United Nations FCCC/ARR/2011/RUS

Framework Convention on Climate Change

Distr.: General
18 October 2012

English only

Report of the individual review of the annual submission of the Russian Federation 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. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of the Russian Federation, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. 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 (Brazil); agriculture – Ms. Olga Gavrilova (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. Stylianos Pesmajoglou and Ms. Ruta Bubniene (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of the Russian Federation, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.[1]

B. Emission profiles and trends

3. In 2009, the main greenhouse gas (GHG) in the Russian Federation was carbon dioxide (CO_2), accounting for 71.8 per cent of total GHG emissions[2] expressed in CO_2 eq, followed by methane (CH_4) (22.4 per cent) and nitrous oxide (N_2O) (5.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.6 per cent of the overall GHG emissions in the country. The energy sector accounted for 82.4 per cent of total GHG emissions, followed by the industrial processes sector (7.4 per cent), the agriculture sector (6.7 per cent), the waste sector (3.4 per cent) and the solvent and other product use sector (0.03 per cent). Total GHG emissions amounted to 2,127,354.39 Gg CO_2 eq and decreased by 36.9 per cent between the base year[3] and 2009. The trend is reasonable and reflects the structural and economic changes that have taken place since the break-up of the Soviet Union in the early 1990s.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

[1] A draft version of this report was communicated to the Government of the Russian Federation on 24 July 2012.

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[3] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	2 498 677.80	2 498 677.80	1 572 674.25	1 471 352.52	1 524 799.93	1 578 915.29	1 609 205.18	1 526 778.26	–38.9
		CH_4	609 552.90	609 552.90	472 174.41	445 519.25	484 711.45	501 404.83	503 780.92	475 800.88	–21.9
		N_2O	219 771.60	219 771.60	140 600.66	108 650.85	104 239.00	106 495.61	111 205.52	111 061.04	–49.5
		HFCs	28 409.78	28 409.78	12 227.45	21 132.04	15 685.03	13 831.25	14 726.82	10 473.88	–63.1
		PFCs	11 680.24	11 680.24	10 019.27	7 298.60	4 722.14	3 798.36	3 728.40	2 449.71	–79.0
		SF_6	1 202.49	1 202.49	416.27	696.52	1 340.04	1 391.46	830.88	790.63	–34.3
KP-LULUCF	Article 3.3[b]	CO_2							18 245.68	14 952.70	
		CH_4							39.61	39.67	
		N_2O							32.35	32.39	
	Article 3.4[c]	CO_2	NA						–494 238.60	–555 888.87	NA
		CH_4	NA						10 906.15	11 620.25	NA
		N_2O	NA						9 117.73	9 700.87	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	2 735 304.58	2 735 304.58	1 793 032.74	1 682 752.93	1 754 347.42	1 807 655.21	1 849 579.66	1 752 865.83	–35.9
		Industrial processes	257 523.35	257 523.35	154 361.68	166 765.77	178 773.87	191 003.73	180 694.40	158 246.56	–38.6
		Solvent and other product use	561.61	561.61	511.68	522.89	531.90	541.40	543.67	557.59	–0.7
		Agriculture	317 286.52	317 286.52	210 156.50	149 062.33	136 811.98	137 658.59	142 831.88	142 372.04	–55.1
		Waste	58 618.76	58 618.76	50 049.71	55 545.84	65 032.41	68 977.86	69 828.10	73 312.37	25.1
		LULUCF	NA	80 286.40	–224 968.92	–461 338.59	–537 518.87	–561 331.05	–592 466.62	–649 598.39	NA
		Total (with LULUCF)	**NA**	**3 449 581.22**	**1 983 143.39**	**1 593 311.17**	**1 597 978.71**	**1 644 505.73**	**1 651 011.09**	**1 477 756.00**	**NA**
		Total (without LULUCF)	**3 369 294.82**	**3 369 294.82**	**2 208 112.31**	**2 054 649.77**	**2 135 497.58**	**2 205 836.79**	**2 243 477.72**	**2 127 354.39**	**–36.9**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation							–4 250.35	–4 260.78	
		Deforestation							22 567.99	19 285.55	
		Total (3.3)							**18 317.64**	**15 024.76**	
	Article 3.4[d]	Forest management							–474 214.72	–534 567.75	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**–474 214.72**	**–534 567.75**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in the national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 3
Information to be included in the compilation and accounting database in tonnes of carbon dioxide equivalent

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	10 796 350 900			10 636 771 965	
Annex A emissions for current inventory year					
CO_2	1 526 871 603	1 526 778 259		1 526 778 259	
CH_4	507 585 699	475 800 881		475 800 881	
N_2O	111 098 662	111 061 038		111 061 038	
HFCs	10 473 878			10 473 878	
PFCs	2 449 708			2 449 708	
SF_6	790 630			790 630	
Total Annex A sources				**2 127 354 393**	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–4 103 710	–4 260 783		–4 260 783	–4 260 783
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA	NA		NA	
3.3 Deforestation for current year of commitment period as reported	19 285 548			19 285 548	19 285 548
Activities under Article 3, paragraph 4, for current inventory year[d]					
Forest management for current year of commitment period	-538 359 793	–534 567 752		–534 567 752	–534 567 752
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period					
3.4 Revegetation in base year					

Abbreviation: NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2011 annual inventory submission was submitted on 14 April 2011. It contains a complete set of common reporting format (CRF) tables for the period 1990–2009 and a national inventory report (NIR). The Party resubmitted the CRF tables and the NIR on 21 August 2011. The Russian Federation also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 14 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1.

7. The Russian Federation officially submitted revised emission estimates on 24 October 2011 in response to questions raised by the expert review team (ERT) during the review. The values used in this report are based on the values contained in the submission of 24 October 2011.

8. Where necessary, the ERT also used the previous year's submission during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[4]

9. During the review, the Russian Federation provided the ERT with additional information and documents, which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

10. The Russian Federation submitted the CRF tables for the years 1990–2009 and the NIR. In general, the inventory is complete in terms of years, gases, sectors, categories and geographical coverage. The ERT commends the Party for having estimated previously non-estimated emissions, as recommended in the previous review report. However, the ERT notes that the inventory is still lacking in completeness. The ERT identified missing emissions from some categories in the energy sector for which the Party provided estimates during the review. In addition, estimates from some sink categories in the LULUCF sector are not provided. Specifically, emissions reported as not estimated ("NE") relate to carbon stock changes in grassland remaining grassland (for unmanaged grasslands), land converted to wetlands, and cropland converted to settlements. The ERT recommends that the Russian Federation provide the estimates for the remaining mandatory categories reported as "NE" in its future annual submissions. The ERT also reiterates its recommendation from the previous review report to include information on recalculations in CRF table 8(b).

[4] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

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

Overview

11. The ERT concluded that the national system continues to perform its required functions. The institutional arrangements and national system are described in the NIR.

Inventory planning

12. The NIR describes the national system and institutional arrangements for the preparation of the inventory. Roshydromet has overall responsibility for the national inventory. The Institute of Global Climate and Ecology (IGCE) of Roshydromet (part of which is the Russian Academy of Science) is responsible for the preparation and management of the inventory, including the collection and storage of activity data (AD), the estimation of emissions and removals for all sectors of the inventory and the compilation of the NIR and the CRF tables. The national system also encompasses the Russian Federal Service for State Statistics (Rosstat) as well as other agencies that provide data in response to the receipt of information requests and relevant government ministries, which provide support by, for example, reviewing the NIR every year.

13. Roshydromet held an inter-institutional meeting on improving the national system in November 2010. The purpose of the meeting was to strengthen the inter-institutional cooperation in order to enable the Party to meet its national inventory reporting requirements under the Kyoto Protocol and any future requirements or commitments in the area of national GHG inventories. The outcome of that meeting was presented to the ERT in response to a question raised by the ERT during the review. The ERT welcomes and encourages the implementation of the procedures mentioned in the document provided by the Party, which will enhance cooperation among institutions, relevant ministries and government agencies under the national system in order to ensure an accurate, transparent and complete national GHG inventory.

14. The inventory team of the Russian Federation consists of about 10 experts at IGCE and one external expert, who also has additional responsibilities, such as providing support to climate change negotiations or participating in related research activities. The experts at IGCE spend approximately two thirds of their time working on the GHG inventory. The sectoral experts within the team are responsible for the calculation of emission estimates and the development of methodologies for their respective sectors under the supervision of their head of department. Each year, when the new inventory cycle starts, these experts discuss possible inventory improvements and their implementation with the inventory manager and the inventory team.

15. Rosstat and other agencies prepare comprehensive statistics in several areas for all sectors, which are used in the inventory preparation process. The statistical data are usually published at the national level, while regional data are also available in many cases (e.g. regional statistics on livestock population and the feeding situation under the agriculture sector, and disaggregated data, such as land-area data and data disaggregated by tree species, which are used to estimate emissions and removals under the LULUCF sector). The ERT welcomes the improvements made by the Party to disaggregate the data for the agriculture sector since the previous inventory submission. However, in most cases, the availability of regional disaggregated data is limited. As the area of the country is large and covers a number of climatic regions and conditions, the availability of regional data can have an impact on the level of emissions and removals. The ERT reiterates the encouragement of the previous review report that the Russian Federation explore ways to use more disaggregated data in the inventory in areas, in particular where this could have an impact on the accuracy of the emission and removal estimates (e.g. data on land-use changes for reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol).

16. The planned improvements for the next cycle of the national inventory are outlined under the relevant sectoral chapters of the NIR. The ERT encourages the Party to provide consolidated information on the implementation of all planned improvements in its future inventory submissions.

