United Nations FCCC/ARR/2021/BLR

Framework Convention on Climate Change

Distr.: General
2 March 2022

English only

Report on the individual review of the inventory submission of Belarus submitted in 2021*

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). This report presents the results of the individual review of the 2021 inventory submission of Belarus, conducted by an expert review team in accordance with 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". The review took place from 18 to 23 October 2021 remotely.

* In the symbol for this document, 2021 refers to the year in which the inventory was submitted, not to the year of publication.

Contents

		Page
	Abbreviations and acronyms	3
I.	Introduction	5
II.	Summary and general assessment of the Party's 2021 inventory submission	6
III.	Status of implementation of recommendations included in the previous review report	7
IV.	Issues identified in three or more successive reviews and not addressed by the Party	48
V.	Additional findings made during the individual review of the Party's 2021 inventory submission	53
Annexes		
I.	Overview of greenhouse gas emissions and removals as submitted by Belarus in its 2021 inventory submission	67
II.	Additional information to support findings in table 2	69
III.	Reference documents	70

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
Annex I Party	Party included in Annex I to the Convention
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
Bel SRC "Ecology"	Belarusian Scientific and Research Centre "Ecology"
Belstat	National Statistical Committee of Belarus
BKB	brown coal briquettes
C	carbon
CaO	calcium oxide
CH_4	methane
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"
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
FAO	Food and Agriculture Organization of the United Nations
FOD	first-order decay
$Frac_{GASM}$	fraction of applied organic nitrogen fertilizer materials and of urine and dung nitrogen deposited by grazing animals that volatilizes as ammonia and nitrogen oxides
$Frac_{LOSS}$	fraction of total nitrogen loss from manure managed
GE	gross energy intake
GHG	greenhouse gas
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	*Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
JSC	joint stock company
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MMS	manure management system(s)
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value

NE	not estimated
NEU	non-energy use
NF_3	nitrogen trifluoride
NH_3	ammonia
NIR	national inventory report
NO	not occurring
NO_X	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SF_6	sulfur hexafluoride
SWDS	solid waste disposal site(s)
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"
VS	volatile solid(s)
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 2021 inventory submission of Belarus, organized by the secretariat in accordance with the UNFCCC review guidelines, particularly 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 18 to 23 October 2021 remotely[1] and was coordinated by Sevdalina Todorova and Javier Hanna Figueroa (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Belarus.

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

Area of expertise	*Name*	*Party*
Generalist	Mikhail Gitarskiy	Russian Federation
	Olia Glade	New Zealand
Energy	Elena Gavrilova	North Macedonia
	Rana Humbatova	Azerbaijan
	Haakon Marold	Australia
IPPU	Wolfram Jörß	European Union
	Kakhaberi Mdivani	Georgia
	Samir Tantawi	Egypt
Agriculture	Marci Baranski	United States
	Kent Buchanan	South Africa
	Christopher John Dore	United Kingdom
LULUCF	Mattias Lundblad	Sweden
	Walter Oyhantcabal	Uruguay
	Marina Shvangiradze	Georgia
Waste	Maryna Bereznytska	Ukraine
	Medeia Inashvili	Georgia
	Sergii Shmarin	Ukraine
Lead reviewers	Mikhail Gitarskiy	
	Kakhaberi Mdivani	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2021 inventory submission in accordance with the UNFCCC review guidelines.

3. The ERT has made recommendations that Belarus resolve the findings related to issues.[2] Other findings, and, if applicable, the encouragements of the ERT to Belarus to resolve them, are also included.

4. A draft version of this report was communicated to the Government of Belarus, which provided no comments.

5. Annex I presents the annual GHG emissions of Belarus, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector.

[1] Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.

[2] Issues are defined in decision 13/CP.20, annex, para. 81.

II. Summary and general assessment of the Party's 2021 inventory submission

6. Table 2 provides the assessment by the ERT of the Party's 2021 inventory 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 2021 inventory submission of Belarus

Assessment			*Issue ID#(s) in table 3 or 5*[a]
Dates of submission	Original submission: NIR, 19 April 2021; CRF tables (version 2), 14 April 2021		
Review format	Centralized review conducted remotely		
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	E.15, E.22, E.29, E.39, E.47, E.52, E.59, E.63, A.1, A.5, A.8, A.11, A.13, L.14, W.8, W.17, W.23
	(c) Development and selection of EFs?	Yes	E.2, E.28, E.31, E.33, E.36, E.37, E.50, E.57, E.62, A.20, L.11
	(d) Collection and selection of AD?	Yes	E.8, E.10, E.12, E.13, E.18, E.19, E.25, E.30, E.55, E.58, I.20, A.3, A.12, L.17, W.6, W.7, W.22, W.25
	(e) Reporting of recalculations?	Yes	G.20
	(f) Reporting of a consistent time series?	Yes	E.60, I.10, W.20, W.21
	(g) Reporting of uncertainties, including methodologies?	Yes	G.21, G.22, L.2, L.17
	(h) QA/QC?	Yes	G.12, G.16, E.4, E.46, L.3, L.4
	(i) Missing categories, or completeness?[b]	Yes	E.34, E.35, I.14, I.15, I.16, I.18, I.19, A.21, L.1, L.9, W.13
	(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	G.24, W.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?	Yes	G.15, E.61, A.17, W.20
National inventory arrangements	Have any issues been identified with the effectiveness and reliability of the institutional, procedural and legal arrangements for estimating GHG emissions?	No	
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	

[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 II.

III. Status of implementation of recommendations included in the previous review report

7. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 4 June 2020,[3] and had not been resolved by the time of publication of the report on the review of the Party's 2019 inventory submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue 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 Belarus

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	AD (G.1, 2019) (G.3, 2017) (G.3, 2016) (G.3, 2015) (table 3, 2013) (8, 2012) Completeness	Collect AD and estimate emissions for all categories and subcategories that are currently reported as "NE" but for which the IPCC provides estimation methods.	Resolved. CRF table 8 indicates that the Party has made substantial progress in collecting AD for categories that were previously reported as "NE", including with regard to CO_2 emissions for categories 4.G (HWP) and 5.C (incineration and open burning of waste). The remaining mandatory categories for which estimation methods are provided in the 2006 IPCC Guidelines but which the Party reported as "NE" are covered under individual issues in the sectoral sections of this table and table 5 (see annex II for a full list of issue ID#s). For emissions reported as "NE" that are considered to be below the significance threshold outlined in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, see ID# G.24 in table 5.
G.2	Follow-up to previous reviews (G.27, 2019) Convention reporting adherence	Include information on changes in response to the review process in the NIR.	Resolved. The Party listed in NIR table 5.4 (pp.314–324) all previous recommendations with time frames for their implementation. In the sectoral chapters of the NIR (e.g. pp.78, 84 and 101), the Party reported plans for improvement and described changes made in response to previous recommendations.
G.3	Further improvements (identified by the Party) (G.26, 2019) Transparency	Report in the NIR on the status of implementation of each planned improvement and on the time frames for implementation.	Addressing. The Party reported in its NIR (table 1.4, p.23) on improvements applied for each of the key categories. Information on planned improvements, including the indicative time frame for implementation, was reported in the LULUCF sectoral chapter (sections 6.3, 6.4.6, 6.5.6, 6.6.6, 6.7.6, 6.8.6 and 6.9.6). Sections of the IPPU, agriculture and waste sectoral chapters (4.2.1.6, 4.4.7.6, 5.3.6, 5.4.6, 7.2.2.6, 7.4.1.6 and 7.5.2.6) provide brief descriptions of the planned improvements for each category, but do not include an indicative time frame for implementation. The NIR states that there are no planned improvements for the energy sector (sections 3.2.4.6, 3.2.5.6, 3.2.6.6 and 3.2.7.6), but during the review the Party explained that some changes are planned, including reallocating CH_4 and N_2O emissions from biomass in road transportation and railways to

[3] FCCC/ARR/2019/BLR. The ERT notes that the report on the individual inventory review of Belarus's 2020 inventory submission has not been published yet. As a result, the latest previously published inventory review report reflects the findings of the review of the Party's 2019 inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			subcategory 1.A.4.a commercial/institutional, applying the correct CH_4 and N_2O EFs for wood/wood waste in its calculations, estimating and reporting CO_2 emissions from biomass use for the relevant categories, and correcting the notation keys (see ID# E.54 in table 5). The NIR (annex 5, table 5.4, pp.314–324) also includes an action plan with time frames for each ERT recommendation, but the plan does not give the status of implementation of the planned improvements. During the review, the Party clarified the status of implementation of the planned improvements, including indicative time frames, as an update to NIR table 5.4.
G.4	Inventory planning (G.3, 2019) (G.8, 2017) (G.8, 2016) (G.8, 2015) (12, 2013) (27, 2012) Accuracy	Enhance efforts to implement improvements to the inventory by using higher-tier estimation methods and country-specific EFs for key categories in accordance with the 2006 IPCC Guidelines.	Resolved. Belarus continues to make efforts to use higher-tier estimation methods and country-specific EFs for key categories, recording related improvements in the NIR (section 1.5), where key categories are described. According to the NIR (p.25, table 1.4), as of 2020 Belarus is moving towards the use of country-specific EFs for CO_2 estimations for key categories 1.A.1, 1.A.2, 1.A.4 and 1.A.5 for combustion of natural gas and for CH_4 estimations for category 5.A (see ID#s E.2, E.22, E.27 and W.2 below). For pending category-specific issues linked to applying higher-tier methods and country-specific EFs for key categories, see ID#s E.2, L.4 and W.7 below. For more information on the methods used for key categories, see ID# G.25 in table 5.
G.5	Inventory planning (G.4, 2019) (G.12, 2017) (G.12, 2016) (G.12, 2015) (table 4, 2013) (13, 2012) Transparency	Report in the NIR whether the key category analysis is used in the prioritization of developments in and improvements to the inventory.	Resolved. The Party reported in its NIR (p.25, table 1.4) a list of inventory improvements for the key categories and summarized each planned improvement, demonstrating how developments in and improvements to the inventory are prioritized on the basis of the key category analysis.
G.6	Inventory management (G.5, 2019) (G.7, 2017) (G.7, 2016) (G.7, 2015) (11, 2013) (26, 2012) Transparency	Include in the NIR information on the personnel involved in the development and management of the inventory in order to demonstrate sufficient levels of capacity and expertise to undertake the various tasks and roles within the inventory team.	Resolved. The Party reported in its NIR (section 1.2.2, p.13) the required information on the roles and responsibilities of the personnel and organizations involved in developing and managing the inventory, describing in detail the tasks each expert is responsible for and their area of expertise.
G.7	Inventory management (G.6, 2019) (G.20, 2017) Convention reporting adherence	Align the reporting on the national inventory arrangements in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraph 50(j), by providing a description of the legal, institutional and procedural arrangements for the preparation of the GHG inventory, together with clear information on the roles and responsibilities of all organizations contributing to the preparation of annual inventories, as well as	Resolved. The Party reported in its NIR (section 1.1, pp.12–15, and table 1.2, pp.19–22) information on the legal arrangements for inventory preparation (decree 137 of 9 March 2021) and described the inventory production cycle. Belarus clearly defined the roles and responsibilities of all organizations that contribute to the preparation of annual inventories (NIR sections 1.2–1.3, figure 1.2) and included in the NIR a detailed table (table 1.2, pp.19–22) specifying the roles and responsibilities of different agencies in relation to inventory data collection. The Party also included a section on changes to the national inventory system (NIR section 1.2.4, p.17).

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		on changes in the national institutional arrangements.	
G.8	Methods (G.9, 2019) (G.6, 2017) (G.6, 2016) (G.6, 2015) (table 3, 2013) (23, 2012) Transparency	Include in the NIR more information to explain the methodologies and procedures used in the calculations, a description of the data-collection process and more data tables to present the AD and EFs that have been used, as well as background information on all AD used in the inventory, specifically for the energy and industrial processes sectors.	Addressing. The Party has made significant progress in terms of improving the overall transparency of the inventory. The NIR contains more information on methodologies, data tables for AD and EFs for major categories, including table 3.4 on parameters for estimating emissions using the reference approach (pp.42–43), and tables on AD and EFs for the IPPU sector (e.g. tables 4.2 (pp.65–66), 4.4 (pp.67–68), 4.6 (p.71), 4.7 (pp.72–73), 4.16 (p.93) and 4.17–4.18 (p.94)) and the agriculture sector (e.g. tables 5.3 (p.120), 5.5–5.11 (pp.122–131) and 5.14–5.23 (pp.133–145). However, the ERT noted that there are multiple transparency issues associated with the background information on the applied methodologies across the energy, IPPU and other sectors (see ID#s E.1, E.10, E.20, E.23, E.26, E.27, E.32, E.42, E.43, E.45, E.48, E.49, E.51, I.8, I.9, I.12, A.6, A.17, L.12(b), W.15 and W.16 below and ID#s E.61, I.21, W.19, W.24 and W.27 in table 5) and concluded that the recommendation has not yet been fully addressed despite the Party's progress.
G.9	NIR (G.10–G.11, 2019) (G.2 and G.21, 2017) (G.2, 2016) (G.2, 2015) (7, 2013) Convention reporting adherence	Provide the missing sections in the NIR following the structure outlined in the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party reported in its NIR information on the inventory elements missing from previous NIRs, including an energy balance for the most recent year (annex 4, pp.304–308), a comparison between the reference and sectoral approaches (section 3.2.1, pp.41–43), information on changes in the national inventory arrangements since the previous inventory submission (section 1.2.4, p.17), and information on recalculations and improvements (chap. 8, pp.256–257, and relevant sections in each sectoral chapter).
G.10	Notation keys (G.13, 2019) (G.25, 2017) Convention reporting adherence	Ensure the correct use of the notation keys (including "NA") in the CRF tables in line with decision 24/CP.19, annex I, paragraphs 37, 50(f) and 53.	Addressing. Although the reporting of notation keys has improved, some notation keys were still used incorrectly for each sector, requiring the Party's attention (see ID#s E.4, E.6, E.7, I.17, L.10, L.14 and W.16 below). During the review, the Party clarified that it will correct this issue in the next NIR.
G.11	Notation keys (G.14, 2019) (G.25, 2017) Convention reporting adherence	Provide justification for the use of notation keys, particularly "NE" and "IE", in the NIR and in CRF table 9.	Addressing. Belarus provided a justification for its use of the notation keys "IE" and "NE" in CRF table 9. However, in most cases, the Party's reason for reporting "NE" is linked to a lack of AD and, in one case, to a lack of IPCC methodology. CRF table 9 and the NIR do not contain a justification for any use of "NE" for categories considered to be insignificant according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines (e.g. categories 5.A and 5.B.2; see ID#s W.5 and W.13 below). During the review, the Party clarified that it will revise CRF table 9 for the next inventory submission.
G.12	QA/QC and verification (G.15, 2019) (G.5, 2017) (G.5, 2016)	Put in place robust QA/QC procedures, in particular for the key categories.	Addressing. The Party reported in its NIR some general information on the QA/QC procedures applied for categories 1.A and 1.B in the energy sector and reported QA/QC procedures for major categories in other inventory sectors (see ID# G.14 below). However, the Party needs to take further steps to ensure that those procedures are applied

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(G.5, 2015) (table 3, 2013) (19, 2012) Convention reporting adherence		across sectors (see e.g. ID#s E.4, E.46, L.3 and L.4 below). The ERT also noted a number of inconsistencies between the NIR and CRF tables (see e.g. ID#s E.13, L.5 and L.9 below and ID#s E.56 and L.19 in table 5) and between different NIR sections (see ID# L.2), errors in CRF table entries and in the use of notation keys (see e.g. ID#s E.12, E.17 and L.10 below) and cases where simple errors identified by previous ERTs have not been corrected (see ID#s E.14, L.10 and L.11 below). During the review, the Party clarified that it will continue to apply QA/QC procedures on an annual basis.
G.13	QA/QC and verification (G.16, 2019) (G.10, 2017) (G.10, 2016) (G.10, 2015) (13, 2013) (19, 2012) Transparency	Report complete and detailed information on sectoral QA/QC procedures in the NIR, in particular for the key categories, and use the information available on internal and external reviews to help develop the section of the NIR that describes the QA/QC procedures undertaken.	Resolved. The Party reported in its NIR (section 1.2.3, pp.15–17) an overview of QA/QC procedures and information on QA/QC procedures for key categories. Each sectoral chapter contains a dedicated QA/QC section with QA/QC procedures for individual key categories, including in the energy sector (NIR pp.47, 51, 53, 56 and 60) and the LULUCF sector (NIR pp.212, 219, 222, 224, 226, 228 and 236), whereas previous inventory submissions only contained a general description of QA/QC procedures at the higher subsectoral level. The NIR also presents detailed category-specific QA/QC and verification activities for agriculture, such as comparing country-specific EFs with those of neighbouring countries (e.g. section 5.2.4, p.129).
G.14	QA/QC and verification (G.17, 2019) (G.18, 2017) (G.19, 2016) (G.19, 2015) Convention reporting adherence	Improve the QC procedures to ensure consistency in the information presented in CRF table 10 and the NIR for the different gases and sectors.	Resolved. The Party corrected the inconsistencies between CRF table 10 and the NIR identified by previous ERTs. Corrections have been made to sectoral NIR tables 3.1 (p.39), 4.1 (p.64), 6.1 (pp.156–157) and 7.1 (pp.240–241) and the ERT did not detect any new inconsistencies with CRF table 10. During the review, the Party clarified that it checked the information reported in the CRF tables and the NIR in order to avoid inconsistencies and the appropriate QC procedures were applied.
G.15	QA/QC and verification (G.18, 2019) (G.18, 2017) (G.19, 2016) (G.19, 2015) Convention reporting adherence	Provide more extensive information on the reasons for observed trends in emissions across the time series at the sectoral level and for the most important categories within these sectors.	Addressing. The Party reported in its NIR (section 2.2, p.37) a general description of changes in emissions by gas between 1990 and 2019, as well as additional information on trends for each sector and category (e.g. sections 3.2.4.1 (p.44), 4.1.1 (pp.63–64), 5.1 (pp.115–117), 5.4 (pp.145–146), 6.1.1 (pp.156–157), 7.1 (pp.240–241) and 7.2 (pp.241–242)). However, the Party did not provide sufficient information on the reasons for observed trends in emissions across the time series for some sectors. For example, when reporting on energy sector trends, the Party often provided values from the beginning and end of the reporting period without describing the main drivers for the trends or explaining any irregularities in the observed significant inter-annual changes (e.g. NIR pp.39 and 43). During the review, the Party clarified that it revises the information reported on the reasons for observed emission trends on an annual basis.
G.16	QA/QC and verification (G.19, 2019) (G.24, 2017) Convention reporting adherence	Include in the NIR detailed information on the QA/QC arrangements in place in accordance with the UNFCCC Annex I inventory reporting guidelines, including information on the QA/QC plan and on	Addressing. The Party reported in its NIR (section 1.2.3, pp.16–17, and table 5.3 in annex 5, p.312) a description of QC procedures and their time frames, as well as information on the personnel responsible for each procedure. However, Belarus did not provide in the NIR detailed information on its QA objectives or the role of QA arrangements in the inventory planning and improvement process. During the review, the Party clarified that the QA procedures conducted by the national inventory team take the form of a cross-

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
		QA/QC procedures already implemented or planned to be implemented in the future.	sectoral check. The NIR is then peer reviewed by the academic secretary and by members of the Young Researchers Board of Bel SRC "Ecology", and the draft NIR is published on the Bel SRC "Ecology" website for public comments. Before the NIR is submitted, the Ministry of Natural Resources and Environmental Protection of Belarus carries out the QA procedures for the draft document. The ERT considers that the recommendation has not yet been fully addressed because the Party did not include in the NIR details of its QA plan.
G.17	QA/QC and verification (G.25, 2019) Convention reporting adherence	Make the values in NIR table 4.1 (under the IPPU sector) and tables II.4.3, II.4.4 and II.4.6 (in annex 4 to the NIR) consistent with the values reported in CRF table summary 2 (including the units) for the entire time series.	Resolved. The values reported for the IPPU sector in NIR table 4.1 (p.64) are consistent with the values reported in CRF table summary 2 (including the units). In addition, the values reported in NIR annex 1 on the key category analysis (pp.258–289, equivalent to annex 4 to the 2019 NIR) for total emissions with and without LULUCF are consistent with the values reported in CRF table 10s6 and CRF table summary 2.
G.18	QA/QC and verification (G.28, 2019) Convention reporting adherence	Report consistent information on the methods and EFs applied between the NIR and CRF table summary 3 for categories 3.B (manure management) and 4.D (wetlands).	Resolved. The Party reported in its NIR (section 5.3.2, p.133) that it applied tier 2 methodology for estimating CH_4 and direct N_2O emissions for the manure management category for cattle and swine, applying a tier 1 methodology and default EFs for all other animal species reported. Belarus also reported in the NIR (section 6.7.2, p.223) that it applied a tier 1 method with default EFs and parameters for estimating CO_2 and N_2O emissions for the wetlands category. The ERT noted that this is consistent with the information provided in CRF table summary 3.
G.19	Recalculations (G.20, 2019) (G.15, 2017) (G.16, 2016) (G.16, 2015) Comparability	Report CRF tables on recalculations with all the necessary information fully in accordance with the UNFCCC Annex I inventory reporting guidelines and using the agreed tables included in decision 24/CP.19, annex II.	Resolved. The Party reported the agreed tables included in decision 24/CP.19, annex II, and provided in CRF table 8 complete information about recalculations where emissions were estimated in accordance with the UNFCCC Annex I inventory reporting guidelines.
G.20	Recalculations (G.21, 2019) (G.16, 2017) (G.17, 2016) (G.17, 2015) Transparency	Report in the NIR complete information on the recalculations relating to previously submitted inventory data, in particular in relation to recalculations made in response to the review process, and include a discussion on the impact of the recalculations on the trend in emissions.	Addressing. The Party included in its NIR (table 1.4, p.25) a summary of recalculations for key categories, including the reasons for the recalculations. The NIR (chap. 8, p.256) provides a general explanation for the recalculations and outlines their overall impact on the GHG emission estimates. For some categories the recalculation data are reported in the sectoral chapters (e.g. sections 3.2.4.5, 3.2.5.5, 3.2.7.5, 3.3.2.5, 4.2.1.5, 4.2.3.5 and 5.1.4), and some recalculations are directly linked to the Party's response to the review process (see e.g. pp.78 and 84). However, the descriptions of the recalculations for some categories in various sectors still lack transparency (see e.g. ID#s E.5, E.28, A.20, W.17 and W.23 below and ID#s E.61 and I.20 in table 5) as they are missing information on the reason for recalculations, changes in the methodology and assumptions, and the results of the recalculations and their impact on the inventory. During the review, the Party noted that it plans to improve the descriptions of its recalculations in the next NIR.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
G.21	Uncertainty analysis (G.22, 2019) (G.13, 2017) (G.13, 2016) (G.13, 2015) (table 4, 2013) (14 and 15, 2012) Convention reporting adherence	Include an explanation for the observed changes in the reported uncertainty estimates between inventory submissions in the NIR; use only well-documented country-specific values for parameters in the uncertainty analysis; and report how the uncertainty analysis is used to prioritize inventory improvements.	Addressing. Belarus provided in the NIR (section 1.6, p.27) an estimate of the cumulative uncertainty of the 2019 inventory in accordance with the UNFCCC Annex I inventory reporting guidelines, paragraph 50(g), in addition to information on the underlying method for its uncertainty estimates and the results of the uncertainty calculations with and without LULUCF. However, the Party did not explain the observed changes in the reported uncertainty estimates between the 2020 and 2021 submissions or how the uncertainty analysis is used to prioritize inventory improvements. More detailed explanations for the uncertainty calculations and parameters used by category were included in the uncertainty sections of each sectoral chapter of the NIR (see e.g. ID#s A.2 and A.18 below). However, the NIR does not provide the sources for the uncertainty values used or the relevant documentation for any country-specific values, including for the LULUCF sector (see e.g. ID# L.20 in table 5). During the review, the Party stated that it will provide all the necessary information on uncertainty estimation in the next inventory submission.
G.22	Uncertainty analysis (G.23, 2019) (G.23, 2017) Convention reporting adherence	Perform and report on the uncertainty assessment by including information on the quantitative estimates of the uncertainty of the data used for all source and sink categories using the 2006 IPCC Guidelines.	Addressing. The Party provided in the NIR (annex 2, tables 2.1–2.2, pp.290–302) quantitative estimates of the uncertainty of the data used for all source and sink categories estimated in the inventory for the base year and the latest inventory year, as well as the trend uncertainty between those two years. However, in those tables, the wrong years were given for both the base year (2008 instead of 1990) and the latest reporting year (2018 instead of 2019), and the overall trend uncertainty contained inaccuracies owing to a technical data transfer error. During the review, the Party provided the ERT with Excel spreadsheets containing detailed uncertainty calculations, which the ERT assessed to be correct, and clarified that some information was misreported in the NIR. The Party noted that it will carefully transfer the data from the spreadsheets to its 2022 NIR and improve its QC procedures for future reports.
G.23	Uncertainty analysis (G.24, 2019) (G.23, 2017) Convention reporting adherence	Report uncertainties for the base year and the latest inventory year, as well as the methods and underlying assumptions used.	Resolved. The Party reported in its NIR (annex 2, tables 2.1–2.2, p.290) quantitative estimates from the uncertainty assessment for the base year, the latest inventory year and the trend uncertainty between those two years. The NIR (section 1.6, p.27) contains a description of the methodological approach used for calculating uncertainties, information on the ranges for the uncertainties and the results of the calculations. In addition, more detailed explanations of the uncertainty calculations and parameters used by category are included in the uncertainty sections of each sectoral chapter of the NIR.
Energy			
E.1	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.1, 2019) (E.1, 2017) (E.1, 2016) (E.1, 2015) (20, 2013) (32, 2012) Transparency	Improve transparency and include detailed information on EFs and AD in the NIR, for example, by including summary tables of the AD and EFs used for the inventory estimations together with a clear description of the sources thereof, and by providing clear indications of the methodology used.	Addressing. The Party reported in its NIR (table 3.4, p.42) information on and sources of the NCVs and carbon content for 14 types of fuel: default carbon content values from the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.3) were used for some 60 per cent of fuels, and the national sources for NCVs were listed in the NIR (p.62) along with the sources of carbon content for the other fuels. Belarus also provided a disaggregated energy balance in its NIR (annex 4). However, the NIR does not provide background information on AD (e.g. in summary tables) and fuel allocation by category for the sectoral approach, or on the fuel-specific EFs used (e.g. by providing background information on the country-

