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Report on the individual review of the inventory submission of Belarus submitted in 2016*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions 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 inventory review of the 2016 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 26 September to 1 October 2016 in Minsk, Belarus.

* In the symbol for this document, 2016 refers to the year in which the inventory was submitted, and not to the year of publication.

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Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction	1–5	3
II. Summary and general assessment of the 2016 inventory submission	6	4
III. Status of implementation of issues raised in the previous review report.....	7	5
IV. Issues identified in three successive reviews and not addressed by the Party	8	25
V. Additional findings made during the 2016 technical review	9	29
 Annexes		
I. Overview of greenhouse gas emissions and removals for Belarus for submission year 2016, as submitted by the Party.....		49
II. Additional information to support findings in table 2		52
III. Documents and information used during the review		56
IV. Acronyms and abbreviations		58

I. Introduction

1. This report covers the review of the 2016 inventory submission of Belarus organized by the UNFCCC secretariat, in accordance with the “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” (hereinafter referred to as the UNFCCC review guidelines) and particularly part III, “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”.¹ The review took place from 26 September to 1 October 2016 in Minsk, Belarus, and was coordinated by Mr. Javier Hanna and Mr. Pedro Torres (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Belarus.

Table 1

Composition of the expert review team that conducted the review of Belarus

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Mr. Marius Țăranu	Republic of Moldova
Energy	Ms. Rana Humbatova	Azerbaijan
IPPU	Ms. Valentina Idrissova	Kazakhstan
Agriculture	Mr. Yuriy Pyrozhenko	Ukraine
LULUCF	Ms. Valentyna Slivinska	Ukraine
Waste	Ms. Medea Inashvili	Georgia
Lead reviewers	Mr. Yuriy Pyrozhenko Mr. Marius Țăranu	

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.

2. This report contains findings based on the assessment by the ERT of the 2016 inventory submission against the UNFCCC review guidelines. The ERT has made recommendations to resolve those findings related to issues.² Other findings and, if applicable, the ERT’s encouragements to resolve them, are also included.

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

4. An overview of the greenhouse gas (GHG) emissions reported under the Convention for Belarus is provided in annex I: table 6 shows GHG emissions with and without indirect carbon dioxide (CO₂) emissions for selected years; and tables 7 and 8 show GHG emissions reported under the Convention by gas and by sector, respectively.

5. The ERT notes that Belarus’s 2015 inventory submission was delayed, consistent with decision 24/CP.19, paragraph 3, and decision 13/CP.20, paragraph 13. As a result, the review of the 2016 inventory submission is being held in conjunction with the review of the 2015 GHG inventory submission, in accordance with decision 20/CP.21, paragraph 1. To the extent that identical information is presented in both inventory submissions, the ERT

¹ Annex to decision 13/CP.20.

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

has reviewed this information only once and, as appropriate, has replicated the findings below in both the 2015 and 2016 annual review reports.

II. Summary and general assessment of the 2016 inventory submission

6. Table 2 provides the ERT's assessment of the 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 below.

Table 2
Summary of review results and general assessment of the inventory of Belarus^a

<i>Assessment</i>	<i>Issue ID number(s) in tables 3 and/or 5^a</i>		
Date of submission	Original submission: 10 June 2016 (NIR and version 5.14 of CRF tables)		
	The values from the latest submission are used in this report		
Review format	In-country		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	1. Identification of key categories	Yes	G.11, G.12, G.18
	2. Selection and use of methodologies and assumptions	Yes	G.6, G.8, E.1, E.8, E.10, E.17, E.20, E.23, E.35, E.37, I.2, I.4, I.9, A.4, A.25, L.2, L.3, W.2, W.9, W.12
	3. Development and selection of emission factors	Yes	G.4, G.8, E.1, E.2, E.6, E.14, E.15, E.16, E.19, E.26, E.35, E.37, I.2, I.4, I.7, I.11, I.12, A.2, A.4, A.9, A.14, A.15, A.20, A.21, L.7, L.8, W.10
	4. Collection and selection of activity data	Yes	E.1, E.4, E.10, E.13, E.21, E.23, E.24, E.27, E.30, E.36, E.37, E.38, I.2, I.4, I.6, I.8, I.9, I.10, I.12, I.13, A.8, A.10, A.11, A.16, A.17, A.21, A.24, A.27, L.2, L.3, L.4, L.7, L.8, W.3, W.5, W.7, W.8, W.9, W.11, W.12
	5. Reporting of recalculations	Yes	G.4, G.16, G.17, E.31, E.38
	6. Reporting of a consistent time series	Yes	G.4, E.22, E.24, E.26
	7. Reporting of uncertainties, including methodologies	Yes	G.13, A.3, L.1
	8. Quality assurance/quality control	Yes	G.5, G.10, G.19, E.3, E.5, E.11, E.12, E.18, E.25, E.32,

Assessment	<i>Issue ID number(s) in tables 3 and/or 5^a</i>		
			E.33, A.6, A.14, A.18, A.26, L.1, L.5, W.10
	9. Missing categories/completeness ^b	Yes	G.3, E.30, E.37, E.39, I.1, I.6, I.13, A.10, A.24, A.27, L.I, L.3, L.6, W.1, W.5, W.7, W.8, W.9, W.11, W.12
	10. 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?	The Party did not report “NE” for any insignificant categories	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	G.17, G.19
National inventory arrangements	Have any issues been identified with the effectiveness and reliability of the institutional, procedural and legal arrangements for estimating GHG emissions, including the changes to the national inventory arrangements since the previous annual submission	Yes	G.7, G.8, G.9, G.10, G.12, G.13, G.14, G.15
Response from the Party during the review	Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes	
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	Yes	Please refer to annex II for a list of questions and issues to be considered during this in-country review

Abbreviations: CRF = common reporting format, ERT = expert review team, GHG = greenhouse gas, NE = not estimated, NIR = national inventory report, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Change Guidelines for National Greenhouse Gas Inventories: Wetlands*.”

^a The ERT identified additional issues in the energy, industrial processes and product use, agriculture, LULUCF and waste sectors that are not specifically listed in table 2 but are included in tables 3 and/or 5.

^b Missing categories, for which methods are provided in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, may affect completeness and are listed in annex II to this document.

III. Status of implementation of issues raised in the previous review report

7. Table 3 compiles all the recommendations made in the previous review report. Owing to the unique circumstances of the 2015 inventory submission, as described in

paragraph 5 above, and the fact that Belarus was not subject to an individual inventory review of its 2014 inventory submission, the latest available review report was for the review of the 2013 inventory submission, published on 20 August 2014. For each issue, the ERT specified whether it believes the issue has been resolved by the conclusion of the review of the 2016 inventory submission and provided the rationale for its determination, taking into consideration the publication date of the previous review report and national circumstances.

Table 3

Status of implementation of issues raised in the previous review report of Belarus

<i>ID#</i>	<i>Issue classification^a</i>	<i>Recommendation made in previous review report^b</i>	<i>ERT assessment and rationale</i>
General			
G.1	Annual submission (6, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Submit inventories by 15 April each year as required by decision 18/CP.8	Not resolved. Belarus submitted its 2016 GHG inventory on 10 June 2016
G.2	NIR (7, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Provide the missing sections in the NIR following the structure outlined in the UNFCCC reporting guidelines	Not resolved. The recommended chapter 9 “Indirect CO ₂ and nitrous oxide emissions” and chapter 10 “Recalculations and improvements” were not provided. In addition, the Party did not provide annex 3 to the NIR, “Detailed methodological description for individual sources or sink categories”
G.3	Activity data (table 3, 2013) (8, 2012) Completeness	Collect AD and estimate emissions for all categories and subcategories which are currently reported as “NE”, but for which the IPCC provides estimation methods	Not resolved. In its 2016 GHG inventory submission, mainly owing to lack of AD, Belarus still reports a considerable number of categories for which the IPCC provides estimation methods as “NE” (actual estimates were not reported), “NO” (actual estimates were reported as not occurring, but the ERT determined that they may be occurring), “NA” (actual emissions were reported as not applicable, but the ERT determined them as being applicable) and “IE” (actual estimates were not reported, and they were not reported elsewhere, i.e. they were missing), as follows: In the energy sector: CO ₂ , CH ₄ and N ₂ O emissions from 1.B.2.a.1 exploration (oil) (“NO”); CO ₂ and CH ₄ emissions from 1.B.2.b.1 exploration (natural gas) (“NO”), 1.B.2.b.3 processing (natural gas) (“IE”) and 1.B.2.b.5 distribution (natural gas) (“IE”); CO ₂ , CH ₄ and N ₂ O emissions from 1.B.2.c venting and flaring (“NA”)

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
			<p>In the IPPU sector:</p> <p>CO₂ emissions from 2.A.4 other process uses of carbonates (“NE”) (2.A.4.a ceramics and 2.A.4.c non-metallurgical magnesium production), 2.D.1 lubricant use and 2.D.2 paraffin wax use (“NE”);</p> <p>HFCs, PFCs, SF₆ and NF₃ emissions from 2.F product uses as substitutes for ozone-depleting substances (“NA”) (2.F.1 refrigeration and air conditioning, 2.F.2 foam blowing agents, 2.F.3 fire protection and 2.F.4 aerosols)</p> <p>In the agriculture sector:</p> <p>CH₄ and N₂O emissions from asses under 3.A.4 other livestock and 3.B.4 other livestock (“NA”);</p> <p>N₂O emissions from 3.D.a.5 mineralization/ immobilization associated with loss/gain of soil organic matter (“NA”);</p> <p>CO₂ emissions from 3.H urea application (“IE”)</p> <p>In the LULUCF sector:</p> <p>CO₂ emissions and removals from 4.A.2.1 cropland converted to forest land (“NE”), 4.A.2.2 grassland converted to forest land (“NE”), 4.A.2.3 wetlands converted to forest land (“NE”), 4.A.2.5 other land converted to forest land (“NE”), 4.B.2.1 forest land converted to cropland (“NE”, “NO”), 4.B.2.2 grassland converted to cropland (“NE”), 4.B.2.3 wetlands converted to cropland (“NE”), 4.B.2.4 settlements converted to cropland (“NE”), 4.B.2.5 other land converted to cropland (“NE”), 4.C.2.1 forest land converted to grassland (“NE”, “NO”), 4.C.2.2 cropland converted to grassland (“NE”), 4.C.2.3 wetlands converted to grassland (“NE”), 4.C.2.5 other land converted to grassland (“NE”), 4.D.1.2 flooded land remaining flooded land (“NE”), 4.D.1.3 other wetlands remaining other wetlands (“NE”), 4.D.2.3 land converted to other wetlands (“NE”), 4.E.1 settlements remaining settlements (“NE”), 4.E.2 land converted to settlements (“NE”), 4.F.1 other land remaining other land (“NE”, “NO”), 4.F.2 land converted to other land (“NE”, “NO”) and 4.G harvested wood products (“NE”);</p> <p>CH₄ emissions from 4.E.1 settlements remaining settlements (“NE”) and 4.E.2 land converted to settlements (“NE”);</p> <p>N₂O emissions from 4.B.2 lands converted to</p>

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
			<p>cropland (“NO”), 4.C.2 lands converted to grasslands (“NE”, “NO”), 4.D.1 wetlands remaining wetlands (“NE”, “NA”, “NO”), 4.E.1 settlements remaining settlements (“NE”), 4.E.2 lands converted to settlements (“NE”, “NO”) and 4.F other land (“NE”);</p> <p>CO₂, CH₄ and N₂O from 4(II) emissions and removals from drainage and rewetting and other management of organic and mineral soils (“NE”)</p> <p>In the waste sector:</p> <p>CO₂ and CH₄ emissions from 5.A.1 managed waste disposal sites (“NO”);</p> <p>CH₄ and N₂O emissions from 5.B biological treatment of solid waste (“NO”);</p> <p>CO₂, CH₄ and N₂O emissions from 5.C incineration and open burning of waste (“NO”), CH₄ emissions from 5.D.1 domestic wastewater (“NE”);</p> <p>CH₄ and N₂O emissions from 5.D.2 industrial wastewater (“NE”)</p>
G.4	Recalculations (table 3, 2013) Consistency	Undertake recalculations for all years of the time series	Not resolved. Belarus has not implemented most of the recommendations made in the previous review report where recalculation issues have been raised; for example, N ₂ O emissions from LPG used for road transportation were calculated in the 2016 GHG inventory submission still using an incorrect EF (62 kg/TJ), which is far above the default value (0.2 kg/TJ) available in the 2006 IPCC Guidelines (see E.6 and E.26 below)
G.5	QA/QC and verification (table 3, 2013) (19, 2012) Transparency	Put in place robust QA/QC procedures and report complete and detailed information on sectoral QA/QC procedures in the NIR, in particular for the key categories	Not resolved. The NIR of the 2016 GHG inventory submission provides limited information on QA/QC procedures implemented for key categories. This issue particularly refers to the energy sector, for which the QC procedures were reported only at the level of the category 1.A fuel combustion activities
G.6	Methods (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 provide background information	Not resolved. The NIR of the 2016 GHG inventory submission still does not provide sufficient background information to explain the methodologies and procedures used in the calculations, to describe the data collection process or to present the AD and EFs that have been used. This is particularly the case for the energy sector

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		on all AD used in the inventory, specifically for the energy and industrial processes sectors	
G.7	Inventory management (11, 2013) (26, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	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	Not resolved. The NIR of the 2016 GHG inventory submission still does not include any information on the personnel involved in the development and management of the inventory, helping to demonstrate that there is sufficient capacity and expertise to undertake the various tasks and roles within the inventory team (e.g. technical expertise in different sectors, experience with operating QA/QC systems and inventory management expertise)
G.8	Inventory planning (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 IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Not resolved. The ERT noted that very few improvements have been made since the previous GHG inventory submission (2015) on this issue, and many key categories are still estimated using tier 1 methodologies and default EFs, despite repeated recommendations made in several previous review reports for the Party to use higher-tier methods and country-specific EFs. The ERT also noted that the NIR of the 2016 GHG inventory submission still does not contain an inventory improvement plan, which would cover recommendations made in the previous review reports, including those that refer to using higher-tier estimation methods and country-specific EFs and/or parameters used for key categories
G.9	Inventory planning (12, 2013) (13, 2012) Accuracy	Report in the NIR a delivery deadline for each of the planned improvements	Not resolved. The NIR of the 2016 GHG inventory submission still does not contain information on delivery deadlines for planned improvements
G.10	QA/QC and verification (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	Not resolved. The NIR of the 2016 GHG inventory submission provides limited information on QA/QC procedures implemented for key categories. This issue particularly refers to the energy sector, for which the QC procedures were reported only at the level of 1.A fuel combustion activities. The ERT noted that Belarus reported in the NIR that its inventory was subject of peer review undertaken by independent experts, which did not participate directly in the elaboration of the inventory; however, the Party has not reported specific details on the sectors and categories that were peer reviewed, or the names of independent peer review experts and/or the institutions they