Inventory preparation

Key categories

17. The Russian Federation has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 submission. The key category analysis performed by the Party and that performed by the secretariat[5] produced similar results; any remaining differences are due to the different ways in which the categories have been split. The Russian Federation has included the LULUCF sector in its key category analysis, which was performed 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 the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (hereinafter referred to as the IPCC good practice guidance for LULUCF). The results of the key category analysis are a driving factor for the preparation of the inventory, particularly in the prioritization of resources and the choice of methodological complexity. In order to further enhance the usefulness of the key category analysis in improving the accuracy of the emission estimates, the ERT encourages the Party to prepare a tier 2 key category analysis, if possible.

18. The Russian Federation has identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Uncertainties

19. The Russian Federation has reported a tier 1 uncertainty analysis; some uncertainty estimates reported in the NIR for the agriculture and LULUCF sectors are the result of a tier 2 uncertainty analysis. The overall uncertainty of the Party's inventory is 9.6 per cent for 2009 (compared to 40.3 per cent in the 2009 submission for 2007 and 9.0 per cent in the 2010 submission for 2008). The trend uncertainty for the period 1990–2009 is 5.6 per cent. The uncertainty rates used are explained in detail in the relevant chapters of the NIR.

Recalculations and time-series consistency

20. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that the recalculations reported by the Party for the years 1990–2009 have been undertaken to take into account changes in AD and methods in all sectors. The effect of the recalculations on estimated total GHG emissions excluding the LULUCF sector is a 0.5 per cent increase for 1990 and a 0.2 per cent increase for 2008, while the effect including the LULUCF sector is a 1.0 per cent increase for 1990 and a 3.0 per cent increase for 2008. The major changes are attributable to methodological changes in the LULUCF sector in the forest land and cropland categories.

21. The rationale for the recalculations is provided in the sector chapters of the NIR and in CRF table 8(b).

[5] 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.

Verification and quality assurance/quality control approaches

22. The Russian Federation has developed a quality assurance/quality control (QA/QC) plan, which is included in the NIR. The plan includes a timetable for the implementation of the QA/QC procedures, descriptions of the quality checks and checklists of the tier 1 QC checks. The QA/QC procedures are undertaken in accordance with a regulation developed by Roshydromet, which establishes a time frame for the implementation of the procedures and a list of activities that need to be performed. QA/QC procedures are performed by IGCE and the other ministries and agencies, which are part of the national system.

23. Experts from governmental agencies and institutions involved in the national system, who did not participate in the preparation of the inventory but have experience in the area of GHG emissions accounting, are invited to undertake QA activities for the national inventory. Due to the high cost associated with the annual implementation of high tier QC checks for the complete inventory, the Russian Federation undertakes a tier 2 QC check every two to three years. The ERT encourages the Party to continue its efforts to improve the QA/QC procedures.

24. Detailed information on the sector-specific QA/QC activities performed is provided in the relevant chapters of the NIR.

Transparency

25. The NIR provides most of the information necessary to assess the inventory data. However, as was referred to in the previous review report, additional information is needed in order to improve the transparency of the NIR, in particular: the provision of detailed data and the assumptions used to estimate country-specific emission factors (EFs) in the energy sector; and the provision of more detailed descriptions of the AD, methods, EFs and other parameters used for the LULUCF sector (see paras. 35, 37 and 108 below). These issues and further examples of improvements will be covered in the relevant sector chapters of this report. In addition, the Party does not always follow the annotated outline of the NIR, including reporting elements under the Kyoto Protocol. The ERT reiterates the recommendation of the previous review report that the Party provide more transparent information on the AD, methods, EFs and other parameters used, in particular for the energy and LULUCF sectors and that it improve the use of the notation keys. In addition, the ERT encourages the Russian Federation to follow more closely the annotated outline of the NIR. A more transparent NIR will facilitate future reviews.

Inventory management

26. The Russian Federation 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, documentation on annual key categories and key category identification, and planned inventory improvements.

3. Follow-up to previous reviews

27. In response to previous reviews, the Russian Federation has made the following major improvements:

(a) The completeness of all sectors of the inventory has been improved (e.g. CH_4 and N_2O emissions from the use of blast furnace gas were estimated and explanations were provided for the recalculated categories under CRF tables 8(b) and 9);

(b) Recalculations have been performed for the energy, agriculture and waste sectors for the entire time series;

(c) A general QA/QC plan and corresponding schedule for its implementation have been reported.

4. Areas for further improvement

Identified by the Party

28. The 2011 NIR identifies several areas for improvement, in particular:

(a) The development of country-specific values for the carbon stored in non-energy fuel use (in the energy sector);

(b) The accounting of CO_2 emissions from the use of magnesite for the manufacture of refractory products (in the industrial processes sector);

(c) The development of country-specific data on forest disturbance (harvestings and destructive forest fires) levels from forest management statistics;

(d) The estimation of a carbon budget by region.

Identified by the expert review team

29. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 159 below.

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

B. Energy

1. Sector overview

31. The energy sector is the main sector in the GHG inventory of the Russian Federation. In 2009, emissions from the energy sector amounted to 1,752,865.83 CO_2 eq, or 82.4 per cent of total GHG emissions. Since 1990, emissions have decreased by 35.9 per cent. The key drivers for the fall in emissions are: the decline in economic activity in the country between 1990 and 1998, resulting in lower overall fuel demand and thus a decrease in related oil and natural gas operations and fuel combustion; and the significant change in the overall fuel mix (an increase in the share of natural gas and a decrease in the shares of oil and coal), resulting in a less carbon-intensive fuel combustion. Within the sector, 49.9 per cent of the emissions were from energy industries, followed by 18.5 per cent from oil and natural gas, 11.5 per cent from transport and 8.2 per cent from other sectors. Manufacturing industries and construction accounted for 7.6 per cent and fugitive emissions from solid fuels accounted for 2.7 per cent. The remaining 1.6 per cent was from the category other.

32. The Russian Federation has made recalculations for the energy sector between the 2010 and 2011 submissions in response to the 2010 annual review report and following changes in AD and EFs. The impact of these recalculations on the energy sector is a decrease in emissions of 0.7 per cent for 2008. The main recalculations took place in the following categories:

(a) CH_4 fugitive emissions from solid fuels;

(b) CO_2 and CH_4 fugitive emissions from oil and natural gas;

(c) CO_2 emissions from energy industries.

33. The ERT found that the inventory of emissions from the energy sector of the Russian Federation was not complete in its submission of 21 August 2011, since some

categories are reported as "NE" for which methodologies are provided in the IPCC good practice guidance, such as CO_2, CH_4 and N_2O emissions from natural gas exploration. In addition, for the category 1.B.2 fugitive emissions from oil only emissions from the servicing of oil-producing wells were estimated, even though the IPCC good practice guidance provides CH_4 and CO_2 EFs for well drilling, and CH_4, CO_2 and N_2O EFs for well testing. In response to the list of potential problems and further questions, the Russian Federation obtained appropriate AD and subsequently provided the ERT with revised emission estimates. The ERT agreed with these estimates and strongly recommends that the Party include, in the NIR of its future annual submissions, appropriate explanations for the sources of AD, the assumptions made and the methodologies used to estimate emissions from oil and natural gas exploration.

34. In the previous review report it was noted that the Party reports emissions of CH_4 and N_2O from solid and gaseous fuels from national navigation as "NE". This was confirmed to be an error, as these fuel types are not used in national navigation in the Russian Federation. This issue has not been resoled in the 2011 submission and the ERT reiterates the recommendation that the Russian Federation review its use of notation keys for all categories and of the time series and ensure that the choice of notation keys is correct. The ERT also noted that for some years of the time series (1992–2002), the Party has reported emissions from some fuel types under individual subcategories as "NE", without providing an explanation in the CRF tables or in the NIR (e.g. consumption of other fuels for sub-categories commercial/institutional and 1.A.4(c) Agriculture/Forestry/Fisheries in 1995). The ERT reiterates the recommendation that the Russian Federation examine whether the notation key "NE" is being correctly applied. The ERT further recommends that the Party provide an explanation in the CRF tables and the NIR for all emissions reported as "NE".

35. The energy inventory of the Russian Federation is not sufficiently transparent to enable an assessment of the methods and assumptions used to obtain some of the Party's country-specific EFs, for example: the country-specific coal CO_2 EFs and oxidation factors; and the country-specific EFs for CH_4 fugitive emissions from natural gas transportation and distribution, and the pumping of natural gas to underground storage sites. In response to questions raised by the ERT, the Party provided additional explanations during the review. The ERT reiterates its recommendation that the Russian Federation provide more transparent information on the methods, EFs and other parameters used in the calculation of the emission estimates.

36. The NIR contains information on the emissions trend in a tabular and graphical format. However, there is very limited discussion on the drivers of the trend, including explanations for the annual fluctuations in the time series. This issue was also raised in previous review reports. The ERT notes that the transparency of the NIR needs to be improved and reiterates the recommendation of the previous review reports that the Russian Federation include a more detailed discussion of the trend and the underlying drivers in its future annual submissions.

37. The ERT commends the Russian Federation for improving its reporting by providing in the NIR data on fuel consumption for different fuels disaggregated at the subcategory level. However, the ERT noted that, for some categories, the sum of fuel consumption did not tally with the total values due to the exclusion of confidential data. In response to a request by the ERT, the Party explained that the excluded data were related to fuel consumption for military use. The ERT recommends that the Party explore possible ways of improving the consistency of the reported AD.

