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**Report of the individual review of the inventory submission
of Belarus submitted in 2011***

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction and summary	1–4	3
A. Overview	1–2	3
B. Emission profiles and trends.....	3–4	3
II. Technical assessment of the annual submission.....	5–92	5
A. Overview	5–27	5
B. Energy	28–46	10
C. Industrial processes and solvent and other product use	47–58	14
D. Agriculture.....	59–76	16
E. Land use, land-use change and forestry.....	77–81	18
F. Waste	82–92	19
III. Conclusions and recommendations.....	93–97	21
Annexes		
I. Documents and information used during the review.....		23
II. Acronyms and abbreviations.....		24

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 inventory submission of Belarus, coordinated by the UNFCCC secretariat, in accordance with decision 19/CP.8. The review took place from 5 to 10 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Domenico Gaudioso (Italy); energy – Mr. Ricardo Fernandez (European Union), Mr. Sergiy Skybyk (Ukraine) and Mr. Michael Strogies (Germany); industrial processes – Ms. Natalya Parasyuk (Ukraine) and Ms. Ingrid Person Rocha e Pinho (Brazil); agriculture – Ms. Olga Garilova (Estonia) and Mr. Yuriy Pyrozhenko (Ukraine); land use, land-use change and forestry (LULUCF) – Mr. Sandro Federici (San Marino) and Ms. Marina Shvangiradze (Georgia); and waste – Ms. Tatiana Tugui (Republic of Moldova). Ms. Parasyuk and Mr. Federici were the lead reviewers. The review was coordinated by Mr. Stelios Pasmajoglou and Ms. Ruta Bubniene (UNFCCC secretariat).

2. In accordance with the “Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention” (hereinafter referred to as the UNFCCC review guidelines), a draft version of this report was communicated to the Government of Belarus, which made no comment on it.

B. Emission profiles and trends

3. In 2009, the main greenhouse gas (GHG) in Belarus was carbon dioxide (CO₂), accounting for 64.7 per cent of total GHG emissions¹ expressed in carbon dioxide equivalent (CO₂ eq), followed by nitrous oxide (N₂O) (18.3 per cent) and methane (CH₄) (17.0 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 0.003 per cent of the overall GHG emissions in the country. The energy sector accounted for 62.4 per cent of total GHG emissions, followed by the agriculture sector (25.9 per cent), the waste sector (7.1 per cent), the industrial processes sector (4.5 per cent) and the solvent and other products use sector (0.1 per cent). Total GHG emissions amounted to 87,886.52 Gg CO₂ eq and decreased by 36.9 per cent between 1990 and 2009. The trend in total GHG emissions is typical of countries with economies in transition, with a rapid decline in the 1990s and a slow increase after 2000. The national inventory report (NIR) explains the main drivers of the emission trends.

4. Tables 1 and 2 show GHG emissions under the Convention, by gas and by sector, respectively. In table 1 CO₂, CH₄ and N₂O emissions do not include emissions and removals from the LULUCF sector.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

Table 1
Greenhouse gas emissions, by gas, 1990 to 2009

Greenhouse gas	Gg CO ₂ eq							Change 1990–2009 (%)
	1990	1995	2000	2005	2007	2008	2009	
CO ₂	103 806.85	57 599.77	53 319.28	56 669.76	58 280.00	60 328.70	56 827.71	–45.3
CH ₄	15 217.16	11 704.96	11 421.85	13 116.50	14 176.47	14 520.68	14 968.71	–1.6
N ₂ O	20 155.25	13 542.08	14 422.84	14 367.85	14 829.69	15 719.21	16 055.49	–20.3
HFCs	NA, NE, NO	2.84	9.35	26.19	31.00	35.80	32.20	100.0
PFCs	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA, NE, NO	NA
SF ₆	NA, NE, NO	0.01	0.41	1.48	2.27	2.39	2.42	100.0

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

Table 2
Greenhouse gas emissions by sector, 1990 to 2009

Sector	Gg CO ₂ eq							Change 1990–2009 (%)
	1990	1995	2000	2005	2007	2008	2009	
Energy	102 242.80	57 259.52	52 684.07	55 311.53	56 835.31	58 659.50	54 832.60	–46.4
Industrial processes	3 614.68	2 035.73	2 604.72	3 484.69	3 853.80	3 971.00	3 996.27	10.6
Solvent and other product use	74.40	62.33	76.04	69.19	72.56	64.09	64.06	–13.9
Agriculture	30 672.65	21 354.44	20 853.32	20 696.13	21 217.46	22 277.86	22 788.48	–25.7
LULUCF	–28 574.44	–31 221.80	–30 902.78	–26 209.98	–27 559.48	–27 138.46	–30 043.54	5.1
Waste	2 574.73	2 137.64	2 955.57	4 620.24	5 340.29	5 634.33	6 205.10	141.0
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	110 604.82	51 627.87	48 270.94	57 971.80	59 759.94	63 468.33	57 842.98	–47.7
Total (without LULUCF)	139 179.26	82 849.66	79 173.72	84 181.78	87 319.42	90 606.78	87 886.52	–36.9

Abbreviation: NA = not applicable.

II. Technical assessment of the inventory submission

A. Overview

1. Inventory submission and other sources of information

5. A complete set of common reporting format (CRF) tables for the period 1990–2009 was submitted on 15 April 2011 and the NIR was submitted on 17 May 2011. Belarus resubmitted its CRF tables on 17 May 2011. Although the 2011 inventory submission was submitted 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 inventories” (hereinafter referred to as the UNFCCC reporting guidelines), the ERT strongly recommends that Belarus submit its future inventories in accordance with the timelines agreed by the Conference of the Parties to the UNFCCC.

6. Where necessary, the expert review team (ERT) also used the previous year’s submission during the review. During the review, Belarus provided the ERT with additional information. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

7. The inventory covers most source and sink categories and gases and is complete in terms of years and geographical coverage. Belarus has provided all the relevant CRF tables for the period 1990–2009. Although the reporting in the CRF tables is generally complete and notation keys are used throughout, CRF table 8(b), with explanatory information for the recalculations, has not been filled in. The ERT reiterates the recommendation made in the previous review report that Belarus provide all necessary information in the corresponding CRF tables in its next inventory submission.