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			specific CO_2 EF or on the CH_4 and N_2O EFs used in the sectoral approach). During the review, the Party clarified that it only provided EFs and carbon content for the reference approach and indicated that it will provide more detailed information in future inventory submissions. The Party also clarified that, under national legislation, technical codes for common practices are developed by the relevant authorities and used as a guide by enterprises in the energy and IPPU sectors, meaning that these codes are authoritative and reliable enough for use as sources of country-specific parameters.
E.2	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.2, 2019) (E.2, 2017) (E.2, 2016) (E.2, 2015) (21, 2013) (44, 2012) Accuracy	Use country-specific EFs for key categories.	Addressing. Since 2020 Belarus has used a country-specific CO_2 EF (54.4 t/TJ) only for natural gas for stationary combustion activities (NIR table 1.4) for both the reference and the sectoral approach. The Party justified its use of the same methodological approach and EFs as the Russian Federation for its national GHG inventory by explaining that all natural gas is imported from the Russian Federation (NIR section 4.3.1.2, p.83). According to NIR table 1.4, which summarizes the methodological tiers applied for key categories, the Party continued to apply default CO_2 EFs for liquid and solid fuels under categories 1.A.1 (energy industries) and 1.A.2 (manufacturing industries and construction), as well as for subcategories 1.A.3.b (road transportation) and 1.A.3.c (railways) and for liquid fuels for subcategory 1.A.3.d (domestic navigation), which are all defined as key categories in CRF table 7. The only key category under fugitive emissions is CH_4 emissions for subcategory 1.B.2.b (natural gas) and Belarus used default CH_4 EFs in the estimations. NIR table 1.4 provides no information on other country-specific CO_2 and CH_4 EFs in the sector. During the review, the Party clarified that it will apply country-specific EFs for other key categories when appropriate information becomes available.
E.3	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.3, 2019) (E.4, 2017) (E.4, 2016) (E.4, 2015) (22, 2013) (33, 2012) Transparency	Include in the NIR detailed information on data management and handling.	Resolved. The Party reported in its NIR (e.g. sections 3.2.4.4, 3.2.5.4, 3.2.6.4, 3.2.7.4 and 3.3.2.4) information on the QA/QC procedures implemented for categories 1.A and 1.B under the energy sector. The QA/QC procedures related to data collection and handling, which apply to all sectors, are described in the NIR (table 1.1, p.16).
E.4	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.4, 2019) (E.5, 2017) (E.5, 2016) (E.5, 2015) (23, 2013) Comparability	Implement QC procedures to ensure the correct and consistent use of notation keys.	Addressing. The ERT noted improvements compared with previous inventory submissions, for example: (a) Belarus reported "IE" (instead of "NO") in CRF table 1.A.(a)s2 and provided accompanying information in CRF table 9 for subcategories 1.A.2.b (non-ferrous metals) and 1.A.2.f (non-metallic minerals), explaining that disaggregated data are not available for these subcategories and emissions were reported under subcategory 1.A.2.g.viii; (b) Belarus reported "IE" (instead of "NO") in CRF table 1.A.(a)s4 for subcategory 1.A.4.c.iii (fishing), providing a note in CRF table 9 that emissions were included under subcategory 1.A.4.c.ii (off-road vehicles and other machinery) owing to the provision of aggregated AD in the energy balance;

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			(c) In CRF table 1.A(a)s2, "NO" was reported instead of "NE" for CO_2 amount captured for subcategories 1.A.2.f and 1.A.2.g.i–viii; (d) In CRF table 1.B.2, "IE" was reported for all AD under subcategory 1.B.2.c (venting and flaring, oil and gas) for CO_2 and CH_4 emissions, with explanations provided in the table and in CRF table 9. However, the Party continued to use notation keys incorrectly in some cases. For example, "NO" was reported in CRF table 1 for GHG precursor emissions (NO_X, carbon monoxide, non-methane volatile organic compounds and sulfur dioxide). In addition, although "NE" should be reported for activities that occur in the country but for which no estimates are provided, in CRF table 1.B.2 the Party continued to report "NO" for AD, the IEF and CO_2 and CH_4 emissions under subcategory 1.B.2.a.5 (distribution of oil products). Similarly, "NA" was reported for CO_2 and N_2O emissions under subcategory 1.B.2.a.4 (oil refining), even though the activity occurs in the country and the 2006 IPCC Guidelines (vol. 2, chap. 4.2.2.2) provide a methodology for the subcategory. During the review, the Party explained that it will correct its use of notation keys in the next inventory submission.
E.5	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.5, 2019) (E.23, 2017) (E.31, 2016) (E.31, 2015) Convention reporting adherence	Include the relevant information on changes made to address recommendations made in previous review reports, as requested in paragraph 50(i) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. The Party reported in its NIR (table 1.4, p.25) information on general improvements made for the key categories and provided brief explanations for the recalculations for the sector in the category-specific sections of the NIR on energy industry (section 3.2.4.5), manufacturing industry and construction (section 3.2.5.5), agriculture/forestry/fishing (section 3.2.7.5), transport (section 3.2.6.5) and fugitive emissions (section 3.3.2.5). However, there are no clear references to previous recommendations and it is unclear whether the recalculations were implemented in response to the review process. During the review, the Party explained that it will continue to improve its reporting to ensure adherence to the reporting requirements.
E.6	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.7, 2019) (E.36, 2017) Convention reporting adherence	Provide information in CRF table 9 explaining the reasons for the use of the notation keys "IE" and "NE".	Addressing. In CRF table 9 the Party explained its use of "IE" for subcategories 1.B.2.c.2.i and 1.B.2.c.2.ii (flaring of oil and gas), noting that emissions were reported in subcategory 1.B.2.c.2.iii (flaring, combined). The Party reported "NE" for the import, export and stock change of bitumen in CRF table 1.A(b), despite reporting these AD for 2000–2013 in its 2018, 2019 and 2020 submissions. No explanation for the use of "NE" was included in CRF table 9 (see ID# E.12 below). During the review, the Party clarified that it will continue to ensure transparency by explaining its reasons for reporting the notation keys "IE" and "NE".
E.7	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.8, 2019) (E.36, 2017) Transparency	Provide information in the NIR on the changes made to the notation keys since the previous submission.	Not resolved. Belarus did not provide clear information on changes made to the notation keys since the previous inventory submission. The ERT noted that the Party changed its reporting from "NE" to "NO" for the amount of CO_2 captured under subcategory 1.A.2.f (non-metallic minerals) for biomass, gaseous fuels, other fossil fuels and solid fuels for the entire time series but did not explain its reasons for doing so in the NIR. During the review, the Party indicated that it will strive to provide such information in the next NIR.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.8	1. General (energy sector) – solid fuels – CO_2, CH_4 and N_2O (E.9, 2019) (E.37, 2017) Accuracy	Report the AD and emissions for different coal types separately according to the statistical data for the years after 2011 and apply the statistical tools provided in the 2006 IPCC Guidelines to 1990–2010 to resolve data gaps and ensure time-series consistency.	Not resolved. The Party continued to report aggregated AD on coal types under lignite for the entire time series in CRF table 1.A(b) for the reference approach. It is difficult to discern the type of coal used in the sectoral approach because Belarus did not include disaggregated AD on use of solid fuels by IPCC category in the NIR. The ERT noted that coal production does not occur in Belarus, which only reports to IEA data for the import of other bituminous coal. The ERT concluded that the Party's reporting may result in inaccurate estimates for solid fuel data because the calorific value for other bituminous coal is some 70 per cent higher than that of lignite. During the review, the Party shared the results of consultations with Belstat and indicated that, owing to the lack of AD by type on coal consumption in the energy balance in previous inventory submissions, the inventory team classified all amounts of coal used as lignite. During the consultations it was clarified that consumption data by coal type provided by Belstat to IEA were classified under other bituminous coal. Belarus stated that it will address this issue for the next inventory submission by replacing the NCV and EF for lignite with the NCV and EF for other bituminous coal in the inventory estimates.
E.9	1. General (energy sector) – all fuels – CO_2 (E.50, 2019) Accuracy	Calculate country-specific CO_2 EFs based on the country-specific carbon contents now used in the reference approach and apply them in the sectoral approach.	Resolved. A country-specific CO_2 EF for natural gas combustion (54.4 t/TJ), calculated on the basis of the country-specific carbon content of 14.84 t C/TJ, was applied for both the reference and the sectoral approach. During the review, the Party clarified that it will make every effort to calculate country-specific CO_2 EFs for other fuels (such as residual fuel oil) for future inventory submissions.
E.10	Fuel combustion – reference approach – all fuels – CO_2 (E.10, 2019) (E.7, 2017) (E.7, 2016) (E.7, 2015) (26, 2013) (35, 2012) Accuracy	Investigate and explain in the NIR and the CRF tables the reasons for the observed difference between the reference approach and the sectoral approach.	Not resolved. Significant differences remain between estimates calculated using the reference and the sectoral approach, ranging between 5.8 and 45.7 per cent (for 2016 and 2012, respectively). For all years the reference approach estimates are higher than those of the sectoral approach, which suggests a possible underestimation of emissions under the sectoral approach. The NIR (section 3.2.1) contains only general information on the reasons for the difference between the reference and sectoral approach estimates for 2019 (28.6 per cent), noting that this is due mainly to not excluding the export of several types of fuel (light catalytic gas oil, fuel oil (heavy distillate), deasphalted oil and bitumen) under the reference approach and the use of different carbon content factors under the reference and the sectoral approach for diesel fuel, heating oil, fuel briquettes and peat. The ERT noted other inconsistencies in the reporting for the reference approach (see ID#s E.12, E.13 and E.14 below), along with a systematic error with reporting the opposite sign in the entries for the stock changes in CRF table 1.A(b). Moreover, the comparison at the fuel level presented in CRF table 1.A(c) is not relevant since Belarus reported "NO" for apparent energy consumption excluding NEU, reductants and feedstock. During the review the Party acknowledged that the sign errors occurred in the stock changes reported in the reference approach for crude oil, gas/diesel oil, LPG, gasoline, jet kerosene and natural gas and stated that it will address this issue for the next inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.11	Fuel combustion – reference approach – solid fuel – CO_2 (E.12, 2019) (E.25, 2017) (E.33, 2016) (E.33, 2015) Accuracy	Strengthen the QC procedures and report the correct total amount of CO_2 emissions for the reference approach by including values for actual CO_2 emissions from all relevant fuels and the corresponding fraction of carbon oxidized.	Resolved. The Party reported in CRF table 1.A(b) the default value of 1.00 for fraction of carbon oxidized for all reported fuels, including coke oven/gas coke, lignite and BKB and patent fuel, and reported CO_2 emissions for all solid fuels in CRF table 1.A(b). For remaining issues on the reporting of solid fuels under the reference approach, see ID# E.8 above.
E.12	Fuel combustion – reference approach – all fuels – CO_2 (E.13, 2019) (E.32, 2017) (E.40, 2016) (E.40, 2015) Accuracy	(a) Account for exports of jet kerosene; (b) Account for exports of bitumen; (c) Estimate carbon stored; (d) Provide emission estimates for imports of coke oven/gas coke; (e) Enhance verification procedures to ensure the consistency of information provided in CRF tables 1.A(b), 1.A(c) and 1.A(d); (f) Include detailed information on the improvements made in the NIR of the next inventory submission.	(a) Not resolved. Belarus reported AD on jet kerosene exports for 2006–2019 and "NA" for 1990–2005. The AD on jet kerosene exports for 2016, 2017 and 2019 provided in the official 2020 energy balance (section 2.5, p.40) (available at https://www.belstat.gov.by/upload/iblock/484/484d69a59d489c53b25079a3c088e5c6.pdf (in Russian)) (199, 260 and 297 kt, respectively) differ significantly from the values for the same years provided in CRF table 1.A(b) (430.71, 561.54 and 210.00 kt, respectively). During the review, the Party clarified that it will revise the jet kerosene export quantities for its next inventory submission; (b) Not resolved. Belarus reported the import, export and stock change of bitumen as "NE" in CRF table 1.A(b), although relevant data were reported to IEA (see ID# E.6 above). During the review, the Party indicated that it will provide bitumen AD in the next inventory submission; (c) Not resolved. Belarus reported NEU of naphtha in CRF table 1.A(d) for all years, with values ranging from 201,85.89 TJ (1993) to 460,85.36 TJ (1990), including carbon excluded from the reference approach. However, the Party reported "NO" in the column entitled carbon stored (carbon excluded) in CRF table 1.A(b) for the entire time series, leading to an overestimation of CO_2 emissions from naphtha in the reference approach and increasing the difference between the reference and sectoral approach estimates; (d) Resolved. Emission estimates for imports of coke oven/gas coke were provided in CRF table 1.A(b); (e) Addressing (see ID# E.17 below); (f) Not resolved. The Party did not provide information in the NIR on the improvements made to the reference approach.
E.13	Fuel combustion – reference approach – liquid fuels – CO_2 (E.14, 2019) (E.41, 2017) Convention reporting adherence	Correct the reporting of AD for jet kerosene imports in CRF table 1.A(b).	Not resolved. Some discrepancies remain between the energy balance reported in the NIR (annex 4) and CRF table 1.A(b) in terms of the data for jet kerosene imports. The AD for jet kerosene imports reported by the Party in CRF table 1.A(b) for 2016, 2017 and 2019 (45.57, 32.34 and 18.00 kt, respectively) also differ significantly from the values reported in the official 2020 energy balance (section 2.4, p.39) for the same years (21, 15 and 23 kt, respectively). During the review, the Party clarified that kerosene import AD will be recalculated in accordance with the official energy balance for the next inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.14	Fuel combustion – reference approach – other fossil fuels – CO_2 (E.15, 2019) (E.41, 2017) Convention reporting adherence	Report the correct sign for the carbon stock change for peat (i.e. it should be negative) in CRF table 1.A(b) for the reference approach estimates.	Not resolved. The Party continued to report stock change for peat using the opposite sign in CRF table 1.A(b), including for 2019 (–205.00 kt), which raised apparent consumption to 2,474.00 kt instead of to 2,064.00 kt, as reported in the energy balance of Belarus. Moreover, the Party reported the incorrect value (28.00 kt) for stock change for peat for 2017, despite reporting the correct value (–28.00 kt) in the 2019 submission. The ERT reiterates that a positive value in the national energy balance should be negative in the CRF table. During the review, the Party confirmed that there was an error with the sign used for the stock changes in the reference approach.
E.15	Fuel combustion – reference approach – all fuels – CO_2 (E.50, 2019) Accuracy	Revise the methodology applied to calculate the average of the country-specific carbon contents by applying a weighted average based on fuel consumption per fuel variety and report the correct values in CRF table 1.A(b).	Addressing. The Party did not report in its NIR any information on the methodology applied to calculate the average of country-specific carbon contents. Belarus continued to report country-specific carbon contents in CRF table 1.A(b) for diesel (19.55 t C/TJ), residual fuel oil (19.9 t C/TJ), BKB (25.65 t C/TJ) and peat (21.7 t C/TJ). These values are substantially lower than the default values from the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.3). The ERT noted that some changes were made to the carbon content for natural gas, which was revised from 16.02 to 14.84 t C/TJ. During the previous review, the Party explained that the country-specific carbon contents for some fuels were calculated as simple averages from the corresponding fuel varieties described in the national technical code of common practice. A link to the code (http://ecoinv.by/images/pdf/tkp_fond/_17.09-05-2013.pdf (in Russian)) was provided in the most recent NIR (p.62). However, the code provides a range of NCVs and carbon contents for several fuel types, and the NIR does not explain how the carbon contents used in CRF table 1.A(b) were selected from these ranges. During the review, the Party stated that it will make every effort to address the issue for all fuels in the next NIR.
E.16	Comparison with international data – liquid, gaseous and other fossil fuels – CO_2, CH_4 and N_2O (E.17, 2019) (E.33, 2017) (E.41, 2016) (E.41, 2015) Transparency	Provide documented information on the country-specific NCVs used in the emission calculations, with the aim of demonstrating the accuracy of those values.	Not resolved. The Party reported in its NIR (table 3.4, p.42) the country-specific NCVs used for diesel oil, residual fuel oil, LPG, household oven fuel, BKB, natural gas and peat, referencing the technical code for common practices (see ID# E.15 above) and rules for calculating emissions for the accounting of implementation measures for energy saving and renewable energy sources (available at http://ecoinv.by/images/pdf/tkp_fond/_17.09-01-2011.pdf (in Russian)) as their sources (NIR p.62) and indicating that country-specific NCVs were only used in the reference approach (NIR p.42). However, the Party did not justify its use of country-specific NCVs in the NIR, except in relation to natural gas, for which the Party noted that, since all gas used in Belarus is imported from the Russian Federation, it uses the same NCV as that country (NIR section 4.3.1.2, p.83). Since the AD on natural gas in the energy balance of Belarus also include associated petroleum gas produced in the country, the ERT notes that this should be investigated to ensure that the NCV used for natural gas and the reporting of fuels is correct. During the review, the Party clarified that the next inventory submission will contain detailed information on all parameters used for the estimations and references for country-specific parameters.
E.17	Feedstocks, reductants and other NEU of	Ensure consistency across CRF tables 1.A(b), 1.A(c) and 1.A(d).	Addressing. Belarus made some improvements regarding the inconsistencies across CRF tables 1.A(b), 1.A(c) and 1.A(d) identified in the previous review. For example, the Party

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	fuels – all fuels – CO_2 (E.18, 2019) (E.12, 2017) (E.12, 2016) (E.12, 2015) (31, 2013) Convention reporting adherence		ensured the consistent use of notation keys between CRF tables 1.A(b) and 1.A(d) by reporting carbon excluded as "NO" across the time series for gasoline, gas/diesel oil, residual fuel and lignite, BKB and patent fuel, and as "NE" for LPG. However, some inconsistencies remain, for example: (a) Belarus reported the amount of carbon excluded for NEU of naphtha for the entire time series in CRF table 1.A(d) but reported naphtha consumption and carbon stored as "NO" in CRF table 1.A(b); (b) It continued to report apparent energy consumption (excluding NEU, reductants and feedstocks) as "NO" for all fuels in CRF table 1.A(c), which is incorrect and inconsistent with the reporting in CRF table 1.A(d). In addition, in CRF table 1.A(b), the Party reported the amount of carbon excluded for natural gas only, reporting "NE" for crude oil, LPG, bitumen, coke oven/gas coke and "NO" for gas/diesel oil, residual fuels and lignite, although carbon stored was reported for these fuels in previous inventory submissions. During the review, the Party clarified that it will continue to take steps to ensure consistency across CRF tables 1.A(b), 1.A(c) and 1.A(d) in the next inventory submission.
E.18	Feedstocks, reductants and other NEU of fuels – all fuels – CO_2 (E.19, 2019) (E.13, 2017) (E.13, 2016) (E.13, 2015) (32, 2013) (43, 2012) Accuracy	Obtain information on the utilization of naphtha, lubricants, coal and coal products as feedstocks and for non-energy purposes; use this information to improve the accuracy of the emission estimates; and provide detailed relevant explanations in the NIR to improve transparency.	Addressing. CRF table 1.A(d) contains values for naphtha and natural gas used as feedstock for 2019 only. The NIR (section 3.2.3, p.44) contains general information on NEU of natural gas for ammonia, methanol and hydrogen production and of naphtha for ethylene, propylene and acrylonitrile production, but any NEU of lubricants, coal and coal products as feedstocks or for non-energy purposes was not mentioned in the NIR and reported as "NE" and "NO" in CRF tables 1.A(b) and 1.A(d). However, the ERT noted that AD (in TJ) for NEU of coal and coke oven coke are published in the official energy balance of Belarus (available on the Belstat website at https://www.belstat.gov.by/ofitsialnaya-statistika/realny-sector-ekonomiki/energeticheskaya-statistika/anual-dannye/toplivno-energeticheskie-balansy-/ (in Russian)). In addition, although Belarus reported NEU of lubricants as "NO" in CRF table 1.A(d), it continued to report lubricant use as "NE" in CRF table 2(I).A-Hs2. During the review, the Party clarified that in the next inventory submission it will report NEU of lubricants as "NE" rather than "NO" in CRF table 1.A(d) to ensure consistency with CRF table 2(I).A-Hs2.
E.19	Feedstocks, reductants and other NEU of fuels – crude oil – CO_2 (E.20, 2019) (E.45, 2017) Accuracy	Recalculate the excluded carbon from NEU of fuels for crude oil in accordance with the 2006 IPCC Guidelines using data from the national fuel and energy balance on crude oil used for non-energy purposes and as feedstock for non-fuel products.	Not resolved. The Party changed its reporting to "NE" for carbon excluded from NEU of fuels for crude oil for the entire time series in CRF tables 1.A(b) and 1.A(d). The energy balance of Belarus provides AD (in TJ) for use of crude oil as a material for non-energy purposes (e.g. 205 TJ in 2019). During the review, the Party clarified that it will make every effort to report crude oil quantities for NEU in its next inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.20	International aviation – liquid fuels – CO_2, CH_4 and N_2O (E.21, 2019) (E.10, 2017) (E.10, 2016) (E.10, 2015) (29, 2013) (42, 2012) Transparency	Provide information in the NIR on how jet kerosene is allocated between domestic and international flights for 2000–2011.	Not resolved. Belarus did not provide detailed and consistent information on the methodology or assumptions used for the allocation of jet kerosene consumption between international and domestic flights. According to CRF table 1.D, jet kerosene was the only fuel used, and 1.7 and 98.3 per cent of fuel used was allocated to domestic and international aviation, respectively, for all years of the time series except 2019, for which 2.03 per cent of jet kerosene consumption was allocated to domestic aviation (see ID# E.21 below). However, the ERT noted that in the previous inventory submission the Party reported the share of domestic consumption of jet kerosene as 4.0 per cent for 2017. During the review, the Party indicated that it held consultations on jet kerosene consumption by international bunkers with Belstat and that it will revise the AD and emissions for international and domestic flights for the next inventory submission and provide relevant explanations in the NIR.
E.21	International aviation – liquid fuels – CO_2 (E.51, 2019) Convention reporting adherence	Ensure the consistency of the values reported for jet kerosene under international bunkers between CRF tables 1.A(b) and 1.D.	Not resolved. The AD reported for international bunkers in CRF table 1.A(b) are only consistent with the AD reported in CRF table 1.D for 2019 (5,318.46 TJ). The AD reported in CRF table 1.A(b) for bunker fuel for previous years range from 625.78 TJ (1998) to 15,990.66 TJ (1990), while the AD for jet kerosene reported in CRF table 1.D range from 1,430.56 TJ (1998) to 78,594.09 TJ (1990). The ERT noted that, according to the energy balance of Belarus, final consumption of jet kerosene in 2019 amounted to 8,864.1 TJ, and AD of 110.25 TJ were reported for domestic aviation for the same year, meaning that emissions from both international bunkers and domestic aviation were underestimated. During the review, the Party clarified that it will revise the AD and emissions reported for international aviation for the next inventory submission and provide appropriate explanations in the NIR.
E.22	1.A Fuel combustion – sectoral approach – all fuels – CO_2 (E.22, 2019) (E.14, 2017) (E.14, 2016) (E.14, 2015) (33, 2013) (44, 2012) Accuracy	Follow the IPCC good practice guidance for key categories under stationary combustion and use country-specific carbon contents for all fuels.	Addressing. Since 2020 Belarus has used country-specific carbon contents and has only used a country-specific CO_2 EF (54.4 t/TJ) for natural gas from stationary combustion activities (NIR table 3.4), justifying in the NIR (section 4.3.1.2, p.83) that, as Belarus imports all its natural gas from the Russian Federation, it has adopted that country's methodological approach for the national GHG inventories. Belarus continued to apply IPCC default EFs for all key categories under stationary combustion (see ID#s E.2 and E.9 above). During the review, the Party clarified that it will apply country-specific EFs once appropriate information is available.
E.23	1.A Fuel combustion – sectoral approach – solid fuels – CO_2, CH_4 and N_2O (E.23, 2019) (E.15, 2017) (E.16, 2016) (E.16, 2015) (35, 2013) (45, 2012) Transparency	Explain in more detail the derivation of the country-specific NCVs for solid fuels and provide a justification for their use.	Resolved. Belarus did not use country-specific NCVs for solid fuels under the sectoral approach, as confirmed by the calculation sheets provided by the Party during the review.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.24	1.A Fuel combustion – sectoral approach – biomass – CO_2 (E.24, 2019) (E.38, 2017) Transparency	Calculate CO_2 emissions from biomass consumption for categories 1.A.1 and 1.A.2 and report estimates in the sectoral approach categories and memo items.	Not resolved. The Party did not report CO_2 emissions from biomass consumption for categories 1.A.1 and 1.A.2 in CRF tables 1.A(a)s1 and 1.A(a)s2, instead reporting "NO", "IE" and "NA" in the tables and in CRF table 1s2 under the related memo item. During the review, the Party clarified that it will make every effort to address this issue for the next inventory submission.
E.25	1.A Fuel combustion – sectoral approach – liquid fuels – CO_2, CH_4 and N_2O (E.25, 2019) (E.39, 2017) Accuracy	Report emissions from refinery gas combustion in all categories where it was used for all years of the time series.	Addressing. The energy balance included in the NIR (annex 4) shows refinery gas consumption under subcategories 1.A.1 (electricity and heat production), 1.A.2.c (chemicals) and 1.A.2.g.viii (other manufacturing industry). In the NIR (table 1.4 on improvements made to key categories, p.25), Belarus indicated that it replaced the country-specific NCV for refinery gas (43.95 TJ/kt) with the default NCV (49.5 TJ/kt) from the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.2) for categories 1.A.1, 1.A.2, 1.A.4 and 1.A.5 and included information on recalculations in the relevant NIR sections (e.g. section 3.2.4.5). The NIR (p.45) also states that additional investigations should be undertaken with a view to defining the volumes of refinery gas consumed during petroleum refining since according to the official energy balance, for subcategory 1.A.1.b (petroleum refining) fuel consumption as a raw material for processing into other fuels also includes energy use of fuels. The ERT notes that the NIR does not provide AD for refinery gas consumption by subcategory or explain the EFs used for the emission estimates, which would enable it to assess the completeness of the estimates. During the review the Party informed the ERT that it consulted Belstat on fuel consumption (refinery gas) during petroleum refining in an effort to address the issue. The ERT noted that according to the NIR (p.309) the Party plans to implement this recommendation in 2022.
E.26	1.A Fuel combustion – sectoral approach – all fuels – CO_2, CH_4 and N_2O (E.26, 2019) (E.40, 2017) Transparency	Provide detailed information in the NIR on all country-specific parameters (NCVs, carbon contents and EFs) used for the inventory for the energy sector (e.g. in tabular format).	Not resolved. For the reference approach, the Party used country-specific parameters (NCVs and carbon contents) for some fuels and reported them in the NIR (table 3.4, p.42). However, Belarus did not provide detailed information on the CO_2, CH_4 and N_2O EFs used for the sectoral approach or the values (default or country-specific) used for each fuel (see ID# E.27 below). During the review, Belarus indicated that the NCVs, carbon contents and CO_2 EFs applied in the reference and sectoral approaches will be made consistent in the next inventory submission. The ERT noted that Belarus only used correlated values for the NCV, carbon content and CO_2 EF for natural gas in the sectoral and reference approaches.
E.27	1.A Fuel combustion – sectoral approach – all fuels – CO_2, CH_4 and N_2O (E.27, 2019) (E.40, 2017) Transparency	Explain the methodology used for developing the country-specific parameters (NCVs, carbon contents and EFs) used for the inventory in the energy sector, and provide a justification that the country-specific parameters are more suitable for the national circumstances.	Not resolved. In the NIR (section 3.2.4.2, p.46) the Party justified its use of country-specific parameters (NCVs, carbon contents and EFs) for natural gas only (see ID#s E.2, E.16 and E.22 above). In its NIR (p.42) the Party reported that it used tier 1 and default EFs for all other fuels and applied default NCVs for the sectoral approach. However, in response to questions from the ERT, during the review Belarus provided Excel calculation sheets containing the AD, NCVs and EFs used for recalculations in subcategory 1.A.4.c agriculture/forestry/fishing. The ERT noted that the Party reported inconsistent information on the NCVs and EFs used between the calculation sheets and the NIR, and