38. As noted in the previous review report, the Russian Federation has reported disaggregated CO_2 emissions from the subcategories under energy industries for the years 2005–2007. However, emissions of CH_4 and N_2O were disaggregated for the year 2007 only. In the 2010 annual submission, the Russian Federation reported disaggregated information for energy industries for the years 2005–2008. In the 2011 annual submission,

the emissions from energy industries from 1990 to 2004 are still aggregated under the category public electricity and heat production. The ERT reiterates the recommendation from the previous review reports that the Russian Federation explore ways of estimating the breakdown of emissions under energy industries for the years 1990–2004, while ensuring time-series consistency, in its future annual submissions.

39. The reasons for some of the recalculations are not described with sufficient transparency in the NIR (e.g. recalculations for the category fugitive emissions from natural gas. The ERT recommends that the Russian Federation include more detailed descriptions of the causes and results of the recalculations in its future annual submissions.

40. The previous review report recommended that the Russian Federation ensure the quality of the inventory, particularly by implementing QA/QC procedures on a systematic basis and documenting all results of the QA/QC checks. In line with the previous review report, the ERT believes that the verification of effective calculation procedures, data sets and assumptions used goes beyond the descriptions in the NIR and is an important and necessary part of the QA/QC procedures. The ERT recommends that the Party further improve its QA/QC procedures in the energy sector to allow a more detailed verification of the calculation procedures, data sources and assumptions used by external experts, and report on the results in its future annual submissions. The ERT recommends that the Party apply and sufficiently detailed documentation on the tier 2 QA/QC procedures for the key categories in the energy sector.

41. The Russian Federation identified the following areas for the further improvement of the completeness and accuracy of its energy sector estimates, to be implemented in the next or future annual inventory submissions:

(a) The development of country-specific values for the carbon stored in non-energy fuel use;

(b) The improvement of QA/QC procedures by involving external experts in the review of emission estimates for aviation (both domestic and international);

(c) The development of country-specific CH_4 and N_2O EFs for energy industries;

(d) The reallocation of fuel consumption and emissions from auto producers from energy industries to manufacturing industries and construction for the whole time series;

(e) The reallocation of the AD for mobile combustion and the refinement of the CH_4 and N_2O EFs based on the vehicle fleet structure;

(f) The implementation of detailed tier 2 QC procedures for categories related to fugitive emissions from solid fuels and oil, natural gas and other categories;

(g) The implementation of a tier 2 approach for the estimation of emissions from key categories under fugitive emissions from oil, natural gas and other sources.

42. The ERT identified the following areas for improvement:

(a) The inclusion of more detailed explanations of the methods used, especially for the determination and justification of country-specific EFs (e.g. the CO_2 EF for coal combustion and the CH_4 EFs for the estimation of fugitive emissions from oil and natural gas industries);

(b) The complete estimation of emissions from categories for which IPCC methodologies exist (e.g. the accounting of all sources for oil and gas exploration);

(c) The use of sufficiently verified parameters to improve the accuracy of the emission estimates (in particular, the CH_4 content in natural gas, and basin-specific EFs for CH_4 fugitive emissions from coal mining);

(d) The implementation of tier 2 QC procedures for all key categories in the energy sector;

(e) The estimation of the breakdown of emissions for the whole time series for the subcategories under energy industries;

(f) The further investigation of the reasons for the differences between the results from the reference approach and the sectoral approach, the correct use of notation keys in the reference approach and the provision of complete information on the non-energy use of fuels in CRF table 1.A(d).

2. Reference and sectoral approaches

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

43. The differences between the estimates of CO_2 emissions derived using the reference approach and the sectoral approach have decreased from 9.8 per cent in 1990 to 1.9 per cent in 2009. However, for different fuel types the differences are much higher. For example, in 2009, the differences between the estimates of CO_2 emissions derived using the reference approach and the sectoral approach are: +8.9 per cent for liquid fuels, –4.2 per cent for solid fuels and +9.5 per cent for gaseous fuels, which constitute significant discrepancies. According to the NIR, the differences are mainly due to the fact that the estimates of carbon stored that were used in the reference approach were based on IPCC default carbon storage factors contained in the Revised 1996 IPCC Guidelines.

44. For the fuels for which no IPCC default values are available, the carbon stored was not estimated by the Russian Federation in the reference approach. Other reasons for the differences between the two approaches mentioned in the NIR are potential losses during the conversion of primary fuels into secondary fuels which are not accounted for in the reference approach and differences between the fuel properties (such as the carbon content) used in the reference and sectoral approaches. These issues have been raised in previous review reports.

45. The Russian Federation reports in the NIR that work to decrease the above-mentioned differences has started (the Party intends to use the NEAT (Non-energy emission accounting tables) model) and preliminary results of the test calculations have been obtained. However, further work is necessary to enable the use of the results of this study in the national inventory. The ERT commends the Party for its efforts to improve the reporting of non-energy fuel use and reiterates the recommendation in the previous review report that the Russian Federation further investigate the reasons for the differences between the two approaches, especially by gaining a better understanding of (and estimating) the amount of stored carbon that is attributable to non-energy fuel use.

International bunker fuels

46. In response to the recommendations of the previous review report, the Russian Federation has continued to improve its approach to the estimation of emissions from domestic and international aviation. In the NIR, it is stated that the current estimates take into account the results of an analysis of the aircraft fleet structure. According to this analysis, the shares of Russian and foreign aircraft in air fleets fluctuated only very slightly between 1990 and 2004. The fuel consumption for the period 1990–1999 was determined on the basis of extrapolation by using the data on international passenger capacity for the years 1990–2004. The ERT commends the Russian Federation for this effort and recommends that the Party continue to elaborate ways to improve the estimation of emissions from this category.

Feedstocks and non-energy use of fuels

47. The amount of stored carbon that is attributable to the non-energy use of fuels or to the use of fuels as feedstocks is determined for fuels for which default storage factors from the Revised 1996 IPCC Guidelines are available. This issue has been noted by the ERT in the previous three review reports. The ERT recommends that the Russian Federation improve its understanding of the non-energy use of fuels and the use of fuel as feedstock and implement national storage factors calculated by the NEAT (non-energy emission accounting tables) model in the next submission and report its work in the NIR.

48. The use of natural gas for ammonia production is not described in the energy chapter of the NIR. According to the explanation provided in the industrial processes chapter of the NIR, non-energy use of natural gas is assessed in the industrial processes sector. The ERT reiterates the recommendation that the Russian Federation complete CRF table 1.A(d) with information on the allocation of emissions from non-energy use of fuels and that the Party provide more detailed information in the NIR on this issue, including information on the allocation of emissions and the processes that use the different fuels as feedstocks or for other non-energy purposes.

3. Key categories

Stationary combustion: solid, gaseous and liquid fuels – CO_2

49. The previous review report recommended that the Russian Federation explore ways of allocating fuel consumption in industrial power plants to the relevant subcategories under manufacturing industries and construction in accordance with the Revised 1996 IPCC Guidelines. However, in the 2011 submission, emissions from fuel consumption from auto producers were reallocated to subcategories under the category manufacturing industries and construction for 2009 only. The ERT commends the Russian Federation for this effort and reiterates the recommendation of the previous review report that the Party reallocate the emissions from auto producers for the remaining years of the time series in order to ensure time-series consistency.

50. CO_2 emissions from stationary combustion of fuels have been calculated following a tier 1 approach using IPCC default EFs for all categories and fuels except for the category public electricity and heat production for which a tier 2 approach and country-specific EFs were applied for black coal, brown coal, natural gas, diesel oil, residual fuel oil and oil coke. These country-specific EFs were derived from plant-specific data from power plants accounting for 90 per cent of electricity and heat production in the Russian Federation. Information used included the origin of the coal (basins) and the corresponding fuel properties and fuel consumption.

51. During the previous review, the ERT noted that the country-specific CO_2 EFs had not been updated over time to reflect changes in, for example, the proportions of coal originating from different coal basins. Furthermore, country-specific CO_2 EFs were only used for energy industries. The ERT commends the Russian Federation for investigating the annual changes in the country-specific CO_2 EFs for coal by considering the amount of coal originating from each basin in each year. However, the ERT reiterates the recommendation that the Party improve the description in the NIR on the derivation of the country-specific EFs, including by specifying which fuels are covered.

52. According to a recommendation in the previous review report, relevant data on fuel consumption are provided in the NIR and are aggregated by category and by different fuel types. However, due to confidentiality concerns (e.g. fossil fuels for military use) some data were not provided. The ERT recommends that the Party explore possible ways to improve the transparency of the reporting of AD (e.g. to report confidential information together with non-confidential to avoid dissemination of confidential data).

Coal mining and handling: solid fuels – CH_4

53. The ERT commends the Russian Federation for implementing recommendations from previous review reports by updating the country-specific EFs for coal mining and handling using basin-specific data. However, it should be noted that the Party estimates CH_4 emissions from coal mining and handling using EFs which were derived using historical basin-specific data on the CH_4 bearing capacity from literature (dated to 1979). The Party explains in the NIR that the CH_4 bearing capacity is a feature of a particular coal deposit and remains constant over time. During the review, the Russian Federation stated that the data from 1979 are still valid and that each emission factor is a constant value linked to the properties of a specific coal deposit. Furthermore, the Party has explained that its direct measurements approach takes into account other factors, which influence the CH_4 emissions, namely the background level of methane release (section 2.6.1.1 of the IPCC good practice guidance), the mining intensity on gassy and non-gassy mines, timely changes in the structure of producing mines (section 2.6.1.5 of the IPCC good practice guidance), changes in the depth of coal seams being worked and the methane content of guiding-beds. However, the ERT is of the view that this approach is based on coal mining practices during the 1970s and does not take into account changes that may have occurred during the period 1990–2009. According to the IPCC good practice guidance, it is important to consider whether the composition of coal mines has changed dramatically during the interim period, as this could introduce uncertainty. Also, other factors (e.g. coal production activity at different gassy and non-gassy mines) may have an influence on the CH_4 emissions intensity. Thus, the ERT recommends that the Russian Federation conduct an analysis of the EFs time-series in order to improve the accuracy of emission estimates in recent years.