8. Belarus still reports a number of categories as “not estimated” (“NE”), including: CO₂ emissions from limestone and dolomite use; CO₂ emissions from soda ash production; HFC (most of the subcategories) and PFC emissions from consumption of halocarbons and SF₆; CH₄ and N₂O emissions from industrial wastewater; CH₄ and N₂O emissions from domestic and commercial wastewater; CO₂, CH₄ and N₂O emissions from land converted to other land (except CO₂ forest land converted to other land reported as “not occurring” (“NO”)); and CO₂ emissions from grassland remaining grassland. Belarus reports emissions from oil transportation as “NO” in the CRF tables. During the review, Belarus clarified that the correct notation key is “NE”. The ERT reiterates the recommendation from previous review reports that Belarus strengthen its efforts in collecting activity data (AD) and estimate emissions for the missing categories and subcategories.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

9. The ERT concluded that the institutional arrangements established by Belarus continued to perform their functions. The NIR does not report on any changes in the institutional arrangements in Belarus since the Party’s previous submission. The legal basis for inventory preparation and the overall structure of the institutional arrangements is

described in the NIR. However, it is not clear how the specific legal responsibilities for GHG inventory preparation are defined for individual ministries and private companies in official governmental decrees. The ERT encourages Belarus to provide further information about the legal role of all institutions in the institutional arrangements for GHG inventory preparation in the NIR of its next inventory submission.

Inventory planning

10. The NIR provides a description of the institutional arrangements for the preparation of the inventory. The Ministry of Natural Resources and Environmental Protection (MNREP) has overall responsibility for the preparation, planning and management of the national inventory. The Belarus Scientific Research Centre “Ecology” (hereinafter referred to as SRC “Ecology”) is responsible for the compilation of the GHG inventory and its reporting. Final approval of the annual GHG inventory is given by MNREP. The major set of AD is obtained from annual publications of the National Statistical Committee of the Republic of Belarus (Belstat).

11. Other ministries are also involved in the provision of data for the inventory, including the Ministry of Industry, the Ministry of Transportation and Communications, the Ministry of Health Protection, the Ministry of Agriculture and Food, the Ministry of Forestry and the Ministry of Housing and Communal Services. Some AD for the energy and the industry sectors are received by SRC “Ecology” from other organizations such as Belarus State Consortia for Oil and Chemistry, “Beltopgas”, “Beltransgas” and “Belenergo” of the Ministry of Energy, the State Committee on Aviation and the State Committee on Property. The specific role of private companies in providing data for the preparation of the inventory is not clarified in the NIR. The ERT encourages Belarus to provide more information on the role of private companies in providing data for the inventory estimates in the NIR of its next inventory submission.

Inventory preparation

Key categories

12. Belarus has reported a key category tier 1 analysis, both level and trend assessments, as part of its 2011 submission. Belarus has included the LULUCF sector in its key category analysis in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The key category level assessment and the trend assessment performed by Belarus and that performed by the secretariat² produced similar results with minor differences. The results of the key category analysis reported in CRF table 7 and the NIR show different results due to the higher level of aggregation of subcategories in the CRF reporting. The ERT reiterates the recommendation made in the previous review report that Belarus make consistent the reporting between the CRF tables and the NIR in its next inventory submission.

² The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party’s analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

13. Belarus does not report in the NIR whether it uses the key category analysis in the prioritization of developments and improvements to its inventory. The ERT reiterates the recommendation made in previous review reports that Belarus clarify this in its next inventory submission. The ERT noted that most key categories are still estimated using lower tiers and default emission factors (EFs). Some EFs reported by Belarus as country-specific are, in fact, default values from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) (e.g. in the energy sector for stationary combustion). The ERT further noted that, for some key categories, Belarus uses old default parameters from the Revised 1996 IPCC Guidelines and, therefore, recommends that Belarus apply parameters from the IPCC good practice guidance (e.g. for fugitive emissions in the energy sector). The ERT reiterates the recommendation from the previous review report that Belarus enhance its efforts in the implementation of higher tiers and country-specific EFs for key categories, in accordance with the IPCC good practice guidance.

Uncertainties

14. In its 2011 submission Belarus provided quantitative uncertainty estimates using the tier 1 method following the IPCC good practice guidance, including uncertainty estimates for AD and EFs. The LULUCF sector is included in the Party's uncertainty analysis. Cumulative uncertainty of total GHG emissions for 2009 is 32.7 per cent (level) and 12.0 per cent (trend) and both values had increased compared with values reported for the previous submission (27.0 and 10.5 per cent, respectively). The NIR does not provide a description of the reasons for the increase in the uncertainty estimates.

15. The ERT noted that the descriptions provided in the NIR of uncertainty values used for AD and EFs in most sectors are not transparent. Many uncertainty values are obtained by expert judgement, but the NIR lacks explanations for the rationale and procedures of such judgements. The ERT reiterates the recommendations from previous review reports that Belarus perform appropriate procedures for the expert judgement of uncertainties and document them, following the recommendations of the IPCC good practice guidance, in its next inventory submission. In some cases Belarus refers to the use of default values for uncertainties.

16. During the review, Belarus informed the ERT that new categories were included in the uncertainty analysis for the 2011 inventory submission and uncertainty values for AD and EFs in the agriculture and LULUCF sectors, as well as in other sectors, were revised. The ERT commends Belarus for its intention to improve its uncertainty analysis. However, the NIR does not contain a sufficient description of the reasons for revising the uncertainty values for AD and EFs and the basis for the values used in the 2011 submission. The ERT, therefore, reiterates the recommendation made in the previous review report that Belarus improve its uncertainty analysis and provide detailed explanations in the NIR of its next inventory submission.

Recalculations and time-series consistency

17. Recalculations have been performed in accordance with the IPCC good practice guidance. The ERT noted that significant recalculations reported by Belarus for the time series 1990 to 2008 have been undertaken in the energy, agriculture, LULUCF and waste sectors due to: shifting from tier 1 to tier 2 methods (e.g. in enteric fermentation), applying country-specific EFs (e.g. manure management); refinement of AD (e.g. in fugitive emissions from oil and natural gas, manure management and agricultural soils); and estimation of fires in the LULUCF sector calculated using country-specific parameters. The ERT commends the effort made by Belarus in improving its inventory and encourages Belarus to continue with this effort.

18. The impact of the recalculations includes: a decrease in the estimated total GHG emissions in 1990 (0.9 per cent) and a decrease in 2008 (0.6 per cent). The rationale for these recalculations is only partially provided in the sectoral chapters of the NIR. For example, for the energy sector an explanation of the reasons for recalculations in the categories transport, other sectors and other is not provided in the NIR. Additionally, the overview chapter for recalculations and improvements was not included in the NIR and no explanatory information is provided in CRF table 8(b). The ERT strongly reiterates the recommendation of the previous review report that Belarus report all information related to recalculations in the NIR and CRF table 8(b) and encourages Belarus to use the recommended outline of the NIR provided in the UNFCCC reporting guidelines for its next inventory submission.

Verification and quality assurance/quality control approaches

19. Belarus has provided a general description of quality assurance/quality control (QA/QC) procedures. In the NIR, Belarus reported that the QA/QC plan was adopted by order of SRC “Ecology” in February 2009. However, the NIR lacks information on its implementation. Also very limited information is provided in the sectoral chapters on the QA/QC procedures applied to individual categories within the sectors. The ERT recommends that Belarus report more detailed information on this in the NIR of its next inventory submission, in particular for the key categories, as well as information on any external reviews undertaken and/or planned to be conducted for the different sectors and key findings on the quality checks of the AD and methods used.