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			used country-specific values that are not mentioned or explained in the NIR (see ID# E.62 in table 5).
E.28	1.A Fuel combustion – sectoral approach – solid and gaseous fuels – CH_4 (E.52, 2019) Accuracy	Recalculate CH_4 emissions under categories 1.A.2 and 1.A.4 by applying the correct default CH_4 EF for solid and gaseous fuels in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.3–2.5) and report on the recalculations in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	Addressing. Belarus applied the correct default CH_4 EF (300 kg/TJ) for solid fuels for subcategory 1.A.4.b (residential) in its 2020 and 2021 submissions. However, the 2020 NIR does not contain any information on recalculations (section 3.2.7.5) and the Party continued to apply a CH_4 EF of 1 kg/TJ for solid fuels for the entire time series for category 1.A.2 (manufacturing industries and construction) and subcategory 1.A.4.c (agriculture/forestry/fishing) and for 2001–2019 for subcategory 1.A.4.a (commercial/ institutional). The Party reported the AD for and CH_4 emissions from gaseous and solid fuels for subcategory 1.A.4.a (commercial/institutional) as "NA" for 1990–2000. For gaseous fuels Belarus continued to apply the incorrect CH_4 EF of 1 kg/TJ for the entire time series for subcategories 1.A.4.b and 1.A.4.c, and for 2001–2019 for subcategory 1.A.4.a. The ERT concludes that CH_4 emissions were underestimated because the 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.3–2.5) indicate different values for the default CH_4 EFs for categories 1.A.2 (for solid fuels) and 1.A.4 (for solid and gaseous fuels), as follows: for solid fuels, 10 kg/TJ in tables 2.3 (manufacturing industries and construction) and 2.4 (commercial/institutional) and 300 kg/TJ in table 2.5 (residential and agriculture/forestry/fishing/fishing farms); and for gaseous fuels, 5 kg/TJ for the categories commercial/institutional, residential and agriculture/forestry/fishing farms in tables 2.4–2.5. During the previous review, the Party acknowledged this finding and explained that the incorrect default EFs were used owing to an error that will be corrected in its next inventory submission.
E.29	1.A.1.b Petroleum refining – all fuels – CO_2, CH_4 and N_2O (E.30, 2019) (E.16, 2017) (E.17, 2016) (E.17, 2015) (36, 2013) Comparability	Reallocate the emissions from petroleum refining to the energy industries category.	Addressing. Although the Party did not report disaggregated emissions for petroleum refining, it improved its reporting for the category by correctly reporting "IE" rather than "NO" under subcategory 1.A.1.b in CRF table 1.A(a)s1. In CRF table 9 Belarus explained that AD and emissions for subcategory 1.A.1.b (petroleum refining) were reported under public electricity and heat production in subcategory 1.A.1.a.iv (other). During the review, the Party clarified that it held consultations with Belstat on fuel consumption (refinery gas) during petroleum refining, and combustion emissions from petroleum refining will be reallocated to the appropriate energy industries category in the next inventory submission.
E.30	1.A.2 Manufacturing industries and construction – all fuels – CO_2, CH_4 and N_2O (E.32, 2019) (E.16, 2017) (E.17, 2016) (E.17, 2015) (36, 2013) (46, 2012) Comparability	Report disaggregated emission data by subcategory under manufacturing industries and construction.	Addressing. Belarus disaggregated the emission estimates for subcategories 1.A.2.a (iron and steel), 1.A.2.c (chemicals), 1.A.2.d (pulp, paper and print), 1.A.2.e (food processing, beverages and tobacco) and 1.A.2.g (other). However, the Party continued to report "IE" for emissions for subcategories 1.A.2.b (non-ferrous metals) and 1.A.2.f (non-metallic minerals) for 2001–2019, explaining in CRF table 9 that they were included under subcategory 1.A.2.g.viii (other). For 1990–2000 Belarus continued to report "IE" for all subcategories under category 1.A.2 (manufacturing industries and construction), explaining that owing to a lack of disaggregated data, all emissions were reported under subcategory 1.A.2.g.viii (other). The ERT noted that the official national energy balance provides separate fuel consumption data for subcategory 1.A.2.f (non-metallic minerals),

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			and data for subcategory 1.A.2.b (non-ferrous metals) are aggregated with subcategories 1.A.2.a (iron and steel) and 1.A.2.g.i (manufacturing of machinery). During the review, the Party clarified that it will report disaggregated emission data for subcategory 1.A.2.f (non-metallic minerals) in the next inventory submission, but disaggregated AD for subcategory 1.A.2.b (non-ferrous metals) are not available owing to the structure of the energy balance of Belarus.
E.31	1.A.2.a Iron and steel – solid fuels – N_2O (E.53, 2019) Accuracy	Recalculate N_2O emissions by applying the correct EFs in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.3) and report recalculations in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	Not resolved. The Party did not apply a recalculation for N_2O emissions for subcategory 1.A.2.a iron and steel (see ID# E.32 below). The ERT considers that emissions from iron and steel were underestimated because the NIR (section 4.4.1.1, p.97) indicates that the technological process for steel production used in the country involves smelting steel in electric arc furnaces, which are normally stand-alone plants owing to their fundamental reliance on scrap rather than iron as a raw material, although they may be located in integrated plants (2006 IPCC Guidelines, vol. 3, chap. 4, p.4.12). If production takes place in a stand-alone plant, the coke oven gas is a by-product from coke ovens, which transform coking coal into coke oven coke and coke oven gas at integrated plants. The ERT noted that according to the IEA energy balance and the national energy balance of Belarus, the country only imported coke oven coke, which was the only solid fuel consumed in iron and steel production in 2019, and the default N_2O EF for coke oven coke is 1.5 kg N_2O/TJ (2006 IPCC Guidelines, vol. 2, chap. 2, table 2.3). However, Belarus continued to apply the default EF for coke oven gas (0.1 kg N_2O/TJ). During the review, the Party clarified that it will make every effort to address this issue for the next inventory submission.
E.32	1.A.2.a Iron and steel – solid fuels – N_2O (E.53, 2019) Transparency	Include in the NIR a description of iron and steel production processes, including the types of fuel used for energy purposes.	Addressing. The Party continued to report fluctuating N_2O IEFs for solid fuel for 2001–2019 ranging from 0.10 kg/TJ in 2001 to 0.27 kg/TJ in 2009, with a value of 1.5 kg/TJ reported for 2010. The ERT noted that the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.3) provide default N_2O EF values of 1.5 kg/TJ for primary solid fuels and 0.1 kg/TJ for the derived gases. However, although the NIR reports new information on iron and steel production processes (section 4.4.1.1, p.97), it does not provide a more detailed explanation of the fuel types aggregated under solid fuels in the subcategory to explain the variation in the reported IEFs. The ERT noted that, in response to a question raised by the previous ERT, Belarus explained that N_2O emissions from solid fuels for this subcategory are the sum of emissions from the main three fuels consumed under the subcategory, with the following default N_2O EFs: lignite, 1.5 kg/TJ; BKB and patent fuel, 1.5 kg/TJ; and coke oven/gas coke, 0.1 kg/TJ. In 2010, owing to national circumstances, only BKB and patent fuel were consumed and the N_2O IEF was therefore 1.5 kg/TJ. The NIR does not include the explanations provided during the previous review or the AD on fuel use by type. During the review, the Party clarified that it will make every effort to address this issue for the next inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.33	1.A.3 Transport – biomass – CO_2, CH_4 and N_2O (E.33, 2019) (E.27, 2017) (E.35, 2016) (E.35, 2015) Accuracy	(a) Reallocate CH_4 and N_2O emissions from biomass in road transportation and railways to category 1.A.4.a (commercial/institutional); (b) Apply the correct CH_4 and N_2O EFs for wood/wood waste in the calculations; (c) Estimate and report CO_2 emissions from biomass use in the corresponding categories; (d) Use the correct notation key for CH_4 and N_2O emissions from biomass in road transportation and railways if this type of fuel is not used in these categories.	(a) Not resolved. Belarus did not reallocate emissions from biomass from subcategories 1.A.3.b (road transportation) and 1.A.3.c (railways) to subcategory 1.A.4.a (commercial/institutional); (b) Not resolved. The Party continued to report in CRF table 1.A(a)s3 the IEFs for both mobile categories as 30 kg CH_4/TJ and 4 kg N_2O/TJ, which are the default values for stationary combustion. During previous reviews the Party explained that biomass reported for road transportation and railways was wood/wood waste used for stationary combustion in institutional buildings, but this information was not included in the NIR. The ERT reaffirms that in cases where biofuels are used for transportation, the emissions should be reported under the transport sector along with the relevant EFs, but in cases where biomass is combusted by stationary sources, the emissions should be allocated to subcategory 1.A.4.a; (c) Not resolved. CO_2 emissions from biomass use in road transportation and railways were reported as "NO" or "IE"; (d) Addressing. The Party reported estimates for CH_4 and N_2O emissions from biomass in road transportation and railways for 2000–2019 and reported "IE" for road transportation subcategories. However, CH_4 and N_2O emissions from biomass were reported as "NA" for railways and "IE" and "NA" for road transportation for 1990–1999. During the review, the Party indicated that it will strive to resolve the above-listed issues for its next inventory submission.
E.34	1.A.3.a Domestic aviation – liquid fuels – CO_2, CH_4 and N_2O (E.54, 2019) Completeness	Investigate whether aviation gasoline consumption is reported in the national energy balance aggregated with some other type of liquid fuel (i.e. gasoline) and report on the results of this investigation in the NIR.	Not resolved. The Party reported aviation gasoline consumption for subcategory 1.A.3.a (domestic aviation) as "NO" for the entire time series in CRF table 1.A(a)s3. The NIR does not contain any information on the allocation of aviation gasoline or mention any investigations made in this area. During the review, Belarus clarified that consumption of aviation gasoline was reported together with that of gasoline under road transportation and indicated that it will be reported as "IE" rather than "NO" in its next inventory submission. The ERT noted that, according to the official national energy balance, 53,473 TJ motor gasoline was consumed for road transportation in 2019. However, CRF table 1.A(a)s3 reports just 578.23 TJ gasoline used for subcategory 1.A.3.b (road transportation), suggesting a possible underestimation of emissions from aviation gasoline.
E.35	1.A.3.a Domestic aviation – liquid fuels – CO_2, CH_4 and N_2O (E.54, 2019) Completeness	If the AD for consumption of aviation gasoline in small aircraft are identified and have not yet been accounted for in the inventory, estimate emissions related to the consumption of aviation gasoline.	Not resolved. The Party continued to report "NO" for aviation gasoline consumption for category 1.A.3.a (domestic aviation) in CRF table 1.A(a)s3; however, according to the previous ERT, the consumption of aviation gasoline by small aircraft (e.g. agricultural planes, leisure aircraft) is likely to occur in Belarus. During the review, the Party acknowledged that AD for gasoline for road transportation include aviation gasoline used by small aircraft and related emissions are reported under subcategory 1.A.3.b (road transportation) but did not provide any specific information on the estimations. The ERT noted that in CRF table 1.A(a)s3 AD on gasoline consumption in subcategory 1.A.3.b

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			(road transportation) for 2019 are substantially lower than the data from the official energy balance of Belarus (see ID# E.34 above). The ERT therefore considers that it is likely that the AD for aviation gasoline are not accounted for.
E.36	1.A.3.b Road transportation – liquid and gaseous fuels – CH_4 and N_2O (E.34, 2019) (E.6, 2017) (E.6, 2016) (E.6, 2015) (24, 2013) Accuracy	Use appropriate CH_4 and N_2O EFs to estimate emissions from road transportation.	Addressing. For its 2020 submission the Party recalculated the time series for gaseous fuels and reported in CRF table 1.A(a)s3 CH_4 and N_2O IEFs for natural gas (92 kg CH_4/TJ and 3 kg N_2O/TJ) that correspond to the default EF values from the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.2). However, the CH_4 and N_2O IEFs reported in the 2021 submission for 1993 (106.53 and 3.47 kg/TJ, respectively) and 1995 (97.46 and 3.18 kg/TJ, respectively) are higher than the default values, and the Party did not provide an explanation for this in the NIR. For gasoline, the Party continued to use the default values for motor gasoline with oxidation catalyst for the total amount of fuel consumed in road transportation (25 kg CH_4/TJ and 8 kg N_2O/TJ) from the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.2) without providing a justification in the NIR outlining the assumptions behind the use of these EFs. The Party also included emissions from light-duty vehicles (which have a lower default EF), heavy-duty trucks and buses, and motorcycles (reported as "IE" in CRF table 1.A(a)s3) under the road transportation category. The ERT noted that gasoline-fuelled vehicles are not necessarily equipped with catalytic converters and that the default EF for motor gasoline without catalytic converters is higher for CH_4 (33 kg/TJ) and lower for N_2O (3.2 kg/TJ) compared with the values used by the Party. During the review, the Party informed the ERT that it plans to use the default EFs for motor gasoline without catalytic converters for its next inventory submission.
E.37	1.A.3.b Road transportation – liquid fuels – CO_2 (E.35, 2019) (E.17, 2017) (E.19, 2016) (E.19, 2015) (38, 2013) (48, 2012) Accuracy	Use country-specific CO_2 EFs to estimate emissions for this key category.	Not resolved. The Party continued to use the default CO_2 EFs from the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.1) to estimate emissions for this key category (see ID# E.2 above). During the review, the Party clarified that it will make every effort to apply country-specific CO_2 EFs for automobile fuels for future inventory submissions.
E.38	1.A.3.b Road transportation – liquid fuels – CO_2 (E.55, 2019) Accuracy	Apply the correct default CO_2 EF for LPG (63.10 kg/TJ) according to the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.1) and recalculate CO_2 emissions accordingly and report the recalculations in the NIR in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. Belarus applied the default CO_2 EF for LPG from the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.1) for the entire time series for its 2020 and 2021 submissions and provided an explanation for the recalculation in the 2020 NIR (section 3.2.6.5, p.42).
E.39	1.A.3.b Road transportation 1.A.3.c Railways –	Verify whether lignite and BKB are used for energy or heating and report on the results in the NIR. In case lignite and BKB are used for	Not resolved. No recalculations or reallocations were made for other fuels under subcategories 1.A.3.b (road transportation) and 1.A.3.c (railways), and the NIR does not provide any additional information on BKB and lignite use (for energy or heating) for

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	other fossil fuels – CO_2, CH_4 and N_2O (E.56, 2019) Comparability	energy, reallocate the consumption of these fuels to category 1.A.3.c. In case lignite and BKB are used for heating, reallocate the consumption of these fuels used in the railway sector to category 1.A.4.a (commercial/institutional).	those subcategories. During the previous review Belarus explained that lignite and BKB are the fuels included under other fossil fuels and that they are used under subcategory 1.A.3.c (railways) but reported under subcategory 1.A.3.b (road transportation). Belarus reported in CRF table 1.A(a)s3 of the 2021 submission quantities of other fossil fuels used for road transportation (e.g. 12.07 TJ for 2019), and the ERT was unable to find information in the NIR on the fuel types considered under other fossil fuels for this subcategory. The Party reported AD and emissions for other fossil fuels as "NO" but provided AD on the use of solid fuels (145.48 TJ) for subcategory 1.A.3.c. During the review, the Party clarified that it will address this issue for the next inventory submission. The ERT considers that lignite and peat briquettes (BKB) are most likely used for heating purposes in the railway sector rather than for mobile combustion in the transport sector, and emissions should therefore be included under subcategory 1.A.4.a (commercial/institutional). For information on the Party's reporting of BKB, see ID# E.55 in table 5.
E.40	1.A.4.a Commercial/institutional – liquid fuels – CO_2 (E.57, 2019) Convention reporting adherence	Correct the 2017 value of the CO_2 EF for liquid fuels in CRF table 1.A(a)s4.	Resolved. The Party corrected the 2017 value of the CO_2 EF for liquid fuels from 134.74 to 73.85 t/TJ for subcategory 1.A.4.a commercial/institutional in CRF table 1.A(a)s4 in its 2020 submission. The revised value is within the default range of 63–77 t CO_2/TJ from the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.4).
E.41	1.A.4.c Agriculture/forestry/fishing – all fuels – all gases (E.39, 2019) (E.28, 2017) (E.36, 2016) (E.36, 2015) Transparency	Collect relevant AD to ensure the transparency and comparability of the reporting for this category, and ensure the consistency of the information provided in the NIR and CRF tables by using the correct notation keys, when it is not possible to disaggregate the emissions.	Resolved. The Party reported emissions for subcategory 1.A.4.c.ii (off-road vehicles and other machinery) separately under subcategory 1.A.4.c in its 2021 submission. CRF table 1.A(a)s4 and the NIR (section 3.2.7.5, p.56) now report consistent information on AD and emission allocation; emission estimates for all gases were reported under subcategory 1.A.4.c.ii in CRF table 1.A(a)s4 and "IE" was reported for subcategory 1.A.4.c.iii (fishing), as explained in the NIR and CRF table 9.
E.42	1.A.5.a Stationary – all fuels – CO_2, CH_4 and N_2O (E.58, 2019) Transparency	Include in the NIR a section to describe the AD, EFs and method applied to calculate emissions under this category.	Not resolved. The Party did not include a dedicated section in the NIR on category 1.A.5, nor did it describe the AD, EFs or method applied to estimate emissions for the subcategory. During the review, the Party clarified that it will address this issue for its next inventory submission.
E.43	1.A.5.a Stationary – all fuels – CO_2, CH_4 and N_2O (E.58, 2019) Transparency	Collect more information from Belstat to identify whether the fuels reported in the energy balance as "distribution losses" are combusted or released as fugitive emissions and document in the NIR the result of this research. If some of the fuels are not combusted – particularly for natural gas, which might not be combusted – revise the AD and recalculate emissions under category	Not resolved. The NIR does not contain any information on investigations performed to identify whether the fuels reported in the energy balance as "distribution losses" are combusted or released as fugitive emissions. No recalculations were made for the subcategory 1.A.5.a. During the review, the Party clarified that it will address this issue for the next inventory submission. The ERT noted that during the previous review the Party clarified that all fuels reported in the energy balance as "distribution losses", including natural gas, peat, firewood, BKB, gasoline, gas/diesel oil, LPG and refinery gas, are allocated under subcategory 1.A.5.a. The ERT reaffirms that, if some of these fuels are

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		1.A.5.a by excluding the amount of fuels not combusted and reallocating it under the correct fugitive emissions category (oil or natural gas).	released in the form of fugitive emissions, they should be accounted for under subcategories 1.B.2.a (oil) and 1.B.2.b (natural gas).
E.44	1.A.5.b Mobile – all fuels – CO_2, CH_4 and N_2O (E.59, 2019) Convention reporting adherence	Report the correct notation key, "IE", for AD and emissions for this category in CRF table 1.A(a)s4 and provide explanatory information in CRF table 9 accordingly.	Addressing. In CRF table 1.A(a)s4 the Party corrected the notation key to "IE" for AD and emissions for subcategory 1.A.5.b mobile, explaining in CRF table 9 that, following consultations with Belstat, emissions for the subcategory were included under subcategory 1.A.3.a (domestic aviation). However, the ERT noted issues with the reporting of emissions under subcategory 1.A.3.a (see ID# E.34 above) and observed that CRF table 9 does not make any reference to emissions from military navigation.
E.45	1.A.5.b Mobile – all fuels – CO_2, CH_4 and N_2O (E.59, 2019) Transparency	Include in the NIR a section describing the AD (types of fuels) used in military activities and where emissions are allocated.	Not resolved. The Party did not include a dedicated section in the NIR on category 1.A.5 or describe the AD, EFs and method applied to estimate emissions for the category. According to the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.1), emissions from domestic military aviation and navigation should be reported under this category. During the previous review, the Party explained that, according to information provided by Belstat, fuels consumed by domestic military aviation and navigation are included under subcategories 1.A.3.a (domestic aviation) and 1.A.3.d (domestic navigation) (see ID#s E.34 and E.44 above). The Party clarified during the current review that the issue will be addressed for the next inventory submission.
E.46	1.B.2 Oil and natural gas and other emissions from energy production – liquid and gaseous fuels – CH_4 (E.40, 2019) (E.20, 2017) (E.25, 2016) (E.25, 2015) (44, 2013) Convention reporting adherence	Develop QC procedures for the oil and natural gas category in order to ensure the accuracy of estimates, time-series consistency, the correct use of notation keys and the transparency of the information provided in the NIR.	Addressing. The Party reported general information on QC in the NIR (section 3.3.2.4, p.60) for category 1.B.2 only. Belarus changed its reporting to "IE" for AD and emissions for subcategory 1.B.2.c.1.i (venting, oil), which, according to CRF table 9, are included under subcategory 1.B.2.c.2.iii (flaring, combined). However, the ERT noted a number of issues with the Party's reporting for the category (see ID#s E.47–E.53 below), which led it to conclude that the QC procedures were not sufficiently developed and applied to ensure the accuracy of estimates, time-series consistency, the correct use of notation keys and the transparency of the information provided in the NIR.
E.47	1.B.2 Oil and natural gas and other emissions from energy production – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.43, 2019) (E.29, 2017) (E.37, 2016)	Use methods and EFs in accordance with the 2006 IPCC Guidelines, and provide in the NIR detailed and documented information on AD and EFs used in the estimation of all gases for all subcategories under fugitive emissions from oil and natural gas.	Not resolved. According to the NIR (section 3.3.2.2, p.59), the Party used methodologies from the 2006 IPCC Guidelines to produce estimates for the category, except for natural gas transmission under subcategory 1.B.2.d (other), for which country-specific methods were applied. However, the Party only referenced CH_4 emissions in the NIR and did not mention CO_2 and N_2O emissions or specify the EFs used. According to information provided in CRF Reporter, Belarus used a tier 1 method and default EFs to estimate CO_2, CH_4 and N_2O emissions for subcategories 1.B.2.a.2 (oil production), 1.B.2.a.3 (oil transport), 1.B.2.a.4 (oil refining/storage), 1.B.2.b.2 (natural gas production) and 1.B.2.d (other). However, the default EF for the tier 1 approach from the 2006 IPCC Guidelines

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(E.37, 2015) Accuracy		(vol. 2, chap. 4, tables 4.2.4–4.2.5) for those subcategories requires AD in 10^6 m^3 gas production and 10^3 m^3 oil produced or transported, but CRF table 1.B gives the AD units for category 1.B.2 as PJ. During the review, the Party indicated that, initially, all AD were in kt or m^3 and were subsequently recalculated in PJ. The Party provided detailed information on the EFs used for subcategories 1.B.2.a.2 (oil production), 1.B.2.a.3 (oil transport), 1.B.2.a.4 (oil refining/storage), 1.B.2.b.2 (natural gas production), 1.B.2.a.6 (other) and 1.b.2.d (other), from which the ERT concluded that the Party continued to use values that are not in accordance with the 2006 IPCC Guidelines. For example, for subcategory 1.B.2.a.2 (oil production), the Party continued to apply CH_4 and CO_2 EFs of 0.00145 kt $CH_4/10^3$ m^3 oil produced and 0.00027 kt $CO_2/10^3$ m^3 oil produced from the IPCC good practice guidance (table 2.16), and for subcategory 1.B.2.a.4 (oil refining) Belarus continued to apply the upper range value from the Revised 1996 IPCC Guidelines (vol. 3, table 1-58, p.1.121) for the CH_4 EF (1,400 kg/PJ). During the review, the Party clarified that appropriate investigations were carried out and it will address the issue for the next inventory submission. However, the information provided by the Party indicates that, although it plans to revise some of the EFs, EFs from the Revised 1996 IPCC Guidelines will continue to be used. The ERT noted that the 2006 IPCC Guidelines should be used for the inventory and, if methods, EFs or parameters from the IPCC good practice guidance or the Revised 1996 IPCC Guidelines are used, their use should be well documented and justified in the NIR, and the Party should demonstrate that their use better represents national circumstances.
E.48	1.B.2 Oil and natural gas and other emissions from energy production – liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.44, 2019) (E.30, 2017) (E.38, 2016) (E.38, 2015) Transparency	Provide in the NIR detailed and documented information on methods, AD and EFs used in the estimates, in particular when changes in methodologies, sources of information and assumptions are made in relation to recalculations, as well as information on the rationale for these recalculations and their impact on total emissions.	Not resolved. The Party did not carry out any recalculations for category 1.B.2 (except for subcategory 1.B.2.d) and only corrected the reference to the EFs from country-specific ("CS") to default ("D") in the CRF table. Recalculations were made for the subcategory for 2009–2018, resulting in substantial differences in CH_4 emission estimates between the 2020 and 2021 submissions, ranging from a decrease of 0.0008 per cent (2010) to an increase of 39.17 per cent (2017). However, the reasons for these differences were not explained in the NIR. Although the NIR (section 3.3.2.5) states that recalculations were performed in relation to subcategory 1.B.2.d (transport of natural gas) on the basis of information provided by Gazprom Transgaz Belarus, the changes and their impact on total estimated emissions were not clearly described, as specified in paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines. In addition, Belarus did not provide in the NIR detailed, documented information on the methods, AD and EFs used to estimate emissions under category 1.B.2 (see ID# E.47 above). During the review, the Party clarified that it performed the necessary investigations for updating the category reporting and stated that it will address the issue for the next inventory submission by reporting the recalculations in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.
E.49	1.B.2 Oil and natural gas and other	Estimate emissions from exploration activities, which may occur in the country, by	Not resolved. In CRF table 1.B.2 Belarus continued to report AD and CO_2, CH_4 and N_2O emissions for exploration activities as "NO" under subcategories 1.B.2.a oil and 1.B.2.b