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			represent
G.11	Key category analysis (table 4, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Undertake a key category analysis following the IPCC good practice guidance	Addressing. Belarus identified its key categories for the base year and the latest reported inventory year, using approach 1, level and trend assessment, including and excluding LULUCF. The information was provided in the NIR using tables 4.2 and 4.3 of the 2006 IPCC Guidelines; however, the level of category disaggregation used for determining the key categories is not fully in accordance with the guidance provided in the 2006 IPCC Guidelines (for instance, in the energy sector the categories are not disaggregated to main fuel types, while in the LULUCF sector, categories are not disaggregated by pools and subcategories)
G.12	Inventory planning (table 4, 2013) (13, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	Report in the NIR whether the Party uses the key category analysis in the prioritization of developments in and improvements to its inventory	Not resolved. Belarus did not report in the NIR of the 2016 GHG inventory submission if it used the key category analysis in the prioritization of developments in and improvements to its inventory
G.13	Uncertainty analysis (table 4, 2013) (14, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	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	Not resolved. Belarus did not provide any explanations for the observed changes in the reported uncertainty estimates between inventory submissions. According to the NIR of the 2016 GHG inventory submission, the cumulative uncertainty of the total GHG emissions for 2014 was 32.6% (level), and this value has increased compared with the respective value reported in the 2015 inventory submission, which is 31.8% (level); Belarus did not report in its 2016 GHG inventory submission the total uncertainty value in the trend. The NIR did not provide a description of the reasons for the changes in the uncertainty estimates between the two latest inventory submissions (2015 and 2016); neither provided information on how the uncertainty analysis was used to prioritize inventory improvements; and the values for parameters used in the uncertainty analysis have not been adequately documented
G.14	Inventory management (15, 2013) (25, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	Include in the NIR an updated version of the inventory improvement plan, which covers all recommendations made in the current and previous review	Not resolved. Belarus did not include in the NIR of the 2016 GHG inventory submission an inventory improvement plan covering the recommendations made in previous review reports

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
reports			
Energy			
E.1	1. General (energy sector) – all fuels – all gases (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	Not resolved. The NIR did not include any detailed information on the AD and EFs used for the inventory estimations according to the disaggregation of categories provided in the 2006 IPCC Guidelines. The NIR contains only brief information on the use of the tier 1 approach and default EFs, and does not include summary tables of AD and EFs or a description of the sources of the AD and EFs
E.2	1. General (energy sector) – all fuels – all gases (21, 2013) (44, 2012) Accuracy	Where possible, use country-specific EFs for key categories	Not resolved. Belarus continued to use default IPCC EFs to calculate GHG emissions from most fuels and key categories
E.3	1. General (energy sector) – all fuels – all gases (22, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Implement tier 2 QC procedures for all key categories in the energy sector	Not resolved. The NIR provided brief information on general QC procedures applied only at the level of 1.A fuel combustion activities
E.4	1. General (energy sector) – all fuels – all gases (22, 2013) (33, 2012) Accuracy	Include in the NIR detailed information on data management and handling	Not resolved. The NIR did not describe how Belarus performs the activities of data management and handling or how it checks the quality of AD used
E.5	1. General (energy sector) – all fuels – all gases (23, 2013) Transparency	Implement QC procedures to ensure the correct and consistent use of notation keys	<p>Not resolved. Although the ERT noted some progress in the transparency of the CRF tables while addressing the issue raised in the previous review report on the use of notation keys, the use of certain notation keys still remains inconsistent:</p> <p>(a) “NO” is used in CRF table 1.A(a) for all gases under 1.A.1.b petroleum refining, but in CRF table 1.B.2 estimates for CH₄ from refining/storage of oil are provided (1.32 kt);</p> <p>(b) In CRF table 1.A(a), “IE” is used to report AD and emissions from 1.A.2.b non-ferrous metals (all fuels) and from 1.A.2.g.i manufacturing of machinery (peat), but no explanatory information is provided in the NIR,</p>

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E.6	1.A.3.b Road transportation – liquid and gaseous fuels – CH ₄ and N ₂ O	Use appropriate CH ₄ and N ₂ O EFs to estimate emissions from road transportation	<p>in the documentation box of CRF table 1.A(a) or in CRF table 9. During the review, Belarus indicated that the notation key “IE” was used by mistake and the emissions in the above-mentioned categories are not occurring;</p> <p>(c) In the NIR (p. 31) Belarus reported on the adoption of national EFs for CO and NO_x from road transportation, and indicated that there are emissions of SO₂ and non-methane volatile organic compounds from road transportation; nevertheless, in CRF table 1 “NO” was used for all indirect GHG emissions from road transportation;</p> <p>(d) In the NIR (p. 33) Belarus indicated that category 1.A.4.c agriculture/forestry/fishing includes emissions from both mobile and stationary combustion of fuel; however, in CRF table 1.A(a) for the category 1.A.4.cii off-road vehicles and other machinery “NO” was used;</p> <p>(e) CRF table 1.A(b) reported imports of 65.0 TJ of coke oven/gas coke for 2014, but in the same table “NO” was used for reporting actual CO₂ emissions;</p> <p>(f) In the NIR (p. 34) Belarus indicated that jet kerosene is used only for international flights and aviation gasoline mainly for small aircraft (domestic aviation), while in CRF table 1.A(a) “NO” is used for AD and emissions from aviation gasoline</p> <p>The ERT notes also that there is still a lack of transparency regarding the reason for the changes of notation keys made by the Party for certain categories. For example, in the 2014 GHG inventory submission, in CRF table 1.A(d), for feedstocks and non-energy use of fuels, the AD for coal oils and tars were reported as “NO”, but the fraction of carbon stored was reported as “NA” and the carbon stored was reported as “NE”. In the 2016 GHG inventory submission the notation key “NO” was used for all the above-mentioned categories, and no explanatory information was provided in the NIR on the reasons of such changes</p> <p>Not resolved. The ERT noted, for example, that the IEF values reported in CRF table 1.A(a) for CH₄ and N₂O emissions from road transportation are not in line with those provided in the 2006</p>

<i>ID#</i>	<i>Issue classification^a</i>	<i>Recommendation made in previous review report^b</i>	<i>ERT assessment and rationale</i>
	(24, 2013) (48, 2012) Accuracy		IPCC Guidelines. The ERT considers that this could lead to an underestimation of the CH ₄ emissions and an overestimation of N ₂ O emissions from road transportation for the entire time series. Belarus used the same EF values for estimating CH ₄ and N ₂ O emissions from 1.A.3b road transportation for gasoline, LPG, gaseous fuels and biomass. Moreover, according to the NIR (p. 31), the tier 1 method with default EFs was used to estimate CH ₄ and N ₂ O emissions from 1.A.3.b road transportation. No additional explanatory information was provided in the NIR on choice of EFs. For example, the default EF used for the estimation of CH ₄ emissions from gasoline was taken as that for vehicles with oxidation catalyst (25 kg/TJ), and the EF value of 30 kg/TJ was used for estimating CH ₄ and N ₂ O emissions from biomass, but the NIR does not include explanatory information on the type of biomass used in road transportation
E.7	Fuel combustion-reference approach – all fuels – CO ₂ (26, 2013) (35, 2012) Transparency	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. The NIR still does not contain any information on the reason for the observed differences between the sectoral and reference approaches (see table 5, E.40)
E.8	Fuel combustion-reference approach – liquid fuels – CO ₂ (27, 2013) Accuracy	Categorize refinery gas as a liquid fuel	Addressing. The refinery gas was categorized as “other liquid fossil” in the reference approach. Nevertheless, Belarus continued to treat refinery gas as primary fossil fuel (see table 5, E.40)
E.9	Comparison with international data – all fuels – CO ₂ (28, 2013) (41, 2012) Transparency	Include in the NIR a comparison of the fuel data used in the inventory and the corresponding IEA data, clarifying the reasons for any significant differences	Not resolved. The NIR does not include a comparison of the fuel data used in the inventory estimates and the corresponding IEA data. The reasons for significant differences were not clarified (see table 5, E.41)
E.10	International aviation – liquid fuels – all gases (29, 2013) (42, 2012) Accuracy	Provide information in the NIR on how jet kerosene is allocated between domestic and international flights for the period 2000–2011	Not resolved. The NIR of the 2016 GHG inventory submission does not provide enough transparent and consistent information on the methodology, AD, sources of information and assumptions used for allocating jet kerosene consumption between domestic and international flights. The ERT noted that the NIR (p. 34) indicates that GHG emissions from aircraft are associated with the combustion of jet kerosene and aviation gasoline; jet kerosene is used only for international flights and aviation gasoline is

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
			<p>used mainly for small aircraft which do not carry out international flights (i.e. domestic aviation). The ERT also noted that annex 2 to the NIR provides information on overall fuel consumption of jet kerosene for the “transport and communications sector”. During the review, in response to a question raised by the ERT, representatives of the National Statistical Committee of the Republic of Belarus (Belstat) indicated that there is no disaggregation of domestic and international fuel consumption in the national energy balance because of the insignificance of the number of domestic flights. However, the ERT further noted that CRF tables 1, 1.A(a), 1.A(b) and 1.D provide separated emission estimates from jet kerosene consumption for domestic aviation and international bunkers for the entire time series, including recalculated estimates for the period 1990–1999, in which the amount of jet kerosene previously reported under aviation bunkers was split between civil and international aviation</p>
			<p>The ERT noted that for consumption of aviation gasoline for domestic aviation the notation key “NO” was used for the complete time series, whereas in the 2014 GHG inventory submission the notation key “C” (confidential) was used for 1990–1999 and AD and emission values were reported for 2000–2012. In addition, the ERT noted that no explanatory information was included in the NIR on recalculations undertaken, including justifications for the sources of AD (for both jet kerosene and aviation gasoline) and the methodology applied, in particular the steps taken for allocating jet kerosene between domestic and international flights</p>
E.11	International bunkers and multilateral operations – liquid fuels – all gases (30, 2013) Consistency	Enhance QC procedures to ensure the consistency of the data reported between CRF tables 1.A(b) and 1.C	Addressing. Belarus has improved, to some extent, the consistency of the information provided in CRF tables 1.A(a), 1.A(b) and 1.D (see E.10 above). The ERT noted that the NIR still does not contain any information on QC procedures implemented for international bunkers or for multilateral operations emission estimates
E.12	Feedstocks, reductants and other non-energy use of fuels – all fuels – CO ₂	Ensure consistency between CRF tables 1.A(b), 1.A(c) and 1.A(d)	Not resolved. Despite the efforts of Belarus to improve the consistency of the information used in CRF tables 1.A(b), 1.A(c) and 1.A(d), the information provided still lacks full consistency.

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	(31, 2013) Consistency		The ERT noted that QC procedures to ensure the consistency of the information provided in the different CRF tables seem not to be applied. The ERT also noted that generally, if feedstocks and non-energy use of fuels are deducted from the apparent energy consumption reported in table 1.A(b), the total difference between the reference and sectoral approaches in table 1.A(c) could be reduced (see table 5, E.40). The ERT further noted that the national energy balance provides information on non-energy use of several types of fuel
E.13	Feedstocks, reductants and other non-energy use of fuels – all fuels – CO ₂ (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 emissions estimates; and provide detailed relevant explanations in the NIR to improve transparency	Not resolved. The NIR (p. 30) indicates that emissions from non-energy use of fuels are accounted for in the IPPU sector. Nevertheless, in the IPPU sector, non-energy use of fuels was not estimated (see table 5, I.13). The ERT noted that emission estimates for carbon excluded from the reference approach for gasoline, jet kerosene, other kerosene, gas/diesel oil, residual fuel oil, lignite, brown coal briquettes (BKB) and patent fuel and natural gas were provided in CRF table 1.A(d). However, the notation key “NO” is used in CRF table 1.A(b) for carbon stored (carbon excluded) for all the above-mentioned fuels
E.14	1.A. Fuel combustion – sectoral approach – all fuels – CO ₂ (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	Not resolved. Belarus continued to use default EFs from the 2006 IPCC Guidelines to calculate GHG emissions from most fuels and is not following the requirements of the 2006 IPCC Guidelines, which are the same as in the IPCC good practice guidance
E.15	1.A. Fuel combustion – sectoral approach – solid fuels – CO ₂ (34, 2013) Accuracy	Investigate further the reasons for the lower EF used for solid fuels and ensure the use of the correct value in the future	Resolved. The ERT noted that the CO ₂ IEF (99.53 t/TJ) for solid fuels in CRF table 1.A(a) is in the range of default values provided by the 2006 IPCC Guidelines which, for peat, is 106 t/TJ, as reported in CRF table 1.A(a)
E.16	1.A. Fuel combustion – sectoral approach – solid fuels – all gases (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	Not resolved. No explanations were provided in the NIR on the derivation of NCVs for solid fuels. In addition, the NIR does not provide a justification for their use. In response to a question raised by ERT during the review, Belarus provided information on the scientific research for the derivation of NCVs for most fuels conducted at the Belarus Scientific and Research Centre “Ecology”
E.17	1.A.2 Manufacturing industries and	Report disaggregated emission data by subcategory under	Addressing. In the 2016 GHG inventory submission Belarus provided emission estimates

<i>ID#</i>	<i>Issue classification^a</i>	<i>Recommendation made in previous review report^b</i>	<i>ERT assessment and rationale</i>
	construction – all fuels – all gases (36, 2013) (46, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	manufacturing industries and construction and reallocate the emissions from petroleum refining and manufacture of solid fuels and other energy industries to the energy industries category	for iron and steel, chemicals, pulp, paper and print and food processing, beverages and tobacco, while the emissions from non-ferrous metals were reported as “IE” (see E.5 above). However, in CRF table 1.A(a) Belarus reported emissions of all gases from petroleum refining and manufacture of solid fuels and other energy industry as “NO”; nevertheless, in CRF table 1.B.2 the estimation of CH ₄ from oil refining/storage was provided and equals 1.32 kt in 2014. In response to a question raised by the ERT during the review, Belarus explained that, because of the structure of the energy balance, the emissions from petroleum refining were allocated under “manufacturing industries and construction” (1.A.2) and “NO” was used mistakenly for “petroleum refining” (1.A.1.b), where “IE” should have been used
E.18	1.A. Fuel combustion – sectoral approach – all fuels – all gases (37, 2013) Consistency	Strengthen QC procedures to ensure that the information reported in various parts of the NIR is consistent	Resolved. No inconsistencies between different parts of the NIR of the 2016 GHG inventory submission for the sectoral approach were identified
E.19	1.A.3.b Road transportation – liquid fuels – CO ₂ (38, 2013) (48, 2012) Accuracy	Use country-specific EFs to estimate emissions for this key category	Not resolved. In its 2016 GHG inventory submission Belarus used default EFs to estimate CO ₂ emissions from liquid fuels for 1.A.3.b road transportation; therefore the Party is still using a tier 1 methodology
E.20	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – CH ₄ (39, 2013) Transparency	Include in the NIR descriptions of the country-specific methodology used, as well as other relevant information for the estimation of emissions, to improve transparency	No longer relevant. The issue is no longer relevant because the NIR (p. 37) indicates that, for estimating fugitive emissions from oil and gas, the 2006 IPCC Guidelines and default EFs were used
E.21	1.B.2.b Natural gas – gaseous fuels – CH ₄ (40, 2013) Transparency	Include in the NIR data on the volume of gas transmission (including any transit amounts) to improve transparency	Not resolved. The AD for natural gas transmission/storage were not included in the NIR of the 2016 GHG inventory submission
E.22	1.B.2.b Natural gas – gaseous fuels – CH ₄ (41, 2013) Completeness	Estimate CH ₄ emissions for natural gas transport for all years of the time series, including 2011, to improve completeness	Resolved. CH ₄ emissions for transmission of natural gas were recalculated for all years of the time series, including 2011, owing to a change of the estimation methodology available in the 2006 IPCC Guidelines and the availability of updated AD
E.23	1.B.2.b Natural gas – gaseous fuels – CH ₄ (42, 2013) (50, 2012)	Report CH ₄ emissions under the distribution of natural gas	Not resolved. Belarus still reports CH ₄ emissions from distribution of natural gas as “IE”. No explanatory information is provided in the NIR,

