Advance Version

COMPLIANCE COMMITTEE

CC/ERT/ARR/2013/35
22 August 2013

Report of the individual review of the annual submission of the Russian Federation submitted in 2012

Note by the secretariat

The report of the individual review of the annual submission of the Russian Federation submitted in 2012 was published on 21 August 2013. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2012/RUS, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations FCCC/ARR/2012/RUS

Framework Convention on Climate Change

Distr.: General
21 August 2013

English only

Report of the individual review of the annual submission of the Russian Federation submitted in 2012*

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the centralized review of the 2012 annual submission of the Russian Federation, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 3 to 8 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Christopher Dore (United Kingdom of Great Britain and Northern Ireland) and Ms. Jolanta Merkeliene (Lithuania); energy – Ms. Carmen Teresa Meneses López (Venezuela (Bolivarian Republic of)), Mr. Ioannis Sempos (Greece) and Ms. Inga Valuntiene (Lithuania); industrial processes – Ms. Laura Dawidowski (Argentina) and Ms. Valentina Idrissova (Kazakhstan); agriculture – Mr. Chang Liang (Canada) and Mr. Yuriy Pyrozhenko (Ukraine); land use, land-use change and forestry (LULUCF) – Ms. Marina Shvangiradze (Georgia) and Mr. Richard Volz (Switzerland); and waste – Mr. Chart Chiemchaisri (Thailand), Ms. Baasansuren Jamsranjav (Mongolia) and Mr. Mikael Szudy (Sweden). Ms. Dawidowski and Mr. Dore were the lead reviewers. The review was coordinated by Ms. Kyoko Miwa (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]

3. In 2010, the main greenhouse gas (GHG) in the Russian Federation was carbon dioxide (CO_2), accounting for 72.4 per cent of total GHG emissions[2] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (22.0 per cent) and nitrous oxide (N_2O) (5.0 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 82.6 per cent of total GHG emissions, followed by the industrial processes sector (7.8 per cent), the agriculture sector (6.2 per cent), the waste sector (3.3 per cent) and the solvent and other product use sector (0.03 per cent). Total GHG emissions amounted to 2,207,596.18 Gg CO_2 eq in 2010 and decreased by 33.7 per cent between the base year[3] and 2010. 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, and the changes to the mix of fuels that are used in the country, in particular the more extensive use of gas and the reduced use of coal.

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.

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

[1] The 2012 annual review report (ARR) for the Russian Federation was published after the submission of the 2013 annual submission.

[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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. 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[a] to 2010

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A sources		CO_2	2 498 581.90	2 498 581.90	1 572 625.21	1 471 362.97	1 524 799.58	1 609 216.92	1 526 260.98	1 598 281.30	–36.0
		CH_4	589 938.43	589 938.43	457 866.73	431 308.33	470 091.07	488 432.38	459 928.21	485 764.09	–17.7
		N_2O	219 947.71	219 947.71	140 720.27	108 744.26	104 277.31	111 695.62	112 402.99	109 286.87	–50.3
		HFCs	12 220.79	28 409.78	12 220.79	21 037.20	15 450.86	14 421.61	10 146.03	10 923.86	–10.6
		PFCs	10 019.27	11 680.24	10 019.27	7 298.60	4 722.14	3 720.57	2 524.58	2 677.57	–73.3
		SF_6	416.27	1 202.49	416.27	696.52	1 340.04	830.88	790.63	662.48	59.1
KP-LULUCF	Article 3.3[b]	CO_2						17 933.26	16 748.21	16 021.41	
		CH_4						48.91	48.43	47.31	
		N_2O						39.94	39.55	38.63	
	Article 3.4[c]	CO_2	NA					–498 560.77	–560 221.72	–567 491.29	NA
		CH_4	NA					10 906.15	11 620.25	10 386.61	NA
		N_2O	NA					9 117.73	9 700.88	8 693.47	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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. 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[a] to 2010