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	emissions from energy production – liquid and gaseous fuels – CO_2 and CH_4 (E.45, 2019) (E.31, 2017) (E.39, 2016) (E.39, 2015) Transparency	collecting relevant missing AD in order to provide emission estimates of CH_4, CO_2 and N_2O from oil and natural gas exploration.	natural gas despite providing AD for oil and natural gas production in the same table. According to Belstat (see https://www.belstat.gov.by/ofitsialnaya-statistika/realny-sector-ekonomiki/energeticheskaya-statistika/anual-dannye/toplivno-energeticheskie-resursy-/ (in Russian)), oil production and associated gas production in Belarus amounted to 1,690 kt and 218 Mm^3, respectively, in 2019. Under the tier 1 methodology from the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.5, p.4.55), oil production AD should be used to estimate CO_2, CH_4 and N_2O emissions from exploration activities. Information published by the oil company Belorusneft (see https://www.belorusneft.by/sitebeloil/en/center/exploration/) suggests that some natural gas exploration activities may occur in the country. During the review, the Party noted that oil deposits in Belarus were explored in the 1960s, meaning that exploration activities have not occurred in recent years. Natural gas produced in Belarus is associated with petroleum gas. However, these explanations were not included in the NIR.
E.50	1.B.2 Oil and natural gas and other emissions from energy production – oil and natural gas – CH_4 (E.46, 2019) (E.44, 2017) Accuracy	Ensure the correctness of the units used for the AD and EFs for all categories under 1.B.2 oil and natural gas and other emissions from energy production and provide a detailed explanation for the choice of EFs.	Not resolved. No recalculations were performed for the category for the 2020 or 2021 submissions. In CRF table 1.B.2 Belarus reported a unit of 10^6 m^3 gas consumed under subcategories 1.B.2.4 (transmission and storage), 1.B.2.b.5 (distribution) and 1.B.2.c (venting and flaring), which is in line with the tier 1 approach from the 2006 IPCC Guidelines (vol. 2, chap. 4, tables 4.2.4–4.2.5). However, for all subcategories under 1.B.2.a (oil) (except 1.B.2.a.1 (exploration)) and for subcategory 1.B.2.b.2 (natural gas production), Belarus continued to report AD in PJ, which is inconsistent with the EF units from the 2006 IPCC Guidelines, which provide default EFs in Gg per 10^6 m^3 fuel or Gg per 10^3 m^3 fuel for gas and oil, respectively. The Party did not provide in the NIR information on the conversion factors used (from Gg per 10^6 m^3 to Gg per PJ), nor did it explain how the EFs used for these categories were derived. During the previous review, the Party clarified that the conversion factors for the AD under subcategory 1.B.2.a (oil) were 0.0423 for 10^3 t to PJ and 0.872 for t to m^3, but this information was not included in the NIR. During the current review, the Party provided the CH_4 EFs for the subcategories, including for subcategory 1.B.2.a.2 (oil production) (0.00145 kt/10^3 m^3); 1.B.2.a.3 (oil transport) (0.0000054 kt/10^3 m^3); 1.B.2.a.4 (oil refining/storage) (0.0014 kt/PJ); 1.B.2.a.6 (other) (0.00025 kt/PJ); and 1.B.2.b.2 (natural gas production) (0.0029 kt/10^6 m^3). However, these do not reflect the default EF values for developed and developing countries suggested by the 2006 IPCC Guidelines (vol. 2, chap. 4, tables 4.2.4–4.2.5). Information on the choice of EFs was not provided in the NIR. The Party also provided the country-specific CH_4 EFs for subcategory 1.B.2.d other (natural gas transport), which range from 4,360.62 kg/PJ for 2013 to 8,079.11 kg/PJ for 2000 (see ID# E.47 above). During the review, Belarus clarified that it carried out investigations for the category and will apply default weighted average values for the subcategories for future inventory submissions. The ERT welcomes the information provided by the Party and reiterates the need to provide a detailed explanation of the choice of EFs and a justification for their use in the next NIR.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.51	1.B.2.b Natural gas – gaseous fuels – CH_4 (E.47, 2019) (E.18, 2017) (E.21, 2016) (E.21, 2015) (40, 2013) Transparency	Include in the NIR data on the volume of gas transmission (including any transit amounts) to improve transparency.	Not resolved. Although Belarus did not include in the NIR AD for natural gas transmission, it reported recalculations on the volumes for natural gas transit (NIR table 3.16, section 3.3.2.5, p.60) in PJ (e.g. 2,048.45 PJ for 2019), naming Gazprom Transgaz Belarus as the source of the information. However, it is still unclear whether the reported values account for the quantities transited through the Yamal–Europe, Northern Lights and Minsk–Kaliningrad natural gas pipelines. Although the AD for subcategory 1.B.2.b.4 (natural gas transmission) (i.e. 20,479.00 10^6 m^3 gas consumed in 2019) should include the transited quantities, AD for gas transit were reported separately under subcategory 1.B.2.d (other). The NIR lacks detailed information on the volume of natural gas transmission, including transit amounts. Belarus clarified during the review that the AD for subcategory 1.B.2.b.4 relate to the volume of natural gas processed and delivered to market (to industrial consumers and natural gas distribution systems) and the volume of natural gas in storage systems, calculated as the sum of associated gas production and imports of natural gas from the Russian Federation from the energy balance (the same value reported in CRF table 1.A(b)). The AD for subcategory 1.B.2.d relate to the volume of natural gas transit, and all estimations were performed directly by Gazprom Transgaz Belarus on the basis of monitoring data.
E.52	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4 (E.48, 2019) (E.43, 2017) Accuracy	Include in the AD under category 1.B.2.b.4 (gas transmission and storage) all gas transmitted by the pipeline system to industrial consumers or natural gas distribution systems, including both produced and imported natural gas, as well as emissions from natural gas storage systems, calculated separately.	Addressing. CRF table 1.B.2 reports AD for subcategories 1.B.2.b.4 (natural gas transmission and storage) and 1.B.2.b.5 (natural gas distribution) of 20,479 10^6 m^3 gas consumed, which accounts for the volume of gas imported (20,261 10^6 m^3) and the volume of associated petroleum gas produced (218 10^6 m^3) in Belarus. Assuming that all gas was supplied and taking into account the absence of export activities, the same AD were reported for gas distribution and gas transmission activities. However, the NIR does not include any additional information on emissions from natural gas storage in the three underground storage facilities operating in Belarus (Mozyrskoye, Osipovichskoye and Pribugskoye, opened in 2008, 1976 and 2000, respectively). Belarus also reported gas transit data under subcategory 1.B.2.d (other), naming Gazprom Transgaz Belarus as the source of the information (see ID# E.51 above). During the review, the Party explained that it has investigated the matter and plans to address the issue and revise the EF used under subcategory 1.B.2.b.4 for the next inventory submission.
E.53	1.B.2.b Natural gas gaseous fuels – CO_2 and CH_4 (E.49, 2019) (E.43, 2017) Transparency	Provide detailed information in the NIR on the methodology used for the emission estimates, and justifications for the completeness of the AD.	Not resolved. Belarus did not provide in the NIR (section 3.3.2) detailed information on AD calculations or the methodology applied for subcategories 1.B.2.b.4 (natural gas transmission and storage), 1.B.2.b.5 (natural gas distribution) and 1.B.2.d other (natural gas transport) or explain how it ensured the completeness of the estimates. During the review, the Party indicated that it is investigating the issue and plans to resolve it for the next inventory submission.
IPPU			
I.1	2.A.1 Cement production – CO_2	Include in the NIR information on the annual factory-specific CaO content and an	Resolved. The Party reported in its NIR (section 4.2, table 4.3, p.67) the values for CaO content in clinker produced for all three cement producers operating in the country across the entire time series, together with information on clinker production per producer and

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(I.22, 2019) Transparency	explanation of how the national EF for clinker was derived.	the method ("dry" or "wet") used in the production plants in 1990–2019 (NIR section 4.2.1.2, p.68). According to the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.12), for an EF to be derived for clinker, the CaO content of the clinker and the fraction of CaO that was derived from a carbonate source must be known. In the NIR (section 4.2.1.3, p.69), the Party reported that it derived the EF by applying the assumption that 100 per cent of CaO is derived from calcium carbonate and the default assumption that emissions from cement kiln dust are 2 per cent of process-related emissions (2006 IPCC Guidelines, vol. 3, chap. 2, p.2.11).
I.2	2.A.3 Glass production – CO_2 (I.3, 2019) (I.15, 2017) Consistency	Ensure the time-series consistency of the emissions by applying the same data source for the entire time series, or, if this is not possible, apply a splicing technique from the 2006 IPCC Guidelines to ensure the consistency of the time series. Include information in the NIR on data sources and on any changes in order to increase transparency.	Resolved. The Party reported in the NIR (section 4.2.3.2, p.73) several data sources for the category, namely Belstat, the Ministry of Architecture and Construction of Belarus and the country's main glass producers. According to the NIR (section 4.2.3, pp.72–75, and table 4.10, p.78), the Party estimated emissions from float glass production by applying float glass data from the Ministry of Architecture and Construction for 1990–2004 and 2006 and information from two factories, JSC Grodno Glassworks and JSC Gomel Glass, for 2008 onward. The float glass data for 2005 and 2007 were obtained through interpolation. To demonstrate how it ensured time-series consistency, the Party reported in its NIR (figure 4.2, p.75) a comparative analysis of flat glass production data by sources for the whole time series, comparing the Belstat data for the entire time series with the data provided by the other two sources and showing the correlation between them. The Party reported in its NIR (p.74) that emissions from container glass production were estimated on the basis of Belstat data for the entire time series.
I.3	2.A.4 Other process uses of carbonates – CO_2 (I.4, 2019) (I.7, 2017) (I.9, 2016) (I.9, 2015) Accuracy	Clarify the activities where soda ash is used and subtract the amount accounted for in other categories (e.g. glass production) from the total soda ash consumed in the country to estimate CO_2 emissions for this category, avoiding any double counting.	Resolved. The Party reported in its NIR (section 4.2.4.2, p.78) information on the industrial processes that involve the use of soda ash, including a list of other processes besides glass production. The Party also reported in its NIR (table 4.10, p.79) separate information on soda ash consumption in glass production and other sectors for 1990–2019. The Party's reporting on the category was updated across the time series to reflect revisions to the AD (NIR section 4.2.4.5, p.81). The amount of soda ash used for glass production was subtracted from the total amount of soda ash consumed in the country, ensuring that no double counting occurred.
I.4	2.A.4 Other process uses of carbonates – CO_2 (I.5, 2019) (I.7, 2017) (I.9, 2016) (I.9, 2015) Transparency	Describe the activities and sources of emissions from other uses of soda ash, trends and choice of AD in the NIR.	Resolved. In the NIR (section 4.2.4.2) the Party included information on the activities and emissions sources for other uses of soda ash (p.78) and explained the AD trend (p.80). The Party reported in its NIR (table 4.10, p.79) information on soda ash consumption for 1990–2019, explaining that the AD are based on a combination of national statistical data on soda ash consumption and data from soda ash producers and the United Nations Comtrade Database (NIR p.78). A partial data combination method was used to ensure consistency of AD for the reporting period. Since 2020 the Party has also requested data from the petrochemical industry and companies producing detergents. As the data on various activities and sources are not collected centrally and are only available at plant level and given that this is not a key category, the Party reported bulk soda ash consumption data corrected for the use for glass production in the NIR (p.78).

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
I.5	2.B Chemical industry – CO_2, CH_4 and N_2O (I.6, 2019) (I.9, 2017) (I.11, 2016) (I.11, 2015) Transparency	Ensure that the information in the NIR on emission estimates for this category is fully transparent in accordance with the requirements of the UNFCCC Annex I inventory reporting guidelines and include information on EFs used, references and descriptions of the production processes for the reported subcategories under the category chemical industry.	Addressing. The previous ERT recognized improvements to the information provided in the NIR on the subcategories reported under the category chemical industry but noted that the Party reported AD, EFs and emissions for categories 2.B.4 (caprolactam production), 2.B.7 (soda ash production) and 2.B.8 (methanol and acrylonitrile production) but did not provide information on production processes. In its 2021 NIR (section 4.3.4, p.87, and section 4.3.8, p.91), the Party described the caprolactam, methanol and acrylonitrile production processes, but information on the soda ash production process was not reported (section 4.3.7). During the review, the Party clarified that it will include further information on the processes for soda ash production in the next NIR.
I.6	2.B.1 Ammonia production – CO_2 (I.7, 2019) (I.8, 2017) (I.10, 2016) (I.10, 2015) Transparency	(a) Reconfirm the AD with the ammonia producer, including the amounts of CO_2 recovery for urea production, revise the estimates of CO_2 emissions from ammonia production on this basis for the whole time series, using the tier 2 or tier 3 method; (b) Provide in the NIR a description of production process, EFs and AD used.	(a) Resolved. Emissions from ammonia production were recalculated for the entire time series and information on CO_2 recovery was reported for the first time in the 2021 submission. Belarus used a tier 2 approach for the estimates, applying equation 3.3 of the 2006 IPCC Guidelines (vol. 3, chap. 3, p.3.13). The NIR (section 4.3.1.1) contains information on the urea production process (pp.81–82) in addition to AD on urea production and related CO_2 emission and recovery estimates for the whole time series (table 4.12, p.83); (b) Addressing. Although the NIR contains information on the AD and EF used (section 4.3.1.2, pp.83–84), it does not describe the ammonia production process. During the review, the Party provided the scheme of the technologies used in ammonia production.
I.7	2.B.1 Ammonia production – CO_2 (I.23, 2019) Accuracy	Identify the correct value of the fuel requirement per unit of output (in GJ/t ammonia produced) and recalculate the CO_2 emissions for the whole time series.	Resolved. The Party reported recalculations for the category in its 2020 and 2021 submissions, with the CO_2 IEF increasing from the constant value of 1.97 t CO_2/t ammonia to a range of values between 2.03 and 2.08 t CO_2/t ammonia (CRF table 2(I)A-H). The 2020 and 2021 NIRs (section 4.3.1.5) explain that the recalculations are linked to the revisions of the NCV, the carbon content of natural gas, and fuel consumption data. According to the NIR (section 4.3.1.2, p.83), the specific coefficient of natural gas consumption (in m^3 per t ammonia produced) was provided by the ammonia manufacturer; the carbon content and conversion factor used (14.836 kg C/GJ and 33.84 10^9 m^3/TJ, respectively) are the same as those used by the Russian Federation, where the country's natural gas is imported from; and the default carbon oxidation factor from the 2006 IPCC Guidelines (vol. 3, chap. 3, table 3.1, p.3.15) was applied. The ERT noted that the fuel requirement value was provided in the 2020 NIR (table 4.9) but not in the 2021 NIR (see ID# I.9 below).
I.8	2.B.1 Ammonia production – CO_2 (I.23, 2019) Transparency	Improve the methodological description in the NIR by clarifying the types of fuel used in the production of ammonia (if only natural gas) and the two equations used, including the values of the parameters applied, to estimate CO_2 emissions (equations 3.2 and 3.3 of the 2006 IPCC Guidelines).	Addressing. The Party reported in its NIR (section 4.3.1.2, p.83) that it used the tier 2 approach to estimate CO_2 emissions for the category, applying equation 3.3 of the 2006 IPCC Guidelines (vol. 3, chap. 3, p.3.13), and that all natural gas used in ammonia production is imported from the Russian Federation (see ID# I.7 above). However, the Party did not report any information on the use of equation 3.2 of the 2006 IPCC Guidelines (vol. 3, chap. 3, p.3.13), even though it represents the first step in the estimation method for ammonia production and determines the total fuel requirement used to estimate CO_2 emissions (equation 3.3) according to the 2006 IPCC Guidelines. In

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			addition, in the NIR (section 4.3.1.1, table 4.12) and in CRF table 2(I).A-Hs1, the Party reported the amount of ammonia produced as AD instead of reporting natural gas used as feedstock for ammonia production, as required by the tier 2 method. During the review, the Party confirmed that only natural gas is used as feedstock and equation 3.2 was used to estimate CO_2 emissions. Belarus provided the calculation sheets for the category, including the estimation of total fuel requirement and CO_2 emissions.
I.9	2.B.1 Ammonia production – CO_2 (I.23, 2019) Transparency	Provide in the NIR (table 4.8) the total fuel requirement of the natural gas used for the production of ammonia.	Addressing. In the NIR (section 4.3.1.2, p.83) the Party explained that the fuel used is natural gas imported from the Russian Federation and information on the fuel requirement of natural gas (in m^3 per t ammonia produced) is provided by the manufacturer (JSC Grodno Azot). However, although the NIR (p.83) provides the NCV, carbon content and oxidation factor (33.82 10^9 m^3/TJ, 14.836 kg/GJ and 1, respectively), the value of the total fuel requirement of the natural gas used for ammonia production (GJ/t) was not included in NIR table 4.12 (p.83), equivalent to table 4.8 of the 2019 NIR. During the review, the Party noted that the total fuel requirement was provided in table 4.19 of the 2020 NIR and clarified that it will report the fuel requirement values in the next inventory submission. Also, the Party provided the Excel file used to estimate emissions from ammonia production for 1990–2019, which shows constant total fuel requirement values for 1990–2007 and variable values thereafter (e.g. 1,116.00 m^3/t ammonia for 2019). Noting the information provided in the previous inventory submission, the ERT considers that the recommendation has not yet been fully addressed because the Party did not provide the total fuel requirement value in its 2021 submission.
I.10	2.B.2 Nitric acid production – N_2O (I.11, 2019) (I.19, 2017) Consistency	Ensure the time-series consistency of emission estimates by applying the same data source for the entire time series, or, if this is not possible, apply a splicing technique from the 2006 IPCC Guidelines to ensure the consistency of the time series.	Addressing. There are no longer inconsistencies in the AD between 2011 and 2012, and the same data source was used across the time series. The Party reported in its NIR (section 4.3.2.2, p.86) that JSC Grodno Azot, a nitric acid manufacturer, provides the AD, sharing the average amount of nitric acid produced for 1990–2016 and providing annual production data since 2017. As a result, CRF table 2(I)A-H contains constant AD for 1990–2016 (213.76 kt), while the AD for 2017–2019 vary, rising to 356.39 kt in 2019. Given the variation in the AD for recent years, the ERT considers that the assumed constant value may not be representative of the N_2O emission trend for 1990–2016. During the review, the Party clarified that the national inventory team will continue to collect consistent data for the whole time series, or, if this is not possible, it will consider using a splicing technique to ensure time-series consistency.
I.11	2.B.2 Nitric acid production – N_2O (I.12, 2019) (I.19, 2017) Transparency	Include information in the NIR on data sources and on any changes in order to increase transparency.	Resolved. The Party reported in its NIR (section 4.3.2.2, p.86) that the nitric acid manufacturer provides the AD (see ID# I.10 above). In addition, the Party explained in the NIR (section 4.3.2.1, p.85) that the increase in AD for 2019 is due to the opening of a new production line.
I.12	2.C.1 Iron and steel production – CO_2 (I.15, 2019) (I.21,	Describe more clearly the origin of the carbon-containing materials used for direct reduction iron and cast iron used in steel-	Addressing. The Party described in its NIR (section 4.4.1.1, p.97) the features of Belarus's metal industry, explaining that products are manufactured using imported raw materials, and scrap metal from industrial processes in the country. However, information on the

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	2017) Transparency	making processes in the NIR (e.g. whether the inputs are imported).	origin of the inputs was not included in the NIR. During the review, the Party clarified that direct reduction iron is not produced in the country and cast iron is either a secondary product from steel-making processes imported from the Russian Federation or collected as a form of scrap metal from industrial activities in the country.
I.13	2.C.1 Iron and steel production – CO_2 and CH_4 (I.24, 2019) Comparability	Report the AD and emissions for electric arc furnaces under category 2.C.1.a (steel).	Resolved. The Party reported in CRF table 2(I).A-Hs2 emissions from secondary steel-making processes under subcategory 2.C.1.a (steel), reallocating them from subcategory 2.C.1.f (other). The AD in CRF table 2(I).A-Hs2 are reported in kt steel production (alternating current electric arc furnace processing) consistently with the data in NIR table 4.20 (p.98).
I.14	2.D Non-energy products from fuels and solvent use – CO_2, CH_4 and N_2O (I.17, 2019) (I.11, 2017) (I.13, 2016) (I.13, 2015) Completeness	Collect relevant available AD and estimate emissions for all subcategories under category 2.D for the complete time series for which the 2006 IPCC Guidelines provide estimation methods.	Addressing. The Party reported CO_2 emissions for category 2.D.2 (paraffin wax use) and emissions of non-methane volatile organic compounds, carbon monoxide, NO_X and sulfur dioxide for category 2.D.3 (other). The Party has not yet estimated CO_2 emissions for category 2.D.1 (lubricant use), which were reported as "NE" in CRF table 2(I).A-Hs2. The Party reported in its NIR (section 4.5, table 4.21) the AD on paraffin wax use, including on domestic manufacturing for the entire reporting period and import/export from 1998. Moreover, the Party reported in its NIR (section 4.5, p.103) that it plans to collect AD on production of solid paraffins for years up to 2011 and imports/exports for years up to 1998. The Party also reported in its NIR (section 4.5.5.6, p.101) that it plans to request information from the Customs Committee on the import and export of lubricants and to collect data on lubricant production and calculate emissions from lubricant use. In addition, the Party reported in CRF table 2(1).A-Hs2 CH_4 and N_2O emissions as "NO" under categories 2.D.1 and 2.D.2. The ERT considers that, although the 2006 IPCC Guidelines do not contain a method for estimating CH_4 and N_2O emissions for these categories, it would be more appropriate to report "NE" as per footnote 6 of the UNFCCC Annex I inventory reporting guidelines. During the review, the Party clarified that it will update the notation key in accordance with the UNFCCC Annex I inventory reporting guidelines and the ERT recommendation. The ERT considers that the recommendation has not yet been fully addressed because the Party did not report information on AD and emissions for lubricant use and production of solid paraffins or import/export data on paraffins for 1990–1997.
I.15	2.E Electronics industry – HFCs, PFCs, SF_6 and NF_3 (I.18, 2019) (I.25, 2017) Completeness	Either estimate emissions from the electronics industry, or, if this is not possible, apply the correct notation key "NE", and provide a reason in the NIR and CRF table 9 for why the emissions cannot be estimated.	Addressing. The Party reported in its NIR (section 4.6, p.108) that, as Belstat does not have the necessary data to estimate emissions for the category, it plans to collect factory data. Consequently, Belarus reported "NE" in CRF tables 2(I)s2 and 2(II) and explained in CRF table 9 that emissions could not be estimated owing to lack of AD. During the review, the Party clarified that AD were provided by enterprises for several years and the category reporting will be revised in 2022.
I.16	2.F Product uses as substitutes for ozone-depleting substances – HFCs, PFCs, SF_6 and	Obtain AD and report emission estimates for all gases.	Not resolved. The Party did not report any emissions for the category in the CRF tables. Belarus reported in its NIR (section 4.7, pp.108–109) and confirmed during the review that it plans to start collecting information on the export and import of HFCs (including

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	NF_3 (I.19, 2019) (I.4, 2017) (I.6, 2016) (I.6, 2015) (55, 2013) (60, 2012) Completeness		mixed refrigerants) and PFCs at least for category 2.F.1 refrigeration and air conditioning for inclusion in the next NIR.
I.17	2.F.4 Aerosols – HFCs and PFCs (I.26, 2019) Transparency	Report the correct notation key, "NE", for HFC and PFC emissions in CRF table 2(I)s2 and include the necessary explanation in CRF table 9.	Not resolved. In CRF table 2(I)s2, the Party left empty cells for category 2.F (product uses as substitutes for ozone-depleting substances) and all its subcategories rather than reporting notation keys and did not provide an explanation in CRF table 9. During the review, the Party clarified that in the next inventory submission it will report the correct notation keys in the appropriate CRF tables and provide explanations in CRF table 9.
I.18	2.G.1 Electrical equipment – SF_6 (I.21, 2019) (I.26, 2017) Completeness	Increase efforts to include emissions from installation and disposal of electrical equipment in the next inventory submission.	Not resolved. The Party continued to provide only operational emissions of SF_6 for this category in CRF table 2(II)B-Hs2 and reported SF_6 emissions from manufacturing and disposal, as well as for recovery, as "NE". The NIR (section 4.8.1.2, p.110) only discusses the Party's approach to estimating emissions due to leakage in relation to emissions from equipment use, and does not cover emissions from installation and disposal of electrical equipment, while CRF table 9 is also missing any additional information. According to the NIR (section 4.8.1.6), no improvements are planned for the category. During the review, the Party confirmed that the completeness matter has still not been resolved.
I.19	2.G.2 SF_6 and PFCs from other product use – SF_6 and PFCs (I.25, 2019) Completeness	Estimate SF_6 and PFC emissions for this category. While this is not possible, report "NE" for SF_6 and PFC emissions under category 2.G.2 and include in CRF table 9 the necessary explanation and provide in the NIR a section explaining the current status of this source in the country and the reasons for not estimating the emissions.	Addressing. The Party reported SF_6 and PFC emissions as "NE" (rather than "NO") for category 2.G.2 in CRF table 2(I)s2. However, CRF table 9 does not contain information on the use of the notation key, and the Party did not clarify in the NIR why emissions were not estimated for this category. During the review, the Party clarified that it will revise the information reported on this category in the next NIR on the basis of the recommendation.
Agriculture			
A.1	3. General (agriculture) – CH_4 and N_2O (A.5, 2019) (A.10, 2017) (A.11, 2016) (A.11, 2015) Accuracy	Estimate the average annual population of growing animals that are alive for less than a year using national data on their life cycle and equation 10.1 of the 2006 IPCC Guidelines (vol. 4, chap. 10).	Addressing. The Party reported in its NIR (section 5.2.2, pp.121–122) the AD used to estimate average annual livestock numbers for farm animals. The Party provided information on how non-dairy cattle were characterized by sex and age, with groups including heifers up to 12 months and bulls up to 12 months. The entire time series was recalculated to take into account the change in the methodology for estimating the average annual population (NIR section 5.2.5, p.131). However, the NIR does not report on additional populations of growing animals that live for less than a year, including dairy cattle, swine, sheep, goats, poultry and rabbits. The ERT noted that the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.1, p.10.11) list animal populations with growing animals, where relevant. During the review, the Party clarified that data on average animal populations were calculated by experts from a national scientific research centre of animal

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			husbandry. The Party further clarified that non-dairy cattle and swine populations were recalculated by category according to age and sex; the population estimates for sheep, goats, rabbits and some fur animals correspond to national statistical data; and fox, ice fox and nutria populations were calculated using rotation factors. The Party stated that it will provide in its next NIR more detailed information on the conversion factors used to estimate animal populations in such a way that animals that live for less than a year are factored in.
A.2	3. General (agriculture) – CO_2, CH_4 and N_2O (A.9, 2019) (A.27, 2017) Transparency	Include in the NIR references to the data sources of the uncertainty values in all relevant sections where uncertainty values are reported.	Resolved. The Party reported in its NIR references to the data sources of the uncertainty values in all sections (5.2.3, 5.3.3, 5.4.3, 5.5 and 5.6) where uncertainty values are reported.
A.3	3.A Enteric fermentation – CH_4 (A.32, 2019) Accuracy	Collect data to calculate a more accurate estimate of GE for dairy and non-dairy cattle, taking into account animal productivity, diet quality and management circumstances and the changes in the husbandry sector throughout the time series (i.e. weight, average weight gain, mature weight, average number of hours worked per day, feeding situation, mean winter temperature, average daily milk production, fat content, percentage of females that give birth in a year and feed digestibility), representing, at least, the current and 1990 characteristics of the animals and interpolating for the other years of the time series.	Addressing. The Party reported recalculations for cattle in its 2020 submission, explaining that the changes relate to feed digestibility and the feeding situation across the entire time series (see section 5.2.5, p.111, of the 2020 NIR). The 2021 NIR (section 5.2.2, p.121) indicates that the GE values for the various age groups for cattle were calculated separately for agricultural organizations, local farms and households using estimates of the net energy required for maintenance, activity, growth, and lactation and pregnancy. The NIR contains information on the average population (table 5.5, p.122), average daily weight gain (table 5.7, p.125) and milk production per day (table 5.9, p.128) for dairy and non-dairy cattle for 1990–2019. However, the number of hours worked per day was reported as "NO" in CRF table 3.As2, and other parameters used to estimate GE in dairy and non-dairy cattle, including weight, fat content, percentage of females that give birth per year and feed digestibility, are constant across the time series (see NIR section 5.2.2, p.126, and CRF table 3.As2), and as such do not take into consideration the changes in husbandry practices in the sector over the time series. During the review, the Party clarified that some parameters could not be derived from national statistics, and some parameters taken from agricultural standards and norms have not been updated. The ERT noted that the NIR does not report a timeline for improving additional parameters. The ERT considers that the recommendation has not yet been fully addressed because the Party did not apply annual parameters such as weight, fat content, percentage of females that give birth per year and feed digestibility, which would improve the accuracy of the GE values for dairy and non-dairy cattle for the period from 1990 to the present day.
A.4	3.A.1 Cattle – CH_4 (A.11, 2019) (A.13, 2017) (A.14, 2016) (A.14, 2015) Transparency	Include in the NIR a comparison analysis of the country-specific EFs and underlying parameters (milk production, weight, etc.) for dairy cattle with IPCC default values and EFs from countries with similar conditions, preferably in tabular format, with	Resolved. In addition to comparing the enteric fermentation CH_4 EFs used for dairy cattle and other cattle with the IPCC default values (2006 IPCC Guidelines, vol. 4, chap. 10, table 10.11) and those of countries with similar climatic conditions (table 5.10 of the 2017 and 2019 NIRs), in its 2020 and 2021 submissions the Party reported in the NIR (table 5.11, p.131) a comparative analysis for a number of underlying parameters such as milk yield and feed digestibility for dairy and non-dairy cattle, comparing them with the IPCC