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	Comparability		in the documentation box of CRF table 1.A(a) or in CRF table 9. The ERT noted that the Party continues to report CH ₄ emissions from natural gas distribution under the category natural gas transmission and storage
E.24	1.B.2.a Oil – liquid fuels – CH ₄ and CO ₂ (43, 2013) (52, 2012) Completeness	Collect the missing AD and estimate the corresponding CH ₄ (and CO ₂) emissions for oil transport for the whole time series, using the default EFs provided in the IPCC good practice guidance (table 2.16 on page 2.87) if no country-specific data are available	Resolved. Belarus has made efforts to improve the quality of AD for this subcategory by collecting data from Beltransgaz JSC and the Belarusian State Concern for Oil and Chemistry and has reported CH ₄ and CO ₂ emissions from oil transport for the entire time series using EFs from the 2006 IPCC Guidelines
E.25	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – CH ₄ (44, 2013) Accuracy	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 the notation keys and the transparency of the information provided in the NIR	Not resolved. The NIR of the 2016 GHG inventory submission does not include any information on QC procedures implemented for the category 1.B.2 oil, natural gas and other emissions from energy production
E.26	1.A.3.b Road transportation – liquid fuels – CH ₄ and N ₂ O (45, 2013) (53, 2012) Accuracy	Use the correct value of CH ₄ EF for LPG and revise the N ₂ O emission estimates using appropriate N ₂ O EFs, considering also the possibility of estimating the amount of fuel used by vehicle type and the number of vehicles equipped with catalytic convertors	Not resolved. The ERT noted that the IEF values for most fuels reported in CRF table 1.A(a) for CH ₄ and N ₂ O emissions from road transportation are not in line with the default values provided in the 2006 IPCC Guidelines (see E.6 above). The ERT also noted that Belarus corrected only the CH ₄ EF for LPG (62 kg/TJ) for the entire time series. In addition, the NIR does not contain any information on investigations made by the Party to assess the possibility of estimating the amount of fuel used by vehicle type and the number of vehicles equipped with catalytic convertors
E.27	1.A.3.e.i Pipeline transport – gaseous fuels – all gases (46, 2013) Completeness	Make efforts to obtain AD for pipeline transportation for the complete time series and to calculate and report the corresponding emission estimates to ensure the time-series consistency and completeness of its estimates for this category	Resolved. AD and emission estimates were reported for 1.A.3.i. pipeline transport
E.28	1.B.2.b Natural gas – gaseous fuels – CH ₄ and CO ₂ (46, 2013) (50, 2012)	Develop and use a country-specific CH ₄ EF based on the length of the transmission pipelines, and include fugitive and venting emissions	No longer relevant. The issue is no longer relevant and applicable in the framework of the requirements of the 2006 IPCC Guidelines

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	Completeness	(including CO ₂) from this activity in its inventory submission	
E.29	1.A.3.e Other transportation – gaseous fuels – all gases (46, 2013) (50, 2012) Comparability	Either reallocate these emissions to the transmission subcategory in the CRF tables, or transparently describe in the NIR the reasons for the current allocation in the CRF tables	Resolved (see E.22 above)
E.30	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – CO ₂ (47, 2013) Completeness	Collect data to allow the estimation and reporting of all associated emissions	Addressing. In the 2016 GHG inventory submission new approaches were applied for data collection to allow the estimation and reporting of associated emissions from the category 1.B.2 oil and natural gas and other emissions from energy production. Data have been provided by Beltransgaz JSC and the Belarusian State Concern for Oil and Chemistry. Nevertheless, CO ₂ emissions (and CH ₄ emissions) from the subcategories 1.B.2.b.3 processing and 1.B.2.b.5 distribution were reported as “IE” and no explanations were provided in the NIR or in the respective CRF tables on the allocation of these emissions (see E.23 above). Regarding 1.B.2.b.3 processing, the ERT considered that emissions for this category may not be estimated and reported. During the review, Belarus indicated that it plans to provide emission estimates from natural gas processing in its next GHG inventory submission
IPPU			
I.1	2. General (IPPU) – All gases (50, 2013) (59 and 60, 2012) Completeness	Ensure that improvements in the transparency and completeness of the inventory are delivered	<p>Not resolved. The ERT noted that some of categories are still reported as “NE” although the 2006 IPCC Guidelines provide estimation methods. The following categories are reported as “NE”: CO₂ emissions from 2.A.4 other process uses of carbonates (2.A.4.a ceramics and 2.A.4.c non-metallurgical magnesium production), 2.D.1 lubricant use and 2.D.2 paraffin wax use</p> <p>In addition, HFCs, PFCs, SF₆ and NF₃ emissions from 2.F product uses as substitutes for ozone-depleting substances (2.F.1 refrigeration and air conditioning, 2.F.2 foam blowing agents, 2.F.3 fire protection and 2.F.4 aerosols) were reported as “NA”, instead of “NE”, as explained by Belarus during the review</p> <p>The ERT also noted that emissions reported as “NO” and “IE” had no explanation in the NIR, reducing the transparency of the information</p>

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
			reported. No improvement plan for these categories has been developed by Belarus so far
I.2	2. General (IPPU) – all gases (51, 2013) (59, 2012) Transparency	Follow the structure of the NIR outlined in the UNFCCC reporting guidelines to improve the transparency of the inventory for the industrial processes sector, and include clear and concise information in the NIR on the methods, AD and EFs used to estimate emissions for each subcategory	Not resolved. Belarus did not follow the structure of the NIR outlined in the UNFCCC Annex I inventory reporting guidelines, which is similar to that outlined in the former UNFCCC reporting guidelines, to improve the transparency of the inventory for the IPPU sector, and did not include clear and concise information in the NIR on the methods, AD and EFs used to estimate emissions for each subcategory in accordance with the 2006 IPCC Guidelines
I.3	2.B Chemical industry – all gases (52, 2013) Transparency	Make correct use of notation keys and provide appropriate explanations in the NIR and in CRF table 9(a) for many chemicals under this category	No longer relevant. As a result of methodology changes in the 2006 IPCC Guidelines for the category 2.B chemical industry, the issue is no longer relevant (see table 5, I.11)
I.4	2.A.1 Cement production – CO ₂ (53, 2013) (62, 2012) Accuracy	Use a higher-tier approach and strengthen efforts to collect plant-specific AD and EFs and use those data to calculate CO ₂ emissions from cement production	Not resolved. The approach described in the NIR (p. 42, section 4.2.1.2) corresponds to the tier 1 approach presented in the 2006 IPCC Guidelines for cement production, whereas the NIR states that a tier 2 approach was applied. During the review, in response to a question raised by the ERT, Belarus confirmed that the tier 1 method and default EFs were used to estimate CO ₂ emissions from this key category. Belarus also explained that there are only three cement plants in the country and that it intends to collect plant-specific AD and EFs and implement a tier 2 method in future
I.5	2.A.4 Other process uses of carbonates – CO ₂ (54, 2013) Completeness	Contact all limestone and dolomite suppliers and users (e.g. metal producers) and collect AD directly from plants to estimate CO ₂ emissions from limestone and dolomite use, thereby improving the completeness of the inventory	No longer relevant. As a result of methodology changes in the 2006 IPCC Guidelines for category 2.A.4 other process uses of carbonates, the issue is no longer relevant (see table 5, I.9)
I.6	2.F. Product uses as substitutes for ozone-depleting substances – HFCs, PFCs and SF ₆ (55, 2013) (60, 2012) Completeness	Obtain AD and report emission estimates for all gases	Not resolved. Belarus reported HFC, PFC, SF ₆ and NF ₃ emissions for category 2.F product uses as substitutes for ozone-depleting substances as “NA”. During the review, in response to a question raised by the ERT, Belarus explained that it was not possible to collect AD and thus emissions were not estimated

<i>ID#</i>	<i>Issue classification^a</i>	<i>Recommendation made in previous review report^b</i>	<i>ERT assessment and rationale</i>
Agriculture			
A.1	3. General (agriculture) – all gases (57, 2013) (67, 2012) Transparency	Continue to take steps to improve the transparency of the inventory for the agriculture sector	Not resolved. General transparency of the NIR was not improved
A.2	3. General (agriculture) – all gases (57, 2013) (68, 2012) Transparency	Provide reference sources for the parameters/factors for which such references are still lacking (e.g. CH ₄ conversion rate for cattle livestock, coefficient corresponding to animal feeding situation (Ca) for cattle, weight of swine livestock)	Not resolved. References to some parameters/factors were not provided in the NIR (e.g. coefficient corresponding to animal feeding situation for the estimation of net energy for activity (2006 IPCC Guidelines, vol. 4, table 10.5), weight of swine). Where provided, references were mostly given without specifying the table or page of the source of the information from the 2006 IPCC Guidelines (e.g. digestible energy and methane conversion factor, p. 71 of the NIR) (see table 5, A.9)
A.3	3. General (agriculture) – all gases (58, 2013) (71, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	Follow the procedure described in the IPCC good practice guidance and perform the uncertainty analysis with uncertainty values related to each parameter/factor used in the emission estimation	Not resolved. As stated in the NIR (section 5.2.3) Belarus did not conduct uncertainty estimation for country-specific EFs from cattle enteric fermentation as well as cattle and swine manure management. The ERT noted that Belarus did not undertake the uncertainty analysis using uncertainties for each value underlying the derivation of country-specific EFs following the approach described in the 2006 IPCC Guidelines (section 3.2.3.1, equations 3.1 and 3.2). The ERT also noted that Belarus did not include in its NIR a qualitative description of uncertainties and assumptions, in particular for key categories
A.4	3.A.4 Other livestock – CH ₄ (60, 2013) Transparency	Provide in the NIR references for the method employed and the CH ₄ EFs and animal weights used to improve transparency	Not resolved. Belarus did not provide in the NIR the references to the approach used to derive enteric fermentation CH ₄ EFs for rabbits and fur animals, and weights of rabbits and fur animals (see table 5, A.9)
A.5	3.A Enteric fermentation – CH ₄ (61, 2013) (74, 2012) Transparency	Correct the notation key used	Not resolved. The ERT noted that Belarus is still using inconsistently some notation keys; for example, in CRF table 3.A the gross energy (GE) intake and CH ₄ conversion rates for sheep, goats, horses and swine as well as rabbits and fur-bearing animals were reported as “NE” instead of “NA” (activities occur in the country but are not included in emission estimations because the tier 1 method is used)
A.6	3.B Manure management – CH ₄ (62, 2013)	Correct the mistakes in the additional information table of CRF table 4.B(a) and implement	Not resolved. In the additional information table of CRF table 3.B(a) for 2014 in the 2016 GHG inventory submission, Belarus continued to report

<i>ID#</i>	<i>Issue classification^a</i>	<i>Recommendation made in previous review report^b</i>	<i>ERT assessment and rationale</i>
	Transparency	appropriate QC procedures to avoid such mistakes in the future	incorrectly the dairy cattle and swine manure allocation per AWMS. This information is not consistent with the information on manure distribution per AWMS reported in table 5.14 of the NIR (for the 1990–2013 period the manure distribution per AWMS is reported correctly)
A.7	3.D.a.3 Crop residues – N ₂ O (64, 2013) (80, 2012) Transparency	Report in CRF table 4.D and the NIR the average-weighted fraction of total above-ground crop biomass that is removed from the field as a crop product	No longer relevant. This issue is no longer relevant because the UNFCCC Annex I inventory reporting guidelines do not require Parties to report in CRF table 3.D the average-weighted fraction of total above-ground biomass that is removed from the field as a crop product (the additional table for reporting of this fraction is no longer available) and the methodology provided in the 2006 IPCC Guidelines does not envisage the use of this fraction for the estimation of emissions from crop residues returned to soils
A.8	3.D.a.3 Crop residues – N ₂ O (65, 2013) (81, 2012) Accuracy	Make efforts to adjust the data collected from national statistics and calculate N ₂ O emissions from forage crops	Not resolved. Belarus did not include the nitrogen from annual and perennial grasses or from grass-clover mixtures in its estimates of N ₂ O emissions from crop residues returned to soils
LULUCF			
L.1	4. General (LULUCF) – all gases (67, 2013) (83, 2012) Completeness	Provide in the NIR and the CRF tables estimates of carbon stock changes and emissions for all mandatory categories, provide a consistent uncertainty analysis for each estimated category, 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	Not resolved. Belarus reported the estimation of carbon stock changes for the great majority of mandatory categories (see G.3 above) as “NE” and “NO”. The results of the uncertainty analysis for each estimated category of the LULUCF sector were not provided in the NIR. The ERT noted that the QC procedures undertaken do not provide evidence that double counting was avoided (i.e. losses from forest fires in CRF tables 4.A and 4(V)). Also, the ERT noted that the relevant authorities responsible for forest management on lands (e.g. Ministry of Forestry, Ministry of Defense, Ministry of Natural Resources and Environmental Protection, State Committee on Property) and the relevant research institutes on forestry and agriculture were not involved in any QA activities for the LULUCF sector
L.2	Land representation – CO ₂ (68, 2013) (84, 2012) Accuracy	Include in the NIR complete, reconciled and transparent information on the areas of land corresponding to the IPCC land-use categories and the identified land-use transitions, including a	Not resolved. Belarus still did not include in the NIR (and CRF table 4.1) information on the areas of land corresponding to the IPCC land-use categories and the identified land-use transitions, and did not include a transparent description of the sources of data and associated methodologies

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		transparent description of the sources of data and associated methodologies and information on how the national land-use categorization is linked to the IPCC land-use categories	and information on how the national land-use categorization is linked to the IPCC land-use categories
L.3	4.A.1 Forest land remaining forest land – CO ₂ (69, 2013) (86, 2012) Completeness	Develop the necessary national AD to quantify the potential emissions and removals for the dead organic matter carbon pool using a tier 2 or higher method	Not resolved. Belarus did not develop the necessary national AD to quantify the potential emissions and removals for the dead organic matter carbon pool using a higher-tier method
L.4	4.A.1 Forest land remaining forest land – CO ₂ (70, 2013) Transparency	Increase the transparency of the NIR by including information on the specific definition of growing stock as applied by Belarus and information on the forest types in terms of their age span	Addressing. In the NIR (tables 6.4–6.7) Belarus provided a set of nationally obtained parameters and AD used for carbon stock change estimation considering forest types, age groups and average annual increment of stemwood stock. However, Belarus did not provide in the NIR AD and parameters, as well as the definition of growing stock, to be used for the estimation of carbon stock changes in future GHG inventory submissions (see table 5, L.7)
L.5	4.A.1 Forest land remaining forest land – CO ₂ (71, 2013) Completeness	Put in place QC procedures to ensure the consistency and completeness of the reporting on organic soils under forest land as well as the consistency between the CRF tables	Not resolved. The ERT identified a number of inconsistencies in the information reported in the CRF tables of the 2016 GHG inventory submission and also between this information and the CRF tables of GHG inventory submissions of previous years. For example, in its 2016 GHG inventory submission Belarus reported AD on organic soils under 4.A.1 forest land remaining forest land for the entire time series as “NE”, although in its 2013 GHG inventory submission, those AD were reported in CRF table 5(II). More importantly, the ERT noted that these AD are mistakenly reported by Belarus in CRF table 4(III) of its 2016 GHG inventory submission as AD for mineral soils
L.6	4.A.2 Land converted to forest land – CO ₂ and N ₂ O (72, 2013) (89, 2012) Completeness	Improve the completeness and transparency of the reporting on organic soils and land converted to forest land in the CFR tables and the NIR, and ensure consistency of the information reported in the NIR with that reported in the CRF tables	Not resolved. Belarus did not ensure completeness and transparency of the reporting on organic soils and consistency between the information reported in the NIR and the CRF tables; for instance, the AD of organic soils under 4.A.2 land converted to forest land have been reported in the CRF tables as “NE” and “NO”; while in the NIR, specifically in table 6.10, Belarus reported the N ₂ O emissions from drained peat soils transferred to forestry, which implies the occurrence of organic soil conversion