Oil and natural gas: gaseous and liquid fuels – CO_2 and CH_4

54. The emission estimates for fugitive emissions from oil and natural gas are mostly based on default EFs from the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. This has been noted in previous review reports. The ERT reiterates the recommendation that the Russian Federation develop more country-specific EFs for this key category. When country-specific EFs have been developed, the Party should evaluate the appropriateness of keeping the EFs constant throughout the time series. Further, the ERT encourages the Russian Federation to estimate the CO_2 emissions from natural gas distribution and consumption.

55. The descriptions of the methods, assumptions and AD used to obtain the country-specific EFs are not sufficiently transparent in the NIR. During the review, the ERT requested that the Russian Federation provide additional explanations and documentation about the methods used to obtain the values of the country-specific EFs. The ERT recommends that the Party include an appropriate description of the methods and assumptions used in its future annual submissions.

56. The Russian Federation states in the NIR (page 84) that the CH_4 content of natural and associated gas was accepted as equal to 80 per cent and that this value corresponds to a national standard (GOST 30319.0-96) which was calculated based on the average natural gas composition. The IPCC good practice guidance provides the typical gas analysis for gas transmission and distribution systems, according to which the CH_4 content of natural gas is 97.3 per cent by volume (see the footnotes for table 2.16 of the IPCC good practice guidance).

57. In response to a question raised by the ERT during the review concerning the CH_4 content of natural gas, the Party explained that the typical natural gas composition in the Russian Federation was obtained according to GOST standard 30319.0-96 “Natural gas. Methods of calculation of physical properties. General”, which was attached to the written response. The ERT studied the above-mentioned interstate standard and considered that the ranges provided for the different natural gas components (the range for CH_4 is from 60 to 100 per cent) are representative of the natural gas definition in the Russian Federation.

However, these values do not take into account the volumes of the different qualities of gas transported by the gas transmission system of the Russian Federation and, hence, mathematically average values (not volume-weighted) are not representative of the overall composition of natural gas in the country.

58. During the review, the Russian Federation provided detailed information from various production sites in the country, which confirmed the range of the CH_4 content of natural gas (60–100 per cent), but also indicated that the majority of the natural gas produced in the Russian Federation has a significantly higher CH_4 content (more than 90 per cent). The ERT notes that the CH_4 content of the natural gas at production sites is expected to be lower than the CH_4 content of the natural gas that is transmitted through the pipeline system in the country. This is also in accordance with the IPCC good practice guidance, which provides a typical CH_4 content value of 91.9 per cent for natural gas at a gas processing plant and a typical CH_4 content value of 97.3 per cent by volume for transmission and distribution systems (see the footnotes for table 2.16 of the IPCC good practice guidance).

59. Taking into account all the information provided by the Russian Federation and the relevant information in the IPCC good practice guidance, the ERT considered that this problem could lead to a potential underestimation of emissions, and included this issue in the list of potential problems and further questions. In response, the Russian Federation recalculated the CH_4 emissions from natural gas transmission and storage by applying the CH_4 content value of 97.3 per cent according to the typical gas analysis provided in the IPCC good practice guidance. This resulted in an increase in emissions from the natural gas transmission category of 18,988.56 Gg CO_2 eq (21.10 per cent) for 2008, an increase of 15,724.32 Gg CO_2 eq (21.10 per cent) for 2009 and an increase of 17,912.99 Gg CO_2 eq (21.12 per cent) for 1990. The ERT commends the Russian Federation for providing estimates based on the revised CH_4 content value and agrees with the revised estimates. The ERT recommends that the Party use this CH_4 content value in future annual submissions and transparently document the methodology, EFs and AD used for the revised calculations.

60. According to the NIR, the Russian Federation uses a factor of 1.017 Gg/106 m3 to convert natural gas from volume to mass. In response to a request by the ERT during the review, the Party provided additional information on how this value was determined. From the calculations of emissions from the transmission category (CRF table 1.B.2(b)(iii)), which were provided to the ERT in response to follow-up questions, the ERT understands that the Party uses the value 1.017 Gg/106 m3 to convert the natural gas from volume units to a weight measure in order to estimate the emissions from natural gas pumped to storage sites.

61. The ERT is of the view that using this value may lead to an overestimation of emissions due to the fact that the revised CH_4 content in natural gas is equal to 97.3 per cent and, according to the Revised 1996 IPCC Guidelines, the density of CH_4 at 20 °C and 1 atmosphere is equal to 0.67 Gg/106 m3, which is well below the value applied by the Party. The ERT recommends that the Russian Federation conduct additional QC measures for the estimation of fugitive emissions from natural gas and, if necessary, revise the approach used to determine the volume to mass factor for natural gas.

4. Non-key categories

Stationary combustion: biomass – CO_2, CH_4 and N_2O

62. The energy chapter of the NIR states that total national GHG emissions did not include emissions from biomass combustion (which, in the Russian Federation, is mostly wood fuel) due to the fact that the emissions from this process are allocated to the LULUCF sector. During the review, the Party clarified that this statement is not fully correct and promised to correct the statement in the NIR of its next annual submission. In addition to this correction, the ERT recommends that the Russian Federation provide explanations for

the estimation of emissions both from biogenic and from non-biogenic waste incineration, indicating the category under which these estimates are reported.

Fugitive emissions: exploration of oil and natural gas – CO_2, CH_4 and N_2O

63. Under the oil exploration category, the Russian Federation has reported emissions only from the servicing of producing wells. However, the IPCC good practice guidance provides CH_4 and CO_2 EFs for well drilling and CH_4, CO_2 and N_2O EFs for well testing. In addition, the Party has reported natural gas exploration as "NE" with the explanation that these activities are "not considered by the IPCC guidelines". However, as the IPCC good practice guidance provides EFs for oil and natural gas field exploration, these emissions should be estimated if they occur in the country.

64. In response to questions raised by the ERT during the review, the Russian Federation noted that it was not possible to estimate emissions from well drilling and testing because of a lack of statistical information on the number of wells drilled in the country (this is required in order to use the EFs provided in the IPCC good practice guidance). The Party stated that Rosstat provides data on the total length of exploratory drilling only (expressed in thousands of m/year), which cannot be converted into the number of wells drilled. The Party also informed the ERT that a survey had been undertaken in order to identify the number of exploratory wells. According to national experts from the oil and gas sector, the exploration technologies applied in the country do not result in any liquid and gas leakage. However, the Russian Federation has concluded that "emissions from exploration may be small as compared with emissions from production". With regard to the emissions from natural gas producing wells, the ERT's understanding (based on oral information provided by the Party during the review week) is that these emissions are included under the subcategory oil.

65. Taking into account all the information provided by the Russian Federation and the relevant information in the IPCC good practice guidance, the ERT considered that this problem could lead to a potential underestimation of emissions, and included this issue in the list of potential problems and further questions raised by the ERT during the review. In response, the Russian Federation provided the ERT with the missing AD for the estimation of emissions from oil and natural gas exploration together with revised emissions estimates, including emissions from oil and natural gas well drilling, testing and servicing. The Party provided the ERT with a revised submission containing updated emission calculations based on the revised AD and default EFs from the IPCC good practice guidance. This resulted in an increase in emissions from the oil exploration category of 132.88 Gg CO_2 eq (72.37 per cent) for 2008, an increase of 113.11 Gg CO_2 eq (61.60 per cent) for 2009, and an increase of 202.91 Gg CO_2 eq (110.51 per cent) for 1990. The ERT agreed with the revised estimates.

66. Emissions from the natural gas exploration category were estimated for the first time by the Russian Federation in the 2011 submission, amounting to 17.49 Gg CO_2 eq for 2008, 16.35 Gg CO_2 eq for 2009 and 15.14 Gg CO_2 eq for 1990. The ERT commends the Russian Federation for providing revised estimates of emissions from oil and natural gas exploration and agrees with the revised estimates. The ERT recommends that the Party include appropriate explanations of the sources of AD, the assumptions made and the methodologies used to estimate emissions from oil and natural gas exploration in its future annual submissions.

C. Industrial processes and solvent and other product use

1. Sector overview

67. In 2009, emissions from the industrial processes sector amounted to 158,246.56 Gg CO_2 eq, or 7.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 557.59 Gg CO_2 eq, or 0.03 per cent of total GHG emissions. Since the base year, emissions have decreased by 38.6 per cent in the industrial processes sector, and decreased by 0.7 per cent in the solvent and other product use sector.

68. The key driver for the fall in emissions in the industrial processes sector is the decrease in industrial activities, reflected in the decrease in emissions from: mineral products, namely from limestone and dolomite use (60.5 per cent), cement production (42.9 per cent) and lime production (45.9 per cent); metal production, namely from iron and steel production (27.7 per cent); and the production of halocarbons and SF_6, namely in by-product emissions from the production of HCFC-22 (77.1 per cent). During the period 2008–2009, the reduction in GHG emissions from the industrial processes sector was associated with a fall in production due to the global economic crisis and, to a lesser extent, with the reduction in specific GHG emissions from activities such as the production of ammonia, primary aluminium, HCFC-22 and SF_6.

69. Within the industrial processes sector, 46.1 per cent of the emissions were from iron and steel production, followed by 12.5 per cent from cement production, 10.1 per cent from ammonia production, 9.0 per cent from limestone and dolomite use, 4.1 per cent from lime production, 4.1 per cent from the production of HCFC-22 and 4.1 per cent from aluminium production, which were the most important categories. The remaining 10.0 per cent were from all other categories of the industrial processes sector reported by the Party.