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		explanations of substantial discrepancies identified.	default values for Eastern and Western Europe (2006 IPCC Guidelines, vol. 4, chap. 10, tables 10.2 and 10.11) and the parameters used by countries with similar climates, including Lithuania, Poland, the Russian Federation and Ukraine. The ERT noted that, following recalculations performed for the 2020 and 2021 submissions, none of the CH_4 IEFs used for dairy cattle across the time series (88.98–115.88 kg/head/year) are above the IPCC default range of up to 128 kg/head/year (2006 IPCC Guidelines, vol. 4, chap. 10, table 10.11) and the values are comparable with those reported by neighbouring countries.
A.5	3.B Manure management – CH_4 and N_2O (A.13, 2019) (A.16, 2017) (A.17, 2016) (A.17, 2015) Accuracy	Make efforts to collect data about the allocation fractions of non-dairy cattle and swine manure per liquid system with and without natural crust cover and revise the estimations of CH_4 and N_2O for this category. A well-documented expert judgment or survey results may be used as a data source for manure allocation per liquid system.	Addressing. The Party reported in its 2020 NIR (section 5.3.5, p.127) that it recalculated emissions for the category on the basis of the revision of the allocation fraction of non-dairy cattle and swine manure per liquid system with and without natural crust cover and the associated revision to the MCF. The 2021 NIR (section 5.3.2, p.137) provides information on the methodology applied, including the underlying assumption for the choice of MCF value for liquid system with natural crust cover. The value for a cool climate (≤ 10 °C) with crust cover from the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.17) is consistent with the average temperature in the country and is based on the assumption that manure storage is overgrown with vegetation, causing a natural crust to form where liquid manure is stored and preventing the release of CH_4. The Party reported that this is based on expert judgment (2020 NIR section 5.3.5, p.127), but no further details were included in the NIRs. During the review, the Party confirmed that 100 per cent of non-dairy cattle and swine manure liquid systems were allocated to natural crust cover but did not provide the ERT with the recalculations. The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide evidence in the form of a well-documented expert judgment or survey results with supporting information, as outlined in the protocol for expert elicitation included in annex 2A.1 of the 2006 IPCC Guidelines (vol. 1, chap. 2), for the assumption that 100 per cent of liquid manure systems have a natural crust.
A.6	3.B Manure management – CH_4 (A.17, 2019) (A.31, 2017) Transparency	Provide detailed information in the NIR on the methodology applied to derive the fractions of manure in the different management systems that are consistent with the values reported in CRF table 3.B(a)2.	Addressing. The allocation of manure to various management systems for dairy and non-dairy cattle for 2019 presented in the NIR (table 5.17, p.139) is consistent with data in CRF table 3.B(a)2 (see ID# A.7 below). The Party outlined the allocation of manure for dairy cattle for the time series in the NIR (table 5.18, p.140). The Party reported in its NIR (section 5.2.3, p.137) that it derived the fractions of manure in the different management systems on the basis of national norms for the technological design of livestock enterprises and management practices in the country, referencing three documents (NIR p.155): standards for the technological design of MMS; norms for the technical design of MMS; and norms for the technological design of new livestock facilities and for the reconstruction and technological re-equipment of existing livestock facilities (order 185 of 2 December 1992 of the Ministry of Agriculture and Food of Belarus). However, the NIR does not contain summary information on the methodology applied to derive the fractions of manure in the different management systems reported in CRF table 3.B(a)2 for different years. During the review, the Party clarified that it consulted experts from agricultural enterprises on the use of different types of manure system for different

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			animals and that it calculated manure on pasture and in stalls on the basis of the grazing period and animal management practices applied on different types of farm.
A.7	3.B Manure management – CH_4 (A.19, 2019) (A.31, 2017) Transparency	Insert the correct values in CRF table 3.B(a)2 so that they are consistent with the values reported in NIR table 5.15 (non-dairy cattle).	Resolved. The Party reported in NIR table 5.17 (equivalent to table 5.15 of the 2017 NIR) the application of different MMS, and the average values reported in the NIR for non-dairy cattle are equal to the values reported in CRF table 3.B(a)2 for 2019.
A.8	3.B Manure management – N_2O (A.22, 2019) (A.34, 2017) Accuracy	Apply values for the fraction of volatile N in line with the 2006 IPCC Guidelines and ensure that the values in the NIR are consistent with the information provided in CRF table 3.B(b) for category 3.B.5 (indirect N_2O emissions).	Not resolved. The Party reported in its NIR (table 5.21, p.143) default values for the amount of N that volatilizes for liquid system and solid storage MMS for dairy and non-dairy cattle, swine, poultry and other (for solid storage 0.4 for dairy cattle and 0.5 for non-dairy cattle, swine and poultry), which, according to its NIR (section 5.3.2, p.142), were sourced from table 10.26 of the 2006 IPCC Guidelines. However, volume 4 of the 2006 IPCC Guidelines contains no such table. Table 10.22 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.65), which lists the default values for N loss due to volatilization of NH_3 and NO_X from manure management, provides different default values for dairy cattle (0.3), non-dairy cattle (0.45), swine (0.45) and poultry (0.4 with litter and 0.55 without litter). The ERT concluded that the values reported in the NIR (table 5.21) were sourced from table 10.23 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.67), which presents total N loss from manure management rather than the fraction of N that volatilizes, found in table 10.22 of the same publication. The Party continued to report the fraction of N lost from dairy cattle manure kept in liquid systems in the NIR (table 5.21) while reporting the category as "NO" in CRF table 3.B(b). During the review, the Party provided a recalculations sheet for 2021, and the ERT found that the values used in the recalculations were aligned with the values reported in the NIR and not the CRF table (see ID# A.20 in table 5). The ERT considers that the recommendation has not been addressed because the Party applied the incorrect default values for the fraction of volatile N for solid storage systems for cattle (dairy and non-dairy), swine, poultry and other livestock. In addition, the Party did not align the reporting for category 3.B.5 between the NIR tables and CRF table 3.B(b).
A.9	3.B Manure management – N_2O (A.23, 2019) (A.34, 2017) Transparency	Justify the choice of values for the fraction of volatile N $Frac_{GASM}$ (category 3.B.5) and $Frac_{LOSS}$ (category 3.D.b.1) from the tables provided in the 2006 IPCC Guidelines with references.	Not resolved. The Party reported the amount of N that volatilizes in the NIR (table 5.21, p.143), but the NIR does not include the $Frac_{LOSS}$ factors, which were included in the NIR (table 5.25) of previous inventory submissions. After reviewing the values in table 5.21, the ERT found that they are not consistent with the default values (see ID# A.8 above). During the review the Party provided the calculations used to estimate indirect N_2O emissions associated with applying manure to agricultural soils. The calculations included the default values for N $Frac_{LOSS}$, including for dairy cattle (0.4 liquid systems, 0.4 solid storage), non-dairy cattle (0.4 liquid systems, 0.5 solid storage), swine (0.48 liquid systems, 0.5 solid storage), poultry (0.77 liquid systems, 0.5 solid storage) and other livestock (0.15 solid storage). The $Frac_{LOSS}$ values used in the calculations are consistent with the default IPCC $Frac_{LOSS}$ values from the 2006 IPCC Guidelines (vol. 4, chap. 10,

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			table 10.23). The ERT considers that the recommendation has not yet been addressed because the Party did not provide a justification for the N $Frac_{GASM}$ and $Frac_{LOSS}$ values used in the NIR.
A.10	3.B Manure management – N_2O (A.24, 2019) (A.34, 2017) Convention reporting adherence	Check the consistency between NIR tables 5.18 and 5.25 and the CRF tables.	Not resolved. The Party continued to report allocation of N excretion to liquid system as "NO" for dairy cattle in CRF table 3.B(b), but the NIR tables report the fraction of N lost from dairy cattle manure kept in liquid systems (see ID#s A.8 and A.9 above).
A.11	3.B Manure management – CH_4 (A.33, 2019) Accuracy	Either apply the default value (0.08) provided in the 2006 IPCC Guidelines and recalculate CH_4 emissions or provide a justification of the national parameter for ash content in manure, based on peer-reviewed published literature, measurements or expert judgment, in accordance with the 2006 IPCC Guidelines.	Not resolved. The Party continued to report the values for ash content in manure of cattle (0.16) and swine (0.15) in NIR table 5.16 (p.136). These values are higher than the default value (0.08) provided in the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.42). The values provided in the NIR (section 5.3.2, p.136) are based on national norms and standards that were provided to the ERT during the review. However, in the view of the ERT, those norms and standards did not provide scientific justification for the values used by the Party for ash content in manure of cattle. The ERT concluded that the Party still needs to provide a justification for the country-specific parameters applied, based on research, studies, peer-reviewed published literature or measured data, in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2.2.4, p.2.12 and 2.15, and vol. 1, chap. 6, p.6.13).
A.12	3.B Manure management – CH_4 and N_2O (A.34, 2019) Accuracy	Collect data to estimate a more accurate share of MMS reflecting the changes and improvements in the animal husbandry sector, representing at least the current and 1990 distribution of MMS and interpolating for the other years of the time series.	Addressing. The Party reported in its NIR (table 5.18) the share of MMS for dairy cows for 1990–2019. According to the NIR (section 5.4.2.1, p.150), the reported information is based on expert judgment. The method used for estimating the full time series was not provided. The Party reported the share of MMS for other livestock (non-dairy cattle, sheep, swine, rabbit, fur-bearing animals, goats, horses, mules and asses, and poultry) in CRF table 3.B(a)s2 and NIR table 5.17 (p.139) for 2019. However, the NIR contains no information on the 1990 distribution, the source of the data used to provide a more accurate estimate of the share of MMS reflecting changes and improvements in the animal husbandry sector, or the method used for estimating the full time series (e.g. interpolation) where variable values were reported. The values reported for rabbit, fur-bearing animals, goats, horses, and mules and asses remain constant over time. The Party did not provide justification for the reported share of MMS values. During the review, the Party stated that the estimated share of MMS is based on input from experts in the livestock sector. Further information on non-livestock animal populations was not provided.
A.13	3.B.1 Cattle – CH_4 (A.35, 2019) Accuracy	Estimate average daily VS excretion for the entire time series so that the VS value reflects the variations that have occurred in dairy cattle in the inventory period, for example, by using equation 10.24 of the 2006 IPCC Guidelines (vol. 4, chap. 10) in	Not resolved. The Party continued to use a constant value (5.54 kg dry matter/head/day) across the time series for the average daily VS excretion of dairy cattle. It also continued to use a national equation for estimating VS excretion (NIR p.103, equation 6.1) based on country-specific values for dry matter and ash proportion, both of which were fixed for the entire time series, which is inconsistent with the growth over time in GE attributable to the increase in milk production (NIR table 5.9). In its NIR (section 5.3.2, p.141) and during the review, the Party stated that its approach was based on its national circumstances and

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		combination with the GE estimated for enteric fermentation.	data availability, which did not allow for the application of a tier 2 method for the category.
A.14	3.B.4 Other livestock – CH_4 (A.26, 2019) (A.15, 2017) (A.16, 2016) (A.16, 2015) Accuracy	Estimate emissions from poultry per subcategory on the basis of statistical data on the country's population structure of poultry. Alternatively, if population structure data are not available, data from FAO can be used as a source of information on the populations of ducks and turkeys in Belarus.	Resolved. The Party disaggregated the poultry subcategory into chickens, ducks and turkeys for the time series on the basis of FAO data for 1990–2019 in the NIR (table 5.15). The ERT considers that this practice is in line with the disaggregation of livestock into main categories in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.1).
A.15	3.B.4 Other livestock – N_2O (A.27, 2019) (A.20, 2017) (A.21, 2016) (A.20, 2015) Accuracy	Derive typical poultry mass and N excretion values per subcategory, using the poultry disaggregation per subcategory recommended in table 10.1 (vol. 4, chap. 10) of the 2006 IPCC Guidelines (ducks, turkeys, etc.), and report in CRF table 3.B(b) average typical poultry mass value instead of the notation key "NE".	Resolved. The Party provided the average poultry mass value (1.11 kg/animal for 2019) in CRF table 3.B(b). It reported in the NIR (table 5.20, p.142) the typical poultry mass and N excretion values per subcategory using the disaggregation recommended in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.1) (ducks, turkeys, etc.).
A.16	3.B.4 Other livestock – CH_4 (A.28, 2019) (A.32, 2017) Transparency	Describe the poultry population in section 5.3 of the NIR on manure storage and use.	Resolved. The NIR (section 5.3) includes a description of the poultry population (section 5.3.2, p.135, table 5.15) and additional methodological information on EFs used (table 5.13) and manure treatment practices (p.138).
A.17	3.D.a.1 Inorganic N fertilizers – N_2O (A.38, 2019) Transparency	Provide in the NIR an explanation of the trend in the N input from application of inorganic fertilizers to cropland and grassland.	Not resolved. The time series of N input from application of inorganic fertilizers to cropland and grassland reported in CRF table 3.D still contains significant outliers, with inter-annual changes ranging between –41.8 per cent (1993–1994) and 43.3 per cent (1995–1996). The NIR does not contain an explanation of the trend in the N input from application of inorganic fertilizers to cropland and grassland. During the review, the Party stated that the data on N fertilizers are provided by Belstat and that the amount applied to soils depends on the economic situation of the agricultural organizations concerned. It also stated that explanations will be included in the next NIR.
A.18	3.H Urea application – CO_2 (A.31, 2019) (A.38, 2017) Transparency	Improve the transparency of the uncertainty values used for urea production by providing the relevant references for the uncertainty values in the NIR in line with the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party provided the reference for the uncertainty values used for urea production in the NIR (section 5.6, p.154), which are based on the default values from the 2006 IPCC Guidelines (vol. 4, chap. 11.4.1, p.11.32).

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
LULUCF			
L.1	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.1, 2019) (L.1, 2017) (L.1, 2016) (L.1, 2015) (67, 2013) (83, 2012) Completeness	Provide in the NIR and the CRF tables estimates of carbon stock changes and emissions for all mandatory categories.	Addressing. The ERT noted that the completeness of reporting for the LULUCF sector has improved since the previous inventory submission. For the first time the Party provided estimates of CO_2 for the HWP category (CRF table 4.G), N_2O emissions for wetlands remaining wetlands (CRF table 4(III)) and CO_2 and N_2O emissions for drained organic soils under the forest land category (CRF table 4(II)). However, it did not provide estimates for the mandatory categories related to the conversion of land in CRF tables 4.A–4.F (see annex II). The only land-transition category for which carbon stock changes were estimated is wetlands converted to cropland (category 4.B.2.3). The Party stated in its NIR (pp.178–179) that it plans to include comprehensive information on land-use categories in its 2023 submission. During the review, the Party stated that it is taking steps to collect the necessary data and report estimates of carbon stock changes and emissions for all mandatory categories and will consider estimating carbon stock changes for land converted to forest land for its future inventory submissions. The Party highlighted the difficulties related to collecting information on forest land over the 20-year period concerned and noted that it is aiming to complete its inventory reporting for the LULUCF sector by 2025, rather than by 2023 as originally planned. However, it noted that annual improvements to the completeness of the inventory are planned.
L.2	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.2, 2019) (L.1, 2017) (L.1, 2016) (L.1, 2015) (67, 2013) (83, 2012) Convention reporting adherence	Provide a consistent uncertainty analysis for each estimated mandatory category.	Addressing. The Party provided uncertainty analyses for categories 6.5.3 (cropland), 6.6.3 (grassland), 6.7.3 (wetlands), 6.8.3 (settlements), 6.9.3 (other land) and 6.10.3 (HWP). In addition, the NIR (table 1.6, p.27) includes uncertainty values for all estimated categories and disaggregated information for certain subcategories, such as biomass burning (crown, ground, soil), land and wetlands converted to cropland, and HWP (separate values for production and export and solid wood and paper wood). However, the ERT noted that the Party did not document the uncertainty values used or the results calculated for each mandatory category consistently with the data provided in the NIR (table 1.6). During the review, the Party stated that it will ensure that the results of the uncertainty analyses are presented consistently in its next NIR.
L.3	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.3, 2019) (L.1, 2017) (L.1, 2016) (L.1, 2015) (67, 2013) (83, 2012) Convention reporting adherence	Enhance the QA/QC procedures that are used for the LULUCF sector and, as a minimum, undertake an internal technical review to ensure consistency between the NIR and the CRF tables.	Addressing. Although some of the issues raised in the previous review report were addressed (see ID#s L.13 and L.16 below), there are still inconsistencies between the NIR and the CRF tables (see ID#s L.5, L.14 and L.18 below). Moreover, notation keys continued to be used incorrectly (see ID# L.10 below) and basic errors identified by the previous ERT were not rectified (see ID# L.12 below). During the review, when asked how it planned to strengthen its QA/QC process, the Party stated that it plans to improve the procedures for validating data aggregation and checking the correctness and completeness of initial data entered into worksheets for calculating emissions and removals, and involve more people and departments in the development of QA/QC procedures.
L.4	4. General (LULUCF) – CO_2, CH_4 and N_2O	Provide detailed information in the planned improvements section (6.1.7) of the NIR with	Addressing. The Party implemented only one of the nine planned improvements for the LULUCF sector (estimation of the HWP category) listed in the 2019 NIR (section 6.1.7),

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(L.4, 2019) (L.9, 2017) Transparency	accompanying time frames related to estimating all missing categories using at least a tier 1 approach, providing an uncertainty analysis and implementing QA/QC procedures for each estimated category, or at least conduct an internal technical review to ensure consistency between the NIR and the CRF tables.	providing the related results in the 2021 NIR (section 6.10) and CRF table 4.G. Consequently, the estimation of the HWP category was removed from the planned improvements section of the 2021 NIR (section 6.3, corresponding to section 6.1.7 of previous NIRs). Updated deadlines for the remaining non-annual activities were provided in the NIR (section 6.3, pp.178–179). The list of planned improvements continues to include the estimation of all missing categories and the implementation of improved QA/QC procedures. The ERT noted that table 5.3 of annex 5 to the 2021 NIR, concerning the action plan to improve the reporting of GHG inventories for 2020–2021, covers the LULUCF sector and provides specific dates for the completion of planned improvements based on the recommendations of the previous ERT. During the review, the Party highlighted improvements in the 2021 submission, such as the addition of NIR tables on areas of controlled combustion (table 6.18), other disturbances (table 6.19) and other land (table 34); the recalculation of carbon losses for category 4.A (forest land) and areas of organic land remaining in the cropland category over a 20-year period for category 4.B (cropland); and the inclusion of initial data on grazing area. The Party clarified that improvements planned and already implemented for the 2022 submission include the estimation of carbon accumulation in living biomass for tree and shrubbery plantings using default factors, the collection of necessary data to take into account a 20-year transition for grassland, settlements and other land (CRF tables 4.C, 4.E and 4.F) and the estimation of carbon stocks for these categories using collected information and default factors. The ERT considers that the recommendation has not been fully addressed because the Party has yet to include in its NIR a detailed and transparent plan to clarify the status and timeline for the implementation of each improvement recommended by the ERT during the previous reviews (i.e. estimate all missing categories using at least a tier 1 approach, provide an uncertainty analysis and implement QA/QC procedures for each estimated category, or conduct an internal technical review to ensure consistency between the NIR and the CRF tables) (see also ID#s L.2 and L.3 above and L.5 below).
L.5	4. General (LULUCF) – CO_2, CH_4 and N_2O (L.5, 2019) (L.10, 2017) Convention reporting adherence	Correct the inconsistency between the information on total forest land area provided in the NIR (table 6.5, p.152) and in CRF table 4.1.	Not resolved. Belarus included in the NIR (section 6.4.1, p.184) the same explanations as it provided to the previous ERT for the differences between the forest areas reported in the NIR and CRF table 4.1 (see ID# L.6 below). NIR table 6.8 shows the total area of forest in the country (“forest fund”), as reported in CRF table 4.1, along with the areas of forest under the responsibility of the Ministry of Forestry covered by the inventory. However, none of the areas of total forest land reported in CRF table 4.1 for 2019 – initial forest land (9,643.8 kha), final forest land (9,717.00 kha) and forest land for 20 years (9,625.9 kha) – coincide with the total area of the forest fund (9,620.9 kha) provided in table 6.8 of the NIR for the same year. The areas of the forest fund reported in NIR table 6.8 are equal to the areas of final forest land for the same year provided in CRF table 4.1 (row 17) for 1990–1994, 1996 and 2014–2017. For 2018 and 2019, the difference between the forest land areas reported in NIR table 6.8 and CRF table 4.1 is 45.3 and 96.1 kha, respectively.

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			During the review, the Party stated that the inconsistency between the forest areas reported in CRF table 4.1 (row 17) and NIR table 6.8 will be corrected in the next NIR.
L.6	4.A Forest land – CO_2, CH_4 and N_2O (L.12, 2019) Transparency	Include in the NIR the explanation provided during the review as well as an additional table showing the total area of forest in the country, as reported in CRF table 4.1, separated into forest land and non-forest land, and the areas of forest managed under the Ministry of Forestry for which carbon fluxes are calculated.	Resolved. The Party reported in the NIR (section 6.4.1, p.184) that the total area of the forest fund (9.6 million ha) is indicated in CRF table 4.1 and that the inventory covers only the area of forest land under the responsibility of the Ministry of Forestry (8.6 million ha). NIR table 6.8 (p.184) shows the total area of the forest fund and the areas of forest land under the responsibility of the Ministry of Forestry for which carbon fluxes are calculated (about 87.9 per cent of the total forest land area (NIR table 6.5)) (see ID# L.17 in table 5).
L.7	4.A.1 Forest land remaining forest land – CO_2 (L.13, 2019) Comparability	Correct the notation key from "IE" to "NE" for net carbon stock change in organic soils on forest land remaining forest land in CRF table 4.A and include an explanation of the use of "NE" in CRF table 9.	Resolved. The notation key was corrected from "IE" to "NE" for net carbon stock change in organic soils on forest land remaining forest land in CRF table 4.A, and an explanation of the use of "NE" was included in CRF table 9.
L.8	4.A.1 Forest land remaining forest land – CO_2 (L.14, 2019) Accuracy	Verify the reasons for the outliers and correct the values of net carbon stock change in litter for 2017 and net carbon stock change in deadwood for 2016 and report the correct CO_2 emissions for this category in CRF table 4.A.	Resolved. The Party corrected the values of net carbon stock change in litter for 2017 (from 368.92 to 522.33 kt C) and net carbon stock change in deadwood for 2016 (from 554.70 to 379.39 kt C) and reflected the changes in the CO_2 estimates for this category in CRF table 4.A.
L.9	4.A.2 Land converted to forest land – CO_2 and N_2O (L.9, 2019) (L.6, 2017) (L.6, 2016) (L.6, 2015) (72, 2013) (89, 2012) Completeness	Improve the completeness and transparency of the reporting on land converted to forest land in the CRF tables and the NIR, and ensure consistency of the information reported in the NIR with that reported in the CRF tables.	Addressing. The ERT noted the progress in assessing soil organic carbon and N_2O for drainage of organic soils in CRF table 4(II). However, net CO_2 emissions and removals from land converted to forest land are still reported as "NE" for all land-use changes and all pools in CRF table 4.A (see annex II). During the review, Belarus indicated that it will make every effort to further improve its reporting and ensure the consistency of the information reported in the NIR with that reported in the CRF tables.
L.10	4.A.2.3 Wetlands converted to forest land – CO_2 (L.15, 2019) Convention reporting adherence	Apply the correct notation key, "NO", for area of mineral soils for wetlands converted to forest land in CRF table 4.A.	Addressing. The recommendation of the previous ERT was based on the absence of mineral soils in wetlands in Belarus. The Party applied the correct notation key for the area of mineral soils in the AD column of CRF table 4.A but not in the columns for implied carbon stock change factors and changes in carbon stock. During the review, the Party clarified that an omission was made during QC procedures and that the necessary changes will be reflected in CRF table 4.A of the next inventory submission.
L.11	4.B.1 Cropland remaining cropland – CO_2	Either apply the EF provided in the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.6, p.5.19) or justify the use of the EF provided in the IPCC good practice guidance for LULUCF as country-specific in the next	Not resolved. The Party did not apply the EF provided in the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.6, p.5.19) or justify the use of the EF provided in the IPCC good practice guidance for LULUCF as country-specific. During the review, the Party

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(L.16, 2019) Accuracy	NIR. If a recalculation is performed, provide in the NIR relevant information on the recalculation in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	confirmed that the necessary recalculations will be made and documented in the next inventory submission in line with the 2006 IPCC Guidelines (vol. 4, chap. 5.2.3).
L.12	4.C.1 Grassland remaining grassland – CO_2 (L.17, 2019) Transparency	(a) Apply the correct notation key, "NA", for carbon stock change in living biomass and dead organic matter in grassland remaining grassland; (b) Provide in the NIR a correct description of the method used under "changes of the carbon content in dead biomass".	(a) Resolved. The Party replaced "NE" with "NA" in CRF table 4.C for carbon stock change in living biomass and dead organic matter in grassland remaining grassland; (b) Not resolved. The Party continued to report in the NIR (section 6.6.2, p.221) under "changes of the carbon content in dead biomass" that, according to the tier 1 and 2 methods, a value of zero is assumed for the net change in carbon stocks in dead biomass of grassland. However, carbon stock is assumed to be zero only under the tier 1 method (2006 IPCC Guidelines, vol. 4, chap. 5, section 6.2.2.1, p.6.l1). During the review, the Party stated that the next NIR will contain the correct description of the method used, under "changes of the carbon content in dead biomass".
L.13	4.D.1 Wetlands remaining wetlands – CO_2 (L.18, 2019) Accuracy	Apply the correct EF (0.2 t C/ha) to estimate CO_2 emissions for 2017.	Resolved. The net carbon stock change per area for peat extraction remaining peat extraction (subcategory 4.D.1.1) was corrected in the 2020 submission. The constant default value of 0.2 t C/ha for nutrient-poor organic soils from the 2006 IPCC Guidelines (vol. 4, chap. 7, table 7.4, p.7.13) was reported (in the place of the 2017 value of 0.28 t C/ha) in CRF table 4.D across the time series.
L.14	4.D.1 Wetlands remaining wetlands – N_2O (L.18, 2019) Accuracy	Report N_2O emissions in accordance with the 2006 IPCC Guidelines and ensure the consistent reporting of N_2O emissions between the NIR and CRF tables and report the notation key "NE" in CRF table 4(II) under category 4.D.1 (peat extraction lands – drained organic soils), together with a justification for not including the emissions in the NIR and CRF table 9.	Not resolved. According to the 2006 IPCC Guidelines (vol. 4, chap. 7, table 7.6, p.7.16), the N_2O EF for drained wetlands is considered negligible for nutrient-poor organic soils, and therefore N_2O emissions for this category do not need to be estimated under tier 1. Belarus reported "NE" in CRF table 4(II) under category 4.D.1 (peat extraction lands – drained organic soils), although it did not provide any explanation in either CRF table 9 or the NIR. However, in the NIR (section 6.7.2, p.223), the Party reported emissions from managed wetlands using the default N_2O EF of 0.1 kg N_2O-N/ha/year (for nutrient-poor organic soils) for drainage and rewetting of forest soils from the IPCC good practice guidance for LULUCF (appendix 3a.2, table 3a.2.1, p.3.275), again without providing any further explanation or justification for the method used. The ERT noted that the AD and N_2O emissions provided in the NIR (table 6.32, pp.223–224) are reported under category 4(III).D.1 (wetlands remaining wetlands) in CRF table 4(III) (N_2O emissions from N mineralization/immobilization associated with loss/gain of soil organic matter resulting from change of land use or management of mineral soils). No transparent explanation is provided in the NIR for the reporting of N_2O emissions under category 4.D (wetlands) in NIR table 6.32 and the reporting of N_2O emissions in CRF tables 4(II) and 4(III). During the review, the Party stated that it will provide the improved N_2O emission estimates and the associated explanations in the next NIR.
L.15	4.G HWP – CO_2 (L.11, 2019) (L.14,	Provide estimates of the annual change in carbon stocks in HWP.	Resolved. The Party reported estimates of the annual change in carbon stocks in HWP for the first time in its 2021 submission. The production approach provided in the 2006 IPCC Guidelines (vol. 4, chap. 12, p.12.29) (approach B in CRF table 4.Gs1) was applied for