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
to forest land			
Waste			
W.1	5.C.1 Waste incineration – all gases (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	Not resolved. Belarus did not provide in the NIR clarifying information on the existence of thermal treatment of waste in Belarus and reported CO ₂ , CH ₄ and N ₂ O emission estimates from category 5.C incineration and open burning of waste as “NO”. During the review, in response to a question raised by the ERT, Belarus confirmed that at least medical waste incineration is practised in the country
W.2	5.A Solid waste disposal on land – CH ₄ (76, 2013) (94, 2012) Accuracy	Use the IPCC first-order decay method to estimate CH ₄ emissions from solid waste disposal on land	Not resolved. Belarus did not use the first-order decay method to estimate CH ₄ emissions from solid waste disposal on land in accordance with the 2006 IPCC Guidelines
W.3	5.A Solid waste disposal on land – CH ₄ (77, 2013) (95, 2012) Transparency	Provide a more comprehensive explanation of the classification of SWDS in the NIR to improve transparency	Not resolved. Belarus did not provide in the NIR explanations of the classification of SWDS in Belarus. Belarus reported only emissions from unmanaged landfills, divided into deep and shallow unmanaged landfills. However, during the review week Belarus informed the ERT that there are in the country SWDS falling under the category of anaerobic managed SWDS with soil used as covering material (see table 5, W.10)
W.4	5.A Solid waste disposal on land – CH ₄ (78, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Make the appropriate corrections in CRF table 6.A and in the additional information table	No longer relevant. The issue is no longer relevant because the new CRF table 5.A does not include an additional information table to report the values of parameters used in the estimates that should be reported and documented in the NIR
W.5	5.A Solid waste disposal on land – CH ₄ (79, 2013) (96, 2012) Completeness	Estimate CH ₄ emissions from wastewater sludge and provide more detailed information in the NIR on the amount of MSW, ISW and wastewater sludge that is landfilled	Not resolved. Belarus reported CH ₄ emissions from domestic and industrial wastewater sludge as “NE” in the category 5.D wastewater treatment and discharge. Belarus still did not estimate the CH ₄ emissions from sludge deposited in landfills in the category 5.A solid waste disposal on land, and also did not provide information in the NIR on the amount of MSW, ISW and wastewater sludge that is landfilled. During the review, in response to a question raised by the ERT, Belarus confirmed that sludge from biological treatment of wastewater is deposited temporarily around the WWTP and periodically landfilled at SWDS

ID#	Issue classification ^a	Recommendation made in previous review report ^b	ERT assessment and rationale
W.6	5.A Solid waste disposal on land – CH ₄ (80, 2013) (97, 2012) Adherence to UNFCCC Annex I inventory reporting guidelines	Improve QC procedures and insert the correct value for the oxidation factor in the respective CRF table	No longer relevant. The issue is no longer relevant because the new CRF table 5.A does not include an additional information table for reporting the oxidation factor
W.7	5.D Wastewater treatment and discharge – CH ₄ (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”	Not resolved. Belarus did not provide any additional information in the NIR on wastewater treatment systems and discharge pathways. CH ₄ emissions from 5.D wastewater treatment and discharge have been reported as “NE” in the CRF tables for all subcategories, with the explanation in the NIR that the aerobic treatment of wastewater is the prevailing technology in the country (treatment systems or discharge pathways that provide anaerobic environments will generally produce CH ₄ whereas systems that provide aerobic environments will normally produce little or no CH ₄). During the review, in response to a question raised by the ERT, Belarus stated that there are some WWTP with biogas recovery facilities in the country. The ERT noted that sludge from biological treatment of wastewater was reported in the NIR as being deposited temporarily around the WWTP, and periodically landfilled at SWDS. The ERT also noted that the NIR does not provide enough information on wastewater treatment systems (i.e. wastewater treatment conditions, depth of pools, temperature, aeration tanks, sludge maintaining conditions, temperature, depths of sludge piles) and discharge pathways (i.e. landfilling, composting, use as fertilizers in agriculture sector) to justify that emissions are not occurring or that they are not estimated as being considered negligible

Abbreviations: AD = activity data, AWMS = animal waste management system, CRF = common reporting format, EF = emission factor, ERT = expert review team, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, IPPU = industrial processes and product use, ISW = industrial solid waste, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NA = not applicable, NCV = net calorific value, NE = not estimated, NIR = national inventory report, NO = not occurring, SWDS = solid waste disposal sites, QA/QC = quality assurance/quality control, 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 reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”, WWTP = wastewater treatment plants, 2006 IPCC Guidelines = 2006 IPCC *Guidelines for National Greenhouse Gas Inventories*.

^a References in parentheses are to the paragraphs and the years of the previous review reports where the issue was raised. Issues are further classified as defined in decision 13/CP.20, annex, paragraph 81.

^b For Belarus, the review of the 2016 GHG inventory submission is being held in conjunction with the review of the 2015 GHG inventory submission and, as such, the 2015 annual review report was not available at the time of this review. In addition, Belarus was also not subject to an individual inventory review in 2014. Therefore, the recommendations reflected in table 3 are from the 2013 annual review report. For the same reason, the years 2014 and 2015 are excluded from the list of years in which the issue has been identified.

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

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 2016 inventory submission of Belarus, and have not been addressed by the Party.

Table 4

Issues identified in three successive reviews and not addressed by Belarus

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
General		
G.3	Collect AD and estimate emissions for all categories and subcategories which are currently reported as “NE”, but for which the IPCC provides estimation methods	3 years (2012, 2013, 2015/2016)
G.5	Put in place robust QA/QC procedures and report complete and detailed information on sectoral QA/QC procedures in the NIR, in particular for the key categories	3 years (2012, 2013, 2015/2016)
G.6	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 provide background information on all AD used in the inventory, specifically for the energy and industrial processes sectors	3 years (2012, 2013, 2015/2016)
G.7	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	3 years (2012, 2013, 2015/2016)
G.8	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 IPCC <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>	3 years (2012, 2013, 2015/2016)
G.9	Report in the NIR a delivery deadline for each of the planned improvements	3 years (2012, 2013, 2015/2016)
G.10	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	3 years (2012, 2013, 2015/2016)

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
	NIR that describes the QA/QC procedures undertaken	
G.12	Report in the NIR whether the Party uses the key category analysis in the prioritization of developments in and improvements to its inventory	3 years (2012, 2013, 2015/2016)
G.13	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	3 years (2012, 2013, 2015/2016)
G.14	Include in the NIR an updated version of the inventory improvement plan, which covers all recommendations made in the current and previous review reports	3 years (2012, 2013, 2015/2016)
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	3 years (2012, 2013, 2015/2016)
E.2*	Where possible, use country-specific EFs for key categories	3 years (2012, 2013, 2015/2016)
E.4	Include in the NIR detailed information on data management and handling	3 years (2012, 2013, 2015/2016)
E.6*	Use appropriate CH ₄ and N ₂ O EFs to estimate emissions from road transportation	3 years (2012, 2013, 2015/2016)
E.7	Investigate and explain in the NIR and the CRF tables the reasons for the observed difference between the reference approach and the sectoral approach	3 years (2012, 2013, 2015/2016)
E.9	Include in the NIR a comparison of the fuel data used in the inventory and the corresponding IEA data, clarifying the reasons for any significant differences	3 years (2012, 2013, 2015/2016)
E.10*	Provide information in the NIR on how jet kerosene is allocated between domestic and international flights	3 years (2012, 2013, 2015/2016)
E.13	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 its emissions estimates; and provide detailed relevant explanations in the NIR to improve transparency	3 years (2012, 2013, 2015/2016)
E.14*	Follow the IPCC good practice guidance for key categories under stationary combustion and use country-specific carbon contents for all fuels	3 years (2012, 2013, 2015/2016)
E.16*	Explain in more detail the derivation of the country-specific NCVs for solid fuels and provide a justification for their use	3 years (2012, 2013, 2015/2016)
E.17*	Report disaggregated emission data by subcategory under manufacturing industries and construction and reallocate the emissions from petroleum	3 years (2012, 2013, 2015/2016)

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
	refining and manufacture of solid fuels and other energy industries to the energy industries category	2015/2016)
E.19*	Use country-specific EFs to estimate CO ₂ emissions from liquid fuels consumption in road transportation, which is a key category	3 years (2012, 2013, 2015/2016)
E.23*	Reporting CH ₄ emissions under the distribution of natural gas	3 years (2012, 2013, 2015/2016)
E.26	Use the correct value of CH ₄ EF for LPG and revise the N ₂ O emission estimates using appropriate N ₂ O EFs, considering also the possibility of estimating the amount of fuel used by vehicle type and the number of vehicles equipped with catalytic convertors	3 years (2012, 2013, 2015/2016)
IPPU		
I.1	Ensure that improvements in the transparency and completeness of the inventory are delivered	3 years (2012, 2013, 2015/2016)
I.2	Follow the structure of the NIR outlined in the UNFCCC reporting guidelines (currently the UNFCCC Annex I inventory reporting guidelines) to improve the transparency of the inventory for the industrial processes sector, and include clear and concise information in the NIR on the methods, AD and EFs used to estimate emissions for each subcategory	3 years (2012, 2013, 2015/2016)
I.4*	Use a higher-tier approach and strengthen efforts to collect plant-specific AD and EFs and use those data to calculate CO ₂ emissions from cement production	3 years (2012, 2013, 2015/2016)
I.6*	Obtain AD and report emission estimates for HFCs, PFCs, SF ₆ and NF ₃	3 years (2012, 2013, 2015/2016)
Agriculture		
A.1	Continue to take steps to improve the transparency of the inventory for the agriculture sector	3 years (2012, 2013, 2015/2016)
A.2*	Provide reference sources for the parameters/factors for which such references are still lacking (e.g. CH ₄ conversion rate for cattle livestock, coefficient corresponding to animal feeding situation (Ca) for cattle, weight of swine livestock)	3 years (2012, 2013, 2015/2016)
A.3	Follow the procedure described in the IPCC good practice guidance and perform the uncertainty analysis with uncertainty values related to each parameter/factor used in the emission estimation	3 years (2012, 2013, 2015/2016)
A.5	Correct the notation key used	3 years (2012, 2013, 2015/2016)
A.8*	Make efforts to adjust the data collected from national statistics and calculate N ₂ O emissions from forage crops	3 years (2012, 2013, 2015/2016)

ID# ^a	Previous recommendation for the issue identified	Number of successive reviews issue not addressed ^b
LULUCF		
L.1*	Provide in the NIR and the CRF tables estimates of carbon stock changes and emissions for all mandatory categories, provide a consistent uncertainty analysis for each estimated category, 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	3 years (2012, 2013, 2015/2016)
L.2	Include in the NIR complete, reconciled and transparent information on the areas of land corresponding to the IPCC land-use categories and the identified land-use transitions, including a transparent description of the sources of data and associated methodologies and information on how the national land-use categorization is linked to the IPCC land-use categories	3 years (2012, 2013, 2015/2016)
L.3*	Develop the necessary national AD to quantify the potential emissions and removals for the dead organic matter pool using a tier 2 or higher method	3 years (2012, 2013, 2015/2016)
L.6*	Improve the completeness and transparency of the reporting on organic soils and land converted to forest land in the CFR tables and the NIR, and ensure consistency of the information reported in the NIR with that reported in the CRF tables	3 years (2012, 2013, 2015/2016)
Waste		
W.1	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	3 years (2012, 2013, 2015/2016)
W.2*	Use the IPCC first-order decay method to estimate CH ₄ emissions from solid waste disposal on land	3 years (2012, 2013, 2015/2016)
W.3*	Provide a more comprehensive explanation of the classification of SWDS in the NIR to improve transparency	3 years (2012, 2013, 2015/2016)
W.5*	Estimate CH ₄ emissions from wastewater sludge and provide more detailed information in the NIR on the amount of MSW, ISW and wastewater sludge that is landfilled	3 years (2012, 2013, 2015/2016)
W.7	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”	3 years (2012, 2013, 2015/2016)

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, IEA = International Energy Agency, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPPU = industrial processes and product use, ISW = industrial solid waste, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NCV = net calorific value, NE = not estimated, NIR = national inventory report, NO = not occurring, SWDS = solid waste disposal sites, QA/QC = quality assurance/quality control, 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”.

^a An asterisk is included after any issue ID# where the underlying issue is related to accuracy or completeness of a key category, a missing category or a potential key category, as indicated in decision 13/CP.20, annex, paragraph 83.

^b For Belarus, the review of the 2016 GHG inventory submission is being held in conjunction with the review of the 2015 GHG inventory submission. Since the reviews of the 2015 and 2016 inventory submissions are not “successive” reviews, but are rather being held in conjunction, for the purpose of counting successive years in table 4, 2015/2016 are considered as one year. In

addition, Belarus was also not subject to an individual inventory review in 2014. Therefore, 2014 is excluded from this table. The ERT noted that this table 4 is the same as appears in the 2015 annual review report for Belarus, modified to reflect the combined 2015/2016 review.

V. Additional findings made during the 2016 technical review

9. Table 5 contains findings made by the ERT during the technical review of the 2016 inventory submission of Belarus that are additional to those identified in table 3 above.