20. The ERT further noted some inconsistencies between the information in the NIR and the CRF tables, particularly: in the energy sector for reporting fugitive emissions; and in the use of notation keys. This problem had also been raised in previous review reports. The ERT reiterates the recommendation that Belarus remove all inconsistencies in its next inventory submission. The ERT recommends that Belarus follow the annotated outline during the preparation of NIR for the next inventory submission.

Transparency

21. In the previous review report it was noted that the NIR lacked transparency in the description of methodologies for: data collection; the development of some country-specific EFs; the allocation of AD by single categories. It was also noted that the NIR lacked transparency in the descriptions for non-key categories in the industrial processes sector. The ERT noted that sector-specific information on uncertainty values, the rationale for recalculations and the results of sectoral QA/QC procedures are still not always clearly reported in the 2011 submission. In particular, explanatory information on emission trends is not yet supported by quantitative data, as had been recommended in the previous review reports. The ERT also notes that transparency of the NIR has decreased when compared with the previous submission (e.g. in the energy sector, an energy balance was not provided; chapters with the reference approach and the sectoral approach were not included; and information is missing on estimating emissions in the category other). The ERT strongly recommends that Belarus solve the issues identified above, improve the description in the NIR of data collection, methodologies, EFs and uncertainty values and provide all background AD used in the inventory in a transparent manner in its next inventory submission.

22. Reporting in the LULUCF sector still contains many gaps, particularly for the conversion of land to other land uses. The representation of lands is not reported in accordance with the IPCC good practice guidance for LULUCF and explanatory information is lacking. The ERT strongly recommends that Belarus improve transparency and accuracy of the information for the LULUCF sector in its next inventory submission.

Inventory management

23. As reported in the NIR, Belarus has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. The archive is kept by SRC "Ecology". However, detailed information on the current situation of the archiving system and on QA/QC procedures, external and internal reviews is not included in the NIR. The ERT recommends that Belarus improve the description of these issues in the NIR of its next inventory submission.

3. Follow-up to previous reviews

24. The ERT commends Belarus for its efforts regarding the improvement of its inventory, particularly regarding the estimation of emissions in the agricultural sector with the application of higher tier methods. However, the ERT noted that some of the recommendations have not yet been implemented; the most important of these relate to the completeness and transparency of reporting. The ERT strongly recommends that Belarus continue its efforts to improve its GHG inventory and implement previous and current recommendations in its next inventory submission.

4. Areas for further improvement

Identified by the Party

25. In its response to the issues raised during the review, Belarus indicated that it is working on the land-use change matrix, which will be compiled in 2011 and on the QA/QC procedures. The 2011 NIR identifies several areas for improvement:

- (a) Further elaboration and implementation of QA/QC procedures;
- (b) Further improvement of methodologies in the collection and analysis of data on GHG emissions;
- (c) The enhancement of the level of detail of the AD used, by obtaining AD from private enterprises and governmental organizations directly;
- (d) The collection of additional AD for use in the inventory, particularly for SF₆ emissions from electrical equipment;
- (e) The estimation of some categories that were previously not estimated, particularly in the industrial processes sector for potential HFCs emissions from refrigeration and air-conditioning equipment;
- (f) The development of country-specific EFs, particularly for the energy and LULUCF sectors in 2011 as well as for the industrial processes and waste sectors in the future.

Identified by the expert review team

26. The ERT identified the following cross-cutting issues for improvement:

- (a) Reporting, in the NIR, additional information on the implementation of QA/QC procedures, including independent review reports;
- (b) The improvement of the completeness of the GHG inventory by including estimates of missing categories, particularly the following: CO₂ emissions from limestone

and dolomite use; CO₂ emissions from soda ash production; HFC (most of the subcategories) and PFC emissions from consumption of halocarbons and SF₆; CH₄ emissions from industrial wastewater; CH₄ emissions from domestic and commercial wastewater; CO₂ and N₂O emissions from waste incineration; CO₂, CH₄ and N₂O emissions from land converted to other land; and CO₂ emissions from grassland remaining grasslands;

(c) The improvement of the transparency of the inventory, by adding in the NIR descriptions of data collection activities, and of methodologies, EFs and uncertainty values applied in the inventory. In addition, all relevant AD should be reported in a transparent manner, particularly for the industrial processes and waste sectors;

(d) The improvement of reporting in the LULUCF sector, by including detailed information on land areas and uses, representation of lands and details on EFs and parameters used in the estimates;

(e) The provision of explanatory information on recalculations and time-series consistency of GHG emission estimates in the corresponding chapter of the NIR and in CRF table 8(b);

(f) The improvement of the accuracy of GHG inventory estimates by implementing higher tier methods and the development of country-specific EFs for key categories;

(g) The improvement of consistency in reporting between the NIR and CRF tables;

(h) The improvement of uncertainty analysis by using documented country-specific uncertainty values.

27. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

28. The energy sector is the main sector in the GHG inventory of Belarus. In 2011, emissions from the energy sector amounted to 54,832.60 CO₂ eq, or 62.4 per cent of total GHG emissions. Since 1990, emissions have decreased by 46.4 per cent. The key drivers for the fall in emissions are: the restructuring of the national economy towards a market economy; the increase in energy efficiency; the switch in fuel use from residual oil and coal to natural gas; and the more intensive use of fuel wood in households.

29. Within the sector, 55.3 per cent of the emissions were from energy industries, followed by 16.1 per cent from other sectors, 15.0 per cent from manufacturing industries and construction, 9.8 per cent from transport and 1.1 per cent from other. Fugitive emissions accounted for 2.7 per cent and came only from oil and natural gas. The ERT noted that wood and peat are the main local energy resources. Natural gas is imported from the Russian Federation and a significant volume of gas is transported through Belarus to neighbouring countries. According to the energy balance, crude oil is also imported from the Russian Federation and processed in refineries. A small amount of coal is combusted in Belarus.

30. In the previous review report it was noted that the reporting of the energy sector in the NIR lacks transparency. In the previous inventory submission, an energy balance in natural units was provided for 2008, but detailed energy consumption data were not provided for the entire time series. The previous ERT reiterated the recommendation in previous review reports that Belarus make available in the NIR the detailed and complete

energy balances for 1990–2009 in its next inventory submission in order to improve transparency. However, in the NIR of the Party's 2011 submission an energy balance was not provided for any year. The ERT noted the decrease of transparency of the NIR compared with the previous submission and strongly reiterates recommendations in previous review reports that the Party make efforts in improving the transparency of its reporting in its next inventory submission.