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	2017) Completeness		estimating CO_2 emissions for this category, as reported in the NIR (section 6.10, pp.228–235) and CRF table 4.G.
L.16	4(V) Biomass burning – CO_2, CH_4 and N_2O (L.19, 2019) Accuracy	Correct the AD for 2016 and report the correct emissions in CRF table 4(V) for biomass burning on forest land remaining forest land.	Resolved. The Party corrected the AD entry error in CRF table 4(V) for biomass burning on forest land remaining forest land for 2016 (from 252,363,230 kg dry matter in the 2019 submission to 27,363,230 kg dry matter in the 2021 submission). The correction did not affect the reported emissions.
Waste			
W.1	5. General (waste) (W.1, 2019) (W.12, 2017) Transparency	Describe in the NIR the waste management practices used in the country.	Resolved. The Party included a description of the waste management practices used in the country in the NIR (sections 7.1 and 7.2.2.2, pp.239 and 242).
W.2	5.A Solid waste disposal on land – CH_4 (W.2, 2019) (W.2, 2017) (W.2, 2016) (W.2, 2015) (76, 2013) (94, 2012) Accuracy	Use the IPCC FOD method to estimate CH_4 emissions from solid waste disposal on land.	Resolved. The Party used the FOD method to estimate CH_4 emissions from solid waste disposal on land for the first time for its 2021 submission. The methodology is presented in the NIR (section 7.2.2.2, p.242). For issues linked to the implementation of the FOD model, see ID#s W.19–W.24 in table 5.
W.3	5.A Solid waste disposal on land – CH_4 (W.3, 2019) (W.4, 2017) (W.5, 2016) (W.5, 2015) (79, 2013) (96, 2012) Completeness	Estimate CH_4 emissions from wastewater sludge.	Resolved. The Party reported CH_4 emissions from wastewater sludge under CH_4 emissions from solid waste disposal on land in CRF table 5.A. An explanation of the approach is provided in the NIR (section 7.2.2.2, p.244).
W.4	5.A Solid waste disposal on land – CH_4 (W.4, 2019) (W.4, 2017) (W.5, 2016) (W.5, 2015) (79, 2013) (96, 2012) Transparency	Provide more detailed information in the NIR on the amount of MSW, industrial solid waste and wastewater sludge that is landfilled.	Resolved. The Party provided information in its NIR on the amount of MSW (section 7.2.2.2, p.243) and industrial solid waste, including wastewater sludge (table 7.3, section 7.2.2.2, p.244), that was landfilled in 2019.
W.5	5.A Solid waste disposal on land – CH_4 (W.5, 2019) (W.6, 2017) (W.8, 2016) (W.8, 2015) Transparency	Identify the country-specific management practices of CH_4 recovery or flaring and report accordingly in the next inventory submission the respective amounts of CH_4 recovered for energy recovery purposes or flared; alternatively, use the notation key	Not resolved. The Party continued to report "NE" for CH_4 recovery or flaring in CRF table 5.A under categories 5.A.2 and 5.A.3 without explaining the use of this notation key in the NIR or CRF table 9. During the review, the Party clarified that the amounts of CH_4 recovered are considered insignificant and that it will justify its use of the notation key "NE" in the next inventory submission.

ID#	Issue classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
		"NO" in the absence of such practices in the country, or justify the use of the notation key "NE".	
W.6	5.A Solid waste disposal on land – CH_4 (W.6, 2019) (W.7, 2017) (W.9, 2016) (W.9, 2015) Accuracy	Collect and elaborate updated information on MSW historical composition using all available reference sources from national studies, surveys and results of relevant projects.	Not resolved. The Party stated in its NIR (section 7.2.2.2, pp.242–244) that it estimated CH_4 emissions from SWDS for the first time using the FOD method (bulk option), which requires historical data on MSW composition since 1950, and the default values for MSW composition from the 2006 IPCC Guidelines (vol. 5, chap. 2.3.1, p.2.12). It also stated in the NIR (pp.242 and 244) that the country-specific average DOC values for 1990–2018 provided in the 2020 submission (i.e. 0.17 for 1999 and 0.21 for 2011) are close to the default value of 0.18 given in the 2006 IPCC Guidelines (vol. 5, chap. 2, table 2.4) and the value given in the FOD spreadsheet model. During the review, the Party confirmed that it used the default values for the morphological composition of the waste and the DOC content thereof. The Party has not yet conducted national studies or surveys to obtain information on historical MSW composition.
W.7	5.A Solid waste disposal on land – CH_4 (W.7, 2019) (W.8, 2017) (W.9, 2016) (W.9, 2015) Accuracy	Explore the possibility of initiating sample measurement of MSW composition in specialized laboratories, ensuring a better reflection of the real historical composition of the MSW disposed of in SWDS, including information on the disposal of sludge originated from wastewater treatment and industrial solid waste, and enabling the use of higher-tier methods for estimating CH_4 emissions from solid waste disposal following the guidance available in the 2006 IPCC Guidelines.	Not resolved. The Party indicated in its NIR (section 7.2.2.2, pp.242–244) that it estimated CH_4 emissions from SWDS for the first time using the FOD method (bulk option) and the default values for MSW composition from the 2006 IPCC Guidelines (see ID# W.6 above). During the review, the Party clarified that it will conduct further studies on the actual historical MSW composition and report the results in the next inventory submission.
W.8	5.A Solid waste disposal on land – CH_4 (W.8, 2019) (W.9, 2017) (W.10, 2016) (W.10, 2015) Accuracy	Improve the QC procedures, choose a correct oxidation factor default value and MCF from the 2006 IPCC Guidelines corresponding with the management practices applicable for the SWDS in Belarus and use these factors correctly for estimating and reporting CH_4 emissions in the NIR and CRF tables.	Resolved. The Party indicated in its NIR (section 7.2.2.2, pp.242 and 244) that it estimated CH_4 emissions from SWDS for the first time using the FOD method (bulk option) in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3, pp.3.10–3.11). In CRF table 5.A, the Party identified all MSW landfills as uncategorized, and it used the default MCF value of 0.6 and an oxidation factor "0" in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3, tables 3.1–3.2, pp.3.14–3.15). For issues linked to the allocation of all solid waste to the uncategorized MSW landfills subcategory, see ID# W.23 in table 5.
W.9	5.A Solid waste disposal on land – CH_4 (W.10, 2019) (W.14, 2017) Consistency	Collect and update information on industrial waste generation, using surrogate data or other methods, and estimate CH_4 emissions from landfilling of industrial waste for the entire time series.	Resolved. The Party provided in its NIR (section 7.2.2.2, pp.243–244) updated information on industrial waste generation, based on data regarding industrial waste management by type of economic activity (production of food, beverages and tobacco products; production of textiles, clothing, leather and fur products; production of wood and paper products; printing; manufacture of rubber and plastic products and other non-metallic mineral products; construction), and estimated CH_4 emissions from landfilling of industrial waste for the entire time series. The AD for the estimates were derived from

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
			data from different sources (Belstat, Bel SRC "Ecology") using assumptions and interpolation or extrapolation to construct the entire time series (see ID# W.21 in table 5).
W.10	5.A Solid waste disposal on land – CH_4 (W.18, 2019) Transparency	Describe in the NIR the correct methodology used to determine the DOC values.	Resolved. In applying the FOD model (see NIR section 7.2.2.2, pp.242 and 244), Belarus used constant default values for the DOC for Eastern Europe and applied values of 0.18 for MSW (default value for the bulk option from the spreadsheet model); 0.24 for industrial waste (national data based on statistics for 2016–2018); and 0.05 for sewage sludge (default value from the 2006 IPCC Guidelines (vol. 5, chap. 3, p.3.11, and chap. 2, p.2.15)).
W.11	5.A.2 Unmanaged waste disposal sites – CH_4 (W.11, 2019) (W.15, 2017) Consistency	Revise and update the MSW generation AD to ensure consistency across the entire time series and revise the CH_4 emission estimates.	Resolved. Belarus did not report any unmanaged waste disposal sites in its 2021 submission; however, it allocated all solid waste disposal to uncategorized sites (see ID# W.23 in table 5).
W.12	5.A.2 Unmanaged waste disposal sites – CH_4 (W.12, 2019) (W.15, 2017) Transparency	Describe in the NIR the MSW generation AD that are used for estimating CH_4 emissions.	Resolved. Belarus did not report any unmanaged waste disposal sites in its 2021 submission; however, it allocated all solid waste disposal to uncategorized sites (see ID# W.23 in table 5).
W.13	5.B Biological treatment of solid waste – CH_4 and N_2O (W.19, 2019) Completeness	Either implement the planned improvement of clarifying the amount of waste subject to mechanical-biological treatment as well as the technologies used, or report "NE" in CRF table 5.B together with a justification for the exclusion in terms of the likely level of the emissions (using approximate AD and default IPCC EFs to derive a likely level of emissions for the respective category) in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Not resolved. The Party reported in its NIR (section 7.3, p.246) that it uses a mechanical-biological plant for processing up to 100 kt MSW/year by anaerobic digestion and recovering biogas as an energy source. However, in CRF table 5.B, the Party reported "NO" for the biological treatment (anaerobic digestion) of solid waste at biogas facilities. During the review, the Party clarified that the biogas from the mechanical-biological treatment at the plant is used to generate heat and electricity, but confirmed that the associated emissions were not reported under the energy sector. The ERT considers that it is possible to roughly estimate the CH_4 and N_2O emissions from the process using national AD and the default EFs from the 2006 IPCC Guidelines (vol. 5, chap. 4.1.3.1, table 4.1). Estimated emissions should be reported under the energy sector in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 4, p.4.4), with AD included in CRF table 5.B (amount of waste subject to anaerobic digestion) and the notation key "IE" reported for emissions, and an explanation provided in CRF tables 5.B and 9. Alternatively, the Party may report "NE" for the emissions and justify that they are insignificant in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The methodology used for calculating emissions and justifying their allocation to the energy sector, or the reason for not including them in the inventory, should be included in the waste sector chapter of the NIR.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.14	5.C.1 Waste incineration – CO_2, CH_4 and N_2O (W.13, 2019) (W.1, 2017) (W.1, 2016) (W.1, 2015) (75, 2013) (93, 2012) Completeness	Improve the consistency of the reporting and provide more information in the NIR on the thermal treatment of industrial waste, and estimate any resulting emissions from the thermal treatment of waste and report such emissions in the NIR and the CRF tables.	Resolved. The Party calculated and reported emissions from the thermal treatment of waste and provided estimates in CRF table 5.C for the first time in its 2021 submission. Background information was reported in the NIR (section 7.4.1, p.246). Since at the time of the preparation of the submission there were no data available for a longer time series, it was assumed that the emissions for this category were constant for the entire time series and that they did not exceed the 2019 level. The ERT concluded that the completeness issue has been resolved; however, it identified an issue with the allocation of the emissions in CRF table 5.C (see ID#s W.25 and W.26 in table 5).
W.15	5.D Wastewater treatment and discharge – CH_4 (W.14, 2019) (W.5, 2017) (W.7, 2016) (W.7. 2015) (81, 2013) (99, 2012) Transparency	Provide more information on wastewater treatment systems and discharge pathways in the NIR to justify that there are no emissions and use the notation key "NO" instead of "NE".	Addressing. The Party provided an additional description on domestic wastewater management and reported in its NIR (section 7.5.1.2, pp.247–248) and in CRF table 5.D the CH_4 emissions for the whole time series (including anaerobic wastewater treatment). "NE" was only reported for subcategory 5.D.3 (other). The Party did not include in its NIR a transparent description (e.g. a schematic illustration) of the wastewater treatment system and discharge pathways used in Belarus or explain its use of the notation key. During the review, the Party provided the ERT with a table detailing all wastewater treatment systems used.
W.16	5.D Wastewater treatment and discharge – CH_4 (W.15, 2019) (W.10, 2017) (W.11, 2016) (W.11, 2015) Transparency	Explore and document the existence of CH_4 for energy recovery and flaring at wastewater treatment plants and, depending on the results obtained, report accordingly in the NIR and CRF tables the CH_4 recovered and/or flared, or use the correct notation key for the domestic and industrial wastewater category.	Not resolved. The Party did not provide additional information in the NIR on CH_4 recovery and flaring at wastewater treatment plants, and reported "NE" in CRF table 5.D. During the review, the Party clarified that no additional information on CH_4 recovered and/or flared at wastewater treatment plants has been collected since the previous review. As explained to the previous ERT, while CH_4 energy recovery and flaring facilities at wastewater treatment plants (both industrial and domestic wastewater) do exist in Belarus, they fall under the responsibility of different parties (industrial enterprises, Ministry of Communal Services, Ministry of Energy, investors, etc.), which makes it difficult to collect data for the whole time series. The ERT notes that no plans were set out for improving the collection of these data in the improvement chapter of the NIR.
W.17	5.D Wastewater treatment and discharge – N_2O (W.16, 2019) (W.11, 2017) (W.12, 2016) (W.12, 2015) Accuracy	Investigate the wastewater treatment practices in the country and provide in the NIR a transparent description of the activities occurring under this category, together with estimates of direct and/or indirect N_2O emissions, in accordance with the methodological approaches available in the 2006 IPCC Guidelines, using the adjusted protein consumption data provided by Belstat during the review.	Not resolved. The NIR (section 7.5.1.2, p.249) states that population and protein consumption data were provided by Belstat. However, the recalculation of N_2O emissions for this category, which were about 31 per cent lower across the time series compared with those reported in the previous inventory submission, was not included or explained in the NIR (section 7.5.1.5). In addition, the Party did not provide in the NIR a transparent description of the activities occurring under this category, together with estimates of direct and/or indirect N_2O emissions. Moreover, no information was provided in the NIR regarding the occurrence of nitrification and denitrification in rivers and estuaries. During the review, Belarus explained that it will include a transparent description of wastewater treatment practices in the country and the activities occurring under this category in its next inventory submission.

ID#	*Issue classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.18	5.D.1 Domestic wastewater – CH_4 (W.20, 2019) Completeness	Estimate CH_4 emissions from domestic wastewater treated on site and not connected to municipal sewer systems.	Resolved. The Party reported CH_4 emissions from domestic wastewater treated on site and not connected to municipal sewer systems for the first time, increasing estimated emissions for the sector by 48.51 kt CH_4 for 2018. The methodology is presented in the NIR (section 7.5.1.2, p.249). The Party followed the recommendations of the previous ERT and estimated the emissions in line with the tier 1 method provided in the 2006 IPCC Guidelines (vol. 5, chap. 6.2.2).

[a] References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue 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.

[b] The report on the review of the 2020 inventory submission of Belarus was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2019 inventory review report. For the same reason, 2020 and 2018 are excluded from the list of review years in which issues could have been identified.

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

8. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three or more successive reviews, including the review of the 2021 inventory submission of Belarus, and had not been addressed by the Party at the time of publication of this review report.

Table 4
Issues identified in three or more successive reviews and not addressed by Belarus

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
General		
G.8	Include in the NIR more information to explain the methodologies and procedures used in the calculations, a description of the data-collection process and more data tables to present the AD and EFs that have been used, as well as background information on all AD used in the inventory, specifically for the energy and industrial processes sectors.	6 (2012–2021)
G.10	Ensure the correct use of the notation keys (including "NA") in the CRF tables in line with decision 24/CP.19, annex I, paragraphs 37, 50(f) and 53.	3 (2017–2021)
G.11	Provide justification for the use of notation keys, particularly "NE" and "IE", in the NIR and in CRF table 9.	3 (2017–2021)
G.12	Put in place robust QA/QC procedures, in particular for the key categories.	6 (2012–2021)
G.15	Provide more extensive information on the reasons for observed trends in emissions across the time series at the sectoral level and for the most important categories within these sectors.	4 (2015/2016–2021)
G.16	Include in the NIR detailed information on the QA/QC arrangements in place, in accordance with the UNFCCC Annex I inventory reporting guidelines, including information on the QA/QC plan and on QA/QC procedures already implemented or planned to be implemented in the future.	3 (2017–2021)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
G.20	Report in the NIR complete information on the recalculations relating to previously submitted inventory data, in particular in relation to recalculations made in response to the review process, and include a discussion on the impact of the recalculations on the trend in emissions.	4 (2015/2016–2021)
G.21	Include an explanation for the observed changes in the reported uncertainty estimates between inventory submissions in the NIR; use only well-documented country-specific values for parameters in the uncertainty analysis; and report how the uncertainty analysis is used to prioritize inventory improvements.	4 (2015/2016–2021)
G.22	Perform and report on the uncertainty assessment by including information on the quantitative estimates of the uncertainty of the data used for all source and sink categories using the 2006 IPCC Guidelines.	3 (2017–2021)
Energy		
E.1	Improve transparency and include detailed information on EFs and AD in the NIR, for example, by including summary tables of the AD and EFs used for the inventory estimations together with a clear description of the sources thereof, and by providing clear indications of the methodology used.	6 (2012–2021)
E.2	Use country-specific EFs for key categories.	6 (2012–2021)
E.4	Implement QC procedures to ensure the correct and consistent use of notation keys.	5 (2013–2021)
E.5	Include the relevant information on changes made to address recommendations made in previous review reports, as requested in paragraph 50(i) of the UNFCCC Annex I inventory reporting guidelines.	4 (2015/2016–2021)
E.6	Provide information in CRF table 9 explaining the reasons for the use of the notation keys “IE” and “NE”.	3 (2017–2021)
E.7	Provide information in the NIR on the changes made to the notation keys since the previous submission.	3 (2017–2021)
E.8	Report the AD and emissions for different coal types separately according to the statistical data for the years after 2011 and apply the statistical tools provided in the 2006 IPCC Guidelines to 1990–2010 to resolve data gaps and ensure time-series consistency.	3 (2017–2021)
E.10	Investigate and explain in the NIR and the CRF tables the reasons for the observed difference between the reference approach and the sectoral approach.	6 (2012–2021)
E.12	(a) Account for exports of jet kerosene; (b) Account for exports of bitumen; (c) Estimate carbon stored; (d) Provide emission estimates for imports of coke oven/gas coke; (e) Enhance verification procedures to ensure the consistency of information provided in CRF tables 1.A(b), 1.A(c) and 1.A(d); (f) Include detailed information on the improvements made in the NIR of the next GHG inventory submission.	4 (2015/2016–2021)
E.13	Correct the reporting of AD for jet kerosene imports in CRF table 1.A(b).	3 (2017–2021)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
E.14	Report the correct sign for the carbon stock change for peat (i.e. it should be negative) in CRF table 1.A(b) for the reference approach estimates.	3 (2017–2021)
E.16	Provide documented information on the country-specific NCVs used in the emission calculations, with the aim of demonstrating the accuracy of those values.	4 (2015/2016–2021)
E.17	Ensure consistency across CRF tables 1.A(b), 1.A(c) and 1.A(d).	5 (2013–2021)
E.18	Obtain information on the utilization of naphtha, lubricants, coal and coal products as feedstocks and for non-energy purposes; use this information to improve the accuracy of the emission estimates; and provide detailed relevant explanations in the NIR to improve transparency.	6 (2012–2021)
E.19	Recalculate the excluded carbon from NEU of fuels for crude oil in accordance with the 2006 IPCC Guidelines using data from the national fuel and energy balance on crude oil used for non-energy purposes and as feedstock for non-fuel products.	3 (2017–2021)
E.20	Provide information in the NIR on how jet kerosene is allocated between domestic and international flights for 2000–2011.	6 (2012–2021)
E.22	Follow the IPCC good practice guidance for key categories under stationary combustion and use country-specific carbon contents for all fuels.	6 (2012–2021)
E.24	Calculate CO_2 emissions from biomass consumption for categories 1.A.1 and 1.A.2 and report estimates in the sectoral approach categories and memo items.	3 (2017–2021)
E.25	Report emissions from refinery gas combustion in all categories where it was used for all years of the time series.	3 (2017–2021)
E.26	Provide detailed information in the NIR on all country-specific parameters (NCVs, carbon contents and EFs) used for the inventory for the energy sector (e.g. in tabular format).	3 (2017–2021)
E.27	Explain the methodology used for developing the country-specific parameters (NCVs, carbon contents and EFs) used for the inventory in the energy sector, and provide a justification that the country-specific parameters are more suitable for the national circumstances.	3 (2017–2021)
E.29	Reallocate the emissions from petroleum refining to the energy industries category.	5 (2013–2021)
E.30	Report disaggregated emission data by subcategory under manufacturing industries and construction.	6 (2012–2021)
E.33	(a) Reallocate CH_4 and N_2O emissions from biomass in road transportation and railways to category 1.A.4.a (commercial/ institutional); (b) Apply the correct CH_4 and N_2O EFs for wood/wood waste in the calculations; (c) Estimate and report CO_2 emissions from biomass use in the corresponding categories; (d) Use the correct notation key for CH_4 and N_2O emissions from biomass in road transportation and railways, if this type of fuel is not used in these categories.	4 (2015/2016–2021)
E.36	Use appropriate CH_4 and N_2O EFs to estimate emissions from road transportation.	5 (2013–2021)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
E.37	Use country-specific CO_2 EFs to estimate emissions for this key category.	6 (2012–2021)
E.47	Use methods and EFs in accordance with the 2006 IPCC Guidelines, and provide in the NIR detailed and documented information on AD and EFs used in the estimation of all gases for all subcategories under fugitive emissions from oil and natural gas.	4 (2015/2016–2021)
E.48	Provide in the NIR detailed and documented information on methods, AD and EFs used in the estimates, in particular when changes in methodologies, sources of information and assumptions are made in relation to recalculations, as well as information on the rationale for these recalculations and their impact on total emissions.	4 (2015/2016–2021)
E.49	Estimate emissions from exploration activities, which may occur in the country, by collecting relevant missing AD in order to provide emission estimates of CH_4, CO_2 and N_2O from oil and natural gas exploration.	4 (2015/2016–2021)
E.50	Ensure the correctness of the units used for the AD and EFs for all categories under 1.B.2 oil and natural gas and other emissions from energy production and provide a detailed explanation for the choice of EFs.	3 (2017–2021)
E.51	Include in the NIR data on the volume of gas transmission (including any transit amounts) to improve transparency.	5 (2013–2021)
E.52	Include in the AD under category 1.B.2.b.4 (gas transmission and storage) all gas transmitted by the pipeline system to industrial consumers or natural gas distribution systems, including both produced and imported natural gas, as well as emissions from natural gas storage systems, calculated separately.	3 (2017–2021)
E.53	Provide detailed information in the NIR on the methodology used for the emission estimates, and justifications for the completeness of the AD.	3 (2017–2021)
IPPU		
I.5	Ensure that the information in the NIR on emission estimates for this category is fully transparent in accordance with the requirements of the UNFCCC Annex I inventory reporting guidelines and include information on EFs used, references and descriptions of the production processes for the reported subcategories under the category chemical industry.	4 (2015/2016–2021)
I.6	Provide in the NIR a description of production process, EFs and AD used.	4 (2015/2016–2021)
I.10	Ensure the time-series consistency of emission estimates by applying the same data source for the entire time series, or, if this is not possible, apply a splicing technique from the 2006 IPCC Guidelines to ensure the consistency of the time series.	3 (2017–2021)
I.12	Describe more clearly the origin of the carbon-containing materials used for direct reduction iron and cast iron used in steel-making processes in the NIR (e.g. whether the inputs are imported).	3 (2017–2021)
I.14	Collect relevant available AD and estimate emissions for all subcategories under category 2.D for the complete time series for which the 2006 IPCC Guidelines provide estimation methods.	4 (2015/2016–2021)
I.15	Either estimate emissions from the electronics industry or, if this is not possible, apply the correct notation key “NE”, and provide a reason in the NIR and CRF table 9 for why the emissions cannot be estimated.	3 (2017–2021)
I.16	Obtain AD and report emission estimates for all gases.	6 (2012–2021)

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
I.18	Increase efforts to include emissions from installation and disposal of electrical equipment in the next inventory submission.	3 (2017–2021)
Agriculture		
A.1	Estimate the average annual population of growing animals that are alive for less than a year using national data on their life cycle and equation 10.1 of the 2006 IPCC Guidelines (vol. 4, chap. 10).	4 (2015/2016–2021)
A.5	Make efforts to collect data about the allocation fractions of non-dairy cattle and swine manure per liquid system with and without natural crust cover and revise the estimations of CH_4 and N_2O for this category. A well-documented expert judgment or survey results may be used as a data source for manure allocation per liquid system.	4 (2015/2016–2021)
A.6	Provide detailed information in the NIR on the methodology applied to derive the fractions of manure in the different management systems that are consistent with the values reported in CRF table 3.B(a)2.	3 (2017–2021)
A.8	Apply values for the fraction of volatile N in line with the 2006 IPCC Guidelines and ensure that the values in the NIR are consistent with the information provided in CRF table 3.B(b) for category 3.B.5 (indirect N_2O emissions).	3 (2017–2021)
A.9	Justify the choice of values for the fraction of volatile N ($Frac_{GASM}$ and $Frac_{LOSS}$ from the tables provided in the 2006 IPCC Guidelines) with references.	3 (2017–2021)
A.10	Check the consistency between NIR tables 5.18 and 5.22 and the CRF tables.	3 (2017–2021)
LULUCF		
L.1	Provide in the NIR and the CRF tables estimates of carbon stock changes and emissions for all mandatory categories.	6 (2012–2021)
L.2	Provide a consistent uncertainty analysis for each estimated mandatory category.	6 (2012–2021)
L.3	Enhance the QA/QC procedures that are used for the LULUCF sector and, as a minimum, undertake an internal technical review to ensure consistency between the NIR and the CRF tables.	6 (2012–2021)
L.4	Provide detailed information in the planned improvements section (6.1.7) of the NIR with accompanying time frames related to estimating all missing categories using at least a tier 1 approach, providing an uncertainty analysis and implementing QA/QC procedures for each estimated category, or at least conduct an internal technical review to ensure consistency between the NIR and the CRF tables.	3 (2017–2021)
L.5	Correct the inconsistency between the information on total forest land area provided in the NIR (table 6.5, p.152) and in CRF table 4.1.	3 (2017-2021)
L.9	Improve the completeness and transparency of the reporting on land converted to forest land in the CRF tables and the NIR, and ensure consistency of the information reported in the NIR with that reported in the CRF tables.	6 (2012–2021)
Waste		