Table 5

Additional findings made during the 2016 technical review of the inventory submission of Belarus

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is the finding an issue^a? If yes, classify by type</i>
General			
G.15	Inventory management	<p>During the review, the ERT found that the size of the inventory team (i.e. one person responsible for the institutional arrangements, the organization of the inventory process and for establishing a dialogue between the team and government organizations and agencies, and two specialists responsible for the preparation of the GHG inventory in all sectors) may be inappropriate to meet the enhanced requirements of the national inventory arrangements under the UNFCCC Annex I inventory reporting guidelines, and in addition, may also be inappropriate to the upcoming requirements under the Paris Agreement. The ERT concluded that substantial efforts are necessary to make the national inventory arrangements capable of functioning under the new framework of reporting requirements</p> <p>The ERT encourages Belarus to consider putting in place substantial efforts to make the national inventory arrangements capable of functioning and meeting the enhanced reporting requirements through actions of the Ministry of Natural Resources and Environmental Protection, which has the overall responsibility for the preparation, planning and management of the national inventory. These efforts could include updating the legal framework established in 2005–2006 and improving the institutional inter-agency cooperation on data and information supply, including the experts' support (e.g. from the National Statistical Committee of the Republic of Belarus (Belstat), the Ministry of Forestry, the Academy of Sciences of Belarus and research institutes on forestry and agriculture). These efforts could also include providing more capacity and support to the Belarus Scientific and Research Centre "Ecology" which is responsible for the compilation and reporting of the GHG inventory (e.g. maintaining the current team and ensuring a sufficient number of competent national experts for each inventory sector and facilitating the participation of relevant institutions in the inventory process, as well as promoting continuous improvements via training and practical experience)</p>	No
G.16	Recalculations	<p>The ERT noted that CRF table 8 on recalculations of the 2016 GHG inventory submission is not populated with emission estimates from the previous submission (2015)</p> <p>The ERT recommends that Belarus, in its next GHG inventory submission, 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</p>	Yes. Comparability
G.17	Recalculations	<p>The ERT noted that Belarus did not provide in the NIR of its 2016 GHG inventory submission information on the few recalculations relating to previously submitted inventory data, in particular in relation to recalculations made in response to the review process. In addition, the discussion on the</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
		<p>impact of the recalculations on the trend of emissions was not provided in the NIR of the 2016 GHG inventory submission at the category, sector and national levels, as appropriate</p> <p>The ERT recommends that Belarus report in the NIR of its next GHG inventory submission, 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 of emissions</p>	
G.18	Key category analysis	<p>The ERT noted that the key category analysis reported in the NIR (table 1.2 and annex 3) and in CRF table 7 contain inconsistent results (e.g. in 1990, CO₂ from the categories 1.A.3.c railways, 1.A.5 other and 3.G liming were identified as being key categories in CRF table 7, but not in the NIR; while category 1.B.2 fugitive emissions from fuels – oil and natural gas (CH₄) was identified as being a key category in the NIR, but not as a whole and only some of its subcategories in CRF table 7)</p> <p>The ERT recommends that Belarus ensure better consistency between the key category analysis reported in the NIR and the CRF tables and correct, as necessary, the key category analysis reported in the NIR of its next GHG inventory submission</p>	Yes. Consistency
G.19	QA/QC and verification	<p>Based on the information included in CRF table 10 and the NIR, the ERT noted that the data reported are largely consistent, with the following exceptions: (a) the NIR (p. 10) indicated that removals from the LULUCF sector in 2014 decreased by 28.0% compared with 1990, whereas CRF table 10 reported a decrease of 35.9%; (b) the NIR (table 3.1) reported that N₂O emissions from the energy sector decreased by 66.5% between 1990 and 2014, but CRF table 10 reported a decrease of 68.3%; (c) the NIR (table 4.1), reported that N₂O emissions from the IPPU sector decreased by 4.7% between 1990 and 2014, but CRF table 10 reported a decrease of 4.4%; (d) the NIR (table 5.2) reported 2 019.84 kt CO₂ eq as emissions from 3.B manure management in 1999, whereas CRF table 10 reported 2 109.84 kt CO₂ eq; (e) the NIR (table 5.2) reported 20 475.01 kt CO₂ eq as emissions from the agricultural sector in 1999, whereas CRF table 10 reported 20 565.01 kt CO₂ eq; (f) the NIR (table 6.1) indicated that reported emissions from the LULUCF sector are presented in “CO₂ eq”, but the reported values represent only the CO₂ emissions which, for most of the years, correspond to the values reported in CRF table 10 (there are small discrepancies for total LULUCF emissions in 1990, 1991, 2002, 2005, 2010 and 2013 and for forest land in 1991, 1993, 2002 and 2005); (g) small discrepancies in the values for total waste emissions from 2003 to 2008 and 2011 between the NIR (table 7.1) and CRF table 10. In addition, the ERT noted that limited information is provided in the NIR on the reasons for observed trends of emissions across the time series at the sectoral level and for the most important categories within these sectors</p> <p>The ERT recommends that Belarus improve its QC procedures to ensure consistency in the information presented in the CRF tables and the NIR for the different gases and sectors in its next</p>	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
GHG inventory submission and provide more extensive information on the reasons for observed trends of emissions across the time series at the sectoral level and for the most important categories within these sectors			
Energy			
E.31	1. General (energy sector) – all fuels – all gases	<p>The ERT noted that the NIR does not include information on changes made to address recommendations made in previous review reports for the energy sector</p> <p>The ERT recommends that Belarus 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</p>	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
E.32	Fuel combustion – reference approach – all fuels – CO ₂	<p>The ERT noted that in CRF table 1.A(b), which reports estimates for the reference approach, the column “Unit” reports the use of TJ (energy unit) for AD on consumption of fuels. Nevertheless, in the same CRF table 1.A(b) net calorific values (NCVs) are given to convert units of mass of fuels to TJ. During the review, in response to a question raised by the ERT, Belarus clarified that the units reported were given by mistake and confirmed that the data provided for export, import, production, international bunkers, stock change and apparent consumption are given in kt for most of the fuels, with the exception of AD for brown coal briquettes (BKB) and patent fuel, peat and solid biomass which are given in tonnes of conventional fuel and for natural gas which is given in cubic metres</p> <p>The ERT recommends that Belarus report the correct units of mass for all fuels in CRF table 1.A(b) and implement QC procedures in order to improve the comparability and accuracy of its reporting in its next GHG inventory submission</p>	Yes. Comparability
E.33	Fuel combustion – reference approach – lignite – CO ₂	<p>The ERT noted that CRF table 1.A(b) reports imports of 781.00 kt of lignite (primary fuel) and 65.00 TJ of coke oven/gas coke (secondary fuel) and net carbon emissions from use of lignite and coke oven/gas coke amounted to 244.36 kt and 35.41 kt respectively in 2014. Nevertheless, in the same table, actual CO₂ emissions from lignite and coke oven/gas coke are reported as “NO”, as is the corresponding fraction of carbon oxidized. Taking into account the information in the national energy balance, the ERT was able to confirm that in 2014 Belarus imported 781 kt of coal (type of coal is not mentioned in the energy balance) and 65 kt of coke</p> <p>The ERT considers that the total amount of CO₂ emissions reported in the reference approach could be underestimated. Therefore, in order to improve the completeness and accuracy of the reporting, the ERT recommends that Belarus strengthen its QC procedures and report in its next GHG inventory submission the correct total amount of CO₂ emissions from the reference approach by including values for actual CO₂ emissions from all relevant fuels and the corresponding fraction of carbon oxidized</p>	Yes. Completeness

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is the finding an issue^a? If yes, classify by type</i>
E.34	1.A.3.b Road transportation – all fuels – CO ₂	<p>The ERT noted that Belarus used the notation key “NO” for reporting emission estimates for all subcategories under the road transportation category (cars, light-duty trucks, heavy-duty trucks and buses and motorcycles). The emission estimates for road transportation are provided for all fuels and gases at an aggregated level. According to a clarification given by Belarus during the review, the structure of the national energy balance does not allow the Party to disaggregate AD by subcategory for road transportation</p> <p>The ERT recommends that Belarus make the necessary efforts to provide disaggregate estimates by subcategory under the road transportation category in its next GHG inventory submission. If this is not possible, the ERT recommends that Belarus use the correct notation keys for all subcategories under road transportation, with the aim for ensuring the transparency of the information given in the CRF tables</p>	Yes. Transparency
E.35	1.A.3 Transport – biomass – all gases	<p>The ERT noted that Belarus reported CH₄ and N₂O emission estimates from biomass in road transportation and railways. CO₂ emissions were reported as “NO”. The ERT also noted that in CRF table 1.A(a) the reported CH₄ and N₂O IEFs from biomass in road transportation are both 30 kg/TJ, while for railways the IEFs are 30.00 kg/TJ and 4.00 kg/TJ, respectively. The NIR did not include any information on the type of biomass used in these transport subcategories. In response to a question raised by the ERT during review, Belarus stated that, according to data from the energy balance, “wood/wood waste” is consumed in the “transportation and communication” sector as fuel for stationary combustion in institutional buildings</p> <p>The ERT recommends that Belarus improve the accuracy and comparability of the reporting in its next GHG inventory submission by: reallocating CH₄ and N₂O emissions from biomass in road transportation and railways to the category 1.A.4.a commercial/institutional; applying the correct CH₄ and N₂O EFs for wood/wood waste in its calculations; and estimating and reporting CO₂ emissions from biomass use in the corresponding categories, as well as using the correct notation key for CH₄ and N₂O emissions from biomass in road transportation and railways, if this type of fuel is not used in these categories</p>	Yes. Accuracy
E.36	1.A.4.c Agriculture /forestry/ fishing – all fuels – all gases	<p>The ERT noted that the NIR (p. 33) indicated that the category 1.A.4.c agriculture/forestry/fishing includes emissions from both mobile and stationary combustion of fuels. However, in CRF table 1.A(a) the notation key “NO” was used for reporting emissions for the subcategory 1.A.4.c.ii off-road vehicles and other machinery. During the review, in response to a question raised by the ERT, Belarus explained that the energy balance does not provide the necessary level of disaggregation and all emissions from fishing and off-road vehicles and other machinery were included under 1.A.4.c.i stationary</p> <p>The ERT notes that agriculture/forestry/fishing is a key category and recommends that Belarus, in its next GHG inventory submission, collect relevant AD to ensure the transparency and comparability of its reporting for this category, and ensure the consistency of the information provided in the NIR and</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
E.37	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – all gases	<p>CRF tables by using the correct notation keys, when it is not possible to disaggregate the emissions</p> <p>The ERT noted that the NIR (p. 37) indicated that Belarus used the 2006 IPCC Guidelines and default EFs to estimate fugitive emissions from oil and natural gas. Nevertheless, the IEFs reported in CRF table 1.B.2 and the equation for the estimation of CH₄ for the above-mentioned categories provided in the NIR (p. 37) are not in line with the 2006 IPCC Guidelines. For example, for emissions of CO₂ and CH₄ from oil production Belarus reported IEFs of 5 565.96 kg/PJ and 29 891.25 kg/PJ, respectively, a CH₄ IEF of 1 400 kg/PJ from oil refining/storage and for emissions of CO₂ and CH₄ from natural gas production Belarus reported IEFs of 4 154.37 kg/PJ and 126 817.76 kg/PJ, respectively; moreover, “NE” was used for reporting the units of AD for all subcategories under oil and natural gas. During the review, in response to a question raised by the ERT, Belarus provided information on AD (see E.38 below), EFs and methodology, indicating that the 2006 IPCC Guidelines and default EFs were used for estimating fugitive emissions from all subcategories, excluding two categories 1.B.2.a.4 refining/storage and 1.B.2.a.6 Other, for which the Revised 1996 IPCC Guidelines were used. Belarus explained that emissions from distribution of natural gas to end users (only in 2014) and the emissions from venting and flaring (whole time series) were not reported in the 2016 GHG inventory submission. The ERT noted that emissions from natural gas distribution were reported as “IE”, and the Party reported only CO₂ from combined flaring, with CH₄ and CO₂ from venting reported as “NA”</p> <p>To ensure the transparency, accuracy and completeness of the reporting the ERT recommends that, in its next GHG inventory submission, Belarus include emission estimates for CO₂ and CH₄ from natural gas distribution, and emission estimates of all gases from all subcategories under venting and flaring, as well as for all subcategories under fugitive emissions from oil and natural gas, using 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 its estimates</p>	Yes. Accuracy
E.38	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – all gases	<p>The ERT noted that the NIR (p. 37) indicated that Belarus performed recalculations for the entire time series because of a new method of data collection and that the AD were provided by Beltransgaz JSC and the Belarusian State Concern for Oil and Chemistry. As a result of the above-mentioned changes, the emissions from oil and natural gas in 2014 and previous years of the time series decreased substantially (by, on average, a factor of 15) compared with reported estimates in the previous GHG inventory submission (2015). The 2014 reported value decreased by 98.1% compared with the 1990 value and by 95.0% compared with the 2013 value in the 2015 GHG inventory submission, respectively. No information on the rationale for these differences and the impact of the recalculations on total emissions was provided in CRF table 8 or the NIR. During the review, in response to a question raised by the ERT, Belarus provided information on AD, EFs and methodology used for estimating fugitive emissions from all subcategories</p> <p>To ensure the transparency of the reporting the ERT recommends that, in its next GHG inventory submission, Belarus provide in the NIR detailed and documented information on methods, AD and</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
E.39	1.B.2 Oil and natural gas and other – liquid and gaseous fuels – all gases	<p>EFs used in its 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</p> <p>The ERT noted that Belarus reported CH₄ and CO₂ (and N₂O) emissions from oil and natural gas exploration as “NO”. During the review, Belarus mentioned that oil sludge from exploration activities is stored in open-air sludge areas together with other wastes, indicating that the activity may occur in the country</p> <p>To ensure completeness of the reporting, the ERT recommends that Belarus estimate emissions from natural gas exploration activities, which may occur in the country, by collecting relevant missing AD in order to provide emission estimates of CH₄, CO₂ and N₂O from oil and natural gas exploration</p>	Yes. Completeness
E.40	Fuel combustion – reference approach – all fuels – CO ₂	<p>The ERT noted that the difference in CO₂ emissions between the reference approach and the sectoral approach is significant and ranges between 38.58% (1991) and –0.52% (2010). In 2014, the difference was 31.6%. No explanatory information was provided in the NIR or in the documentation box of CRF table 1.A(c). The ERT considers that the difference is probably due to, among other things: (a) the treatment of the refinery gas as primary fuel in the reference approach; (b) not accounting for exports of jet kerosene and bitumen in the reference approach (the data were communicated by the Party to IEA, but not reported under the Convention); (c) not accounting for carbon stored (carbon excluded) because the notation key “NO” is used in table 1.A(b); and (d) not accounting for imports of lignite and coke oven/gas coke (see table 3, E.12)</p> <p>To improve the transparency of the reporting the ERT recommends that Belarus treat refinery gas as secondary fuel, account for exports of jet kerosene and bitumen, estimate carbon stored, provide emission estimates from imports of lignite and coke, and include detailed information on the improvements made in the NIR of its next GHG inventory submission, and enhance its verification procedures to ensure consistency of the information provided in CRF tables 1.A(b), 1.A(c) and 1.A(d)</p>	Yes. Transparency
E.41	Comparison with international data – liquid fuels, gaseous fuels, peat – all gases	<p>The ERT noted that Belarus used different NCVs to convert AD to TJ for reporting apparent energy consumption under the Convention and to IEA. The NCVs used by the Party for residual fuel oil (37.96 TJ/Gg), LPG (44.20 TJ/Gg) and natural gas (33.53 TJ/Gg) are lower or significantly lower than the lower value of the default range of NCVs provided in the 2006 IPCC Guidelines, and for peat (15.00 TJ/Gg) the NCV is higher than the upper value of IPCC default range (12.5 TJ/Gg). The AD for 2014 on natural gas, as reported in the CRF tables, are 4% lower than the AD reported to IEA, while the peat production AD for the same year are more than 40% higher, both probably because of differences in the NCVs, but also, in the case of peat, because of other factors. During the review, in response to a question raised by the ERT, Belarus explained that the national NCVs used in the inventory estimates (based on scientific research by the Belarus Scientific and Research Centre “Ecology”) were not communicated to Belstat, which is the institution reporting to IEA. The ERT</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
		<p>noted also that the apparent consumption of liquid fuels as reported in the CRF tables is 9% higher than that reported to IEA, which is probably due to the fact that exports of jet kerosene and bitumen were reported to IEA but were not reported under the Convention</p> <p>The ERT recommends that Belarus provide documented information on the country-specific NCVs used in the emission calculations in its next GHG inventory submission, with the aim of demonstrating the accuracy of those values, and encourages the Party to enhance the inventory arrangements for its next GHG inventory submission, in order to ensure consistency of the information reported to UNFCCC and to other international bodies</p>	
IPPU			
I.7	2.A.2 Lime production – CO ₂	<p>The ERT noted that the NIR (p. 44) indicated that Belarus used default EFs for emission estimates from lime production (0.75 t CO₂/t lime for high-calcium lime and 0.78 t CO₂/t lime for dolomitic lime) and referred to table 2.4 of the 2006 IPCC Guidelines. However, table 2.4 of the 2006 IPCC Guidelines provides a range of default CO₂ EF values, from 0.86 to 0.77 t CO₂/t for dolomitic lime production, with the suggestion that the lower value be used for developing countries. Moreover, the resulting IEF reported in CRF table 2(I).A–H for 2014 is 0.74 t CO₂/t lime produced. During the review, in response to a question raised by the ERT, Belarus confirmed that it had used an incorrect EF from the 2006 IPCC Guidelines</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus use the correct CO₂ EF for dolomitic lime from table 2.4 of the 2006 IPCC Guidelines or develop its national EFs and revise its estimates of CO₂ emissions from this category accordingly for the whole time series</p>	Yes. Accuracy
I.8	2.A.3 Glass production – CO ₂	<p>The ERT noted that Belarus used a tier 1 approach and default EFs to estimate CO₂ emissions from glass production. However, the NIR does not explain what cullet ratio was used to estimate CO₂ emissions. During the review, in response to a question raised by the ERT, Belarus explained that 15% and 30% of cullet ratio values were used for flat and container glass production, respectively. However, Belarus was not able to justify the chosen values</p> <p>To improve transparency, the ERT recommends that Belarus clarify the values of cullet ratio used for its estimates of CO₂ emissions from glass production, include these data in its NIR and report revised estimates, if necessary, in its next GHG inventory submission</p>	Yes. Transparency
I.9	2.A.4 Other process uses of carbonates – CO ₂	<p>The ERT noted that CO₂ emissions of 16.97 kt were reported in CRF tables 2(I) and 2(I).A–H from the category 2.A.4.b other uses of soda ash, although the NIR does not contain any explanation on this emission source. During the review, in response to a question raised by the ERT, Belarus explained that most soda ash is used in the country as a component in the production of glass, soap and other detergents, and soda ash is also used in degreasing and refining of metals, in the production of pulp,</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
I.10	2.B.1 Ammonia production – CO ₂	<p>leather tanning and softening boiler water. However, as the State Statistics Committee reports only aggregated data for total use of soda ash in Belarus it is not possible to disaggregate these data by different uses and categories in the inventory</p> <p>The ERT recommends that Belarus 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 CO₂ emissions in this category, avoiding any double counting. The ERT also recommends that Belarus describe the activities and sources of emissions from other uses of soda ash, trends and choice of AD in the NIR of its next GHG inventory submission</p> <p>The ERT noted that the NIR (p. 48) indicates that the tier 2 approach is used to estimate emissions from ammonia production. However, the parameters provided in the NIR (e.g. carbon content, CO₂ recovery) are not fully in line with the tier 2 method described in the 2006 IPCC Guidelines. In addition, according to the 2006 IPCC Guidelines, CO₂ emissions from ammonia production include both energy and non-energy use of fuels, whereas CO₂ recovered could be accounted for in other categories. During the review, in response to a question raised by the ERT, Belarus explained that for the future, it intends to clarify the values of AD and EFs to be used with the single ammonia producer in the country</p> <p>The ERT recommends that Belarus reconfirm the AD with the ammonia producer, including the amounts of CO₂ recovery for urea production. The ERT also recommends that, in its next GHG inventory submission, Belarus revise its estimates of CO₂ emissions from ammonia production on this basis for the whole time series, using the tier 2 or tier 3 method and provide in the NIR a description of production process, EFs and AD used</p>	Yes. Accuracy
I.11	2.B Chemical industry – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted that for a number of subcategories under 2.B chemical industry (2.B.2 nitric acid production, 2.B.4 caprolactam production, 2.B.7 soda ash production, 2.B.8 methanol and acrylonitrile production) no information was provided in the NIR on the type of production process or the selection of EFs. According to the NIR (p. 49), tier 1 methods with default EFs were used for estimating emissions from these categories; however, the IEF values reported in the CRF tables fluctuate during the 1990–2014 period and do not correspond to default EF values. During the review, in response to a question raised by the ERT, Belarus provided general information on the types of production process; however, the Party explained that the fluctuations of the IEFs were due to mistakes during the preparation of its inventory submission</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus ensure that the information in its 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</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
I.12	2.C Metal industry – CO ₂ and CH ₄	<p>category chemical industry</p> <p>The ERT noted that Belarus did not provide information in its NIR on the types of metal production process, EF selection and AD used and their sources for the emission estimates under this category. The ERT also noted that CH₄ and CO₂ emissions are reported in CRF table 2(I).A–H, but AD are not shown. During the review, in response to a question raised by the ERT, Belarus explained that only electrical steel is produced in the country. Belarus also provided a reference for the country-specific CH₄ EF used</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus improve the transparency of its reporting on emission estimates from this category, ensure that its reporting is in full adherence with the UNFCCC Annex I inventory reporting guidelines and include in the NIR and the relevant CRF tables the information provided during the review on the processes for steel production in the country, AD and EFs used</p>	Yes. Transparency
I.13	2.D Non-energy products from fuels and solvents use – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted that Belarus reported the notation key “NE” for CO₂, CH₄ and N₂O emissions from the category 2.D non-energy products from fuels and solvents use for the complete time series. During the review, in response to a question raised by the ERT, Belarus confirmed that emissions for this category were not estimated because of lack of AD</p> <p>The ERT recommends that Belarus collect relevant available AD and estimate emissions for all subcategories under the category 2.D non-energy products from fuels and solvents use for the complete time series, for which the 2006 IPCC Guidelines provide estimation methods</p>	Yes. Completeness
Agriculture			
A.9	3. General (agriculture) – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted that country-specific EFs and other parameters for non-dairy cattle under enteric fermentation were provided in the NIR (table 5.8), without disaggregation of cattle by sex/age group. The ERT further noted that references to default EFs from the 2006 IPCC Guidelines for all animal species (except cattle) were provided in the NIR without specific reference to tables or pages. The ERT also noted that country-specific EFs for non-dairy cattle and swine under manure management per livestock sex/age group were not provided in the NIR, while, according to the NIR (tables 5.5 and 5.12) the non-dairy cattle population was subdivided into seven sex/age groups and the swine population into six groups. The ERT noted that lack of transparency in the reporting of country-specific EFs makes it difficult for the ERT to replicate and assess the inventory. During the review, in response to a question raised by the ERT, Belarus provided the ERT with country-specific EFs for non-dairy cattle and swine sex/age groups in agricultural enterprises and households in tabular format, for both enteric fermentation and manure management</p> <p>The ERT recommends that Belarus provide in the NIR of its next GHG inventory submission clear</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
A.10	3. General (agriculture) – CH ₄ and N ₂ O	<p>references to the sources of default EFs in the 2006 IPCC Guidelines (e.g. tables, pages) for all animal species other than cattle and include tables with country-specific EFs for non-dairy cattle and swine disaggregated by sex/age groups, for both enteric fermentation and manure management</p> <p>The ERT noted that, according to the FAO database,^b the population of asses in Belarus is in the range of 8 000–9 000 heads for the period 1992–2014. However, Belarus did not report CH₄ and N₂O emissions under enteric fermentation and manure management from this animal category in the corresponding CRF tables</p> <p>The ERT recommends that Belarus report CH₄ and N₂O emissions from asses under enteric fermentation and manure management in its next GHG inventory submission or, if not estimated, use the notation key “NE”, providing justification for why such emissions from this animal category have not been estimated in the NIR and in CRF table 9, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines</p>	Yes. Completeness
A.11	3. General (agriculture) – CH ₄ and N ₂ O	<p>As stated in the NIR (p. 67), average annual livestock population is derived as a simple average population on 1 January of each year (i.e. it is assumed that animals are alive for at least one year). However, the ERT noted that, according to the 2006 IPCC Guidelines (chapter 10.2.2) animals grown for meat (e.g. broilers, beef cattle and market swine) are alive for only part of a complete year and the populations of these livestock species should be based on a period of less than a year. In response to a question raised by the ERT during the review, Belarus stated that it plans to request information regarding the lifecycle of growing animals from Belstat and the Ministry of Agriculture and Food</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus estimate the average annual population of growing animals that are alive for less than a year using national data on their lifecycle and equation 10.1 from the 2006 IPCC Guidelines</p>	Yes. Accuracy
A.12	3. General (agriculture) – N ₂ O	<p>The ERT noted that typical animal mass values for sheep, horses and goats are reported in CRF table 3.B(a) as “NE”. However, according to the NIR (table 5.16) those values are 48.5 kg, 377.0 kg and 38.5 kg respectively. The ERT considers that these typical animal mass values as provided in the NIR (table 5.16) are in line with the 2006 IPCC Guidelines (table 10A-9)</p> <p>The ERT recommends that Belarus report in its next GHG inventory submission typical animal mass values for horses, sheep and goats in CRF table 3.B(a) using the values provided in the NIR instead of using the notation key “NE”</p>	Yes. Comparability
A.13	3.A.1 Cattle – CH ₄	<p>The ERT noted that, according to the NIR (table 5.8), milk production of dairy cattle for 1990–2014 is constant (8.4 kg/head/day). However, CRF table 3.A for 1990 reports milk production to be 8.4 kg/head/year, while for 2014 it reports milk production to be 12.36 kg/head/year. In response to a question raised by the ERT during the review, Belarus stated that the correct milk production data</p>	Yes. Consistency