			Gg CO_2 eq							*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A		Energy	2 714 750.45	2 714 750.45	1 778 021.58	1 668 062.46	1 739 331.60	1 834 024.59	1 737 281.73	1 824 123.76	–32.8
		Industrial processes	238 795.23	257 431.42	154 306.15	166 682.75	178 539.67	180 381.36	158 019.06	172 818.51	–27.6
		Solvent and other product use	561.61	561.61	511.68	522.89	531.90	543.67	557.59	564.92	0.6
		Agriculture	318 369.17	318 369.17	210 974.65	149 623.60	137 224.66	143 540.79	142 883.75	137 401.76	–56.8
		Waste	58 647.90	58 647.90	50 054.48	55 556.19	65 053.18	69 827.58	73 311.29	72 687.23	23.9
		LULUCF	NA	80 066.76	–227 154.87	–464 746.28	–542 958.86	–596 697.88	–651 706.99	–652 436.95	NA
		Total (with LULUCF)	**NA**	**3 429 827.31**	**1 966 713.67**	**1 575 701.60**	**1 577 722.15**	**1 631 620.11**	**1 460 346.43**	**1 555 159.23**	**NA**
		Total (without LULUCF)	**3 331 124.37**	**3 349 760.56**	**2 193 868.54**	**2 040 447.88**	**2 120 681.00**	**2 228 317.99**	**2 112 053.42**	**2 207 596.18**	**–33.7**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation						–5 200.39	–5 165.24	–5 092.23	
		Deforestation						23 222.50	22 001.43	21 199.58	
		Total (3.3)						**18 022.10**	**16 836.19**	**16 107.35**	
	Article 3.4[d]	Forest management						–478 536.89	–538 900.60	–548 411.21	
		Cropland management	NA					NA	NA	NA	NA
		Grazing land management	NA					NA	NA	NA	NA
		Revegetation	NA					NA	NA	NA	NA
		Total (3.4)	**NA**					**–478 536.89**	**–538 900.60**	**–548 411.21**	**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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. 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.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2010, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	11 009 425 225	11 037 980 885		11 037 980 885
Annex A emissions for current inventory year				
CO_2	1 593 170 384	1 598 281 297		1 598 281 297
CH_4	485 416 366	485 764 091		485 764 091
N_2O	109 034 379	109 286 873		109 286 873
HFCs	10 923 859			10 923 859
PFCs	2 677 573			2 677 573
SF_6	662 484			662 484
Total Annex A sources	**2 201 885 044**	**2 207 596 177**		**2 207 596 177**
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	–5 092 227			–5 092 227
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA			NA
3.3 Deforestation for current year of commitment period as reported	21 199 580			21 199 580
Activities under Article 3, paragraph 4, for current inventory year[c]				
3.4 Forest management for current year of commitment period	–548 411 212			–548 411 212
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] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 4
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	1 526 260 980			1 526 260 980
CH_4	459 636 331	459 928 207		459 928 207
N_2O	112 190 443	112 402 995		112 402 995
HFCs	10 146 027			10 146 027
PFCs	2 524 584			2 524 584
SF_6	790 630			790 630
Total Annex A sources	**2 111 548 994**	**2 112 053 422**		**2 112 053 422**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	–5 165 240			–5 165 240
3.3 Afforestation and reforestation on harvested land for 2009 as reported	NA			NA
3.3 Deforestation for 2009 as reported	22 001 433			22 001 433
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–538 900 598			–538 900 598
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009				
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] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 5
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	1 609 216 920			1 609 216 920
CH_4	487 924 819	488 432 381		488 432 381
N_2O	111 494 280	111 695 621		111 695 621
HFCs	14 421 612			14 421 612
PFCs	3 720 571			3 720 571
SF_6	830 882			830 882
Total Annex A sources	**2 227 609 084**	**2 228 317 987**		**2 228 317 987**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	–5 200 393			–5 200 393
3.3 Afforestation and reforestation on harvested land for 2008 as reported	NA			NA
3.3 Deforestation for 2008 as reported	23 222 497			23 222 497
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–478 536 891			–478 536 891
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008				
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] 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 2012 annual inventory submission, containing a complete set of common reporting format (CRF) tables for the period 1990–2010, was submitted on 13 April 2012. The national inventory report (NIR) was submitted on 25 May 2012. The expert review team (ERT) noted that this was after the submission deadline of 15 April as specified in decision 15/CMP.1 Although, under decision 15/CMP.1, there is a six-week period before any consequences resulting from a late submission come into effect, the ERT recommends that the Russian Federation submit its next NIR by 15 April. The Party also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: KP-LULUCF activities, the accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 13 April 2012.

7. The Russian Federation officially submitted revised emission estimates on 22 October 2012 in response to questions raised by the ERT during the review. The overall impact of these revised estimates was an increase in estimated total GHG emissions of 708.90 Gg CO_2 eq (0.03 per cent), 504.43 Gg CO_2 eq (0.02 per cent) and 5,711.13 Gg CO_2 eq (0.26 per cent) for 2008, 2009 and 2010, respectively, and an increase of 1,074.46 Gg CO_2 eq (0.03 per cent) for 1990. The values in this report are based on those from the submission of 22 October 2012. The Russian Federation officially submitted revised CRF tables for the second time on 13 December 2012, in order to correct the reference of the accounting quantity of Kyoto Protocol units in the KP-LULUCF CRF accounting table. This editorial correction had no impact on the annual accounting quantities reported by the Party for the KP-LULUCF activities.

