7 241.60	5 556.23	4 000.88	128.27	NO, NA	88.05	0.53
2020	90 368.01	7 098.81	5 380.96	3 314.52	171.91	NO, NA	90.55	8.51
Percentage change 1990–2020	**–24.9**	**–38.4**	**–46.5**	**NA**	**–92.2**	**NA**	**–94.4**	**NA**

Note: Emissions and removals reported for the sector other (sector 6) are not included in this table.
[a] Belgium did not report indirect CO_2 emissions in CRF table 6.

Table I.3
Greenhouse gas emissions and removals by sector for Belgium, 1990–2020
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	103 774.97	26 057.67	11 509.88	–2 936.13	4 344.25	NO
1995	107 711.80	29 958.26	11 619.75	–2 281.52	4 303.56	NO
2000	106 161.23	28 265.06	10 697.76	–1 681.37	3 755.12	NO
2010	99 515.34	22 129.71	9 538.16	–358.03	2 462.56	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2011	89 904.22	21 514.59	9 463.31	–286.32	2 251.57	NO
2012	89 048.09	19 764.81	9 377.55	–270.84	2 171.16	NO
2013	88 819.64	20 446.79	9 386.92	–915.64	1 804.97	NO
2014	82 829.86	20 776.22	9 534.47	–898.89	1 627.88	NO
2015	86 994.76	20 853.05	9 527.68	–848.07	1 579.98	NO
2016	85 162.55	21 393.48	9 383.47	–755.55	1 478.38	NO
2017	84 761.09	21 383.72	9 474.81	–632.12	1 478.26	NO
2018	85 195.27	21 677.04	9 335.19	–594.73	1 386.54	NO
2019	85 457.03	20 285.00	9 378.45	–472.15	1 327.71	NO
2020	77 011.43	18 886.67	9 317.77	–335.86	1 217.39	NO
Percentage change 1990–2020	**–25.8**	**–27.5**	**–19.0**	**–88.6**	**–72.0**	**NA**

Note: Belgium did not report indirect CO_2 emissions in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for Belgium

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[a]	*Activities under Article 3.3 of the Kyoto Protocol*		*FM and elected activities under Article 3.4 of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–2 499.00				
Technical correction				1 010.17				
Base year[b]	*NA*				NA	NA	NA	NA
2013		–242.60	421.78	–1 864.51	NA	NA	NA	NA
2014		–252.27	424.05	–1 837.22	NA	NA	NA	NA
2015		–261.97	426.81	–1 780.21	NA	NA	NA	NA
2016		–276.72	730.31	–1 978.71	NA	NA	NA	NA
2017		–283.79	740.32	–1 863.70	NA	NA	NA	NA
2018		–290.76	749.84	–1 834.84	NA	NA	NA	NA
2019		–289.84	734.82	1 709.12	NA	NA	NA	NA
2020		–296.67	743.60	–1 578.43	NA	NA	NA	NA
Percentage change base year–2020					**NA**	**NA**	**NA**	**NA**

Note: Values in this table include emissions from land subject to natural disturbances, if applicable.

[a] The value reported in this column relates to 1990.

[b] Belgium has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

2. Table I.5 provides information on the Party's accounting quantities for reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5
Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Belgium
(kt CO_2 eq)

		Net emissions/removals										
GHG source/sink activity	*Base year*[b]	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*Total*[c]	*Accounting parameters*	*Accounting quantities*[a]
A.1. AR		–242.599	–252.267	–261.974	–276.722	–283.787	–290.761	–289.844	–296.670	–2 194.623		–2 194.622
Excluded emissions from natural disturbances		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
A.2. Deforestation		421.776	424.048	426.812	730.310	740.320	749.839	734.816	743.600	4 971.522		4 971.523
B.1. FM										–14 446.740		–2 536.100
Net emissions/ removals		–1 864.510	–1 837.223	–1 780.210	–1 978.715	–1 863.697	–1 834.840	–1 709.116	–1 578.428	–14 446.740		
Excluded emissions from natural disturbances[d]		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Any debits from newly established forest		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO

GHG source/sink activity	*Net emissions/removals*										*Accounting parameters*	*Accounting quantities*[a]
	Base year[b]	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*Total*[c]		
FMRL[e]											–2 499.000	
Technical corrections to FMRL											1 010.170	
FM cap											41 387.106	–2 536.100
B.2. CM (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B.3. GM (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B.4. RV (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
B.5. WDR (if elected)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

[a] The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.
[b] Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.
[c] Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.
[d] The Party indicated in its report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol its intent to apply the provisions from natural disturbances to its accounting of FM at the end of the commitment period. The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.
[e] As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO_2 eq per year.

3. Table I.6 provides an overview of key data from Belgium's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.6
Key data for Belgium under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission

Parameter	*Data*
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
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances	Yes, for FM[a]
3.5% of total base-year GHG emissions, excluding LULUCF	5 173.388 kt CO_2 eq (41 387.106 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	Issue 2 194 622 RMUs
2. Deforestation	Cancel 4 971 523 units
3. FM	Issue 2 536 100 RMUs

Note: Values in this table reflect the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table I.5.