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		<p>were reported in CRF table 3.A and are based on annual data from Belstat</p> <p>The ERT recommends that Belarus ensure consistency in the information provided regarding this parameter and report the correct data on milk production for the reporting period in the NIR of its next GHG inventory submission</p>	
A.14	3.A.1 Cattle – CH ₄	<p>The ERT noted that the country-specific CH₄ EF for dairy cattle under enteric fermentation reported in CRF table 3.A for 2009 (128.53 kg/head/year) is higher than the higher value of the range of the IPCC default values (90–128 kg/head/year). During the review, Belarus did not provide a justification for such a high value of country-specific EF for dairy cattle in 2009</p> <p>The ERT recommends that Belarus include in the NIR of its next GHG inventory submission 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 explanations of substantial discrepancies identified. The ERT further encourages Belarus to conduct appropriate QA procedures (e.g. a peer review of the methodology and data used to estimate country-specific EFs for dairy cattle)</p>	Yes. Transparency
A.15	3.A.4 Other livestock – CH ₄	<p>The ERT noted that, according to the NIR (table 5.9), Belarus used EFs of 0.13 and 0.75 kg CH₄/head/year for fur-bearing animals and rabbits, respectively, to calculate CH₄ emissions under other livestock. However, CRF table 3.A reported an IEF for fur-bearing animals of 0.14 kg CH₄/head/year and for rabbits an IEF of 0.77 kg CH₄/head/year in 2014. In response to a question raised by the ERT during the review, Belarus stated that the NIR reported the correct EFs. Belarus also provided the ERT with a table confirming that the discrepancy between the EFs reported in the NIR and CRF tables is due to rounding of emission estimates in CRF table 3.A. For example, CH₄ emissions from rabbits and fur-bearing animals in Party's calculation sheets for 2014 amount to 0.2050 and 0.0285 Gg CH₄, respectively. However, the values reported in CRF table 3.A for this year amount to 0.21 and 0.03 Gg CH₄, respectively</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus report CH₄ emissions from enteric fermentation of fur-bearing animals and rabbits without rounding in CRF table 3.A</p>	Yes. Accuracy
A.16	3.B.4 Other livestock – CH ₄	<p>As stated in the NIR (table 5.11), under this category, Belarus used an EF for poultry under manure management of 0.03 kg CH₄/head/year from the 2006 IPCC Guidelines. However, the ERT noted that, according to the 2006 IPCC Guidelines (table 10.15), the EF of 0.03 kg CH₄/head/year is relevant only for layers. For broilers, turkeys and ducks, the EFs are 0.02, 0.09 and 0.02 kg CH₄/head/year, respectively</p> <p>The ERT recommends that Belarus estimate emissions from poultry per subcategory in its next GHG inventory submission, based on statistical data of the country's population structure of poultry.</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
		Alternatively, if population structure is not available, FAO data can be used as a source of information on the populations of ducks and turkeys in Belarus	
A.17	3.B Manure management – CH ₄ and N ₂ O	<p>According to the NIR (p. 81) an MCF for liquid systems of 17% was used. The ERT noted that, in the 2006 IPCC Guidelines (table 10.17), this parameter corresponds to liquid systems without natural crust cover. In the NIR (p. 84), it is further stated that an EF for liquid systems of 0.005 kg N₂O-N/kg N from the 2006 IPCC Guidelines was used. However, the ERT noted that the 2006 IPCC Guidelines (table 10.21) provides an EF of 0.005 kg N₂O-N/kg N for liquid systems with natural crust cover. In response to a question raised by the ERT during the review, Belarus stated that data on manure allocation per liquid systems with and without natural crust cover were not available. Hence, to avoid underestimation of emissions, Belarus used a higher MCF value for liquid systems without natural crust cover (17% instead of 10%) and an EF of 0.005 kg N₂O-N/kg N for liquid systems with natural crust cover instead of zero</p> <p>The ERT recommends that Belarus make efforts to collect data about the allocation fractions of non-dairy cattle and swine manure per liquid systems with and without natural crust cover and revise its estimations of CH₄ and N₂O for this category in its next GHG inventory submission. The ERT noted that a well-documented expert judgment or survey results may be used as a data sources for manure allocation per liquid system</p>	Yes. Accuracy
A.18	3.B.1 Cattle – N ₂ O	<p>The ERT noted that, in the NIR (table 5.15), the average-weighted Nex values in 2014 for dairy cattle and non-dairy cattle were 77.09 and 37.10 kg N/head/year, respectively. However, CRF table 3.B(b) for 2014 reported a value of Nex for dairy cattle of 7 709 kg N/head/year and for non-dairy cattle a value of 3 679 414 kg N/head/year. In response to a question raised by the ERT during the review, Belarus stated that the Nex values for cattle reported in the CRF table 3.B(b) are incorrect (typing error)</p> <p>The ERT recommends that Belarus report the correct Nex values for dairy and non-dairy cattle in CRF table 3.B(b) in its next GHG inventory submission and enhance its QC procedures to ensure the accuracy and consistency of the information reported in the CRF tables and the NIR</p>	Yes. Consistency
A.19	3.B Manure management – N ₂ O	<p>The ERT noted that livestock population data multiplied by Nex values reported in CRF table 3.B(b) for all animal species differ from the total N excreted values reported in CRF table 3.B(b) for 2014 in the range of 0.003–4.8%. In response to a question raised by the ERT during the review, Belarus stated that these discrepancies arose because of rounding of the Nex values reported in the CRF table 3.B(b)</p> <p>The ERT recommends that Belarus, in its next GHG inventory submission, report in CRF table 3.B(b) Nex values for all animal species without rounding</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
A.20	3.B.4 Other livestock – N ₂ O	<p>The ERT noted that Nex values for fur-bearing animals and rabbits (1.5 and 4.7 kg N/head/year, respectively) are reported in both the NIR (table 5.16) and CRF table 3.B(b). In the description to table 5.16 in the NIR (p. 84) it is stated that Nex values are derived based on animal mass using data from the 2006 IPCC Guidelines. However, the ERT noted that the 2006 IPCC Guidelines (table 10.19) provide a default Nex value for mink and polecat (4.59 kg N/head/year), for fox and racoon (12.09 kg N/head/year) and for rabbits (8.10 kg N/head/year) that should be directly used in the GHG inventory (i.e. without multiplication by animal mass values). In response to a question raised by the ERT during the review, Belarus provided the ERT with country-specific animal mass values for fur-bearing animals (0.9 kg) and rabbits (1.6 kg) that were multiplied by corresponding Nex values from the 2006 IPCC Guidelines (table 10.19). The ERT considers that multiplication of Nex values from the 2006 IPCC Guidelines by animal mass leads to an underestimation of N₂O emissions from fur-bearing animals and rabbits under manure management</p> <p>The ERT recommends that Belarus use the correct Nex values for fur-bearing animals and rabbits from the 2006 IPCC Guidelines (table 10.19) in its next GHG inventory submission</p>	Yes. Accuracy
A.21	3.B.4 Other livestock – N ₂ O	<p>The ERT noted that the Nex value for poultry (0.8 kg N/head/year) is provided in the NIR (table 5.16) without indicating typical poultry mass. The ERT further noted that CRF table 3.B(b) reports typical poultry mass as “NE” (under other). In response to a question raised by the ERT during the review, Belarus stated that the Nex value for poultry is based on the value in the 2006 IPCC Guidelines (table 10.19) and typical poultry mass of 2.8 kg. The ERT considers that using the mass value of 2.8 kg for all poultry subcategories leads to an increase in the uncertainty of the estimates because, according to table 10A.9 of the 2006 IPCC Guidelines, poultry mass varies between 0.9 kg for broilers and 6.8 kg for turkeys</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus derive typical poultry mass and Nex values per subcategory, using the poultry disaggregation per subcategory recommended in table 10.1 of the 2006 IPCC Guidelines (ducks, turkeys, etc.). The ERT further recommends that Belarus report in CRF table 3.B(b) average typical poultry mass value instead of the notation key “NE”</p>	Yes. Accuracy
A.22	3.B.5 Indirect N ₂ O emissions – N ₂ O	<p>The ERT noted that in CRF table 3.B(b) the IEF value for atmospheric deposition from indirect N₂O emissions under manure management is reported as being equal to 0.02 kg N₂O-N/kg N, without any reference to the source for this value in the NIR although, according to the 2006 IPCC Guidelines (table 11.3), the default EF value is 0.01 kg N₂O-N/kg N. In response to a question raised by the ERT during the review, Belarus stated that the EF value of 0.01 kg N₂O-N/kg N from the 2006 IPCC Guidelines was used in the inventory calculations and the discrepancy found is due to rounding of emission estimates reported in CRF table 3.B(b). The ERT further noted that indirect emissions from atmospheric deposition in the calculations amount to 1.2071 Gg N₂O for 2014; however, these</p>	Yes. Accuracy