8. The ERT also used previous years' submissions 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. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory is complete in terms of years (1990–2010), gases and geographical coverage, and is generally complete in terms of mandatory[5] source and sink categories. The ERT identified the following issues:

[4] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (k)), under the auspices of the international transaction log (ITL) 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.

[5] Mandatory source and sink categories under the Kyoto Protocol are all source and sink categories for

(a) Energy: the Russian Federation has reported CO_2 emissions from coal mining and handling as not estimated ("NE") (see para. 35 below). Although no methodology is provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the guidelines state that "Countries with significant quantities of CO_2 in their coal seam gas should make efforts to evaluate or quantify these emissions". The ERT noted that the Russian Federation has also reported as "NE" CO_2 and CH_4 emissions for the solid fuel transformation categories for which IPCC methodologies are not available. The ERT encourages the Russian Federation to investigate the possibility of estimating these emissions in its next annual submission;

(b) Industrial processes: in table 4.23 of the NIR, which includes information on the amounts of calcium carbide used in the Russian Federation, data on the export/import of calcium carbide did not account for trading with Kazakhstan, owing to a customs agreement that came into force in July 2010. The ERT considered that this could lead to a potential underestimation of CO_2 emissions from the use of calcium carbide. In response to the list of potential problems and further questions raised by the ERT during the review week, the Russian Federation provided revised emission estimates for the calcium carbide category together with supporting information that the ERT considered to be in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) (see paras. 63 and 70 below). The same issue with regard to data on export/import to and from Kazakhstan has also been identified for soda ash use and pig iron. However, during the review, the Russian Federation provided data and explanations showing that no underestimation of CO_2 emissions from these two categories has occurred (see paras. 63 and 68 below);

(c) Industrial processes: the ERT noted that the Russian Federation has reported as "NE" emissions for some categories for which IPCC methodologies are not available, that are: asphalt roofing (CO_2 emissions), road paving with asphalt (CO_2 emissions), ammonia production (CH_4 and N_2O emissions), several subcategories of chemical industry (CO_2, CH_4 and N_2O emissions) and solvent and other product use (CO_2 emissions). The ERT encourages the Russian Federation to investigate the possibility of estimating these emissions in its next annual submission.

(d) LULUCF: the ERT noted that the carbon stock changes in some of the pools in certain mandatory categories in the LULUCF sector are reported as "NE" (see para. 93 below). The pools reported as "NE" have an impact on the following categories: grassland, wetlands, settlements and other land. In response to questions raised by the ERT during the review, the Russian Federation confirmed its intention to resolve this completeness issue and provide emission estimates for those pools in its 2014 annual submission. The ERT welcomes this intention and, recognizing that this improvement will take some time to implement, recommends that the Party improve the completeness of the inventory by including emission estimates for all pools under the mandatory LULUCF categories in its 2014 annual submission.

which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* provide methodologies and/or emission factors to estimate GHG emissions.

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 Russian Federation reported that there have been no changes to its national system since the previous annual submission. The ERT concluded that the national system continues to perform its required functions.

Inventory planning

12. The NIR describes the national system for the preparation of the inventory. The Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet) has overall responsibility for the national inventory and also has responsibility for some parts of its management, such as the official contacts, requests for and receipts of information and obtaining approval from the government for the submission of the CRF tables and the NIR to the UNFCCC secretariat. The Institute of Global Climate and Ecology (IGCE) of Roshydromet and the Russian Academy of Sciences have responsibility for the preparation and most of the management of the national inventory. IGCE collects the necessary data, performs the calculations, compiles the NIR and the CRF tables, and prepares information for the KP-LULUCF activities. The national system also encompasses the Federal Service for State Statistics (Rosstat), other agencies that provide additional data and the relevant government ministries, which provide support by, for example, reviewing the NIR every year.

13. The planned improvements for the next national cycle of inventory preparation are outlined in the NIR under the relevant sectoral chapters. However, the ERT noted that, in most cases, the planned improvements mentioned in the sectoral chapters of the NIR of the 2011 annual submission (in particular in the energy and industrial processes sectors) are repeated in the NIR of the 2012 annual submission.[6] In response to questions raised by the ERT during the review, the Russian Federation provided an updated GHG inventory improvement plan for the 2012 annual submission. The plan is based on the results of the key category analysis and the uncertainty assessment undertaken for the 2012 annual submission and on the findings of the previous annual review reports. The plan outlines the timeline for the planned improvements, except for the improvements in the energy sector. The ERT encourages the Russian Federation to identify and report specific deadlines for planned energy sector improvements, in order to ensure the timely implementation of the improvements. In addition, the ERT recommends that the Russian Federation ensure that sufficient resources are available for the timely implementation of the planned improvements, in order to improve the quality of future annual submissions. The ERT also reiterates the encouragement in the previous review report that the Russian Federation provide, in the NIR of its next annual submission, consolidated information on the implementation of all planned improvements.