31. The ERT noted that emissions from most subcategories reported under energy industries and manufacturing industries and construction are not estimated at a disaggregated level in the CRF tables. The exceptions are emissions from public electricity and heat production, transport and other sectors, where subcategories are reported at the recommended level of disaggregation. The subcategories petroleum refining, manufacture of solid fuels and other energy industries and all subcategories under manufacturing industries and construction are aggregated and reported under other (manufacturing industries and construction). In the previous review reports it was recommended that Belarus disaggregate the emission estimates by subcategory, following the structure of the UNFCCC reporting guidelines, and report these accordingly in its next inventory submission. The ERT reiterates this recommendation and encourages Belarus to implement it in its next inventory submission.

32. Belarus has provided specific details of its QA/QC and verification procedures for the energy sector in the relevant parts of the NIR, as well as estimates of the uncertainties associated with the energy sector and its categories, following the IPCC good practice guidance. The ERT encourages Belarus to implement tier 2 QC procedures for the key categories in the energy sector.

2. Reference and sectoral approaches

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

33. CO₂ emissions from fuel combustion were calculated using both the reference approach and the sectoral approach. For 2009, there is a difference of 12.09 per cent in CO₂ emission estimates, with the difference for liquid fuels amounting to 23.95 per cent. The previous ERT recommended that Belarus improve the input data used for the reference approach in the CRF tables in order to enhance the completeness of the information reported. In the previous review report, the ERT noted the inconsistency in the reporting of differences between estimates made using the reference and sectoral approaches in the CRF tables and in the NIR.

34. The previous review report recommended that Belarus calculate the differences in the NIR with the calculation formula from the CRF table 1.A(c). However, this recommendation has not been implemented in the 2011 inventory and the transparency of reporting of the reference approach estimates has decreased in comparison with the previous submission. The NIR and the CRF do not provide explanatory information for the difference between the two approaches for the whole time series. The ERT, therefore, strongly recommends that Belarus investigate the reasons for the differences between the two approaches and to provide relevant explanations in its next inventory submission. It also recommends that Belarus include a description of the reference approach in the NIR in its next inventory submission. The apparent consumption in Belarus' reference approach for 2009 corresponds closely to the International Energy Agency (IEA) data. For 2009, there is a difference of 1.4 per cent in apparent consumption between the reference approach and the IEA data.

International bunker fuels

35. Emissions from jet kerosene are reported as “included elsewhere” (“IE”) in CRF table 1.A(b), and the following explanation is provided: “It is assumed, that all jet kerosene is consumed for international flights. So it is included in international bunkers”. The ERT recommends that Belarus revise the reporting of international aviation and to consider aviation bunker in the reference approach estimates in the next inventory submission.

Feedstocks and non-energy use of fuels

36. The ERT noted that emissions from feedstocks and non-energy use of naphtha, lubricants, coal oils and tars and ethane are reported as “NO” without any explanation provided in the NIR. During the review, Belarus clarified that there was an incorrect use of notation keys. The ERT recommends that Belarus revise its use of notation keys in its next inventory submission.

3. Key categories

Stationary combustion: liquid, solid and gaseous fuels – CO₂

37. The methodology for calculating CO₂ emissions from solid fuels, according to the NIR, used an EF for solid fuels based on Belarus’ data, referenced as country-specific net calorific value (NCV), and oxidation factors and carbon content of fuels from the Revised 1996 IPCC Guidelines. The ERT notes that Belarus is using the IPCC tier 1 method by applying default IPCC EFs and only country-specific NCVs. The NIR should correctly state this use of a tier 1 sectoral approach method. The ERT reiterates the recommendations of the previous review report that Belarus follow the IPCC good practice guidance for key categories and use a higher tier method, which would include obtaining a country-specific carbon content EF for solid fuels. In addition, the ERT recommends that Belarus: further explain the derivation of the country-specific NCV of solid fuels in the NIR and how an NCV measured with preliminary drying for solid fuels is most appropriate for Belarus’ national circumstances; and obtain country-specific carbon contents for solid fuels consistent with this approach to measure country-specific NCVs.

38. The fuels used by manufacturing industries and construction are not disaggregated to IPCC categories (e.g. iron and steel, chemicals, etc.). As it was noted in the previous review report, the national statistics have started to report such disaggregated data and, as noted in the current NIR, this work will finish in time for the next inventory submission. The ERT commends this effort and encourages Belarus to report disaggregated emissions data within the manufacturing industries and construction category as soon as they are available.

39. Natural gas accounts for more than 90 per cent of the total fuel used in the energy industries category and for two thirds of the total fuel used in other categories. Belarus calculates GHG emissions from natural gas combustion using the tier 1 approach. The ERT reiterates the recommendation in the previous review report that, in line with the IPCC good practice guidance, Belarus use a higher tier approach to estimate emissions from this key category.

Road transportation: liquid fuels – CO₂

40. According to the NIR, the fuels used for road transportation are not separated by type of vehicle (cars, heavy duty and light duty trucks, buses and other) for the emissions calculations. Belarus uses a tier 1 approach for the calculations with default EFs from the Revised 1996 IPCC Guidelines. The ERT reiterates the recommendation of the previous review report that Belarus use a higher tier approach to estimate emissions from this key category in line with the IPCC good practice guidance. In response to a request from the ERT, Belarus clarified that national statistics provide data on stationary and mobile fuel

combustion as a whole. Belarus assumes that most of these fuels is used for transportation needs. The ERT recommends that Belarus make efforts to obtain more detailed data on fuel combustion with disaggregation on fuel consumption for different purposes.

Fugitive emissions: oil and natural gas – CH₄

41. Data reported in tables 3.2 and 3.3 of the NIR are inconsistent with data reported in CRF table 1.B.2. The ERT noted that there are inter-annual fluctuations in fugitive emissions from oil and natural gas, the causes of which are not described in the NIR. For example, for the natural gas transportation emissions (which were reported in the NIR as distribution) there is a significant variation between 2006 and 2008. The ERT recommends that Belarus conduct detailed QC procedures to verify the AD used in the estimation and calculation of emissions from the main sources in oil and natural gas. The ERT reiterates the recommendation from the previous review report that Belarus include detailed descriptions of the oil and natural gas activities in the country, as well as of the data used in the emission estimates and, as Belarus currently uses a tier 1 method, to use a higher tier method in its next inventory submission.

42. Natural gas transit and transmission through the territory of the country is considerable (more than three times the volume of the domestic consumption), so the ERT recommends that Belarus develop and use a country-specific CH₄ EF based on the length of the transmission pipelines (as recommended by the IPCC good practice guidance) and include in its estimates fugitive and venting emissions from this activity in its next inventory submission. Fugitive emissions from natural gas transport are reported under the category other instead of transmission. The ERT recommends that Belarus transparently describe the reasons for such allocation in the NIR and in the CRF. At the same time, distribution emissions are reported as “IE” with allocation to the sub-category 1.B.2.b.iii transmission. The ERT reiterates the recommendation of the previous review report that Belarus explore ways to report emissions in the relevant CRF subcategories in order to improve the comparability of its inventory.