ID#	*Previous recommendation for issue*	*Number of successive reviews issue not addressed*[a]
W.5	Identify the country-specific management practices of CH_4 recovery or flaring and report accordingly in the next GHG inventory submission the respective amounts of CH_4 recovered for energy recovery purposes or flared; alternatively, use the notation key "NO" in the absence of such practices in the country, or justify the use of the notation key "NE".	4 (2015/2016–2021)
W.6	Collect and elaborate updated information on MSW historical composition using all available reference sources from national studies, surveys and results of relevant projects.	4 (2015/2016–2021)
W.7	Explore the possibility of initiating sample measurement of MSW composition in specialized laboratories, ensuring a better reflection of the real historical composition of the MSW disposed of in SWDS, including information on the disposal of sludge originated from wastewater treatment and industrial solid waste, and enabling the use of higher-tier methods for estimating CH_4 emissions from solid waste disposal following the guidance available in the 2006 IPCC Guidelines.	4 (2015/2016–2021)
W.15	Provide more information on wastewater treatment systems and discharge pathways in the NIR to justify that there are no emissions and use the notation key "NO" instead of "NE".	6 (2012–2021)
W.16	Explore and document the existence of CH_4 for energy recovery and flaring at wastewater treatment plants and, depending on the results obtained, report accordingly in the NIR and CRF tables the CH_4 recovered and/or flared, or use the correct notation key for the domestic and industrial wastewater category.	4 (2015/2016–2021)
W.17	Investigate the wastewater treatment practices in the country and provide in the NIR a transparent description of the activities occurring under this category, together with estimates of direct and/or indirect N_2O emissions, in accordance with the methodological approaches available in the 2006 IPCC Guidelines, using the adjusted protein consumption data provided by Belstat during the review.	4 (2015/2016–2021)

[a] Reports on the reviews of the 2014, 2018 and 2020 inventory submissions of Belarus have not yet been published. Therefore, 2014, 2018 and 2020 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 inventory 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 2021 inventory submission

9. Table 5 presents findings made by the ERT during the individual review of the 2021 inventory submission of Belarus that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2021 inventory submission of Belarus

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
General			
G.24	Notation keys	The Party included in CRF table 9 (categories reported as "NE") categories 2.E.1–2.E.4 (all gases), 4.A forest land – rewetted organic and mineral soils, and 5.C.1.2.b other/industrial waste, clinical waste and hazardous waste and	Yes. Completeness

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		an explanation that the emissions are reported as "NE" owing to unavailability of AD. During the review, the Party clarified that it is making every effort to collect data for estimating emissions for the missing categories. For internal reasons the Party is encountering difficulties in obtaining data for the whole time series, especially for the LULUCF sector. The national inventory team aims to continue to reduce the number of categories that have not been estimated. In accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines (annex to decision 24/CP.19), Annex I Parties shall report why emissions or removals for the mandatory CRF categories have not been estimated, which was done by Belarus in CRF table 9 for most of the categories (see ID#s I.17–I.19 in table 3). The UNFCCC Annex I inventory reporting guidelines also state that a Party may consider that a disproportionate amount of effort would be required to collect data for a gas from a specific category that would be insignificant in terms of the overall level and trend in national emissions and in such cases use the notation key "NE". The Party should then provide in the NIR justifications for exclusion in terms of the likely level of emissions. The total national aggregate of estimated emissions for all gases and categories considered insignificant shall remain below 0.1 per cent of the national total GHG emissions. Parties should use approximated AD and default IPCC EFs to derive a likely level of the emissions. However, none of the categories reported as "NE" by Belarus and included in CRF table 9 were identified as insignificant (see ID#s G.1 and G.11 in table 3). Similarly, the NIR (section 1.7 on completeness) provides no further information on any categories considered insignificant. The ERT recommends that the Party provide information in the NIR on insignificant categories reported as "NE" in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, and demonstrate that the total national aggregate of insignificant categories that are not estimated remains below 0.1 per cent of the national total GHG emissions.	
G.25	Methods	The Party reported in CRF table summary 3 and NIR table 1.4 (pp.25–27) that, although for many key categories country-specific EFs and parameters have been identified (e.g. CO_2 from gaseous fuels for categories 1.A.1, 1.A.2, 1.A.4 and 1.A.5; CO_2 for categories 2.A.1 and 2.B.1; CH_4 for category 3.A.1 (cattle); CH_4 and N_2O for category 3.B.1 (cattle); CO_2 for category 4.G; and CH_4 for category 5.A), there are several key categories for which a tier 1 methodology is still applied (e.g. CO_2 from combustion of liquid and solid fuels for categories 1.A.1 (including combustion of peat), 1.A.2, 1.A.4 and 1.A.5; emissions from all fuel types for category 1.A.3; CH_4 for category 1.B.2.b; direct N_2O for category 3.D; and CO_2 for categories 3.G, 4.A.1, 4.B.1 and 5.D). This is not in accordance with the UNFCCC Annex I inventory reporting guidelines (para. 11), according to which, for categories that are considered to be key categories in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 4), Annex I Parties should make every effort to develop and/or select EFs and collect and select AD in line with the recommended IPCC methods. According to paragraph 11 of the UNFCCC Annex I inventory reporting guidelines, for categories that are considered to be key categories, where national circumstances prohibit the use of a recommended method, the Annex I Party shall explain in its annual GHG inventory submission the reason(s) that it was unable to implement a recommended method in accordance with the decision trees in the 2006 IPCC Guidelines. During the review, the Party clarified that it is making every effort to use higher-tier estimation methods and country-specific EFs for key categories. The Party did not provide any reason for its inability to implement a recommended method in accordance with the decision trees in the 2006 IPCC Guidelines. The ERT encourages the Party, for categories that are considered to be key categories in accordance with paragraph 11 of the UNFCCC Annex I inventory reporting guidelines and the 2006 IPCC Guidelines, to make every effort to	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		develop and/or select EFs and collect and select AD in line with the IPCC good practice, and to use a recommended method in accordance with the relevant decision trees in the 2006 IPCC Guidelines. The ERT recommends that the Party include in its inventory submission an explanation for categories that are considered to be key categories and for which national circumstances prohibit the use of a recommended method, and the reason(s) for its inability to implement a recommended method in accordance with the decision trees in the 2006 IPCC Guidelines.	
Energy			
E.54	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O	The NIR chapter on the energy sector (chap. 3) contains no information on planned improvements in the relevant sections for each category (sections 3.2.4.6, 3.2.5.6, 3.2.6.6, 3.2.7.6 and 3.3.2.6). During the review, the Party informed the ERT of its planned improvements, including in response to the review process (see ID#s E.47, E.48 and E.50 in table 3). Belarus clarified that some improvements in the sectors are being made continuously, sometimes without preliminary planning. The improvement plan for the energy sector was included in the general improvement plan (NIR annex 5, table 5.4). The ERT noted that this information is inconsistent with that provided in the energy chapter of the NIR. For example, NIR section 3.3.2.6 states that no improvements are envisaged for category 1.B.2; however, table 5.4 in annex 5 to the NIR mentions plans to collect AD with a view to estimating emissions from oil and natural gas exploration activities. The ERT recommends that the Party provide in its NIR detailed and consistent information on the improvements planned for the energy sector.	Yes. Transparency
E.55	1. General (energy sector) – solid fuels and peat – CO_2, CH_4 and N_2O	In CRF table 1.A(b) Belarus provided information on BKB exports and stock changes and reported "NA" for imports. No data on BKB exports or stock changes were reported to IEA or in the official 2020 energy balance of Belarus. Further, in CRF table 1.A(b) Belarus reported an NCV of 16.53 TJ/kt for BKB. The NIR (table 3.4 and p.62) provides a link to the rules for calculating emissions for the accounting of implementation measures for energy saving and renewable energy sources (http://ecoinv.by/images/pdf/tkp_fond/_17.09-01-2011.pdf (in Russian)), which were used as the source for the NCV. The ERT examined the linked document and found that the value of 16.53 TJ/kt corresponds to "wooden sleepers for fuel needs" (i.e. biomass). During the review, Belarus clarified that the source of the BKB AD was the data on peat briquettes provided in the energy balance, for which the correct NCV is 16.59 TJ/kt. The ERT noted that CRF table 1.A(b) lists BKB and peat as different fuel types with different parameters (NCVs, EFs and carbon contents) and that the categorization of peat as a solid fuel is not in line with the fuel definitions given in the 2006 IPCC Guidelines (vol. 2, table 1.1). The ERT recommends that Belarus ensure the correct allocation of fuel amounts in line with the IPCC fuel categorization (2006 IPCC Guidelines, vol. 2, table 1.1) and correct its reporting in relation to BKB and peat in CRF table 1.A(b) on the basis of information to be collected on the use of these fuel types and their parameters. The ERT also recommends that the Party make the necessary reallocations and corrections in its reporting for all categories under the sectoral approach where peat briquettes are used and report in the NIR information on the applied reallocations and recalculations.	Yes. Comparability
E.56	Fuel combustion – reference approach – liquid fuels – CO_2	The NIR (section 2.3.2, p.44) indicates that Belarus uses paraffin wax for non-energy purposes, and the corresponding CO_2 emissions are reported under the IPPU sector in CRF table 2(I).A-Hs2. According to the methodology provided in the 2006 IPCC Guidelines (vol. 2, chap. 6, p.6.9), AD for NEU of paraffin wax should be	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		reported in CRF table 1.A(d) and carbon stored in CRF table 1.A(b). However, in the Party's inventory submission, those tables provide no information on paraffin wax consumption ("NO" was reported for the entire time series) under other oils as per the IPCC allocation for paraffin wax (see 2006 IPCC Guidelines, vol. 2, table 1.2). The ERT recommends that Belarus ensure consistency between the information reported in the NIR and CRF tables 1.A(b), 1.A(d) and 2(I).A-Hs2 on the NEU of paraffin wax.	
E.57	1.A.3.b Road transportation – gaseous fuels – CH_4 and N_2O	The Party reported in CRF table 1.A(a)s3 IEFs of 92 kg CH_4/TJ and 3 kg N_2O/TJ for natural gas under subcategory 1.A.3.b (road transportation) – which correspond to the default values from the 2006 IPCC Guidelines (vol. 2, chap. 3, p.3.21) – for the entire time series except for 1993 and 1995, for which Belarus reported higher values (CH_4 and N_2O IEFs of 106.53 and 3.47 kg/TJ, respectively, for 1993 and 97.46 and 3.18 kg/TJ, respectively, for 1995). During the review, Belarus indicated that the variations in the CH_4 and N_2O IEFs for natural gas for road transportation were attributable to errors in data entry to CRF Reporter and that it will address the issue for the next inventory submission. The ERT recommends that Belarus correct the reporting of CH_4 and N_2O emissions for 1993 and 1995 and include information on the recalculations in the NIR.	Yes. Accuracy
E.58	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O	The overall fuel consumption for road transportation was recalculated for the 2021 submission, with fuel consumption values decreasing by between 49.9 per cent (for 1990) and 99.5 per cent (for 2018) across the time series. The category accounted for 4.4 per cent of the overall emissions of the country in 2019, which is the lowest proportion of any other Annex I Party (others range between 7.5 and 57.4 per cent of total national emissions excluding LULUCF). The values reported in the official energy balance of Belarus for the use of gasoline, diesel oil and LPG for road transportation for 2015–2020 are much higher than those reported in CRF table 1.A(a)s3. For example, the AD reported in CRF table 1.A(a)s3 for the use of gasoline, diesel oil and LPG for road transportation for 2019 (578.23, 14,480.74 and 74.1 TJ, respectively) differ from those reported in the energy balance of Belarus (53,473, 84,794 and 3,868 TJ, respectively). During the review, Belarus indicated that the discrepancies between the AD for the use of gasoline, diesel oil and LPG for road transportation reported in the energy balance and CRF table 1.A(a)s3 are attributable to the partial reporting of fuel consumption for road transportation under liquid fuels in category 1.A.4 (other sectors), but did not clarify the fuel allocation across the categories. The ERT investigated the matter and concluded that, for 2019, the AD for liquid fuels (132,322.71 TJ) reported under category 1.A.4 (other sectors) in CRF table 1.A(a)s4 were many times higher than the AD reported for liquid fuels for commercial, residential and agriculture, forestry and fishing (32,670 TJ) provided in the energy balance of Belarus. The ERT recommends that Belarus ensure the accuracy and completeness of AD reported for mobile consumption of different fuels under categories 1.A.3.b (road transportation) and 1.A.4 (other sectors), ensuring that the allocation is in line with the allocation suggested in the 2006 IPCC Guidelines (vol. 2, chap. 2, p.2.9). The ERT also recommends that the Party provide detailed information on fuel allocation under category 1.A.4 (other sectors) in the NIR, including the source of the reported AD, disaggregated information on the types of liquid fuel used, and the subcategory of category 1.A.4 under which the fuels are reported. The ERT recommends that the Party explain any recalculations in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	Yes. Accuracy
E.59	1.A.3.b Road transportation – liquid	In response to a previous recommendation (see ID# E.35 in table 3), the Party explained during the review that the AD on gasoline for road transportation include aviation gasoline for small aircraft. However, the ERT noted that, in	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue?[a]
	fuels – CO_2, CH_4 and N_2O	CRF table 1.A(a)s3, AD on gasoline consumption for 2019 reported under subcategory 1.A.3.b (road transportation) would still be substantially lower than the data in the official energy balance of Belarus even if aviation gasoline for small aircraft were not included (see ID# E.34 in table 3). In addition, the ERT noted that the reporting of aggregated data under road transportation leads to inaccurate estimates of CO_2, CH_4 and N_2O emissions for subcategories 1.A.3.a (domestic aviation) and 1.A.3.b (road transportation) owing to differences in the methodologies and EFs applied. For example, the 2006 IPCC Guidelines (vol. 2, chap. 3, pp.3.16 and 3.64) provide different default values for CO_2 EFs for road transportation (69.3 t/TJ) and for domestic aviation (70 t/TJ). For road transportation, the default values vary for CH_4 EFs (3.8–33 kg/TJ) and N_2O EFs (3.2–8 kg/TJ) depending on the technology used (2006 IPCC Guidelines, vol. 2, chap. 3, table 3.2.2). For domestic aviation, the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.6.5) provide default values for CH_4 EFs (0.5 kg/TJ) and N_2O EFs (2 kg/TJ). The ERT recommends that the Party ensure the correct allocation of fuel consumption between road transportation and domestic aviation (ensuring gasoline used in aviation is reported under the appropriate subcategory), estimate the related emissions in accordance with the methodologies and EFs provided in the 2006 IPCC Guidelines (vol. 2, chap. 3) and include explanatory information on the recalculations in the NIR.	
E.60	1.A.4.a Commercial/ institutional – all fuels – CO_2, CH_4 and N_2O	For subcategory 1.A.4.a (commercial/institutional), for 1990–2000, Belarus used the notation key "NA" for all emissions for all fuels except for biomass, for which it reported "NO", but provided estimates, including AD and IEFs, for 2001–2019. For category 1.A.4 (other sectors), for CO_2 emissions from biomass, Belarus used the notation key "NO" for the entire time series, even where it reported AD. During the review, Belarus indicated that it allocated the emission estimates for all fuels for subcategory 1.A.4.a for 1990–2000 to subcategory 1.A.5.a (other stationary, and that it plans to provide in its next inventory submission disaggregated AD and emission estimates, including estimates for biomass, for all gases for the entire time series. The ERT recommends that Belarus provide disaggregated AD and CO_2, CH_4 and N_2O emission estimates for subcategory 1.A.4.a (commercial/institutional) for 1990–2000, ensuring the time-series consistency of the data in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 5, pp.5.14–5.15), and provide explanatory information in the NIR on the reallocation and recalculation. If disaggregated data are not provided and CO_2 emissions from biomass are not reported, the ERT recommends that the Party revise the notation keys used (in case of aggregated AD and emissions, "IE" should be used and an appropriate explanation should be provided in CRF table 9, and CO_2 emissions that have not been estimated should be reported as "NE" in CRF table 1.A(a)).	Yes. Consistency
E.61	1.A.4.c Agriculture/forestry/ fishing – all fuels – CO_2, CH_4 and N_2O	Belarus revised its reporting under category 1.A.4.c, reallocated AD between subcategories 1.A.4.c.i (stationary combustion) and 1.A.4.c.ii (off-road vehicles and other machinery) and provided a corresponding explanation in the NIR (section 3.2.7.5, p.56). For subcategory 1.A.4.c.iii (fishing), it used notation keys "IE" (gasoline and gas/diesel oil) (see ID# E.4 in table 3) and "NO" for all other fuels. The ERT noted that the reallocation resulted in AD trends with significant inter-annual changes. For example, under subcategory 1.A.4.c.i, the AD reported for biomass for 2018–2019 are significantly (50–55 per cent) lower than for previous years; the AD reported for liquid fuels for 1990–2017 vary from 268.84 TJ (for 2012) to 14,580.28 TJ (for 2014), with "NA" reported for 2018–2019; and the AD for peat are provided only for 2001–2015, with "NA" reported for other years. Under subcategory 1.A.4.c.ii, for AD for biomass, gaseous fuels and other fossil fuels, the Party reported "NO" rather than "IE", which it had reported in the 2020 submission; and the AD are reported for other liquid fossil fuels for 2004–2015 and for LPG for 2001–2019, with "NA" reported for other years in the time series. It was not clear how AD for gasoline, LPG and diesel oil were distributed between subcategories 1.A.4.c.i and 1.A.4.c.ii. During the review, Belarus provided	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		spreadsheets containing the AD, NCVs and EFs used for recalculations under category 1.A.4.c and stated that it will provide, in its next NIR, more detailed information on the AD applied to ensure the transparency of its reporting for this category. The ERT recommends that the Party improve the transparency of its reporting by providing detailed information on the allocation of AD for all fuels between subcategories 1.A.4.c.i (stationary combustion) and 1.A.4.c.ii (off-road vehicles and other machinery). The ERT also recommends that the Party explain any significant inter-annual changes in fuel consumption within the subcategories and revise its use of notation keys across the time series in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines (where a specific fuel is not used for a given year, "NO" should be reported; where aggregated data are reported, "IE" should be reported and an explanation should be provided in CRF table 9).	
E.62	1.A.4.c Agriculture/forestry/ fishing – all fuels – CH_4 and N_2O	The Party reported in CRF table 1.A(a)s4 CH_4 IEFs of 30 kg/TJ for biomass and 1 kg/TJ for solid fuels for subcategories under category 1.A.4.c. The default CH_4 EFs given in the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.5, pp.2.22–2.23) range between 3 and 300 kg/TJ for biomass and 5 and 300 kg/TJ for solid fuels, depending on the fuel mix. No information was provided in the NIR on the CH_4 EFs, the fuel types reported under biomass and solid fuels or the NCVs used in the estimations to justify the low values used. The ERT considers that the CH_4 IEFs reported by the Party are probably incorrect, which indicates that the CH_4 emissions from biomass and solid fuels may have been underestimated. During the review, the Party provided spreadsheets containing the AD, NCVs and EFs used for category 1.A.4.c. On the basis of the information provided, the ERT noted that the NCVs used by Belarus for residual oil and peat (37.96 and 15 TJ/Gg, respectively) differ significantly from the default values (40.4 and 9.76 TJ/Gg, respectively) given in the 2006 IPCC Guidelines (vol. 2, table 1.2). It also noted that the country-specific NCVs used by Belarus for certain types of fuel, such as fuel for household ovens (42.01 TJ/Gg) and industrial waste (biomass fraction) (29.3 TJ/Gg), are not in line with the information provided in the NIR (p.42) on the values (i.e. default) used in the sectoral approach. The ERT further noted that the NIR provides no justification for these values and no information on the methodologies used for developing the country-specific parameters. Moreover, the CH_4 and N_2O EFs used in emission estimates for residual fuel oil, natural gas, wood and wood waste, and peat differ significantly from the default EFs given in the 2006 IPCC Guidelines (vol. 2, table 2.5). For residual fuel oil, the Party reported values of 3 kg/TJ (CH_4) and 6 kg/TJ (N_2O) instead of 10 and 0.6 kg/TJ, respectively; for natural gas, it reported 1 kg/TJ (CH_4) instead of 5 kg/TJ; for wood and wood waste, it reported 30 kg/TJ (CH_4) instead of 300 kg/TJ; and for peat, it reported 1 kg/TJ (CH_4) and 1.5 kg/TJ (N_2O) instead of 300 and 1.4 kg/TJ, respectively. During the review, the Party clarified that some values were used by mistake and will be corrected for the next inventory submission. The ERT recommends that the Party correct the CH_4 and N_2O EFs used for the category and recalculate the corresponding emissions for the entire time series, providing detailed information in the next NIR on the EFs used, the fuel mix and the recalculation performed.	Yes. Accuracy
E.63	1.B.2.b Natural gas – gaseous fuels – CO_2 and CH_4	According to the key category analysis presented in annex 1 to the NIR (pp.258–289) and CRF table 7, only subcategory 1.B.2.b (natural gas) is considered a key category for fugitive emissions of CH_4. Belarus reported the use of default CH_4 EFs for emission estimates for that category. The Party reported in its NIR (table 1.4, p.25) that no improvements are envisaged for key category 1.B.2.b (natural gas). At the same time, under the country-specific	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue?[a]
		category 1.B.2.d (other – natural gas transport), Belarus provided estimates of CH_4 emissions from natural gas transit based on a country-specific CH_4 EF, with IEFs ranging from 8,079.11 kg/PJ for 2000 to 4,360.62 kg/PJ for 2013, and reported "NA" for CO_2 emissions for the entire time series. The ERT noted that, in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.1), CO_2 and CH_4 emission estimates for natural gas transmission, including transit volumes, should be reported under subcategory 1.B.2.b.4 (natural gas transmission and storage). Furthermore, the 2006 IPCC Guidelines (vol. 2, chap. 4, tables 4.2.4–4.2.5) provide a methodology for estimating CO_2 emissions from natural gas transmission, including transit volumes. The ERT considers that CO_2 emissions from natural gas transmission have been underestimated, since the amount of gas reported under gas transmission (subcategory 1.B.2.b) does not include the transit volumes reported by Gazprom Transgaz Belarus, which are three times more than the domestic consumption reported by Belarus. It noted that, according to an online news article published on 7 June 2021, the annual transit of natural gas to Poland through Belarus has not dipped below 37.7 billion m³ since at least 2015, except for in 2020, when the coronavirus disease 2019 reduced demand in Europe for gas from Russia (see https://www.argusmedia.com/en/news/2222462-gazprom-plans-for-lower-4q-belarus-transit-to-eu). The ERT also noted that it was difficult to draw any conclusion from the country-specific CH_4 EF used, since the NIR lacks any information on how the data were measured or any references to peer-reviewed journals, and that the provision in the NIR of information on the AD and the CH_4 and CO_2 EFs used for each type of technology would further improve the transparency of the reporting. During the review, Belarus explained that the AD reported under subcategory 1.B.2.b.4 represent the volume of natural gas consumed in Belarus, and the AD reported for category 1.B.2.d represent the volume of natural gas transmitted by pipelines, including the volumes transited through the Yamal–Europe, Northern Lights and Minsk–Kaliningrad natural gas pipelines. The CH_4 emissions reported under category 1.B.2.d were calculated by Gazprom Transgaz Belarus on the basis of monitoring data, making it possible to indicate a country-specific method and EFs. The AD reported under category 1.B.2.d for 2019 amount to 2,048.453 PJ (2,048,453 TJ/33.82 TJ/million m^3 = 60,569 million m^3) and the AD reported under subcategory 1.B.2.b.4 for 2019 amount to 20,479 million m^3. The ERT recommends that Belarus provide revised estimates for CO_2 and CH_4 emissions for subcategory 1.B.2.b.4 based on the AD on gas transmission, taking into account transit volumes and clearly documenting in the NIR the country-specific EFs (e.g. any weighted average CH_4 EF value based on volumes of gas and technology used) and methodology used for gas transmission, together with information on any recalculations and/or any planned improvements for the reporting of this key category.	
IPPU			
I.20	2.A.1 Cement production – CO_2	The Party reported in its NIR (section 4.2.1, table 4.5, pp.69–70) that CO_2 emissions from cement production were recalculated for the entire time series on the basis of plant-specific data obtained from local enterprises on CaO content in clinker, clinker production volumes and the amount of cement produced by process type (dry and wet processes). The recalculated emissions for 2015–2018 are lower than the previously estimated values (e.g. by 14.8 per cent for 2018), while for other years (except 1999 and 2000) they are higher (e.g. by 19.5 per cent for 1990). In addition, the CO_2 IEFs for 1990–1997, 2001, 2003–2011 and 2017–2018 (which range between 0.45 and 0.67 t/t) differ significantly from the IPCC default value of 0.52 t/t (2006 IPCC Guidelines, vol. 3, chap. 2, p.2.12), while for several years (1991–1993, 1995, 1997, 2001, 2006–2010), the reported values (0.58–0.66 t/t) are the highest of all reporting Annex I Parties (0.12–0.66 t/t). However, for 2017 and 2018, the reported values (0.47 and 0.45 t/t,	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue?[a]
		respectively) are the lowest of all reporting Annex I Parties (0.47–0.59 t/t and 0.45–0.63 t/t, respectively). The ERT noted that the information in the NIR is insufficient to explain the recalculations made. During the review, the Party clarified that AD on clinker production for two factories were inputted incorrectly. The updated estimations shared by the Party during the review showed underestimations for 2015–2018. The Party informed the ERT that the necessary corrections will be made for the next inventory submission. The ERT recommends that the Party correct AD for this category for the time series, justify the CO_2 EF and its trend, report updated CO_2 emission estimates for the entire time series and include in its next NIR information on the recalculations performed in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	
I.21	2.A.2 Lime production – CO_2	The Party reported in its NIR (section 4.2.2, p.71) that a decline in lime production (NIR table 4.6) was caused by a drop in demand for lime from agricultural enterprises. The amount of lime applied to soils for the time series is reported in the NIR (section 5.5, table 5.31, p.153). The ERT noted that the declining trend in lime production does not fully correlate with the trend in the amount of lime applied to soils. For instance, for 2017, lime production was 4.7 per cent lower than for 2016, while the amount of lime used for soil liming increased by 24.1 per cent over the same time frame. There is no explanation for these trends in the NIR. During the review, the Party clarified that lime is used in the country for a number of purposes, including construction, fish-breeding, sugar, paper and wood pulp production, and wastewater sludge stabilization, and that the inter-annual changes in lime production over the time series are mainly attributable to the needs of the different enterprises. The ERT recommends that the Party include in its NIR an explanation of the changes across the time series in the amount of lime produced in the country, as well as information on its uses (including the application of lime to soils).	Yes. Transparency
Agriculture			
A.19	3.B.4 Other livestock – CH_4 and N_2O	The Party reported in its NIR (sections 5.11, p.131, and 5.2.2, p.144) that the AD for the poultry population were estimated using State statistics on poultry numbers and FAO data to determine the structure of the population by type: chickens, ducks and turkeys. The population numbers for chickens, ducks and turkeys can be found in NIR table 5.6 (p.123) and the share of the poultry population is reported in NIR table 5.15 (p.135). The ERT noted that the 2006 IPCC Guidelines (vol. 4, chap. 10, section 10.2.2) suggest using further subdivisions of poultry populations (broilers, layers and chickens) to improve accuracy if the data are available. Specific subcategories can be found in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.1). During the review, the Party stated that it plans to improve its categorization of poultry for future inventory submissions. The ERT encourages the Party to estimate the poultry population by species (chickens, ducks and turkeys) and subcategory where relevant (e.g. layers, broilers and chickens), using country-specific data to improve the accuracy of the emission estimates.	Not an issue
A.20	3.B.5 Indirect N_2O emissions – N_2O	The Party reported recalculations of indirect N volatilized as NH_3 and NO_X in its 2020 and 2021 submissions. The recalculation referred to in the 2021 submission (NIR section 5.3.5, p.145) relates to an overall recalculation for animal species, while the recalculation referred to in the NIR of the 2020 submission (section 5.3.5, p.127) relates directly to changes in indirect N_2O estimates linked to a recommendation from the review process. However, the ERT noted that the values used for the recalculation referred to in the 2020 NIR were incorrectly sourced from table	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue?[a]
		10.23, rather than table 10.22, of the 2006 IPCC Guidelines (vol. 4, chap. 10) (see ID# A.8 in table 3). During the review, the Party provided a calculation sheet that included the fraction of volatile N and the factor for atmospheric deposition referred to in the NIR (table 5.21, p.143). The ERT found, however, that the emission estimates in the calculation sheet provided were not the same as the values given in CRF table 3.B(b) for the relevant time series (e.g. total direct N_2O emissions for 2019 were reported as 1.88 Gg in CRF table 3.B(b) and 1.63 Gg in the calculation sheet). It also found that the EF for atmospheric deposition given in CRF table 3.B(b) (0.02 kg N_2O-N/kg N) differed from the EF referred to in the calculations and the NIR (table 5.21, p.131) (0.01 kg N_2O-N/kg N) (see ID# A.10 in table 3). During the review, the Party clarified that the values presented to the ERT were estimated in August 2021 and were not provided in the NIR or CRF table 3.B(b). The Party stated that it will correct the data in its next inventory submission. The ERT recommends that the Party report consistently the values used in its estimations, including the EF for atmospheric deposition, in CRF table 3.B(b) and the NIR, correct the EFs applied for calculating the indirect N volatilized as NH_3 and NO_X for this category across the time series using the default values included in the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.22), and document the recalculations in the NIR.	
A.21	3.F Field burning of agricultural residues – CH_4 and N_2O	The Party reported in its NIR (section 5.1, p.114) that burning of agricultural residues is prohibited by law and does not occur in the country. It is reported as "NO" in CRF table 3.F for the entire time series. The ERT noted that the Party did not provide justifiable evidence that burning of agriculture residues does not occur in the country. According to information from the statistical database of FAO, burning of both wheat and maize residues occurred in Belarus over the entire time series. The ERT conducted a rough calculation to estimate the CH_4 and N_2O emissions associated with the burning of wheat and maize crop residues based on the FAO data and concluded that they may amount to approximately 44 kt CO_2 eq for 2019, which is below 45.06 kt CO_2 eq, the significance threshold for the Party according to the UNFCCC Annex I inventory reporting guidelines (para. 37(b)). During the review, the Party stated that it does not have any information that could be used to estimate crop residue burning and was unaware of the collection of such data by FAO. The ERT recommends that the Party investigate (e.g. by means of an expert survey and desk review) possible emissions from field burning of residues and report its findings in the NIR together with the relevant emissions. If the Party can demonstrate that there is no burning of agricultural residues in the country for the entire time series, the ERT recommends that the Party continue reporting emissions as "NO" and provide supporting documentation in the NIR. If the emissions are found to be insignificant, the ERT recommends that the Party report emissions and AD as "NE" in CRF table 3.F and provide justification in the NIR in accordance with the UNFCCC Annex I inventory reporting guidelines (para. 37(b)).	Yes. Completeness
LULUCF			
L.17	4. General (LULUCF) – CO_2, CH_4 and N_2O	The NIR (table 6.8, p.184) shows the total area of the forest fund (total area of forest land in Belarus) and the areas of forest under the responsibility of the Ministry of Forestry for which carbon fluxes are calculated by year. Clarifications provided in the NIR (table 6.5, p.180) demonstrate that only about 87.9 per cent of the total forest fund is currently included in the national LULUCF inventory (this was also confirmed by the Party during the review). The ERT noted that the difference between these two areas for 2019 is about 1,300 kha. It also noted that the AD uncertainty for forest land is calculated at 15–25 per cent in the NIR (section 6.4.3, p.212) and that the above-mentioned difference was not accounted for in the uncertainty analysis presented by the Party. During the	Yes. Accuracy