70. The Russian Federation has made recalculations for the industrial processes sector between the 2010 and 2011 submissions in response to the 2010 annual review report. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 0.2 per cent for 2008. The ERT noted that recalculations of the time series 1990–2008 have been undertaken to take into account:

(a) The use of a tier 1a methodology to estimate CO_2 emissions from ammonia production;

(b) The estimation of the additional amount of nitric acid used in the production of nitrogen-based (N-based) mineral fertilizers, such as nitrophoska, nitroammophoska and nitroammophos, in order to provide more complete estimates of nitric acid production and N_2O emissions;

(c) The estimation of CH_4 emissions from dichloroethylene production;

(d) The use of plant-specific AD on the carbon content in electrodes to estimate CO_2 emissions from steel production;

(e) The estimation of CO_2 emissions from silicon metal;

(f) The use of a tier 2 methodology to estimate PFCs from primary aluminum;

(g) The use of a tier 2 methodology and revised plant-specific AD to estimate HFC-23 fugitive emissions from the production of HCFC-22;

(h) The use of revised plant-specific EFs and AD to estimate fugitive emissions from SF_6 production;

(i) The estimation of HFC-134a emissions from aerosols/metered dose inhalers;

(j) The use of revised AD on domestic refrigerator production and export for the period 2005–2008;

(k) The estimation of emissions of HFC-402a,b in industrial refrigeration;

(l) The use of revised AD on SF_6 emissions from electrical equipment for 2008.

71. The CRF tables include estimates for all categories of emissions from the industrial processes and solvent and other product use sectors for which methodologies are available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. Emission estimates have been reported for all gases, all years of the inventory time series, and for all geographical locations.

72. The Russian Federation has provided justifications in the NIR for the assumptions made and the choices of AD, EFs and methodologies used. To protect commercially sensitive information, the Party reported AD from some categories (e.g. CO_2 and PFC emissions from aluminium production) as confidential ("C"). The CRF tables and the NIR provide sufficient information to enable the assessment of the data used and the methodologies applied.

73. Quantitative information on uncertainties for all categories within the industrial processes sector has been discussed in a transparent manner in the NIR. The uncertainty analysis was based on the default EF uncertainties included in the IPCC good practice guidance and the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), while for the AD, the uncertainties were based on information obtained from Rosstat and other country-specific information obtained from ministries, industrial associations and directly from plants, as well as from expert judgment. The ERT reiterates the recommendation from previous review reports that the Russian Federation use, to a greater extent, country-specific information available for its uncertainty assessment and ask the institutions providing AD to estimate the relevant uncertainty values.

74. Very limited information is provided in the sectoral chapter of the NIR on the QA/QC procedures applied to the individual categories of the industrial processes sector. The ERT reiterates the recommendation from previous review reports that the Russian Federation report more detailed information on the sector-specific QA/QC procedures in the NIR of its future annual submissions, in particular for the key categories, as well as information on any external reviews undertaken and/or planned for the industrial processes sector and any key findings from the QC checks of the AD and methods used.

75. The NIR identified that the estimates of the CO_2 emissions from the use of magnesite for the manufacture of refractory products will be improved in the future annual submissions. The ERT encourages the Russian Federation to follow this intention.

2. Key categories

Cement production – CO_2

76. A tier 2 method was used for the estimation of CO_2 emissions from cement production. In previous review reports, the Russian Federation was encouraged to use country-specific data for the values of the lime content of clinker and the cement kiln dust correction factor. The Party followed this recommendation in part. The Party applied, for the first time for the whole time series, country-specific data on the calcium oxide (CaO) content of clinker and the default cement kiln dust correction factor. The CaO content of clinker was based on the plant-specific data received from 19 of the 52 operating cement plants existing in the country with a share of clinker production that composes 61 per cent of the total clinker production in the Russian Federation. The average CaO content of

clinker was calculated as a weighted average volume of clinker production in these selected plants. The ERT appreciates the efforts made by the Party to collect the respective information and further encourages the Russian Federation to determine, in addition, the national cement kiln dust correction factor and to do so on a regular basis (e.g. every five years).

Ammonia production – CO_2

77. In previous review reports, the ERT recommended that the Russian Federation make efforts to estimate CO_2 emissions from ammonia production using a tier 1a methodology, based on natural gas input and country-specific EFs based on the carbon content of natural gas, instead of a tier 1b methodology and an IPCC default EF. The recalculations of CO_2 emissions from ammonia production based on natural gas consumption are included in the 2011 inventory submission for the first time. The calculations were based on AD on the volume of ammonia production and the specific consumption of natural gas for the ammonia production units. The weighted average specific consumption of natural gas used as feedstock for the production of 1 t of ammonia was calculated based on data from 72 per cent (in 1990) to 95–96 per cent (in 2000–2009) of the total emissions from ammonia production in the Russian Federation. The ERT appreciates the efforts of the Party to implement this methodological improvement.

Aluminium production – PFCs

78. The Russian Federation applied a tier 2 methodology, which is based on plant-specific process data for anode effect performance, to estimate the PFC emissions from aluminium production, as recommended by the IPCC good practice guidance. The calculations were based on AD on aluminium production, technologies, and the frequency and duration of anode effects obtained from the company RUSAL. For the period 2006–2009, the PFC emissions have been calculated for each facility and technology used at each of the 13 aluminium plants operating on the territory of the Russian Federation. The implied emission factors (IEFs) have been calculated using data on the frequency and duration of the anode effects and a default angular coefficient (from the IPCC good practice guidance) for each aluminium production technology. For the period 1990–2005, data are available only for the aluminium plants as a whole. The IEFs specific to the year 2006 have been used to calculate the PFC emissions for the period 1990–2005. The ERT encourages the Russian Federation to make efforts to collect the missing information for the remaining years of the time series.

3. Non-key categories

Nitric acid production – N_2O

79. The official statistics of the Russian Federation take full account of the data on the production of commercial weak nitric acid in monohydrate and concentrated nitric acid in monohydrate, but do not take into account the output of weak nitric acid processed into other products (e.g. N-based mineral fertilizers, such as ammonium nitrate, nitrophoska, nitroammophoska and nitroammophos). In the 2011 NIR, the Party has included the amount of non-concentrated nitric acid used in the production of other N-based mineral fertilizers. The Russian Federation has estimated the amount of nitric acid, which was used for the production of ammonium nitrate, nitrates of sodium and calcium, and mineral fertilizers: nitrophoska, nitroammophoska and nitroammophos. The Party also used scientifically based factors to convert the amount of N-based fertilizer processed into nitric acid. The ERT appreciates the efforts made by the Party to collect and estimate the respective information.

Other (chemical industry) – CH_4

80. Following the recommendation of the previous review report, the Russian Federation has calculated and reported CH_4 emissions from dichloroethylene production by using the AD and default EF provided in the Revised 1996 IPCC Guidelines.

Ferroalloys production – CO_2

81. Following the recommendation of the previous review report, the Russian Federation has calculated and reported in the NIR the CO_2 emissions from silicon metal production by using the default EF provided in the Revised 1996 IPCC Guidelines. The AD were obtained from the research group Infomain for the period 1990–1999 and from Rosstat for the period 2000–2009.

Consumption of halocarbons and SF_6 – HFCs and PFCs

82. Following the recommendation of the previous review report, the Russian Federation has estimated the HFC-134a emissions from the category aerosols/metered dose inhalers. The estimations were made based on the number of patients with bronchial asthma due to the lack of AD on aerosols/metered dose inhalers imported into the country. The ERT agrees with the approach used by the Party.

D. Agriculture

1. Sector overview

83. In 2009, emissions from the agriculture sector amounted to 142,372.04 Gg CO_2 eq, or 6.7 per cent of total GHG emissions. Since the base year, emissions have decreased by 55.1 per cent. The key driver for the fall in emissions is the reduction in the livestock and poultry population, the decrease in cultivated areas and the decline in the use of synthetic fertilizers applied to soils. Within the sector, 54.3 per cent of the emissions were from agricultural soils, followed by 28.0 per cent from enteric fermentation and 17.0 per cent from manure management. The remaining 0.6 per cent was from rice cultivation.

84. The Party has made recalculations for the agriculture sector between the 2010 and 2011 submissions in response to the 2010 annual review report and following changes in AD. The impact of these recalculations on the agriculture sector is a decrease in emissions of 2.3 per cent for 2008. The main recalculations took place in the following categories:

(a) Enteric fermentation;

(b) Manure management;

(c) Rice cultivation;

(d) Agricultural soils.

85. The recalculations were performed due to: the update of AD on the livestock population in 2008 (i.e. cattle, sheep, goats and swine); the recalculation of EFs for enteric fermentation from cattle for the period 1990–2001; the correction of the share of manure managed in liquid storage systems for cattle and swine; and the correction of the data on harvest areas and yields. Explanations for the recalculations are provided in CRF table 8(b). The ERT welcomes the efforts of the Party to enhance the accuracy of the inventory.

86. Emissions have been reported for all agricultural categories and for all gases, years and geographical locations. The emissions from the burning of crop residues are reported as not occurring (“NO”), since this is prohibited by law.

87. Some cases of incorrect and inconsistent reporting, which do not influence the emission estimates, were found in the some CRF tables:

(a) CRF table 4.F: the crop production by crop species was reported as "NO". However, the amounts of crop produced were used to estimate the emissions from crop residues;

(b) CRF table 4.E: the fraction of above-ground biomass, the fraction oxidized and the carbon fraction in biomass burned were reported as "NE", while they should be reported as "NA", since the prescribed burning of savannas is reported as "NO".

88. The inventory of the agriculture sector is generally transparent. The NIR contains information on the AD, EFs and methods used to estimate emissions. Additional information used in the calculation of the estimates is provided in annex 3 to the NIR.