[6] The ERT recognizes that the 2011 ARR was not finalized prior to the submission of the Russian Federation's 2012 annual submission and, therefore, it may not have been possible for the Party to take into account the recommendations made in the 2011 ARR in the compilation of its 2012 annual submission.

Inventory preparation

Key categories

14. The Russian Federation has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2012 annual submission. The key category analysis performed by the Russian Federation and that performed by the secretariat[7] produced similar results. The Party has included the LULUCF sector in its key category analysis, which was performed in accordance with 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 ERT reiterates the encouragement in the previous review report that the Russian Federation prepare a tier 2 key category analysis. The use of a tier 2 key category analysis is expected to enhance the identification of key categories and, hence, to provide more accurate information on where it is appropriate to invest in improving the inventory and, in particular, where it is appropriate to use higher-tier methods.

15. In the NIR, the Russian Federation explained that the results of the key category analysis have been used to prioritize the development and improvement of the GHG emissions inventory. However, the ERT considered that the information provided in the NIR is not sufficient, as it does not explain how the information from the key category analysis is used to prioritize inventory improvement activities. The ERT noted that, in the GHG inventory improvement plan provided to the ERT during the review (see para. 13 above), the Russian Federation included a number of planned improvements that relate to the key categories and the reduction of uncertainty. In response to a question raised by the ERT during the review, the Party explained how the results from the key category analysis, as well as the uncertainty assessment, are used to prioritize the development and improvement of the GHG inventory. The Russian Federation explained that inventory improvement activities are prioritized based on the key categories contributing the largest amounts to the overall uncertainty of the inventory, also taking into account the required resources and timescales. The ERT commends the Party for this approach and encourages the Russian Federation to provide a clear and specific description of the prioritization of inventory improvements in the chapter on the key categories in the NIR of its next annual submission.

16. The Russian Federation has identified and reported in the NIR and in the KP-LULUCF CRF tables that forest management is a key category for 2010. However, in response to a question raised by the ERT during the review, the Russian Federation confirmed that deforestation associated with forest land converted to settlements was also identified as a key category in the KP-LULUCF key category analysis and that this error would be corrected in its next annual submission.

Uncertainties

17. The Russian Federation has reported a tier 1 uncertainty analysis (for the energy, industrial processes, solvent and other product use, and waste sectors) and tier 2 uncertainty estimates for the agriculture and LULUCF sectors in its 2012 annual submission. The overall uncertainty, including LULUCF, in the 2012 annual submission was 9.2 per cent for

[7] 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 Land Use, Land-Use Change and Forestry*. 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.

the latest inventory year (2010), and 5.8 per cent for the trend uncertainty. Compared with the latest inventory year in the previous annual submission, there is little change in the overall uncertainty (9.6 per cent overall uncertainty and 5.6 per cent uncertainty in the trend reported for 2009 in the 2011 annual submission). As described in the NIR, the slight decrease in the overall uncertainty for 2010 reported in the 2012 annual submission can be explained by the use of a different disaggregation of categories in the uncertainty assessment compared to the previous annual submission. The ERT agrees with this explanation and considers that the changes made are in line with the IPCC good practice guidance. The ERT noted that annex 5 to the NIR does not include an uncertainty analysis excluding LULUCF. The ERT encourages the Party to include an uncertainty analysis, excluding LULUCF, in its next annual submission.

18. The Russian Federation primarily uses IPCC default uncertainty values, but some country-specific values and values based on expert judgement are also used. The ERT found very limited explanations in the NIR of how the uncertainties were estimated (e.g. see paras. 95 and 114 below). The ERT recommends that the Party provide more comprehensive and transparent information in its next annual submission, in particular to explain how and where expert judgement has been used and has contributed to the parameters used in the uncertainty calculations.

Recalculations and time-series consistency

19. Recalculations have been performed and reported in the 2012 annual submission in accordance with the IPCC good practice guidance. The ERT noted that the recalculations reported by the Russian Federation of the time series 1990–2009 have been undertaken mainly to take into account improvements in the activity data (AD) and emission factors (EFs) used, to address identified errors and to follow recommendations made in the previous annual review reports. The major recalculations were performed in the energy sector (CH_4 emissions from natural gas and CH_4 emissions from coal mining and handling in fugitive emissions from fuels) (see para. 30 below). Recalculations were also undertaken in the industrial processes sector (HFC emissions from refrigeration and air-conditioning equipment (see para. 61 below) and the LULUCF sector (see para. 92 below). The effect of the recalculations on the estimates of total GHG emissions is a decrease of 0.6 per cent for 1990 and a decrease of 0.7 per cent for 2009. The rationale for these recalculations is provided in the NIR and in CRF table 8(b). Recalculations were made for the KP-LULUCF activities for 2008 and 2009 (see para. 116 below).