43. Emissions from venting of oil are reported as “IE”. Noting that Belarus is processing significant volumes of crude oil, the ERT encourages Belarus to make separate estimates of CH₄ emissions (also of CO₂, if relevant) from the venting of oil systems in its next inventory submission. The ERT further recommends that Belarus clarify its use of notation keys for the reporting of fugitive emissions and more transparently document the inclusion of subcategories in this category (e.g. the use of the notation key “IE” for oil and natural gas flaring) in both the CRF tables and the NIR.

44. In the CRF tables, Belarus reports emissions from oil transportation as “NO”. The ERT noted that Belarus reports oil imports, oil production and oil refinement. During the review, Belarus clarified that the correct notation key is “NE”. The ERT strongly recommends that Belarus estimate emissions from this category in the next inventory submission.

4. Non-key categories

Road transportation: liquid fuels – CH₄, N₂O

45. Belarus uses default CH₄ EFs from the Revised 1996 IPCC Guidelines for the road transportation calculations. The ERT noted that the EF for CH₄ for liquefied petroleum gas (LPG) in road transportation used by Belarus appears to be taken from the default EF for natural gas in table 1-7 of the Revised 1996 IPCC Guidelines (50 kg/TJ). This is not the correct EF to use for calculating CH₄ emissions from LPG use for road transportation, so the ERT reiterates the recommendation of the previous review report that Belarus revise its

approach in its next submission and instead use the appropriate LPG CH₄ EF, as listed in table 1-45 of the Revised 1996 IPCC Guidelines.

46. The N₂O EF used in the calculations for gasoline cars (0.6 kg/TJ) for the complete time series is below the IPCC default range (1–20 kg/TJ). The EF used for diesel cars (0.6 kg/TJ) for the complete time series is also below the IPCC default range (3–4 kg/TJ). These EFs may be appropriate to use for old cars without catalytic converters; however, the ERT noted that Belarus' vehicle fleet may include a significant number of new and used cars equipped with such technology. These cars have significantly higher N₂O emissions and the EFs used in the inventory may not be representative of the actual condition of the vehicle fleet. The ERT, therefore, reiterates the recommendation of the previous review report that Belarus estimate the amount of fuel combusted by vehicle type and, in particular, consider the number of vehicles equipped with catalytic converters and revise its N₂O emission estimates using appropriate N₂O EFs in its next inventory submission.

C. Industrial processes and solvent and other product use

1. Sector overview

47. In 2009, emissions from the industrial processes sector amounted to 3,996.27 Gg CO₂ eq, or 4.5 per cent of total GHG emissions. Between 1990 and 2009, emissions from the industrial processes sector increased by 9.5 per cent. The key driver for the rise in emissions is an increase in cement production (clinker) by 47.1 per cent due to growth in the construction industry, whereas production levels and emissions from two other key categories (lime production and ammonia production) decreased during the period (27.7 and 21.5 per cent, respectively). Within the industrial processes sector, 64.7 per cent of the emissions were from mineral products, followed by 33.0 per cent from the chemical industry. Metal production accounted for 1.5 per cent and 0.8 per cent came from consumption of halocarbons and SF₆. The CO₂ and N₂O emissions from the remaining categories are reported as "NA" or "NO".

48. CO₂ was the main GHG emitted by the industrial processes sector, accounting for 97.8 per cent of sectoral emissions. The contributions of CH₄, N₂O, HFCs and SF₆ were 1.3, 0.03, 0.8 and 0.07 per cent, respectively. Emissions from the solvent and other product use sector amounted to 64.06 Gg CO₂ eq, or 0.07 per cent of total GHG emissions in Belarus. Emissions from this sector decreased by 13.9 per cent between 1990 and 2009. In this sector, Belarus has estimated only the N₂O emissions from use for anesthesia and non-methane volatile organic compounds emissions from paint application, degreasing and dry cleaning, chemical products manufacture and processing.

49. Belarus has made recalculations for the industrial processes sector between the 2010 and 2011 submissions in response to the 2010 annual review report. The ERT noted that recalculations of the time series 1990–2008 have been undertaken to take into account:

- (a) The use of the tier 2 methodology to estimate CO₂ emissions from ammonia production;
- (b) Revised AD for 1997 on CO₂ emissions from ammonia production.

50. The CRF tables include estimates of almost all categories from the industrial processes and solvent and other product use sectors for which IPCC methodologies are available. Emissions have been reported for almost all gases, all years of the inventory time series, and for all geographical locations. Belarus reported emissions from soda ash production and limestone and dolomite use as "NE", due to lack of AD. The ERT reiterates the recommendation from previous review reports that, to improve the completeness of the inventory in its next submission, Belarus collect AD and estimate emissions from all

categories for which the Revised 1996 IPCC Guidelines and the IPCC good practice guidance provide methodologies and/or EFs.

51. Belarus also continues to report actual HFC emissions from refrigeration and air-conditioning equipment only and actual SF₆ emissions from electrical equipment under consumption of halocarbons and SF₆. Other subcategories and some missing species of HFCs, PFCs and SF₆ emissions from consumption of halocarbons and SF₆ are reported as “NE” due to lack of AD or “NO”. The ERT reiterates the recommendation from previous review reports that Belarus strengthen its efforts to collect AD and estimate emissions for the missing subcategories under consumption of halocarbons and SF₆.

52. Belarus has provided some justifications in the NIR for the assumptions made and the choice of AD, EFs and methods used for key categories. However, the ERT noted the lack of transparency in the NIR, because information and explanations for non-key categories were reported all together under the section other production. The CRF tables and the NIR did not provide sufficient information to enable the ERT to assess the data used and the methodologies applied. The ERT reiterates the recommendation from previous review reports that Belarus improve the overall transparency of the inventory by including clear and concise information in its NIR on methods, EFs and AD used, as well as other additional information, in order to fully adhere to the requirements of the UNFCCC reporting guidelines, in its next inventory submission.

53. Emissions from ferroalloys production were reported as “NE” because of lack of AD. However, ferroalloys are imported from the Russian Federation and Ukraine. Thus the notation key “NO” should be used for ferro-alloys. The ERT reiterates the recommendation from the previous review report that Belarus clarify all industrial activities in the country and make proper use of notation keys and documentation boxes in the CRF tables and corresponding NIR chapters in its next inventory submission.

54. The NIR provided information on overall uncertainties for the AD of key categories only. No further discussion of the uncertainties of EFs is provided, although IPCC default EFs were mainly used. The ERT reiterates the recommendation from the previous review report that Belarus estimate uncertainties more thoroughly and follow closely the UNFCCC reporting guidelines when providing information on uncertainties for the sector.