89. The description of the uncertainty estimates for the agriculture sector is provided in the NIR. A tier 2 method was used to perform the uncertainty analysis for 2004. The same uncertainty estimates were used for the 2011 inventory, except for the categories for which the methodologies had changed, in which case a tier 1 method was used for the analysis.

90. The description of the sector-specific QA/QC procedures performed is included in the NIR. The AD on the livestock population were revised to ensure consistency of the time series, and a comparison with the data on the livestock population reported by the Food and Agriculture Organization of the United Nations (FAO) was performed. The AD on the amount of synthetics fertilizer applied to agricultural soils were compared with the balance of mineral fertilizers developed. The results of the comparison are presented in the NIR. A comparison of the emissions from crop residues estimated based on the country-specific methodology with the emissions estimated based on the methodology reported in the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines was performed by the Party as part of its QC procedures.

2. Key categories

Enteric fermentation – CH_4

91. The Russian Federation uses a country-specific methodology, which is consistent with the tier 2 approach provided in the Revised 1996 IPCC Guidelines, to estimate emissions from dairy and non-dairy cattle and a tier 1 approach to estimate emissions from other livestock categories. This is in line with the IPCC good practice guidance. Disaggregated AD on the dairy and non-dairy cattle population by region were used for the estimation of emissions.

92. The ERT welcomes the recalculations performed by the Party in the 2011 submission for the years in the period 1990-2001 in order to enhance the time-series consistency of the data used to estimate the emissions from enteric fermentation from dairy and non-dairy cattle (e.g. the use of disaggregated data by region according to the gross energy input of fodder consumed and the fodder digestion factor for the period 1990–2001 for the estimation of emissions).

Manure management – CH_4 and N_2O

93. The Russian Federation uses a tier 2 method from the Revised 1996 IPCC Guidelines to estimate CH_4 emissions from manure management for dairy, non-dairy cattle and swine and a tier 1 method to calculate emissions from other livestock categories and poultry.

94. The Party used the default method from the IPCC good practice guidance to estimate N_2O emissions from manure management for all categories of livestock and poultry. Country-specific N excretion rates were used in the calculation of the estimates.

95. In response to the recommendations in the previous review report, the Party revised the allocation of manure managed in liquid and solid storage systems and the fraction of manure which goes to pasture, range and paddock in the 2011 submission. The split of manure managed in liquid and solid storage systems was estimated separately for each of year of the inventory time series. The ratio of the livestock population by category (i.e. the young cattle population and swine population kept in breeding households) kept for breeding to the total livestock population by category was used as a basis to calculate the quantity of manure stored in liquid storage systems.

96. The annual changes in the structure of the total cattle and swine populations cause changes in the amount of manure stored in liquid and solid storage systems.

97. The amount of manure left on pasture, range and paddock was also estimated separately for each year of the time series. The fraction of grazing feed in the annual feed consumption by livestock category was used as a basis for the estimates. The Party assumed that the livestock consumed the grazing feed only during the grazing period and that the fraction of grazing feed corresponds to the period during which the livestock is on pasture. The manure of cattle is stored in solid storage systems.

98. The ERT welcomes the improvements made by the Party and recommends that the Russian Federation report in the NIR the data on the split of manure managed in liquid and solid storage systems for the entire time series in order to improve the transparency of its reporting.

Agricultural soils –N_2O

99. The Russian Federation used tier 1a and tier 1b methods from the IPCC good practice guidance to estimate N_2O emissions from agricultural soils. For the estimation of emissions from crop residues, the Party used a country-specific method, which also considers emission estimates from N-fixing crops. In addition, country-specific EFs for different soil types were used for the estimation of emissions from the application of synthetic fertilizer.

100. The AD on the amount of synthetic fertilizer applied to agricultural soils were obtained based on a balance developed for fertilizers (BAL = production + import – export). During the review, the Party provided detailed explanations of the data used to perform the balance and on the QC activities performed to guarantee the quality of the data used in the balance. The AD on crop production are obtained from Rosstat.

101. The practice of applying sewage sludge is prohibited in the Russian Federation due to sanitary standards. Therefore, emissions from this category are not occurring.

102. The ERT recommends that the Party ensure consistency in the use of the notation keys in CRF tables 4.D, 4.E and 4.F.

E. Land use, land-use change and forestry

1. Sector overview

103. In 2009, net removals from the LULUCF sector amounted to 649,598.39 Gg CO_2 eq. In 1990 and 1991, the sector was a net source of GHG emissions. From 1992 onwards, the sector has resulted in net removals, which have been increasing annually. The key drivers for this increase are the reduction in forest harvesting and the changes in cropland

management. The high decrease in net emissions is mostly explained by the significant reduction in emissions, of 55.0 per cent, in timber harvesting in the late 1990s and the 2000s; the decrease in emissions from cropland soils (–67.3 per cent) caused by the abandonment of agricultural land; the decrease in the intensive application of organic fertilizer; and the increase in removals (by 180 times) from large areas of cropland converted to grassland in the early 1990s.

104. Within the sector, total net removals of 678,265.88 Gg CO_2 eq were from forest land remaining forest land and land converted to forest land, followed by total net removals of 75,970.58 Gg CO_2 eq from grassland remaining grassland and land converted to grassland. Cropland remaining cropland was responsible for net emissions of 76,684.26 Gg CO_2 eq, followed by land converted to settlements with net emissions of 20,987.06 Gg CO_2 eq, while wetlands were responsible for 93.53 Gg CO_2 eq. Emissions and removals from other land categories have been reported as "NE" and "NO".

105. The Russian Federation has made recalculations for the LULUCF sector between the 2010 and 2011 submissions in response to the 2010 annual review report, following changes in the AD, EFs and methodologies applied and in order to rectify identified errors. The impact of these recalculations on the LULUCF sector is a decrease in net removals by 7.2 per cent for 2008. The main recalculations took place in the following categories:

(a) Cropland (410.3 per cent);

(b) Settlements (–14.2 per cent);

(c) Forest land (–2 per cent).

106. The ERT notes that the completeness of the Party's reporting has significantly improved following the recommendations from the previous review reports. However, the inventory is not yet complete. The carbon stock changes in the living biomass and organic soils pools in grassland converted to forest land are "NE". The ERT recommends that the Party further improve the completeness of the inventory by including these estimates in the NIR of its future annual submissions.

107. The NIR noted the following proposed improvements by the Federal Forestry Agency, to further improve the calculation procedures applied to the estimation of emissions and removals from forest land: using annual data on disturbance (harvestings and destructive forest fires) levels from forest management statistics instead of mean values derived from the detection of areas harvested and burnt over a number of years; disaggregating the input and reported data on the carbon budget per region; calculating uncertainties instead of using expert judgement. The ERT encourages the Russian Federation to implement these planned improvements in its future annual submissions.

108. The ERT notes that the transparency of the Party's reporting has also significantly improved following the recommendations from the previous review reports. However, not all categories (e.g. settlements, other lands) are reported as separate subchapters. In particular, settlements, which became a key category in 2009, is not reported in the NIR as a separate subchapter. The ERT recommends that the Party further improve the transparency of the inventory by the provision in the NIR of more disaggregated background data used for the calculation of the biomass stock changes and more detailed information on how the statistical data on different land management practices and disturbances are linked to each other in the estimation of carbon stock changes and emissions and removals.

109. The Russian Federation has provided a tier 1 uncertainty estimate for the LULUCF sector for the year 2009. The overall uncertainty for the LULUCF sector was estimated to be 14.0 per cent for the year 2009. The NIR reports that the uncertainty estimates are

mainly based on expert judgement. The ERT therefore recommends that the Russian Federation make additional efforts in estimating uncertainties.

110. The ERT considers that several of the issues identified during the 2010 in-country review (e.g. the use of notation keys, the omission of categories in the report) could have been avoided with the use of more comprehensive QA/QC procedures. While recognizing the improvements made by the Party since the previous review, the ERT reiterates the recommendation from the previous review report that the Russian Federation further strengthen its QA/QC procedures in the LULUCF sector, paying special attention to the correspondence between national and IPCC land definitions and to the consistency of the time series of AD and estimates of emissions and removals, and the completeness of reporting. For future annual submissions, the ERT encourages the Party to provide verification data.

2. Key categories

Forest land remaining forest land – CO_2, CH_4 and N_2O

111. This key category contributes 22.8 per cent of total sectoral emissions and removals. All pools are reported for the managed forests. The accuracy of estimates for this category has significantly improved following the implementation of most of the recommendations from the previous review reports. In particular, the land representation matrix containing the changes in land application has been improved, and the AD on the areas and volumes of forest stands, as well as the conversion factors, have been disaggregated at the regional level by age class, species and climatic zone. However, further efforts are still required by the Party such as to strengthen the QA/QC procedure for the verification of the assumptions made in the construction of the land representation matrix. The ERT recommends that the Party continue improving the quality of the reported estimates.

112. The issue raised in the previous review report regarding the double counting of CO_2 emissions from forest fires has been resolved and currently only CH_4 and N_2O emissions from both destructive and non-destructive fires have been reported under the category biomass burning. During the review, the Party clarified that CO_2 emissions from "stand-replacing disturbances" (destructive fires) are reported within the carbon stock changes under forest land. In order to improve transparency, while avoiding double counting, the ERT encourages the Party to report, in a table in its NIR, CO_2 emissions, by each carbon pool, associated with destructive forest fires.