20. The ERT noted that the emission estimates are generally consistent over the time series. However, the ERT identified some time-series inconsistencies owing to the use of different data sets over the time series (see para. 39 below). The ERT also noted that some of the recalculations have been applied only for the latest years of the time series and not throughout the time series, resulting in inconsistencies (see paras. 45, 46 and 51 below). The ERT recommends that, in its next annual submission, the Russian Federation apply the recalculations to all years of the time series, where relevant, in order to ensure time-series consistency.

Verification and quality assurance/quality control approaches

21. The Russian Federation has a quality assurance/quality control (QA/QC) plan, which is included in the NIR. The plan includes an annual timetable for the implementation of the QA/QC procedures, descriptions of the quality checks and checklists for 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. However, during the review, the ERT identified several inconsistencies within the NIR, as well as between the NIR and the CRF

tables, errors in the default EFs used, errors in the units used, and errors in the use of the notation keys (see paras. 32, 38, 66, 80, and 88 below). The ERT recommends that the Russian Federation improve its QC procedures for the energy, industrial processes and agriculture sectors, in order to minimize such inconsistencies and errors in its next annual submission. The ERT also noted that there is a lack of comprehensive sector-specific QC activities described in the NIR (e.g. QC checks on data sets that are tailored to the data sources and data structures for each of the categories). The ERT therefore encourages the Russian Federation to strengthen its reporting of sector-specific QC procedures, in order to increase the transparency of the reporting in its next annual submission.

22. As well as explaining the procedures for verification studies, chapter 1.3 of the NIR describes two types of GHG inventory QA procedures undertaken by the Russian Federation: a review of the information presented in the NIR by the data providers (audit); and an independent technical review of the NIR and the CRF tables (peer reviews). Information on the first type of QA procedure is provided in the NIR, but information on the peer reviews conducted for the 2012 annual submission, including by whom or by which institutions the reviews were conducted, is not included. In response to questions raised by the ERT during the review, the Russian Federation explained that the peer reviews performed by institutions that are not involved in the inventory preparation process are conducted on a regular basis, but not necessarily for all sectors and categories each year, owing to limited financial resources. In 2012, peer reviews were conducted by Gazprom VNIIGAZ Ltd. for fugitive emissions from oil and gas operations, by the Central Research Institute for Aviation Motors for domestic and international aviation, and by the Centre for Forest Ecology and Productivity for the LULUCF sector. Subject to the availability of resources in 2013, the Russian Federation plans to extend the peer review procedures to other categories, in particular in the energy and industrial processes sectors. The ERT commends the Party for implementing QA procedures and recommends that the Russian Federation provide, in its next annual submission, more transparent and detailed information on the QA procedures and verification studies undertaken and on how the reviews lead to improvements in the inventory.

Transparency

23. The ERT concluded that the CRF tables and the descriptions in the NIR of the 2012 annual submission are generally transparent; nevertheless, the ERT found that some parts of the NIR lacked sufficiently detailed and comprehensive supporting information on the data and methodologies used in the emission estimates, particularly in relation to the aspects described below in this paragraph. The ERT therefore recommends that the Russian Federation continue to improve the transparency of the information provided in its next annual submission. In particular, the ERT recommends that the Party improve the transparency of the NIR for:

(a) The explanations of the AD and parameters used, including how they are derived, the assumptions used and the information on the actual values used in the emission estimates (see paras. 41, 54, 84 and 106 below);

(b) The tiers used for each category, in order to improve the transparency of the methods (see para. 75 below);

(c) Explanatory information regarding the use of the notation keys (see para. 79 below);

(d) The recalculations, in particular the provision of more detailed information on the reasons for the recalculations, the changes to the AD or methodologies used, and the resulting impact on the emission estimates (see para. 57 below);

(e) The IEF trends, including the features observed therein (see para. 85 below).

24. The ERT also noted that the general description of the inventory completeness in NIR chapter 1.5 could be improved. The ERT encourages the Russian Federation to include in the NIR additional information on the inventory completeness (e.g. a table summarizing the completeness of the reporting) in order to increase the overall transparency of the GHG inventory, in its next annual submission.

Inventory management

25. The NIR explains that the Russian Federation has a centralized archiving system, which is both electronic and paper-based, and is maintained by IGCE. The archive contains EFs and AD at disaggregated levels, including 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. In response to a question raised by the ERT during the review, the Russian Federation provided information from the archiving system on QA/QC procedures. The ERT considered this information to be suitably detailed and complete.