[a] The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.8 include the information to be included in the compilation and accounting database for Belgium. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1
Information to be included in the compilation and accounting database for 2020, including on the commitment period reserve, for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
CPR	525 805 662			525 805 662
Annex A emissions				
CO_2	90 368 008			90 368 008
CH_4	7 098 807			7 098 807
N_2O	5 380 959			5 380 959
HFCs	3 314 525			3 314 525
PFCs	171 907			171 907
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	90 546			90 546
NF_3	8 507			8 507
Total Annex A sources[a]	**106 433 259**			**106 433 259**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–296 670			–296 670
Deforestation	743 600			743 600
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 578 428			–1 578 428

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.2
Information to be included in the compilation and accounting database for 2019 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	99 432 619			99 432 619
CH_4	7 241 601			7 241 601
N_2O	5 556 231			5 556 231
HFCs	4 000 878			4 000 878
PFCs	128 270			128 270
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	88 052			88 052
NF_3	535			535
Total Annex A sources[a]	**116 448 185**			**116 448 185**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–289 844			–289 844
Deforestation	734 816			734 816
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 709 116			–1 709 116

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.3
Information to be included in the compilation and accounting database for 2018 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	99 873 631			99 873 631
CH_4	7 313 037			7 313 037
N_2O	5 632 545			5 632 545
HFCs	4 547 999			4 547 999
PFCs	131 321			131 321
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	94 861			94 861
NF_3	646			646
Total Annex A sources[a]	**117 594 040**			**117 594 040**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–290 761			–290 761
Deforestation	749 839			749 839
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 834 840			–1 834 840

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.4
Information to be included in the compilation and accounting database for 2017 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	99 126 283			99 126 283
CH_4	7 386 823			7 386 823
N_2O	5 895 378			5 895 378
HFCs	4 408 089			4 408 089
PFCs	179 174			179 174
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	101 505			101 505
NF_3	627			627
Total Annex A sources[a]	**117 097 879**			**117 097 879**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–283 787			–283 787
Deforestation	740 320			740 320
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 863 697			–1 863 697

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.5
Information to be included in the compilation and accounting database for 2016 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	99 601 625			99 601 625
CH_4	7 544 440			7 544 440
N_2O	5 718 442			5 718 442

	Original submission	*Revised submission*	*Adjustment*	*Final value*
HFCs	4 052 443			4 052 443
PFCs	402 737			402 737
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	97 479			97 479
NF_3	715			715
Total Annex A sources[a]	**117 417 881**			**117 417 881**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–276 722			–276 722
Deforestation	730 310			730 310
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 978 715			–1 978 715

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.6
Information to be included in the compilation and accounting database for 2015 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	101 061 722			101 061 722
CH_4	7 589 981			7 589 981
N_2O	5 991 067			5 991 067
HFCs	4 075 476			4 075 476
PFCs	143 737			143 737
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF_6	92 634			92 634
NF_3	850			850
Total Annex A sources[a]	**118 955 467**			**118 955 467**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–261 974			–261 974
Deforestation	426 812			426 812
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 780 210			–1 780 210

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.7
Information to be included in the compilation and accounting database for 2014 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	96 887 002			96 887 002
CH_4	7 577 638			7 577 638
N_2O	6 139 454			6 139 454
HFCs	3 939 985			3 939 985
PFCs	128 436			128 436
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	95 231			95 231
NF_3	690			690
Total Annex A sources[a]	**114 768 437**			**114 768 437**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–252 267			–252 267

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Deforestation	424 048			424 048
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 837 223			–1 837 223

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.8
Information to be included in the compilation and accounting database for 2013 for Belgium
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	102 666 433			102 666 433
CH_4	7 723 211			7 723 211
N_2O	6 135 233			6 135 233
HFCs	3 679 956			3 679 956
PFCs	134 926			134 926
Unspecified mix of HFCs and PFCs	NA, NO			NA, NO
SF_6	117 320			117 320
NF_3	1 242			1 242
Total Annex A sources[a]	**120 458 320**			**120 458 320**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–242 599			–242 599
Deforestation	421 776			421 776
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–1 864 510			–1 864 510

[a] The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which estimation 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 the reporting in the Party's inventory are the following:

(a) 1.A.3.b.iii heavy-duty trucks and buses, gaseous fuels (N_2O) (see ID# E.6 in table 3);

(b) 2.B.8 petrochemical and carbon black production (CO_2 and CH_4) (see ID# I.5 in table 3);

(c) 4.A.2.1 cropland converted to forest land (CO_2) (see ID# L.4 in table 3);

(d) AR (CO_2) (see ID# KL.7 in table 3).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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 https://www.ipcc.ch/publication/2013-revised-supplementary-methods-and-good-practice-guidance-arising-from-the-kyoto-protocol/.

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: IPCC. Available at https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2014, 2015, 2016, 2018 and 2020 annual submissions of Belgium, contained in documents FCCC/ARR/2014/BEL, FCCC/ARR/2015/BEL, FCCC/ARR/2016/BEL, FCCC/ARR/2018/BEL and FCCC/ARR/2020/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_2022_Final.pdf.

Annual status report for Belgium for 2022. Available at https://unfccc.int/sites/default/files/resource/asr2022_BEL.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Olivier Biernaux (Belgian Interregional Environment Agency), including additional material on the methodology and assumptions used. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

EEA. 2019. EMEP/EEA air pollutant emission inventory guidebook 2019. Luxembourg: Publications Office of the European Union. Available at https://www.eea.europa.eu/publications/emep-eea-guidebook-2019.

LR.1: https://orbi.uliege.be/bitstream/2268/172379/1/jacquemin_fw_2014_131_34-49%5BForetsAnciennes1%5D.pdf.

Statbel: https://statbel.fgov.be/nl/themas/landbouw-visserij/land-en-tuinbouwbedrijven#figures.

Walloon Forest inventory, 2015: http://iprfw.spw.wallonie.be/docs/Publication_Inventaire-forestier-wallon.pdf.