55. Very limited information is provided in the sectoral chapter on the QA/QC procedures applied to individual categories of the industrial processes sector. The ERT recommends that Belarus report more detailed information on this in the NIR of its next inventory submission, in particular for the key categories, as well as information on any external reviews undertaken and/or planned to be conducted for the industrial processes sector and key findings on the quality checks of the AD and methods used.

2. Key categories

Cement production – CO₂

56. Belarus used the IPCC tier 2 methodology, using clinker production volumes as AD and the default calcium oxide (CaO) content and correction factor for Cement Kiln Dust, to estimate emissions. In the NIR, Belarus stated that it intends to collect and use plant-specific data from three existing producing plants. The ERT encourages Belarus to strengthen its efforts in collecting plant-specific AD and EFs and to report on this in its next inventory submission, and also recalculate CO₂ emissions for the complete time series to improve the accuracy of the estimates in this category.

Lime production – CO₂

57. Emissions were calculated using the IPCC tier 2 method and default EFs for the entire time series (0.75 t/t for high-calcium quicklime and 0.86 t/t for dolomitic lime). However, the CRF tables provide an implied emission factor (IEF) equal to 0.74 t/t, which is lower than those referred to in the explanations provided in the NIR. During the previous review Belarus confirmed that it included total lime production as AD, although emissions were estimated using a default 0.97 correction factor for hydrated lime, as recommended in the IPCC good practice guidance. Using corrected AD, the IEF appeared to be correct (0.77 t/t). The ERT recommends that Belarus correct this value in its next inventory submission. The ERT reiterates the recommendation from previous review reports that Belarus collect country-specific data on the proportion of quicklime and dolomitic lime production and use these in estimating emissions from this category to improve the accuracy of the estimates in its next inventory submission.

Ammonia production – CO₂

58. Belarus estimated emissions using a tier 2 methodology based on natural gas consumption for the entire time series. However, the description of the methodology, AD and EFs used is not presented in a clear and transparent way in the NIR. The ERT reiterates the recommendation from previous review reports that, in its next inventory submission, Belarus obtain plant-specific data on the carbon content of natural gas used for ammonia production to improve the accuracy of estimates and perform a cross-check of natural gas consumption with the energy sector to avoid double counting. The ERT also recommends that Belarus improve the transparency of its reporting of the methodology, AD and EFs used for calculating the emissions.

D. Agriculture

1. Sector overview

59. In 2009, emissions from the agriculture sector amounted to 22,788.48 Gg CO₂ eq, or 25.9 per cent of total GHG emissions. Since 1990, emissions have decreased by 25.7 per cent. The key drivers for the fall in emissions are a reduction in livestock population and a decrease in the use of synthetic fertilizers. Within the sector, 60.9 per cent of the emissions were from agricultural soils, followed by 28.2 per cent from enteric fermentation and 10.9 per cent from manure management.

60. The inventory is complete in terms of categories, gases, geographical coverage and years. Belarus has implemented higher tier methods to estimate emissions from enteric fermentation of dairy and non-dairy cattle and emissions from manure management of dairy and non-dairy cattle and swine. Belarus has estimated emission from fur animal and rabbits for the first time in the 2011 submission. The ERT welcomes the efforts made by the Party to improve the inventory and encourages Belarus to continue the improvements in this area.

61. Belarus does not cultivate rice, and this activity and the prescribed burning of savannas are reported as “NO” in the country. Field burning of agricultural residues is prohibited by law in Belarus and is also reported as “NO”.

62. In general, the descriptions of AD, EFs and methodologies used provided in the NIR are transparent. However, further improvements could be made in describing the methodologies used (in particular higher tier methods) and the selection of EFs including the provision of references, especially when EFs are based on expert judgement.

63. The uncertainty analysis for the agriculture sector was conducted in accordance with the tier 1 methodology described in the IPCC good practice guidance. However, the

references to uncertainty rates for individual AD and EFs are not provided in the NIR. The ERT recommends that Belarus provide detailed descriptions of references to the uncertainty rates for AD and EFs in its next inventory submission.

64. Belarus has made recalculations for the agriculture sector between the 2010 and 2011 submissions following changes in AD and EFs and due to the use of higher tier methodologies. The impact of these recalculations on the agriculture sector is a decrease in emissions of 2.1 per cent for 2008. The main recalculations took place in the following categories:

- (a) Enteric fermentation;
- (b) Manure management;
- (c) Cultivation of organic soils.

2. Key categories

Enteric fermentation – CH₄

65. Belarus used a tier 2 method to estimate emissions from enteric fermentation of dairy and non-dairy cattle. A tier 1 method was used to estimate emissions from other categories of livestock. CH₄ emissions from fur animals and rabbits were estimated for the first time in the 2011 submission. The ERT welcomes the improvements made since the last inventory submission and encourages Belarus to continue with these improvements in order to implement higher tier methods.

66. The ERT noted that the milk-fed calves were not excluded from the enteric fermentation calculations. The ERT recommends that Belarus apply a CH₄ conversion rate of zero to calves for the period when they are milk-fed.

67. The ERT noted that the same feed digestibility and CH₄ conversion coefficients were used for all categories of non-dairy cattle (i.e. 60 per cent and 6 per cent, respectively). However, Belarus does not provide references for the parameters used. The ERT recommends that Belarus improve the transparency of its reporting by including references to all parameters used in the calculations.

68. The NIR includes CH₄ EFs for enteric fermentation of non-dairy cattle for the entire time series, which are aggregated for all categories. The ERT recommends that Belarus report separately the CH₄ EF for each category of non-dairy cattle in order to improve the transparency of the inventory.

69. Belarus selected the IPCC default EFs for sheep and swine that are recommended for Western Europe, but there is no additional information in the NIR explaining whether these EFs are more suited to the country than the EFs of Eastern Europe. The ERT reiterates the recommendation from the previous review report that Belarus provide more information on the selection of EFs for these livestock categories.

70. The ERT found several inconsistencies in the notation keys used. For example, Belarus uses “NE” for the weight of non-dairy cattle and for the ratio of non-dairy cattle that give birth, while the NIR contains information on these parameters. The ERT recommends that Belarus correct the use of notation keys

Manure management – CH₄, N₂O

71. Belarus used a tier 2 method to estimate emissions from manure management of cattle and swine. A tier 1 method was used for other livestock categories. The ERT welcomes the improvements made since the last submission and encourages Belarus to continue with its efforts to implement higher tier methods.

72. The ERT noted that the data and information used in the calculations were not transparently presented in the NIR (e.g. which data were used to estimate the generation of manure in dry matter by categories of cattle and swine). The ERT recommends that Belarus include additional information in its next inventory submission.

73. The ERT noted that the NIR did not provide references on the allocation of manure managed among different manure management systems. The ERT recommends that Belarus report such references and include the further information on the manure management system in Belarus for the entire time series in its next inventory submission.