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		review, the Party clarified that forest land in Belarus is assigned to departmental State bodies (presented in NIR table 6.5) and that the AD required to estimate carbon fluxes are available only for the territories assigned to the Ministry of Forestry (NIR table 6.8, p.184). The Party added that it will make efforts to resolve this issue, reassess the uncertainties and estimate GHG emissions for 100 per cent of its forest land. The ERT recommends that Belarus estimate the carbon fluxes for the total national territory. The ERT also recommends that the Party conduct the LULUCF uncertainty analysis, taking into consideration the fact that only part of the country's forest fund is included in the national inventory, until the reporting of carbon fluxes for the total territory of the country is available.	
L.18	4.G HWP – CO_2	Although AD on the production and export of HWP are provided in the NIR (tables 6.38 (export) and 6.39 (production), pp.233–234), CRF table 4.Gs2 contains only blank cells (for 1960–1989) and the notation key "NE" instead of AD on the production, import and export of sawnwood, wood panels, and paper and paperboard. During the review, the Party explained that there had been an oversight during QC and that the relevant information will be provided in the next inventory submission. The ERT recommends that the Party ensure the complete and consistent reporting of the AD on the production, import and export of HWP in CRF table 4.Gs2 and the NIR.	Yes. Comparability
L.19	4.G HWP – CO_2	The NIR (table 6.40, p.235) shows that HWP production in Belarus accounted for a net removal of 2,030.22 kt CO_2 in 2019; however, for the same year CRF table 4.Gs1 shows this same figure (–2,030.22 kt CO_2) for HWP exports and emissions of 222.56 kt CO_2 for HWP domestic production and consumption. The overall removals for the category reported in CRF table 4 are reported as 1,807.66 kt CO_2. During the review, the Party stated that NIR table 6.40 will be revised accordingly for the next NIR. The ERT recommends that the Party revise the values for net CO_2 emissions and removals from HWP in the NIR (table 6.40) and ensure the consistency of that reporting with the values given in CRF table 4.Gs1.	Yes. Convention reporting adherence
L.20	4.G HWP – CO_2	The NIR (section 6.10.3, p. 236) indicates that AD uncertainty for this category is assumed to be 15 per cent; however, no source or justification is provided for the uncertainty values used. The NIR (section 6.10.2, p.231) specifies that, owing to the country's national circumstances (it was part of the former Soviet Union), the Party does not have country-specific statistics on the production and export of HWP for 1961–1989 and that the AD for those years were calculated on the basis of information from various sources. AD uncertainty for those years is not reported in the NIR. During the review, in response to a question on the relevance of the 15 per cent uncertainty value reported for the time series, the Party stated that the uncertainty values for this category will be reassessed. The ERT encourages the Party to reassess the uncertainty values reported for HWP AD.	Not an issue
Waste			
W.19	5.A Solid waste disposal on land – CH_4	The Party applied the FOD method (bulk option) to estimate CH_4 emissions from solid waste disposal on land for the first time in its 2021 submission (see ID# W.2 in table 3). The FOD model requires historical data on disposed MSW, industrial waste and sewage sludge for 1950 onward. Although the NIR (section 7.2.2.2, p.242) contains general information on the AD applied, it does not contain complete and transparent information on the sources for those AD, all assumptions made, the values used for shares of disposed waste, or a justification for the constant values for those shares reported by the Party across the time series. During the review, the Party provided the FOD	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		spreadsheet model and background data files, including AD for the entire time series for disposed MSW, industrial waste and sewage sludge (specifying the sources of data together with the relevant calculations based on the assumptions indicated in the NIR). On the basis of the information provided during the review, the ERT concluded that the information provided in the NIR is not comprehensive and is missing significant clarifications. For example, the NIR does not indicate that there are two sources of available historical data on the volumes of MSW disposal for 1990–2019, or for which years of that period each source is considered in the calculations (see ID# W.20 below). The ERT recommends that the Party transparently describe in the NIR the data sources for the volumes of generated MSW, industrial waste and sewage sludge and their application by year, as well as the background assumptions used and the procedures applied for years for which statistical data are not available. The ERT also recommends that the Party explain in its NIR how time-series consistency is ensured where multiple data sources are used for the reported period.	
W.20	5.A Solid waste disposal on land – CH_4	The ERT noted significant inter-annual changes in annual waste volumes disposed of at SWDS for 1995–1996 (16.73 per cent), 2003–2004 (14.15 per cent) and 2004–2005 (–20.52 per cent). The Party reported limited information in its NIR (p.242) on the methodology used for collecting AD on MSW disposal across the historical time series, and no information at all on the inter-annual changes referred to above. During the review, the Party clarified that it is taking steps to avoid such time-series inconsistencies and plans to make further revisions to the reporting of AD under this category. It provided the ERT with files containing the AD (see ID# W.19 above) and demonstrating the use of different data sources across the time series. Belarus clarified that the inter-annual changes for 1995–1996 and 2003–2004 were caused by the erosion of purchasing power owing to the difficult financial situation of the country. In addition, the Party explained that the AD were provided by the Ministry of Housing and Communal Services until 2005 and have been provided by Belstat since then. The Party indicated that it is planning to investigate this issue for the next inventory submission. The ERT recommends that the Party revise and, if necessary, update the MSW generation AD to ensure consistency across the entire time series and revise the CH_4 emission estimates accordingly, providing explanatory information on any recalculations performed in the NIR.	Yes. Consistency
W.21	5.A Solid waste disposal on land – CH_4	The Party calculated CH_4 emissions from industrial waste for the entire time series (see ID# W.9 in table 3). It reported in its NIR (p.243) that the data on the volume of industrial waste generated by type of economic activity were provided by Belstat for 2016–2018 (see www.belstat.gov.by/ofitsialnaya-statistika/makroekonomika-i-okruzhayushchaya-sreda/okruzhayuschaya-sreda/sovmestnaya-sistema-ekologicheskoi-informatsii2/i-othody/i-1-obrazovanie-othodov/ (in Russian)) and by Bel SRC "Ecology" (a subsidiary body of the Ministry of Natural Resources) for 2019 (see www.ecoinfo.by/content/2399.html (in Russian)). Data for 2005–2015 were calculated on the assumption that 15 per cent of generated waste contains DOC (this assumption is based on information available for 2016–2018 from Belstat). For 2019, information on the volume of disposed industrial waste was provided by the Ministry of Natural Resources and Environmental Protection. The ERT noted that the NIR does not contain the AD used for the entire time series or explain how consistency was ensured. During the review, the Party provided the ERT with files showing the AD used and the calculations made (see ID# W.20 above) and containing detailed data on industrial waste flows for 2019. The ERT recommends that the Party provide in the NIR detailed information on the AD (e.g. in tabular format) and its sources and any assumptions used to calculate industrial waste disposed of at landfills and demonstrate how	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		time-series consistency is ensured. The ERT also recommends that, if the Party updates AD on disposed industrial waste for the entire time series to ensure the consistency of data across the time series, it report any recalculations made in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	
W.22	5.A Solid waste disposal on land – CH_4	According to information provided by the Ministry of Natural Resources and Environmental Protection for 2019 (see ID# W.21 above), only 2.7 per cent of generated industrial waste was disposed of at SWDS. Owing to lack of data for previous years, this value was applied for the entire time series. On the basis of the calculation files provided by the Party during the review (see ID# W.19 above), the ERT confirmed the 2.7 per cent share of industrial waste across the time series and noted that the share of sewage sludge disposed of at SWDS was reported as 2.7 per cent for 1950–2018 and as 1.93 per cent for 2019, whereas the NIR (section 7.2.2.2, p.244) reports this share as 1.93 per cent for the entire time series. The NIR does not provide any information on the use of balance checks for generated sludge as recommended in the 2006 IPCC Guidelines (vol. 5, chap. 6, p.6.16). The ERT considers that it may be possible to conduct a survey or obtain expert judgment on historical trends of industrial wastewater and sewage sludge disposal taking into account all available reference material (national studies, surveys and results of relevant projects) and other methods of industrial wastewater and sewage sludge treatment. The ERT recommends that the Party improve emission estimates for this category using updated AD calculated on the basis of more accurate values for the shares of disposed industrial wastewater and sewage sludge across the time series, or justify the application of the constant value of 2.7 per cent of generated industrial waste disposed of at SWDS across the time series. The ERT encourages the Party to include information in its NIR on the use of balance checks for generated sludge and its use and application in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 6, p.6.16).	Yes. Accuracy
W.23	5.A Solid waste disposal on land – CH_4	All SWDS were reported as uncategorized in CRF table 5.A of the 2021 submission but as unmanaged in previous submissions. The reallocation of emissions and the application of the FOD model led to recalculations across the entire time series and a corresponding decrease in emissions from 1997 onward (e.g. by 29.3 per cent (from 158.64 to 112.10 kt) for 2018). The NIR (section 7.2.2.5, p.245) does not provide any details on the decrease in emissions resulting from the recalculations or any explanation for the reallocation of emissions. The ERT noted that the reallocation of all waste to uncategorized sites is not in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3.2.3, table 3.1), as Parties may only use the MCF for uncategorized sites where they are unable to categorize their SWDS as managed (anaerobic and semi-aerobic) and unmanaged (deep and shallow). During the review, the Party explained that the national classification of managed and unmanaged waste disposal sites does not correspond to the IPCC classification. The ERT considers that it would be possible for the Party to conduct a survey or obtain expert judgment to categorize its SWDS in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3.2.3, table 3.1) and ascertain the share of waste disposed of at those SWDS to ensure the accuracy of the estimates made. The ERT recommends that the Party make an accurate estimate of emissions for this key category and separately estimate and report emissions from managed and unmanaged waste disposal sites in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3.2) by, for example, using survey findings or expert judgment documented in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 2, annexes).	Yes. Accuracy
W.24	5.B.1 Composting – CH_4 and N_2O	The Party did not include any information in its NIR (section 7.3) on composting practices and reported “NO” for this activity in CRF table 5.B. During the review, the Party clarified that the “National Strategy for the Management of Municipal Solid Waste and Secondary Material Resources in the Republic of Belarus” – approved by resolution	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue?[a]
		567 of the Council of Ministers of 28 July 2017 – established a procedure for handling the organic part of MSW, and that a feasibility study on the construction of composting sites was conducted in 2017–2020. According to the strategy, for 2021–2025 composting sites are due to be built in large cities. In the above-mentioned strategy, it is planned that 354 kt waste will be composted at those sites in 2025, 497 kt in 2030 and 535 kt in 2035. The ERT recommends that the Party include in the NIR a separate section on composting, including information on the progress of its plans to build composting sites under the "National Strategy for the Management of Municipal Solid Waste and Secondary Material Resources in the Republic of Belarus", and provide information justifying the use of the notation key "NO" in CRF table 5.B.	
W.25	5.C Incineration and open burning of waste – CO_2, CH_4 and N_2O	The Party reported CO_2, CH_4 and N_2O emissions from waste incineration for the first time in its 2021 submission and included background information on calculations in the NIR (section 7.4.1, p.246) (see ID# W.14 in table 3). The ERT noted that the Party obtained AD for 2019 only and applied them to the entire time series for this subcategory on the basis of the assumption that the emissions in question did not exceed the 2019 level, but did not justify this assumption or describe the composition of the incinerated waste. During the review, the Party stated that, according to the State waste register, 232.78 kt waste was incinerated in 2019, of which 99.5 per cent clinical waste and 0.5 per cent medical waste. The ERT recommends that the Party collect AD on the amount of industrial and medical waste incinerated for the whole time series to recalculate the CO_2, CH_4 and N_2O emissions across the time series for the category. If this is not possible, the ERT recommends that the Party further justify the assumption and constant values used or apply one of the techniques for resolving data gaps from the 2006 IPCC Guidelines (vol. 1, chap. 5, section 5.3).	Yes. Accuracy
W.26	5.C Incineration and open burning of waste – CO_2, CH_4 and N_2O	Belarus reported emissions for category 5.C.1 (waste incineration, non-biogenic, other (industrial solid waste, hazardous waste and clinical waste)) as "NE" in CRF table 5.C, although according to the NIR (section 7.4.1, p.246) such emissions were calculated for the first time for the 2021 submission. During the review, the Party clarified that the AD and emissions for category 5.C.1 were mistakenly reported under category 5.C.2 and will be reallocated as appropriate in the next inventory submission. The ERT recommends that the Party ensure consistent reporting of information on incineration and open burning between the NIR and the CRF tables and reallocate the emissions from incineration of industrial and medical waste (reported under category 5.C.2 in the 2021 submission) to category 5.C.1, separately reporting the waste amounts and emissions for incineration of industrial solid waste, hazardous waste and clinical waste.	Yes. Comparability
W.27	5.C Incineration and open burning of waste – CO_2, CH_4 and N_2O	The Party reported in its NIR (section 7.4.1.1, p.246) that there is no open burning of waste in Belarus, although emissions were reported for this activity in CRF table 5.C (see ID# W.26 above). The ERT noted that no background documentation or references are provided in the NIR to substantiate this claim. During the review, the Party clarified that, according to Belstat, it has fully implemented Sustainable Development Goal indicator 11.6.1 on MSW collection coverage, with 100 per cent of the population served by municipal SWDS. The Party also clarified that the burning of non-fuel substances, materials and waste outside special facilities is prohibited under national legislation on air quality, and that making fires and burning plant residues is permitted only outside common areas and settlements and subject to compliance with environmental protection and fire safety rules. Moreover, the incineration of waste on private property is prohibited under fire safety rules. Also, under national legislation on waste management, individuals are obliged to separate waste by type for collection or to deliver waste to authorized sites.	Yes. Transparency

ID#	*Finding classification*	*Description of finding with recommendation or encouragement*	*Is finding an issue?*[a]
		The ERT recommends that the Party include in the NIR information justifying that GHG emissions from open burning of waste do not occur in the country.	

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

Annex I

Overview of greenhouse gas emissions and removals as submitted by Belarus in its 2021 inventory submission

Tables I.1–I.3 provide an overview of the total GHG emissions and removals as submitted by Belarus. Table I.1 shows total GHG emissions, including and excluding LULUCF and, for Parties that have decided to report indirect CO_2 emissions, with and without indirect CO_2. Tables I.2 and I.3 show GHG emissions reported under the Convention by Belarus by gas and by sector, respectively.

Table I.1
Total greenhouse gas emissions and removals for Belarus, base year–2019
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions and removals including indirect CO_2 emissions*[a]	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*
1990	108 472.82	139 151.99	NA	NA
1995	48 285.99	83 442.94	NA	NA
2000	38 929.82	79 717.08	NA	NA
2010	40 429.32	90 694.80	NA	NA
2011	41 191.57	90 342.30	NA	NA
2012	44 361.80	91 370.71	NA	NA
2013	43 327.07	92 264.23	NA	NA
2014	43 933.54	91 040.70	NA	NA
2015	40 641.50	85 975.45	NA	NA
2016	46 669.40	87 745.02	NA	NA
2017	51 478.71	88 542.20	NA	NA
2018	49 725.69	89 064.61	NA	NA
2019	58 351.87	90 115.70	NA	NA

Note: Emissions and removals reported in 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.

Table I.2
Greenhouse gas emissions and removals by gas for Belarus, excluding land use, land-use change and forestry, 1990–2019
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	103 757.55	18 852.36	16 542.07	NO, NE	NO, NE	NO, NE	NO, NE	NO, NE

1995	57 507.96	14 497.08	11 437.90	NO, NE	NO, NE	NO, NE	0.00	NO, NE
2000	54 706.24	13 346.09	11 664.66	NO, NE	NO, NE	NO, NE	0.10	NO, NE
2010	62 774.84	14 716.58	13 201.28	NO, NE	NO, NE	NO, NE	2.10	NO, NE
2011	61 628.92	14 769.31	13 941.77	NO, NE	NO, NE	NO, NE	2.30	NO, NE
2012	62 674.22	15 134.07	13 559.95	NO, NE	NO, NE	NO, NE	2.46	NO, NE
2013	63 237.30	15 531.61	13 492.81	NO, NE	NO, NE	NO, NE	2.51	NO, NE
2014	62 608.77	15 495.34	12 934.16	NO, NE	NO, NE	NO, NE	2.43	NO, NE
2015	58 037.50	15 415.04	12 520.40	NO, NE	NO, NE	NO, NE	2.52	NO, NE
2016	59 851.42	15 301.46	12 589.40	NO, NE	NO, NE	NO, NE	2.74	NO, NE
2017	60 115.69	15 465.69	12 957.92	NO, NE	NO, NE	NO, NE	2.91	NO, NE
2018	60 961.76	15 627.62	12 471.77	NO, NE	NO, NE	NO, NE	3.46	NO, NE
2019	61 022.46	15 736.36	13 350.06	NO, NE	NO, NE	NO, NE	6.83	NO, NE
Percentage change 1990–2019	**–41.2**	**–16.5**	**–19.3**	**NA**	**NA**	**NA**	**NA**	**NA**

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

Table I.3
Greenhouse gas emissions and removals by sector for Belarus, 1990–2019
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	98 235.07	5 868.02	30 487.41	–30 679.17	4 561.50	NO
1995	54 758.13	3 754.95	20 833.57	–35 156.95	4 096.29	NO
2000	51 996.34	4 164.01	19 063.40	–40 787.27	4 493.33	NO
2010	57 785.71	5 988.27	21 759.75	–50 265.47	5 161.06	NO
2011	56 697.37	5 936.93	22 492.10	–49 150.73	5 215.89	NO
2012	57 662.45	5 970.96	22 423.74	–47 008.91	5 313.56	NO
2013	58 515.44	6 042.57	22 106.85	–48 937.16	5 599.37	NO
2014	57 456.40	6 323.24	21 584.19	–47 107.16	5 676.86	NO
2015	53 538.27	5 741.68	21 098.83	–45 333.95	5 596.68	NO
2016	55 661.28	5 351.54	21 219.18	–41 075.62	5 513.03	NO
2017	56 131.56	5 194.28	21 601.64	–37 063.50	5 614.73	NO
2018	57 150.03	5 154.39	20 931.26	–39 338.92	5 828.93	NO
2019	56 722.28	5 805.36	21 715.23	–31 763.82	5 872.83	NO
Percentage change 1990–2019	**–42.3**	**–1.1**	**–28.8**	**3.5**	**28.7**	**NA**

Notes: (1) Belarus did not report emissions or removals in the sector other (sector 6); (2) Belarus did not report indirect CO_2 emissions in CRF table 6.

Annex II

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.a Domestic aviation – aviation gasoline (CO_2, CH_4 and N_2O) (see ID#s E.34 and E.35 in table 3);

(b) 2.D.1 Non-energy products from fuels and solvent use – lubricant use (CO_2) (see ID# I.14 in table 3);

(c) 2.E Electronics industry (HFCs, PFCs, SF_6 and NF_3) (see ID# I.15 in table 3);

(d) 2.F Product uses as substitutes for ozone-depleting substances (HFCs, PFCs, SF_6 and NF_3) (see ID# I.16 in table 3);

(e) 2.G.1 Electrical equipment (SF_6) (see ID# I.18 in table 3);

(f) 2.G.2 SF_6 and PFCs from other product use (SF_6 and PFCs) (see ID# I.19 in table 3);

(g) 3.F Field burning of agricultural residues (CH_4 and N_2O) (see ID# A.21 in table 5);

(h) 4.A.2.1 (cropland converted to forest land), 4.A.2.2 (grassland converted to forest land), 4.A.2.3 (wetlands converted to forest land), 4.A.2.5 (other land converted to forest land), 4.B.2.1 (forest land converted to cropland), 4.B.2.2 (grassland converted to cropland), 4.B.2.3 (wetlands converted to cropland), 4.B.2.4 (settlements converted to cropland), 4.B.2.5 (other land converted to cropland), 4.C.2.1 (forest land converted to grassland), 4.C.2.2 (cropland converted to grassland), 4.C.2.3 (wetlands converted to grassland), 4.C.2.5 (other land converted to grassland), 4.D.1.3 (other wetlands remaining other wetlands), 4.D.2.3 (land converted to other wetlands), 4.E.1 (settlements remaining settlements), 4.E.2 (land converted to settlements) and 4.F.2 (land converted to other land) (CO_2, CH_4 and N_2O) (see ID#s L.1 and L.9 in table 3);

(i) 5.B Biological treatment of solid waste (CH_4 and N_2O) (see ID# W.13 in table 3).

Annex III

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 1997. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency. Available at https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html.

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/.

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/publication/good-practice-guidance-for-land-use-land-use-change-and-forestry/.

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 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 2012, 2013, 2015, 2016, 2017 and 2019 inventory submissions of Belarus, contained in documents FCCC/ARR/2012/BLR, FCCC/ARR/2013/BLR, FCCC/ARR/2015/BLR, FCCC/ARR/2016/BLR, FCCC/ARR/2017/BLR and FCCC/ARR/2019/BLR, 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%202020_final.pdf.

Annual status report for Belarus for 2021. Available at https://unfccc.int/sites/default/files/resource/asr2021_BLR.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Kristina Gonchar (Bel SRC “Ecology”), 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:

FAO, 2021. FAOSTAT Climate Change, Emissions, Burning - Crop Residues http://www.fao.org/faostat/en/#data/GB (Accessed 14 October 2021).

Rules for calculating emissions for the accounting of implementation measures for energy saving and renewable energy sources, Minsk. 2011. Available at http://ecoinv.by/images/pdf/tkp_fond/_17.09-01-2011.pdf.

Energy balance of the Republic of Belarus. National Statistical Committee of the Republic of Belarus. 2020. Available at https://www.belstat.gov.by/upload/iblock/484/484d69a59d489c53b25079a3c088e5c6.pdf.

Energy balance of the Republic of Belarus. National Statistical Committee of the Republic of Belarus. 2021. Available at https://www.belstat.gov.by/upload/iblock/b65/b65315f91d76adb70baef67c3afb8d9e.pdf.

All-Union standards for the technological design of systems for the removal and preparation for the use of manure (ONTP 17.18).

Norms of technological design of systems for removal and preparation for use of manure and droppings (NTP 17-99).

Republican norms of technological design of new, reconstruction and technological re-equipment of livestock facilities. / Order of the Ministry of Agriculture and Food of the Republic of Belarus dated 02.12.1992 No. 185.