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		<p>emissions were rounded and reported in CRF table 3.B(b) as 1.21 Gg N₂O</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus report N₂O indirect emissions from atmospheric deposition in CRF table 3.B(b) without rounding. The ERT further encourages Belarus to provide in its NIR a clear reference to the use of default EFs from the 2006 IPCC Guidelines</p>	
A.23	3.D.a.3 Crop residues – N ₂ O	<p>The ERT noted that, according to the NIR (section 5.4.2.1), Belarus plans to implement a higher-tier approach for the estimation of N₂O emissions from crop residues based on the amount of biomass returned to soils and its N content, corresponding to Levin’s method.^c The ERT noted that Levin’s method provides regression equations per crop type to estimate the amount of crop biomass returned to soils taking into account the results of long-term measurements of the biomass of plant residues in different soil types, ecological conditions, agricultural machinery usage and yield levels for the European part of the former Soviet Union. During the review, Belarus stated that it plans to implement Levin’s method for its next GHG inventory submission. The ERT also noted that Levin’s approach was developed for the estimation of the biomass of crop residues rather than for the estimation of N₂O emissions. For the application of Levin’s approach for GHG inventory purposes, the ERT notes that the methodological approach included in an article by Pyrozhenko^d could be used. This approach is based on Levin’s research and is relevant for countries of Eastern Europe</p> <p>The ERT welcomes the efforts made by Belarus aimed at improving the accuracy of N₂O emission estimations from crop residues under agricultural soils by implementing a higher-tier approach and encourages Belarus to include detailed descriptions of references, assumptions, AD (crop harvested areas and yields) and EFs used to derive emissions based on Levin’s approach in the NIR of its next GHG inventory submission</p>	No
A.24	3.D.a.5 Nitrogen mineralization/immobilization associated with loss/gain of soil organic matter – N ₂ O	<p>The ERT noted that the notation key “NA” is used in CRF table 3.D for reporting AD and N₂O emissions from N mineralization/immobilization associated with loss/gain of soil organic matter for all years of the time series. In response to a question raised by the ERT during the review, Belarus stated that emissions from mineralization/immobilization of N have not been estimated</p> <p>The ERT recommends that Belarus estimate in its next GHG inventory submission N₂O emissions from N in mineral soils that are mineralized in association with loss of soil carbon, based on the recommendations of the 2006 IPCC Guidelines (vol. 4, chapter 2, equation 2.25)</p>	Yes. Completeness
A.25	3.D.b Indirect N ₂ O emissions from managed soils – N ₂ O	<p>The ERT noted that indirect N₂O emissions from atmospheric deposition and N leaching/run-off are reported in CRF table 3.D as “IE”. Neither CRF table 9 nor the NIR provide any explanatory information on the allocation of these emissions. In response to a question raised by the ERT during the review, Belarus stated that indirect N₂O emissions from soils are included in the LULUCF sector</p>	Yes. Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
A.26	3.D.b.1 Atmospheric deposition – N ₂ O	<p>and reported in CRF table 4(IV). The ERT considers that indirect emissions are allocated incorrectly because, according to the footnote in CRF table 4(IV), N sources for cropland and grassland should be reported in the agriculture sector using CRF table 3.D</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus report indirect emissions from cropland and grassland in the agriculture sector using CRF table 3.D, in accordance with the UNFCCC Annex I inventory reporting guidelines</p> <p>The ERT noted that fraction of livestock N excretion that volatilises as NH₃ and NO_x from manure (Frac_{GASM}) was reported in the additional information table of CRF table 3.D as “NO”, while the indirect N₂O emissions from managed soils estimated using this fraction have been reported as “IE” in CRF table 3.D (see A.25 above). During the review Belarus stated that the value 0.2 for Frac_{GASM} was used in its estimation of indirect N₂O emissions from managed soils (2006 IPCC Guidelines, vol. 4, table 11.3)</p> <p>The ERT recommends that Belarus report the value of Frac_{GASM} in the additional information table of CRF table 3.D instead of using the notation key “NO” and provide references to this fraction in the NIR of its next GHG inventory submission</p>	Yes. Comparability
A.27	3.H Urea application – CO ₂	<p>The ERT noted that Belarus reports in CRF table 3.G–I emissions from urea application as “IE” with no further explanations in CRF table 9 and the NIR. In response to a question raised by the ERT during the review, Belarus stated that data about urea application are not available. Therefore, emissions in this category were not estimated. The ERT considers that domestic production and import/export data on urea can be used to obtain an approximate estimate of the amount of urea applied to soils on an annual basis, as recommended in the 2006 IPCC Guidelines (vol. 11, chapter 11.4.3). Alternatively, statistics from the International Fertilizer Association or FAO may be used as data sources for urea application. In particular, the ERT noted that FAO statistics contain urea application values for Belarus in 2002 and 2008–2013</p> <p>The ERT recommends that Belarus make efforts to collect specific data on urea application in the country for the complete time series or, alternatively, derive data based on production and import/export or international databases, including using interpolation/extrapolation methods for any data gaps, as recommended by the 2006 IPCC Guidelines, and report emissions from urea application in its next GHG inventory submission</p>	Yes. Completeness
LULUCF			
L.7	4.A.1 Forest land remaining forest land – CO ₂	<p>According to the NIR (chapter 6.1.1), Belarus has reported estimates of carbon stock changes in living biomass (gains and losses) in CRF table 4.A using the 2006 IPCC Guidelines methodology with national and default coefficients. However, Belarus has not provided in the NIR (chapter 6.2.1.2) the transparent AD on harvesting and forest fires, as well as the EFs used, to enable the ERT to reconstruct</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
L.8	4 (V) Biomass burning – CO ₂ , CH ₄ and N ₂ O	<p>the estimates of carbon losses in living biomass. Also, during the review, Belarus was not able to justify that the applied CF (0.5 t C/t dry matter) is a country-specific value. The ERT noted that the default CF from the 2006 IPCC Guidelines (table 4.3, chapter 4) is 0.47 t C/t dry matter</p> <p>The ERT recommends that, in its next GHG inventory submission, Belarus provide documented justification on the value of the country-specific CF used in its estimates of carbon stock changes in living biomass, and if this is not possible the ERT recommends that the Party revise its estimates of carbon stock changes in living biomass based on the appropriate default value provided in the 2006 IPCC Guidelines and include in the NIR the necessary AD (e.g. harvesting and forest fires) and information on the EFs and coefficients used in the estimates to ensure transparency and full implementation of the 2006 IPCC Guidelines</p> <p>Belarus reported in the NIR (section 6.2.1.2) that GHG emissions from biomass burning on forest land remaining forest land were estimated in accordance with the 2006 IPCC Guidelines and that it used national coefficients. However, the ERT notes that the NIR did not provide sufficient AD and EFs in order for the ERT to replicate the emission estimations. During the review, in response to a question raised by the ERT, Belarus provided the ERT with the detailed calculation of these emissions, including AD, coefficients and EFs applied. The ERT noted that the coefficients used in the calculations are not in line with those provided in the 2006 IPCC Guidelines (e.g. those in table 2.5). Also, the ERT noted that the CF (0.5 t C/t dry matter) was used by Belarus without justification as a country-specific value and that it does not match with the default CF from the 2006 IPCC Guidelines (see L.7 above)</p> <p>The ERT recommends that Belarus revise its emission estimates from biomass burning on forest land in accordance with the 2006 IPCC Guidelines and provide in the NIR all AD and national and default parameters used for its estimates in its next GHG inventory submission</p>	Yes. Accuracy
Waste			
W.8	5.A Solid waste disposal on land – CH ₄	<p>Belarus used the notation key “NE” to report CH₄ recovered and CH₄ flared in CRF table 5.A for unmanaged waste disposal sites, which is the only subcategory estimated under the solid waste disposal category. The NIR does not provide information on the country-specific management practices on CH₄ recovery or flaring in SWDS and their historical evolution. During the review Belarus did not provide clarifications on whether CH₄ recovery or flaring are used as management practices at the SWDS; however, according to Belstat^e there is a small amount of biogas that has been recovered in the country since 2010</p> <p>The ERT recommends that Belarus identify the country-specific management practices of CH₄ recovery or flaring and report accordingly in its next GHG inventory submission the respective amounts of CH₄ recovered for energy recovery purposes or flared; alternatively, use the notation key</p>	Yes. Completeness

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
W.9	5.A Solid waste disposal on land – CH ₄	<p>“NO”, in the case of absence of such practices in the country or justify the use of the notation key “NE”</p> <p>Belarus reported in the NIR the composition of the MSW disposed in SWDS based on data provided by the Ministry of Natural Resources and Environment Protection, the Ministry of Housing and Communal Services and the Industrial Corporation for Housing and Communal Services for certain large cities and years. The ERT considers that the MSW composition values need to be further processed in terms of adjustment and consolidation, because they are obtained from various sources, and that the values should be regrouped according to the selected estimation methodology. Belarus also reported in the NIR on landfilling in SWDS of the sludge originating from wastewater treatment and industrial solid waste; however, Belarus did not report emissions from these types of waste in the corresponding CRF tables. During the review, the ERT identified that the industrial waste data collection systems in place in the country allow for the tracking of the paths of each type of industrial waste disposed in SWDS. The ERT also considers that further details are needed on the information provided by Belarus during the review regarding the common practices of depositing sludge from wastewater treatment in specific “sludge depositing areas” on the territory of WWTP (see table 3, W.5 and W.7)</p> <p>The ERT recommends that Belarus collect and elaborate updated information on MSW historical composition using all available reference sources from national studies, surveys and results of relevant projects in its next GHG inventory submission. The ERT also recommends that Belarus 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 in SWDS, including information on the disposal of sludge originated from wastewater treatment and industrial solid waste, enabling also the use of higher-tier methods for estimating CH₄ emissions from solid waste disposal following the guidance available in the 2006 IPCC Guidelines</p>	Yes. Accuracy
W.10	5.A Solid waste disposal on land – CH ₄	<p>The ERT noted that the NIR stated that a “0” value for oxidation factor (OX) was used in the calculations, although according to the 2006 IPCC Guidelines (vol. 5, table 3.2), the OX would be equal to “0” for managed but not covered with aerated material, unmanaged and uncategorized SWDS or to “0.1” for managed SWDS covered with CH₄-oxidizing material. The ERT also noted that Belarus reported CH₄ emissions only from unmanaged landfills (classifying all landfills in the country as “unmanaged” or “uncategorized”). During the review, in response to a question raised by the ERT, Belarus clarified that the most common management practice in Belarus is “burying” solid waste using ground as covering material for landfills. Taking this information into account, the ERT considered that there are managed SWDS in the country and that the values used for the parameters OX and MCF, characterizing the country-specific management practices of the SWDS, have been not chosen correctly</p> <p>The ERT recommends that Belarus improve its QC procedures, choose a correct OX default value and MCF from the 2006 IPCC Guidelines corresponding with the management practices applicable for the</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is the finding an issue ^a ? If yes, classify by type
W.11	5.D Wastewater treatment and discharge – CH ₄	<p>SWDS in Belarus and use these factors correctly for estimating and reporting CH₄ emissions in the NIR and CRF tables in its next GHG inventory submission</p> <p>The ERT noted that, for the entire time series, Belarus used the notation key “NE” to report CH₄ flared and used for energy recovery under the entire wastewater treatment and discharge category (see table 3, W.7), not specifying domestic and industrial wastewater and stating in the NIR that they are usually mixed. During the review, the ERT was unable to clarify whether the WWTP in Belarus have facilities for CH₄ recovery or flaring as management practices</p> <p>The ERT recommends that Belarus explore and document the existence of CH₄ for energy recovery and flaring at WWTP and, depending on the results obtained, report accordingly in the NIR and CRF tables of its next GHG inventory submission, the CH₄ recovered and/or flared, or use the correct notation key for the domestic and industrial wastewater category</p>	Yes. Transparency
W.12	5.D Wastewater treatment and discharge – N ₂ O	<p>The ERT noted that N₂O emissions can occur as direct emissions from treatment plants or from indirect emissions from wastewater after disposal of effluent into waterways, lakes or the sea. Direct emissions from nitrification and denitrification at wastewater treatment plants may be considered as a minor source. Typically, these emissions are much smaller than those from effluent and may only be of interest to countries that predominantly have advanced centralized WWTP with nitrification and denitrification steps. The NIR of the 2016 GHG inventory submission lacks information on the characterization of the wastewater treatment practices used in Belarus. In addition, no information is provided in the NIR regarding the occurrence of nitrification and denitrification in rivers and in estuaries. During the review, in response to a question raised by the ERT, Belarus made available to the ERT an adjusted set of data on the average annual per capita protein consumption, as provided by Belstat</p> <p>The ERT recommends that Belarus investigate the wastewater treatment practices in the country and provide in the NIR of its next GHG inventory submission a transparent description of the activities occurring under this category, together with estimates of direct and/or indirect N₂O 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</p>	Yes. Accuracy

Abbreviations: AD = activity data, CF = carbon fraction in dry matter, CRF = common reporting format, EF = emission factor, ERT = expert review team, FAO = Food and Agriculture Organization of the United Nations, GHG = greenhouse gas, IE = included elsewhere, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, MCF = methane conversion factor, MSW = municipal solid waste, N = nitrogen, Nex = nitrogen excretion rate, NIR = national inventory report, NA = not applicable, NE = not estimated, NO = not occurring, SWDS = solid waste disposal sites, QC = quality control, 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”, WWTP = wastewater treatment plants, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

^a Recommendations are related to issues as defined in decision 13/CP.20, annex, paragraph 81, identified by the ERT during the review. Encouragements are made to the Party to address all findings not related to such issues.