113. The methodology applied by the Party to estimate emissions from "stand-replacing disturbances" is based on the use of AD on areas burned averaged over a number of consecutive years, which varies among forest types and regions, and carbon stock change factors averaged throughout the Russian Federation. The previous review report recommended that the Russian Federation use alternative available annual AD to estimate the areas subject to such disturbances. It was previously recommended that the Party use averaged data as verification and that it use regional averages for the carbon stock change factors; in particular, for clear-cut areas, the carbon stock change factors should result from the averaging of the per ha carbon stock of mature and over-mature classes of forest land. The ERT notes that the issue remains unresolved in the 2011 submission and reiterates the recommendation that the Party use alternative available AD in the future annual submissions. This issue is part of the list of planned improvements provided by the Party in the 2011 NIR.

114. The previous review report had recommended that the Party use a higher-tier method for the assessment of CH_4 and N_2O emissions from forest fires. However, the Party still uses a tier 1 approach (some EFs are the same as those used by another reporting Party with similar conditions). The ERT reiterates its recommendation that the Russian

Federation make further efforts to apply a higher-tier method in its future annual submissions.

Cropland remaining cropland – CO_2

115. Following the recalculations made in response to the recommendations from previous review reports the IEF for mineral soils has decreased for the year 2008 from 0.53 Mg C/ha to 0.23 Mg C/ha, (56.6 per cent decrease). The ERT recommends that the Russian Federation continue to develop country-specific EFs for the losses from mineral soils and an accurate assessment of the uncertainties.

116. The Russian Federation uses a tier 1 default EF to estimate emissions from organic soils in cropland remaining cropland. As already noted in previous review reports, if a tier 2 EF similar to that used by reporting Parties with similar circumstances (e.g. Finland, Latvia or Sweden) were used, organic soils would become a significant pool within this key category. The ERT encourages the Russian Federation to develop country-specific EFs for organic soils in cropland remaining cropland and use them in its future annual submissions.

Land converted to grassland – CO_2

117. The Russian Federation reports estimates for the mineral soil pools together with the organic soil pools as provided by the model RothC that has been adapted and tested in different climatic zones of the country. Details of the methodology applied are provided in the NIR. The ERT notes that the Party did not follow the recommendation from the previous review report to use the correct notation key (included elsewhere ("IE")) for the organic soils included in the estimates reported for mineral soils or to report separately, in the CRF tables, the carbon stock changes in organic soils. The ERT recommends that the Party report separately the carbon stock changes in organic soils according to the corresponding CRF tables.

3. Non-key categories

Land converted to forest land – CO_2, CH_4 and N_2O

118. The ERT notes that the Russian Federation submitted revised estimates for land converted to forest land for all GHGs, applying factors based on methods used by other reporting Parties, to include losses of carbon and non-CO_2 emissions due to disturbances. The ERT recognizes the improvements made in this category and encourages the Russian Federation to further use country-specific data with the aim of including losses due to disturbances, thus improving the accuracy of the model outputs, and to report in its future annual submissions.

F. Waste

1. Sector overview

119. In 2009, emissions from the waste sector amounted to 73,312.37 Gg CO_2 eq, or 3.4 per cent of total GHG emissions. Since 1990, emissions have increased by 25.1 per cent. The key driver for the rise in emissions is the increase in solid waste disposal on land and industrial wastewater treatment. Within the sector, 64.7 per cent of the emissions were from solid waste disposal on land; the remaining 35.3 per cent were from wastewater handling. Emissions from waste incineration are reported under the energy sector, in line with the Revised 1996 IPCC Guidelines.

120. The Russian Federation has made recalculations for the waste sector between the 2010 and 2011 submissions in response to the 2010 annual review report. The impact of these recalculations on the waste sector is a decrease in emissions of 9.1 per cent for 2008. The main recalculations took place in the following categories:

(a) Solid waste disposal on land;

(b) Industrial wastewater treatment.

121. The methodologies, the assumptions used and comprehensive information on background data for the estimation of emissions from the waste sector are described in the NIR. The Party followed the recommendation from the previous review report and provided information on the amount and composition of industrial solid waste disposed to solid waste disposal sites (SWDS). However, the ERT noted that there is no clear explanation of how the AD for municipal waste (NIR table 8.7) and industrial waste (NIR table 8.6) disposed at SWDS are taken into consideration under this category. During the review, the Russian Federation provided the ERT with a summary table containing the total amount of municipal and industrial waste, as well the amount of sludge disposed at managed and unmanaged SWDS. The ERT recommends that the Party provide the missing information and an explanation in the NIR of its future annual submissions.

122. The ERT also noted that the AD, EFs and assumptions used for the estimation of CO_2 and N_2O emissions from waste incineration are included under chapters 8.2 and 8.3 of the NIR. This is not in line with UNFCCC reporting guidelines, as these emissions should be included separately under chapter 8.4 (Emissions from Incineration of Waste). The ERT encourages the Russian Federation to improve the structure of its NIR by including a new chapter on CO_2 and N_2O emissions from waste incineration.

123. Internal QC procedures have been performed in the waste sector, including cheeks of the AD, calculations and time-series consistency. Category-specific QA/QC procedures have been carried out for CH_4 emissions from solid waste disposal on land as it is a key category.

2. Key categories

Solid waste disposal on land – CH_4

124. CH_4 emissions from solid waste disposal on land is a key category by level and trend and amounted to 47,455.08 Gg CO_2 eq in 2009. The Russian Federation used the IPCC tier 2 first order decay method with a country-specific value for degradable organic carbon (DOC) and IPCC default parameters (e.g. the methane generation rate constant (k) and the fraction of DOC disseminated). The AD on municipal solid waste disposal were taken from the report published by the Academy of Public Services for 1960–1990 and from a Rosstat publication and database for the years 1999–2008. Data for the years 1991–1998 were interpolated.

125. In its 2011 submission, the Russian Federation has reported recalculated CH_4 emissions from industrial waste, using the IPCC tier 2 method, following the recommendation in the previous review report. The ERT welcomes this effort.

Wastewater handling – CH_4 and N_2O[6]

126. CH_4 emissions from industrial wastewater handling were recalculated due to updated AD and to the use of EFs that take into consideration the impact of the efficiency of the sewage treatment system on CH_4 emissions. The ERT welcomes this effort.

127. Emissions of N_2O from human sewage were estimated following the methodology from the Revised 1996 IPCC Guidelines. Data from the FAO statistical database (FAOSTAT) on protein consumption were used for the years 1990–2003. AD for the years 2004–2009 were calculated based on country-specific parameters taken from official statistical sources.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

128. The Party reported emissions and removals from afforestation and reforestation, deforestation and the elected activity forest management according to the requirements set out by decisions 15/CMP.1 and 16/CMP.1.

129. The total area subject to activities under Article 3, paragraph 3, of the Kyoto Protocol covers around 0.14 per cent of the forest land of the Russian Federation and the total net emissions from these activities amount to around 0.7 per cent of total national GHG emissions (excluding LULUCF). The AD for afforestation and reforestation refer only to plantations registered as subsidized plantations where the geographical location is identified in the corresponding registry. The AD for deforestation result from forest cadastral data that are revised annually. However, because of the minimal occurrence of forest land conversion, which is significantly smaller than the uncertainty of the land data, the ERT encourages the Russian Federation to use alternative independent data (i.e. from remote sensing) to verify the deforestation statistics.

130. In 2009, the Party reported total net emissions of 15,024.76 Gg CO_2 eq for activities under Article 3, paragraph 3, of the Kyoto Protocol, and net removals of 534,567.75 Gg CO_2 eq for activities under Article 3, paragraph 4. For 2008–2009, the Party reported total net emissions of 33,342.40 Gg CO_2 eq for activities under Article 3, paragraph 3, of the Kyoto Protocol, and net removals of 1,008,782.47 Gg CO_2 eq for activities under Article 3, paragraph 4.

131. The Party has made recalculations for the KP-LULUCF activities between the 2010 and 2011 submissions in response to the 2010 annual review report following changes in AD and in order to rectify identified errors. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) An increase in net emissions for 2008, from a net sink of 6,052.90 Gg CO_2 eq to a net source of 18,317.64 Gg CO_2 eq for activities under Article 3, paragraph 3;

(b) An increase in net removals for 2008, from 428,117.57 Gg CO_2 eq to 474,214.72 Gg CO_2 eq for activities under Article 3, paragraph 4.

[6] Not all emissions related to all gases under this category are categories, particularly N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as whole, the individual gases are not assessed in separate sections.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation – CO_2, CH_4 and N_2O

132. The Russian Federation has applied a model for the estimation of the carbon stock changes in and non-CO_2 emissions from afforested lands (agricultural lands converted to forest land under management) based on yield tables, which do not encompass the impact of disturbances on carbon stocks (e.g. fire, pest, drought, harvesting). Thus, the model does not fully represent the real conditions under which forest plantations are developing, and, therefore, losses of carbon stocks and non-CO_2 emissions are underestimated by the model. Following the recommendations from the previous review report, the Russian Federation has applied a correction factor based on methods used by other reporting Parties, in order to include losses of carbon and non-CO_2 emissions due to disturbances.

133. A conservative approach is used for the assessment of losses assuming that all losses are a consequence of fire. In order to ensure the completeness of reporting, the biomass burning areas under Article 3, paragraph 3, of the Kyoto Protocol should be reported in CRF table 5(KP-II)5. The ERT recognizes that the conservative approach constitutes an improvement and recommends that the Russian Federation further develop the model using country-specific data with the aim of including losses due to disturbances, thus improving the accuracy of the model outputs, and report the CO_2 emissions from destructive fires in CRF table 5(KP-II)5 (biomass burning), in its future annual submissions. The ERT further recommends that the Party report the AD and associated carbon stock changes disaggregated per year of conversion.