3. Follow-up to previous reviews

26. The ERT recognizes that the 2011 annual review report was not finalized prior to the submission of the Russian Federation's 2012 annual submission. Therefore, it may not have been possible for the Party to consider the recommendations from the review of the 2011 annual submission when compiling the emission estimates for the 2012 annual submission. The ERT noted that the main issues highlighted in previous reports that have not yet been addressed by the Party include the following:

(a) The reporting of a number of subcategories (and pools) as "NE" – a number of them in the LULUCF sector are still reported as "NE" in the most recent annual submission (see paras. 91 and 93 below);

(b) The inclusion of more detailed and comprehensive information in the NIR on the AD, parameters, methodologies and assumptions used. The ERT notes that while there have been improvements, there are still transparency issues in the NIR (see paras. 41, 51, 68, 85, 94 and 106 below);

(c) The need to develop country-specific EFs and other parameters (e.g. in the energy sector), in order to move to higher-tier methods. While some improvements have been made, this issue is still relevant for the energy and LULUCF sectors in the most recent annual submission (see paras. 36, 99, 100, 102 and 103 below);

(d) The strengthening of the QA/QC procedures. The ERT identified issues associated with the most recent annual submission which require strengthening of the QA/QC system (see paras. 31, 48 and 96 below).

27. The Russian Federation has implemented several inventory improvements based on the recommendations in the previous review reports, such as:

(a) The reallocation of emissions from autoproducers from the energy industries category to the manufacturing industries and construction category in the energy sector for 2009 and 2010 (see para. 45 below);

(b) An explanation of the trends in CH_4 emissions and the associated uncertainty estimates for coal mining and handling in the energy sector (see para. 56 below);

(c) The calculation of fugitive emissions for missing categories (e.g. CO_2, CH_4 and N_2O emissions from well-drilling and well-testing activities included under natural gas exploration) in the energy sector for all years of the time series (see para. 58 below);

(d) The improvement of the land representation matrices and the disaggregation at the regional level by incorporating information on the age class, species and climatic zone of the AD (e.g. the areas and volumes of forest stands, and conversion factors) (see para. 98 below);

(e) The improvement of the reporting of activities under Article 3, paragraph 3, of the Kyoto Protocol by taking into account the impact of disturbances on the carbon stock changes in afforested lands (see para. 118 below);

(f) The improvement of AD on deforested areas under the LULUCF sector for all years of the time series based on updated statistics on settlement areas provided by Rosstat (see para. 121 below).

4. Areas for further improvement identified by the expert review team

28. During the review, the ERT identified a number of areas for improvement. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 7 below.

B. Energy

1. Sector overview

29. The energy sector is the main sector in the GHG inventory of the Russian Federation. In 2010, emissions from the energy sector amounted to 1,824,123.76 Gg CO_2 eq, or 82.6 per cent of total GHG emissions. Since 1990, emissions have decreased by 32.8 per cent. The key drivers for the fall in emissions are the major structural changes to the economy following the break-up of the Soviet Union and the general economic decline between 1990 and 1998 and the changes in the fuel mix (e.g. natural gas is now used more extensively in place of coal for energy production). Within the sector, 48.9 per cent of the emissions were from energy industries, followed by 19.5 per cent from the fugitive emissions from oil and natural gas, 12.5 per cent from transport, 7.6 per cent from manufacturing industries and construction, 7.5 per cent from other sectors and 2.5 per cent from the fugitive emissions from solid fuels. The remaining 1.5 per cent were from the category other.

30. The Russian Federation has made recalculations for the energy sector between the 2011 and 2012 annual submissions for all years of the time series in response to the recommendations in previous annual review reports, following changes in AD and EFs, and in order to rectify identified errors. The impact of these recalculations on the energy sector is a decrease in emissions of 0.9 per cent for 2009, and a decrease of 0.8 per cent for 1990. The main recalculations took place in the following categories:

(a) CH_4 emissions from oil and natural gas: a decrease in emissions of 4.9 per cent for 2009, primarily caused by changes to the method used to calculate CH_4 emissions from natural gas distribution;

(b) CH_4 emissions from coal mining and handling: a decrease in emissions of 1.6 per cent for 2009, due to the use of a revised methodology which assumes higher levels of CH_4 recovery/flaring;

(c) CH_4 and N_2O emissions from road transportation for 2008 and 2009: a decrease in emissions of 4.8 per cent for CH_4 for 2009 and an increase in emissions of 23.7

per cent for N_2O for 2009, due to new AD on the amount of vehicles of different Euro classes.