^b Available at <http://faostat3.fao.org/compare/E>.

^c Levin FI. 1977. Plant Residues in Crop Fields and Determination of Their Amounts by the Yield of Primary Production, *Agrokimiya*. No. 8: 36–42.

^d Pyrozhenko YV. 2012. Methods for Estimation of Nitrous Oxide Emissions in Result of Agricultural Crop Residues Mineralization. *J. Int. Environmental Application & Science*. Vol. 7 (3): 648–654. Available at www.jieas.com/volumes/vol121-3/abs12-v7-i3-30.pdf.

^e Information available at www.belstat.gov.by/ofitsialnaya-statistika/realny-sector-ekonomiki/energeticheskaya-statistika/operativnye-dannye_3/proizvodstvo-dobycha-prirodnih-vidov-toplivno-energeticheskikh-resursov/.

Annex I

Overview of greenhouse gas emissions and removals for Belarus for submission year 2016, as submitted by the Party

Table 6 shows total greenhouse gas (GHG) emissions, including and excluding land use, land-use change and forestry and, for Parties that have decided to report indirect carbon dioxide (CO₂) emissions, with and without indirect CO₂. Tables 7 and 8 show GHG emissions reported under the Convention by Belarus by gas and by sector, respectively.

Table 6
Total greenhouse gas emissions for Belarus, 1990–2014^a

(kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions including indirect CO₂ emissions^b</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>
1990	109 073.78	133 457.16	109 073.78	133 457.16
1995	52 955.68	80 369.78	52 955.68	80 369.78
2000	51 714.30	77 959.72	51 714.30	77 959.72
2010	66 137.31	91 183.55	66 137.31	91 183.55
2011	68 764.04	91 671.73	68 764.04	91 671.73
2012	73 839.56	90 925.11	73 839.56	90 925.11
2013	71 301.98	93 037.25	71 301.98	93 037.25
2014	76 263.52	91 895.65	76 263.52	91 895.65

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.

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

^b The Party has reported indirect CO₂ emissions as “NO” (not occurring) in common reporting format table 6.

Table 7
Greenhouse gas emissions by gas for Belarus, excluding land use, land-use change and forestry 1990–2014^a

(kt CO₂ eq)

	<i>CO₂^b</i>	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1990	100 438.10	17 944.37	15 074.70	NA, NO	NA, NO	NA, NO	NA, NE, NO	NA, NO
1995	56 005.94	13 611.08	10 752.77	NA, NO	NA, NO	NA, NO	0.002	NA, NO
2000	53 686.86	12 922.70	11 350.07	NA, NO	NA, NO	NA, NO	0.10	NA, NO
2010	61 632.49	17 109.27	12 439.69	NA, NO	NA, NO	NA, NO	2.10	NA, NO
2011	61 128.40	17 499.48	13 041.55	NA, NO	NA, NO	NA, NO	2.30	NA, NO
2012	60 636.85	17 461.77	12 824.04	NA, NO	NA, NO	NA, NO	2.46	NA, NO
2013	61 510.99	18 724.36	12 799.39	NA, NO	NA, NO	NA, NO	2.51	NA, NO
2014	60 615.65	18 599.18	12 678.39	NA, NO	NA, NO	NA, NO	2.43	NA, NO
Per cent change 1990–2014	-39.6	3.6	-15.9	NA	NA	NA	NA	NA

Abbreviations: NA = not applicable, NE = not estimated, NO = not occurring.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Belarus reported indirect CO₂ emissions as “NO” in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Belarus, 1990–2014^{a, b}
 (kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	95 626.17	4 339.69	30 478.02	–24 383.38	3 013.29	NO
1995	53 614.84	2 618.42	21 635.77	–27 414.11	2 500.76	NO
2000	51 131.35	3 230.72	20 132.40	–26 245.42	3 465.25	NO
2010	57 116.75	4 927.48	21 827.43	–25 046.24	7 311.89	NO
2011	56 681.69	4 910.48	22 400.70	–22 907.69	7 678.85	NO
2012	56 141.33	4 984.96	22 385.26	–17 085.56	7 413.56	NO
2013	57 018.78	5 196.03	22 071.15	–21 735.27	8 751.29	NO
2014	55 692.52	5 529.13	22 015.79	–15 632.12	8 658.21	NO
Per cent change 1990–2014	–41.8	27.4	–27.8	–35.9	187.3	NA

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Belarus reported indirect CO₂ emissions as “NO” in common reporting format table 6.

Annex II

Additional information to support findings in table 2

A. Missing categories that may affect completeness

1. The categories for which methods are included in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) were reported as “NE” (not estimated) or for which the expert review team (ERT) otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory (see G.3 in table 3 above) are the following:

(a) Energy sector: CO₂, CH₄ and N₂O emissions from 1.B.2.c venting and flaring; CO₂ and CH₄ emissions from 1.B.2.b.5 distribution (natural gas); CO₂, CH₄ and N₂O emissions from 1.B.2.a.1 exploration (oil); and CO₂ and CH₄ emissions from 1.B.2.b.1 exploration (natural gas) and 1.B.2.b.3 processing (natural gas);

(b) Industrial processes and product use (IPPU) sector: CO₂ emissions from 2.A.4 other process uses of carbonates (2.A.4.a ceramics and 2.A.4.c non-metallurgical magnesium production), 2.D.1 lubricant use and 2.D.2 paraffin wax use; and HFCs, PFCs, SF₆ and NF₃ emissions from 2.F product uses as substitutes for ozone-depleting substances (2.F.1 refrigeration and air conditioning, 2.F.2 foam blowing agents, 2.F.3 fire protection and 2.F.4 aerosols);

(c) Agriculture sector: CH₄ and N₂O emissions from asses under 3.A.4 other livestock and 3.B.4 other livestock; N₂O emissions from 3.D.a.5 mineralization/immobilization associated with loss/gain of soil organic matter and CO₂ emissions from 3.H urea application;

(d) Land use, land-use change and forestry (LULUCF) sector: CO₂ emissions and removals from 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.1.2 flooded land remaining flooded land, 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, 4.F.1 other land remaining other land, 4.F.2 land converted to other land and 4.G harvested wood products; CH₄ emissions from 4.E.1 settlements remaining settlements and 4.E.2 land converted to settlements; N₂O emissions from 4.B.2 land converted to cropland, 4.C.2 land converted to grasslands, 4.D.1 wetlands remaining wetlands, 4.E.1 settlements remaining settlements, 4.E.2 lands converted to settlements and 4.F other land; and CO₂, CH₄ and N₂O from 4(II) emissions and removals from drainage and rewetting and other management of organic and mineral soils;

(e) Waste sector: CO₂ and CH₄ emissions from 5.A.1 managed waste disposal sites; CH₄ and N₂O emissions from 5.B biological treatment of solid waste; CO₂, CH₄ and N₂O emissions from 5.C incineration and open burning of waste; CH₄ emissions from 5.D.1 domestic wastewater; and CH₄ and N₂O emissions from 5.D.2 industrial wastewater.

B. Recommendation for an in-country review: list of issues

2. The ERT has recommended that the next review for Belarus be conducted as an in-country review. The ERT considers that an in-country review is essential for Belarus because the Party demonstrated during the 2016 review a failure to follow many of the requirements established in 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” (hereinafter referred to as the UNFCCC Annex I inventory reporting guidelines). In particular, Belarus did not follow the good practice for emission estimates as provided in the 2006 IPCC Guidelines for a large number of categories that the Party included in its 2016 GHG inventory submission; its reported estimates are not complete for a number of categories in all sectors; and its national inventory arrangements appear not to be fully functional.

3. In accordance with decision 13/CP.20, annex, paragraph 64, the ERT has provided a list of questions and issues to be addressed during this in-country review (see below), in addition to the list of unresolved issues in table 3 and the issues identified in table 5.

4. Issue: National inventory arrangements. The ERT noted that several issues reflect that the functions pertaining to national arrangements are not fully functional, therefore the in-country review should address the following issues:

(a) Check whether the size of the inventory team is appropriate to comply with the requirements of the UNFCCC Annex I inventory reporting guidelines and to implement adequately the guidance for inventory calculations provided in the 2006 IPCC Guidelines;

(b) Check whether Belarus has made progress in adjusting and enhancing its institutional, legal and procedural arrangements necessary to undertake as appropriate specific functions related to inventory planning, preparation and management;

(c) Check whether Belarus has increased the capacity of its national arrangements for the timely performance of the necessary general and specific functions of inventory preparation, including data collection and coordination with government agencies and other entities involved in the inventory preparation and whether it has made the necessary arrangements for increasing the technical competence of the staff involved in the inventory development process;

(d) Check whether Belarus included in the national inventory report (NIR) an updated version of its inventory improvement plan, which covers all recommendations made in the current and previous review reports and contains a delivery deadline for each of the planned improvements;

(e) Check whether Belarus reported in the NIR how it uses the key category analysis and the uncertainty analysis in the prioritization of developments in and improvements to its inventory;

(f) Check whether Belarus has put in place robust quality assurance/quality control (QA/QC) procedures for its inventory and has reported complete and detailed information on sectoral QA/QC procedures in the NIR, in particular for the key categories.

5. Issue: Transparency. The ERT found a general problem with the transparency and completeness of the NIR, therefore the in-country review should check whether Belarus included in the NIR sufficient information explaining the methodologies and procedures used in the calculations, descriptions of the data collection process and more tables presenting the activity data (AD) and emission factors used, as well as background information on the AD used in the inventory, in particular for the energy sector and IPPU sector.

6. Issue: Consistency. The ERT noted several issues of lack of consistency in the information provided in the common reporting format (CRF) tables and the NIR. Therefore the in-country review should check whether Belarus made all efforts, including performance of enhanced QC procedures, necessary to ensure consistency between the NIR and the CRF tables, including the correct and consistent use of notation keys in the CRF tables.

7. Issue: Completeness. The ERT noted a considerable number of categories reported as “NE” (not estimated), as well as categories reported as “NO” (not occurring), “NA” (not applicable) and “IE” (included elsewhere) for which no documented explanations were provided to justify the lack of numerical estimates. Therefore the in-country review should check whether Belarus has made all the necessary efforts to collect relevant AD and estimate emissions for all categories and subcategories occurring in the country, for which the 2006 IPCC Guidelines provide estimation methods.

8. Issue: Accuracy. The ERT noted that many key categories are estimated using tier 1 methodologies and default EFs despite repeated recommendations made in several previous review reports for the Party to use higher-tier methods and country-specific EFs. Therefore the in-country review should focus on the implementation of the improvements to the inventory referring to the use of higher-tier estimation methods and country-specific EFs for key categories, in accordance with the 2006 IPCC Guidelines.

9. The in-country review should also consider and address the following most relevant sectoral issues:

(a) Energy: whether Belarus:

(i) Uses country-specific carbon contents for all fuels and explained in detail the derivation of the country specific net calorific values for solid fuels and provided a justification for their use;

(ii) Provides transparent information in the NIR on the utilization of fuels as feedstocks and for non-energy purposes and uses this information to improve the accuracy of its emission estimates;

(b) IPPU: whether Belarus:

(i) Uses a higher-tier approach, based on plant-specific AD and EFs to calculate CO₂ emissions from cement production;

(ii) Collects relevant available AD and estimates emissions for all categories and subcategories occurring in the IPPU sector, for which the 2006 IPCC Guidelines provides estimation methods;

(c) Agriculture: whether Belarus:

(i) Estimates average annual populations of growing animals that are alive for less than a year using equation 10.1 from the 2006 IPCC Guidelines and provides national data on their lifecycles;

(ii) Includes in the NIR a comparison analysis of the country-specific EFs for dairy cattle and underlying parameters with the default EF values of the 2006 IPCC Guidelines and EFs from countries with similar conditions, and provides explanations of any substantial discrepancies identified;

(iii) Collects data about the allocation fractions of non-dairy cattle and swine manure per liquid systems with and without natural crust cover;

(iv) Reports indirect emissions from cropland and grassland in the agriculture sector using CRF table 3.D;

- (d) LULUCF: whether Belarus:
 - (i) Includes in the NIR complete, reconciled and transparent information on the areas of land in the country corresponding to the Intergovernmental Panel on Climate Change (IPCC) land-use categories and the identified land-use transitions (land-use matrix), including a transparent description of the sources of data and associated methodologies and information on how the national land-use categorization is linked and made consistent with the IPCC land-use categories;
 - (ii) Develops the necessary national AD and quantifies the potential emissions and removals for dead organic matter using a higher tier method;
- (e) Waste: whether Belarus:
 - (i) Collects updated information on municipal solid waste composition using all available country-specific reference sources, ensuring a reflection of the real situation in the country, and uses a higher-tier method for estimating CH₄ emissions from solid waste disposal on land in accordance with the 2006 IPCC Guidelines;
 - (ii) Identifies the practices of wastewater treatment in wastewater treatment plants in the country and provides related transparent information in the NIR together with estimates of direct and/or indirect N₂O emissions in accordance with the 2006 IPCC Guidelines.

Annex III

Documents and information used during the review

A. Reference documents

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 <http://unfccc.int/resource/webdocs/agi/2015.pdf>.

Annual status report for Belarus for 2016. Available at <http://unfccc.int/resource/docs/2016/asr/blr.pdf>.

FCCC/ARR/2013/BLR. Report of the individual review of the inventory submission of Belarus submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/BLR.pdf>.

FCCC/ARR/2012/BLR. Report of the individual review of the inventory submission of Belarus submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/BLR.pdf>.

“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”. Annex to decision 24/CP.19. Available at <http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=4>.

“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”. Annex to decision 13/CP.20. Available at <http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf#page=6>.

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

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Kristina Gonchar (Department of International Projects of the Republic Scientific and Research Unitary Enterprise: Belarus Scientific and Research Centre “Ecology”), including additional material on the methodology and assumptions used.

The following documents¹ were also provided by Belarus:

Institute “Belzhilproekt”. 2011. *Methodological recommendations for determining morphologic composition of the municipal solid waste in cities with various level of*

¹ Reproduced as received from the Party.

conveniences in residential sector (in Russian). Minsk. Ministry of housing and communal services of the Republic of Belarus.

Institute “Belzhilproekt”. 2011. *Methodological recommendations for determining and applying coefficients of conversion of volume (cubic metres) of Municipal Solid Waste into weight (tonnes)* (in Russian). Minsk. Ministry of housing and communal services of the Republic of Belarus.

Institute “Belzhilproekt”. 2011. *Normatives for the Number of Containers for collecting municipal solid waste and normatives for municipal solid waste generated per capita* (in Russian). Minsk. Ministry of housing and communal services of the Republic of Belarus.

Annex IV

Acronyms and abbreviations

CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
ERT	expert review team
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs, unspecified mix of HFCs and PFCs, SF ₆ and NF ₃ , without GHG emissions and removals from LULUCF
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial processes and product use
kt	kilotonne (1 kt = 1 gigagram (Gg))
LULUCF	land use, land-use change and forestry
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
QA/QC	quality assurance/quality control
UNFCCC	United Nations Framework Convention on Climate Change