Deforestation – CO_2

134. The Russian Federation has applied the 20-year IPCC default transition period to account for changes in the soil organic matter pool associated with deforestation; the litter and soil organic matter carbon stocks are assumed to be completely oxidized as a consequence of the land-use change. Following the recommendations from the previous review report, the AD on the deforested area have been improved, but these data were still aggregated and assessed through the increase in the area of settlements. The ERT recognizes the efforts made by the Party in the 2011 submission and recommends that the Russian Federation continue to improve the methodology used to estimate emissions due to forest conversion by verifying the AD using independent sources of data (e.g. remote sensing) and disaggregating the reported AD and associated carbon stock changes by year of conversion, in its future annual submissions.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2, CH_4 and N_2O

135. The ERT noted that, due to an error in the unit of AD (data in kha has been used as input instead of data in ha, as requested), the N_2O and CH_4 IEFs (139.02 Mg/ha for CH_4 and 7.69 Mg/ha for N_2O) for biomass burning in CRF table 5(KP-II)5 are inconsistent with those reported under the Convention in CRF table 5(V). Moreover, the ERT noted that CO_2 emissions from "stand-replacing disturbances" (destructive fires) have been reported within the carbon stock changes in CRF table 5(KP-I)B.1. In order to improve transparency, while avoiding double counting, the ERT encourages the Party to report in its future NIRs, a table with CO_2 emissions, by each carbon pool, associated with destructive forest fires.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

136. The Russian Federation has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the SIAR on the SEF tables and the SEF comparison report.[7] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

137. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements set out in paragraph 88(a–j) of the annex to decision 22/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

138. The Russian Federation has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

139. Table 4 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 4
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in tonnes of carbon dioxide equivalent

	2011 submission[a]			*2010 submission*[b]	*"Net" accounting quantity*
	As reported	*Revised estimates*	*Final*	*Final*	
Afforestation and reforestation	–8 197 394	–8 511 130	–8 511 130	–4 093 685	–4 417 445
Deforestation	41 853 535		41 853 535	26 607 307	15 246 227
Forest management	–605 000 000		–605 000 000	–462 469 007	–142 530 993
Article 3.3 offset[d]	–33 656 141	–33 342 400	–33 342 400	–22 513 623	–10 828 777
Forest management cap[e]	–605 000 000		–605 000 000	–605 000 000	0
Cropland management	NA		NA	NA	NA
Grazing land management	NA		NA	NA	NA
Revegetation	NA		NA	NA	NA

Abbreviation: NA = not applicable.

[7] The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

[a] The values included under the 2011 submission are the cumulative accounting values for 2008 and 2009 as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2009.

[b] The values included under the 2010 submission are the final accounting values as a result of the 2010 review and are included in table 4 of the 2010 annual review report (FCCC/ARR/2010/RUS, page 40).

[c] The "net" accounting quantity is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2011 submission and where the quantities issued or cancelled based on the 2010 review have been subtracted ("net" accounting quantity=final 2011-final 2010).

[d] Article 3.3 offset: For the first commitment period, a Party included in Annex I that incurs a net source of emissions under the provisions of Article 3, paragraph 3, may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[e] In accordance with paragraph 11 of the annex to decision 16/CMP.1, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, after the application of paragraph 10 of the annex to decision 16/CMP.1 and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

140. Based on the information provided in table 4 for the activity afforestation/reforestation, Russian Federation shall issue 4,417,445 removal units in its national registry.

141. Based on the information provided in table 4 for the activity deforestation, Russian Federation shall cancel 15,246,228 AAUs, ERUs, CERs and/or RMUs in its national registry.

142. Based on the information provided in table 4 for the activity forest management, Russian Federation shall issue 153,359,774 removal units in its national registry.

National registry

143. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

Calculation of the commitment period reserve

144. The Russian Federation has reported its commitment period reserve in its 2011 annual submission. The Party reported its commitment period reserve to be 10,796,350,900 t CO_2 eq based on the national emissions in its most recently reviewed inventory (2,159,270,180 Gg CO_2 eq). In response to the list of potential problems and further questions raised by the ERT, the Russian Federation revised its total emissions estimates (2,127,354,393 Gg CO_2 eq). The revised CRP is 10,636,771,965 t CO_2 eq. The ERT agrees with this figure.

3. Changes to the national system

145. The Russian Federation reported that there have been no changes to its national system since the previous annual submission. The ERT concluded that the Party's national

system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

146. The Russian Federation reported changes in its national registry since the previous annual submission. The changes are in relation to the updating and testing of the Seringas software and the introduction of a new registry website with updated information. The production environment of the national registry was connected to the ITL and the registry thus became fully functional on 21 October 2010. Observations on the changes to the national registry are contained in the SIAR. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

147. The Russian Federation reported that there is no change in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, since the previous annual submission. The ERT concluded that the information provided continues to be complete and transparent.

III. Conclusions and recommendations

148. The Russian Federation made its annual submission on 14 April 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

149. The ERT concludes that the inventory submission of the Russian Federation has generally been prepared and reported in accordance with the UNFCCC reporting guidelines. The Party has submitted a complete set of CRF tables for the years 1990–2009 and an NIR. However, the ERT notes that the inventory is still lacking in completeness. The ERT identified missing emissions from some categories in the Energy sector for which the Party provided estimates during the review. In addition, estimates from some sink categories in the LULUCF sector are not provided. Specifically, emissions reported as not estimated ("NE") relate to carbon stock changes in land converted to forest land, grassland remaining grassland, wetlands remaining wetlands, land converted to wetlands, settlements remaining settlements and land converted to settlements.

150. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1.

151. The Party's inventory is in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The 2011 inventory submission is generally of a high quality and shows significant improvements in the major issues (e.g. recalculations in the LULUCF sector). However, the ERT identified a need for further improvements, in particular the further development of country-specific EFs and other parameters (e.g. in the energy sector) in order to move to higher-tier methods. Additional improvements are reflected in the recommendations of the ERT.

152. The Party has made recalculations for the inventory between the 2010 and 2011 submissions in response to the 2010 annual review report. The ERT noted that the recalculations reported by the Party for the years 1990–2009 have been undertaken to take into account changes in AD and methods in all sectors. The effect of the recalculations on estimated total GHG emissions excluding the LULUCF sector is a 0.5 per cent increase for 1990 and a 0.2 per cent increase for 2008, while the effect including the LULUCF sector is a 1.0 per cent increase for 1990 and a 3.0 per cent increase for 2008. The major changes are attributable to methodological changes in the LULUCF sector in the forest land and cropland categories.

153. The Party has chosen annual accounting of emissions and removals related to forest management and activities under Article 3, paragraph 3, of the Kyoto Protocol. During the review, the Party revised its estimates for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol improving the accuracy of the inventory.

154. The Party has made recalculations for the KP-LULUCF activities between the 2010 and 2011 submissions in response to the 2010 annual review report. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) An increase in emissions from deforestation from 398.31 Gg CO_2 eq in the 2010 submission to 22,567.99 Gg CO_2 eq in the 2011 submission;

(b) An increase in removals due to forest management from 428,117.57 Gg CO_2 eq in the 2010 submission to 474,214.72 Gg CO_2 eq in the 2011 submission.

155. The Russian Federation has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and used the required reporting format tables as required by decision 14/CMP.1.

156. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

157. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

158. The Russian Federation has reported the information requested under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2011 annual submission. The information contained in the submission is complete and transparent.

159. In the course of the review, the ERT formulated a number of recommendations relating to the transparency of the information presented in the annual submission, the QA/QC and verification procedures as well as methodological issues. The key recommendations are that the Russian Federation:

(a) Further strengthening of the QA/QC procedures; the inclusion of descriptions of sector-specific QA/QC procedures for the industrial processes and LULUCF sectors; the further improvement of the descriptions of the sector-specific QA/QC procedures for the waste sector; and the provision of descriptions of the QA procedures and their results;

(b) Further develop country-specific EFs and other parameters (e.g. in the energy sector) in order to move to higher-tier methods;

(c) Provide more transparent information on the AD, methods, EFs and other parameters used, in particular for the energy (i.e. the provision of the assumptions used to estimate the country-specific EFs in the NIR) and LULUCF sectors.

IV. Questions of implementation

160. No questions of implementation were identified by the ERT during the review.

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>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

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>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf# page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for the Russian Federation 2011. Available at <http://unfccc.int/resource/docs/2011/asr/rus.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/RUS. Report of the individual review of the greenhouse gas inventory of the Russian Federation submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/arr/rus.pdf>.

UNFCCC. *Standard Independent Assessment Report*, parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Alexander Nakhutin, (Institute of Global Climate and Ecology), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by the Russian Federation:

Dedikov JV, Akopova GS, Gladkaja NG, Piotrovskij AS, Markellov VA, Salichov SS, Kaesler H, Ramm A, Müller von Blumencron A and Lelieveld J. 1999. Estimating methane releases from natural gas production and transmission in Russia. Atmospheric Environment. 33: pp.3291–3299.

Russian Statistical Annual. 2010. ROSSTAT, Moscow: pp. 403, 405.

Zemenkov et al. 2004. Gas networks and storages. Moscow: pp. 12, 13.

Dudek et al. 2002. Emission inventory on company level: Lessons from Russia. Mitigation and Adaptation Strategies for Global Change 7: pp. 155–172.

Natural gas. Methods of calculation of physical properties. General. Interstate standard (ГОСТ 30319.0–96).

[1] Reproduced as received from the Party.

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
EF	emission factor
ERT	expert review team
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 109 joule)
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
ITL	international transaction log
LULUCF	land use, land-use change and forestry
m^3	cubic metre
Mg	megagram (1 Mg = 1 tonne)
NA	not applicable
NE	not estimated
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDL	solid waste disposal on land
UNFCCC	United Nations Framework Convention on Climate Change