74. The ERT noted an inconsistency in the notation keys used. For example, Belarus used the notation key “NE” to report the split in manure generated by non-dairy cattle and swine and managed in different systems in CRF table 4.B(a). The ERT recommends that, in its next inventory submission, Belarus use weighted-average values of manure generated by non-dairy cattle and swine, which are managed in different manure systems.

Agricultural soils – N₂O

75. The tier 1a and tier 1b methodologies with IPCC default EFs were used to estimate emissions from this category.

76. The NIR reports that AD for cultivation of organic soils have been updated for the entire time series. However, it is still not clear how data obtained from sources other than the national statistics have been used for the estimation of N₂O emissions. Updated areas of cultivated organic soils are higher for the entire time series than those reported in the 2010 submission, but the differences and the reliability of these data are not explained in the NIR. The ERT reiterates the recommendations of the previous review report that Belarus provide relevant explanations for the differences and reliability of data used on the area of cultivation of organic soils in the NIR of its next inventory submission.

E. Land use, land-use change and forestry

1. Sector overview

77. In 2009, net removals from the LULUCF sector amounted to 30,043.54 Gg CO₂ eq. Since 1990, net removals have increased by 5.1 per cent. The key driver for this increase is the increase in forest areas. Within the sector, removals of 30,020.91 Gg were from forest land and emissions of 60.04 Gg were from perennial cropland. The remaining removals of 37.41 Gg were from peatland extraction. The sector constitutes an offset of 34.2 per cent of the total GHG emissions in 2009.

78. Carbon stock changes in the following pools have not been estimated: soil organic matter in cropland and grassland; living biomass, dead organic matter and soil organic matter for each conversion subcategory of forest land to other land uses; and soil organic matter for conversion of other land uses to forest land, cropland and grassland. Carbon stock changes for organic soils in forest land have been reported in the NIR but not reported in the CRF tables. An uncertainty analysis has not been performed in a way consistent with the IPCC good practice guidance for LULUCF. The ERT recommends that Belarus provide in the NIR, and in the CRF tables, information on estimates of carbon stock changes and other emissions for all mandatory categories. Furthermore, the ERT recommends that Belarus provide a consistent uncertainty analysis for each estimated category.

79. Belarus has reported in NIR table 7-2 a time series (1990, 2000, 2005 and 2008–2009) of AD of land-use categories. However, the data time series reported in the CRF tables does not correspond with that provided in the NIR, with the exception of grassland. Indeed, for the year 2009: forest land area reported in the NIR (table 7-2) is 8,538.70 kha

while in the CRF tables it is 7,964.60 kha; for cropland the NIR reports 5,663.80 kha compared with 1,379.20 kha in the CRF tables; for wetlands the comparable data are 889.60 kha versus 13.67 kha; for settlements 484.90 kha versus no reporting in the CRF tables; and for other land the NIR has 532.40 kha compared with no reporting in CRF tables. Moreover, the total area reported in the CRF tables changes annually being, for example, 11,576.70 kha in 1990 and 12,620.57 kha in 2009. The ERT recommends that Belarus provide a consistent and accurate time series of annual land use and land-use change matrices which cover the whole national territory and all land use and land-use categories and subcategories and to ensure full correspondence between the data reported in the NIR and in the CRF tables.

2. Key categories

Forest land remaining forest land – CO₂

80. Belarus applied the default method of the IPCC good practice guidance for LULUCF to estimate emissions and removals from living biomass by using country-specific data. However, information on how those carbon stock change factors have been derived is not provided. The ERT recommends that Belarus improve the transparency of its reporting by providing information on the data used to derive country-specific carbon stock change factors.

3. Non-key categories

Land converted to forest land – CO₂ and N₂O

81. In the NIR, Belarus provided estimates of emissions from wetlands converted to forest land following drainage and reported increasing emissions of CO₂ and N₂O from 1990 to 2009. The emissions of both gases had increased by 415 per cent since 1990 but Belarus did not include these estimates in the CRF tables. The ERT recommends that Belarus continue its efforts to provide transparent information and to include the estimates in the CRF tables.

F. Waste

1. Sector overview

82. In 2009, emissions from the waste sector amounted to 6,205.10 Gg CO₂ eq, or 7.1 per cent of total GHG emissions. Since 1990, emissions have increased by 141.0 per cent. The key driver for the rise in emissions is the increase of solid waste disposal on land due to economic growth and an increase in the consumption level of the population, as well as due to improvements to the national waste accounting system. Within the sector, 90.0 per cent of the sectoral emissions were CH₄ emissions from solid waste disposal on land and the remaining 10.0 per cent were N₂O emissions from human sewage under wastewater handling. The ERT noted that no significant improvements have been made in the 2011 submission since the previous submission.

83. CH₄ emissions from wastewater handling are reported as “NE”, as well as N₂O emissions from industrial wastewater and domestic and commercial wastewater. CH₄ emissions from managed solid waste disposal on land are reported as “NO”, implying that all landfills are unmanaged; and all GHG emissions from waste incineration are reported as “NO”, although the NIR reports on some industrial plants that are incinerating waste. The ERT reiterates the recommendation of the previous review report that Belarus enhance its efforts to estimate those emissions not currently estimated in its next inventory submission.

84. The methodologies and assumptions used for estimating emissions from the waste sector are described in the NIR, but almost all cells in the tables with additional background data in the CRF are reported as “NE”. The use of the notation key “NO” for waste incineration is not explained in the NIR. The ERT reiterates the recommendation of the previous review report that Belarus provide the missing information and an explanation for the use of all notation keys in the NIR of its next inventory submission.

85. Data verification procedures have been applied and general QA/QC procedures have been performed in the sector. Category-specific QA/QC has been carried out for CH₄ emissions from solid waste disposal on land as key category. The ERT encourages Belarus to continue with further improvements to the GHG inventory for the waste sector, such as using the tier 2 method for solid waste disposal on land, apply the IPCC GPG value for a fraction of degradable organic carbon DOC_F (see paragraph 87 below), and provide relevant background information on waste management practices in Belarus, in its next inventory submission.

2. Key categories

Solid waste disposal on land – CH₄

86. CH₄ emissions from solid waste disposal on land amounted to 5,994.84 Gg CO₂ eq in 2009. Belarus has defined all solid waste disposal sites (SWDS) in the country as unmanaged for the complete time series because of the absence of control of scavenging at the landfills. In the previous review report it was recommended that Belarus reconsider the current classification of SWDS, and use for its estimates country-specific data based on all available statistical data and results from research available in the country. Although the IPCC tier 2 method is described in the NIR, Belarus continued to use the IPCC tier 1 method for estimating emissions from this category. The ERT reiterates the recommendation of the previous review report that Belarus reconsider the current classification of SWDS and that it is good practice to apply the tier 2 method (first order decay) for this key category and strongly recommends that Belarus make efforts to apply this higher tier for its CH₄ estimates in its next inventory submission.