31. The ERT noticed discrepancies between the NIR and the data presented in the CRF tables. For example, in the introduction to the section on fuel combustion in the NIR (section 3.2.1, page 34), the Party states that recalculations were not performed, although recalculations for fuel combustion for road transportation were performed, and data on the recalculations were presented in the CRF tables. However, these recalculations are mentioned on page 66, subsection 3.2.3.5, of the NIR. The ERT recommends that the Russian Federation correct such errors and inconsistencies between the NIR and the CRF tables in its next annual submission. In addition, the ERT recommends that the Russian Federation, in its next annual submission, strengthen the QA/QC procedures associated with checking the NIR and the CRF tables, in order to increase the accuracy of the reporting.

32. The ERT noted that the use of notation keys is not consistent throughout the time series for some categories; for example:

(a) The implied emission factor (IEF) for CO_2 emissions from biomass in petroleum refining is indicated as included elsewhere ("IE") for 1990 and for the years 1999–2004, as "NE" for the period 1991–1998, as not applicable ("NA") for the period 2006–2010, and as 107.1 t/TJ for 2005;

(b) The Russian Federation has reported the energy consumption for other fuels in food processing, beverages and tobacco as not occurring ("NO") for 1990 and as "IE" for the years 1991–1999, and has included estimates of the energy consumption for the years 2000–2010. No clear explanation is provided in the NIR. In response to a question raised by the ERT during the review, the Russian Federation explained that the notation key "NO" should be used for the years 1990–1999;

(c) The fuel consumption data reported for biomass and other fuels for non-ferrous metals are not consistent across the time series. For biomass, data are reported for 1990, 1991 and for the period 2000–2004, and the notation key "NO" is used for the years 1992–1999, while the notation key "IE" is used for the period 2005–2010. For other fuels, the notation key "NO" is used for the years 1990–1999 and 2003, data are reported for the years 2000–2002 and 2004 and the notation key "IE" is used for the years 2005–2010. In response to a question raised by the ERT during the review, the Russian Federation confirmed that fuel consumption does not occur in the years where the notation key "NO" is used and that, therefore, the current reporting and use of notation keys is correct.

33. The ERT noted that questions related to the use of notation keys in the energy sector have been repeatedly raised in previous review reports. In order to assist in the review process and increase the transparency of the reporting, the ERT recommends that the Russian Federation, in its next annual submission, review its use of notation keys for all categories in the energy sector and years to ensure that they are correct. Further, the ERT recommends that the Russian Federation include information in the NIR of its next annual submission that explains all instances of the notation keys used.

34. Following the recommendations in previous review reports, the Russian Federation has included additional information on the AD used in the individual subcategories at the level where the emission calculations are performed. A good example of such an explanation is provided in section 3.3.2 of the NIR on fugitive emissions from coal mining and handling. The NIR now also includes information on the individual fuels used in fuel combustion. The ERT commends the Russian Federation for the improvements made to the transparency of the NIR. Nevertheless, for some categories, the ERT still experienced difficulties in understanding the methodologies used in the inventory, owing to a lack of detailed information on the AD. For example, the AD used to estimate emissions from

navigation is not discussed at all in the NIR. The ERT therefore recommends that the Russian Federation further increase transparency by including explanations of the sources and processing of the AD used for each of the categories/subcategories in its next annual submission.

35. The energy sector of the Russian Federation's emissions inventory is generally complete. However, the Party has reported CO_2 emissions from coal mining and handling as "NE". The Revised 1996 IPCC Guidelines indicate that "Countries with significant quantities of CO_2 in their coal seam gas should make efforts to evaluate or quantify these emissions", although no guidance is provided on how the associated emissions might be estimated. In addition, the Revised 1996 IPCC Guidelines refer to CO_2 emissions from coal fires, combustion and oxidation of waste coal and other carbonaceous materials, indicating that those emissions "could be significant", but do not provide a method to calculate the corresponding emissions. The ERT encourages the Russian Federation to investigate the possibility of estimating CO_2 emissions from coal mining and handling, in order to improve the completeness of the inventory in its next annual submission.

36. The Russian Federation uses default carbon content values and oxidation factors for the estimation of emissions for several key categories in the energy sector. The ERT strongly recommends that the Russian Federation use country-specific values for the carbon content of fuel and country-specific oxidation factors to estimate CO_2 emissions from the key categories, in accordance with the IPCC good practice guidance, in its next annual submission.

37. The Russian Federation has performed an uncertainty analysis, which includes the emission categories in the energy sector. The ERT considers that the uncertainty analysis is in line with the IPCC good practice guidance.