87. The ERT noted that Belarus used the DOC_F value (0.77) from the Revised 1996 IPCC Guidelines, which may lead to an overestimation of CH₄ emissions from this category. The ERT recommends that the Party replace it with a value in the range recommended by the IPCC good practice guidance (0.5–0.6)

88. Background information on waste management is described in the NIR, providing an overview of the situation in Belarus. However, there is some inconsistency between the NIR and the CRF tables. The NIR states that 90 per cent of waste is disposed at SWDS, but in CRF table 6.A the fraction of waste disposed at SWDS is equal to 1. The NIR does not contain any references to AD for municipal solid waste disposed at SWDS and for industrial waste management (i.e. it is not clear whether industrial waste is treated or disposed at SWDS). The ERT recommends that Belarus include the relevant explanations and information about municipal and industrial waste disposal in its next inventory submission.

3. Non-key categories

Wastewater handling – CH₄ and N₂O

89. CH₄ emissions from industrial, domestic and commercial wastewater handling are reported as “NE”. Belarus explained in the NIR that the basic way of treating domestic and industrial sewage in the country is biological under aerobic conditions. However, the IPCC good practice guidance notes that, in developing countries, a small share of domestic

wastewater is collected in sewer systems, with the remainder ending up in pits or latrines. The ERT noted that countries with similar economical and geographical conditions (e.g. Czech Republic and Ukraine) considered that an amount ranging from 15–30 per cent of wastewater is treated in anaerobic conditions. The ERT reiterates the recommendation of the previous review report that Belarus use all available statistical data and results from research in the country, which indicate that a small amount of anaerobic wastewater treatment exists, and report emissions from industrial, domestic and commercial wastewater handling in its next inventory submission.

90. According to the NIR, Belarus reports that sludge from wastewater treatment plants are disposed at SWDS. However, CRF table 6.B does not contain any references about sludge and the notation key “NE” is used for its reporting. The ERT reiterates the recommendation of the previous review report that Belarus provide relevant explanations on the above-mentioned issue and use the notation key “IE” in its next inventory submission.

91. Emissions of N₂O from human sewage were estimated following the methodology from the Revised 1996 IPCC Guidelines. The country-specific parameters are taken from official statistical sources. The N₂O emissions fluctuated throughout the years 1990–2009. Emission for the years 2007–2008 had been recalculated based on updated data on protein consumption and population number. Following a recommendation from previous review reports Belarus explained that this trend reflects the economic situation within the country and changes in protein consumption during the reporting period. The ERT welcomes the Party’s effort.

Waste incineration – CO₂ and N₂O

92. AD and corresponding emissions are reported as “NO” in the CRF tables, although the NIR reports that some industrial plants in the country are incinerating waste. The ERT reiterates the recommendation of the previous review report that Belarus describe in the NIR the situation of waste incineration in the country and estimate GHG emissions from this category in its next inventory submission.

III. Conclusions and recommendations

93. Belarus submitted a complete set of CRF tables for the years 1990–2009 on 15 April 2011 and its NIR on 17 May 2011. Belarus resubmitted its CRF tables on 17 May 2011. The ERT strongly recommends that Belarus submit its next inventory in accordance with the timelines agreed by the Conference of the Parties to the UNFCCC.

94. The ERT concludes that, in general, the inventory submission of Belarus has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete in terms of geographical coverage, years and sectors, but not complete in terms of categories and gases. Some of the categories were reported as “NE”, particularly: the industrial processes sector (CO₂ emissions from limestone and dolomite use; CO₂ emissions from soda ash production; HFC (most of the subcategories) and PFC emissions from consumption of halocarbons and SF₆); the waste sector (CH₄ and N₂O emissions from industrial wastewater; CH₄ and N₂O emissions from domestic and commercial wastewater; CO₂ and N₂O emissions from waste incineration (reported as “NO”); and the LULUCF sector (CO₂, CH₄ and N₂O emissions and removals from land converted to other land (except CO₂ forest land converted to other land) and CO₂ emissions and removals from grassland remaining grassland). The ERT recommends that Belarus provide estimates for these categories in its next inventory submission, in order to improve completeness.

95. Belarus' inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT noted that lower tiers and default EFs are applied for most key categories. Some of the EFs applied are taken from the Revised 1996 IPCC Guidelines even though updated values are provided in the IPCC good practice guidance. The ERT further noted that, in its 2011 submission, Belarus undertook a number of recalculations, particularly in the agriculture and LULUCF sectors, to improve its estimates using country-specific EFs and a higher tier approach. The ERT commends Belarus for the efforts made.

96. The institutional arrangements implemented by Belarus for the preparation of the inventory in general continue to perform its required functions. However, the ERT found that the descriptions of the institutional arrangements provided in the NIR need to be improved in relation to the legal responsibilities of ministries and private companies involved in the inventory management.

97. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the inventory submission, transparency and accuracy of the information presented in Belarus' inventory submission. The key recommendations are that Belarus:

(a) Improve the descriptions of the institutional arrangements and QA/QC procedures, including the independent review reports and the results of their implementation in the NIR;

(b) Ensure the inclusion in its next inventory submission of emissions for categories currently reported as "NE" and for which methods and/or EFs are provided in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and/or the IPCC good practice guidance for LULUCF. If emissions for a given category cannot be estimated, Belarus should provide sufficient explanation in the NIR as to why such an estimate cannot be made;

(c) Improve the transparency of the descriptions of data collection activities, methods, EFs, uncertainty values and AD, particularly in the energy, industrial processes and waste sectors;

(d) Improve the descriptions and rationale of the recalculations made and time-series consistency of GHG emission estimates;

(e) Improve the reporting in the LULUCF sector, by including detailed information on land areas and uses, EFs and parameters used in the estimates and a matrix of land conversions to ensure the consistent representation of areas of land-use categories;

(f) Enhance the accuracy of the GHG inventory by implementing higher tier methods and developing country-specific EFs for key categories;

(g) Improve the consistency of the reporting between the NIR and the CRF tables;

(h) Improve the uncertainty analysis by using documented country-specific uncertainty values and, if necessary, using correct default values.

Annex I

Documents and information used during the review

A. Reference documents

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

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

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

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

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Status report for Belarus 2011. Available at <http://unfccc.int/resource/docs/2011/asr/blr.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011. Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/BLR. Report of the individual review of the greenhouse gas inventory of Belarus submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/arr/blr.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Evgeniya Bertosh, Ms. Kristina Gonchar, Mr. Ivan Narkevitch (Belarus Scientific Research Centre “Ecology), including additional material on the methodology and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
DOC _F	a fraction of degradable organic carbon
EF	emission factor
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 and SF ₆ without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
NA	not applicable
NCV	net calorific values
N ₂ O	nitrous oxide
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SF ₆	sulphur hexafluoride
SWDS	solid waste disposal sites
UNFCCC	United Nations Framework Convention on Climate Change