2. Reference and sectoral approaches

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

38. The difference in the estimates of CO_2 emissions between the reference approach and the sectoral approach peaks at 12.0 per cent in 1991, then steadily falls over the course of the time series from 7.2 per cent in 1992 to 1.8 per cent in 2010. The reasons for the differences between the reference and sectoral approaches are provided in the NIR, annex 4. According to the Russian Federation, the differences observed in 2010 are due to the differences between the fuel properties (carbon content) used in the reference approach and the sectoral approach, and because the potential losses that occur during the conversion of primary fuels into secondary fuels are not considered in the reference approach. However, the ERT noted that the Party uses the notation key "NA" under apparent energy consumption (excluding non-energy use and feedstocks) in CRF table 1.A(c) for the comparison of the reference and sectoral approaches. To calculate the difference in energy consumption between the two approaches, data reported in the column "Apparent energy consumption (excluding non-energy use and feedstocks)" in the reference approach and energy consumption in the sectoral approach are used for the comparison. The ERT also noted that the energy consumption data provided in CRF table 1.A(c) are not equal to the apparent energy consumption data presented in CRF table 1.A(b) for the reference approach, as required by the CRF tables. This is also the case for CO_2 emissions. Further, the apparent energy consumption for other fuels, reported in CRF table 1.A(c), is negative for 2004 and for the years 2007–2010 (other years being reported as zero ("0")). If there are losses, as suggested by the Russian Federation, then these should be subtracted from the reference approach calculations and clearly presented in CRF tables 1.A(b) and 1.A(c). The ERT recommends that the Party fully and correctly complete CRF tables 1.A(b) and 1.A(c) in its

next annual submission in order to obtain a correct comparison between the CO_2 emissions calculated using the sectoral and reference approaches.

39. The apparent energy consumption according to the Russian Federation's reference approach for most years of the time series corresponds to the International Energy Agency (IEA) data within 6 per cent. The CRF values are systematically lower for all years of the time series except for 1990 and 1991, when the CRF data are approximately 10 per cent higher than the IEA data. During the review, in response to a question raised by the ERT, the Russian Federation explained that national statistics on fuel production, exports, imports and stock changes were used to calculate the apparent energy consumption used for the reference approach for all years of the time series. The NIR indicates that AD from the detailed fuel and energy balance (FEB) prepared by Rosstat are used for the GHG emission calculations for fuel combustion activities. However, the disaggregated FEB for the Russian Federation was not produced for the period 1992–1999. Thus, the energy balance prepared by IEA for the Party was used for the years 1992–1999. This is inconsistent with the response provided by the Russian Federation in response to questions raised by the ERT during the review. The ERT notes that if the Party uses IEA data for its inventory preparation for these years of the time series, then the difference between the fuel consumption according to the sectoral and reference approaches is expected to be lower. The ERT recommends that the Russian Federation, in its next annual submission, review its choice of AD and clearly explain the difference between national and international statistics, in order to ensure that its time-series consistency meets the requirements of the IPCC good practice guidance and that the methodologies used are accurately reported in the NIR.

International bunker fuels

40. The fuel consumption for Russian and non-Russian aircraft for domestic/international flights was calculated based on annual flying times (by aircraft type) and average fuel flow rates (by aircraft type). The main assumptions used to estimate the emissions are well described in the NIR under the relevant chapters. However, the ERT noted that the AD and corresponding background information were not clearly described in the NIR. For example, it is not clear whether the fuel flow rates include the landing and take-off phases as well as the cruise phases. In response to questions raised by the ERT during the review, the Russian Federation confirmed that both phases are taken into account in the fuel flow rates. The Party also confirmed that the AD on flight hours for the years 2000–2010 were obtained from the Federal Aviation Agency and were extrapolated for the earlier years of the time series. The ERT considers that background information on annual flying time by aircraft type (flight hours) is necessary for the review process and, therefore, in order to ensure sufficient transparency, the ERT encourages the Russian Federation to include this information on the AD in the NIR of its next annual submission, and in particular on the methods used to extrapolate the available data to generate emission estimates for the period 1990–1999.

41. The Russian Federation estimates emissions from domestic and international navigation based on data on the loading and unloading of dry and bulk cargo at national ports. The AD are derived from the FEB prepared by Rosstat, whereby data are collected from companies in accordance with a national statistical survey. The assumptions used in the emission estimates are well described in the NIR. However, the ERT noted that the NIR does not include a table of the estimated fuel consumption. The ERT considers such AD to be very helpful for the review process and to facilitate transparency and therefore encourages the Russian Federation to include information on the AD in a tabular format in the NIR of its next annual submission.

Feedstocks and non-energy use of fuels

42. In order to estimate the country-specific carbon storage factors, the Russian Federation started developing the NEAT (non-energy accounting tables) model in 2010. In the 2012 annual submission, the Party explains in the NIR that the NEAT model is used to calculate CO_2 emissions estimated under the reference approach, but that the development of the model is ongoing. In the NIR, the Russian Federation provides a comparison between the CO_2 emissions estimated using the sectoral approach, the reference approach using country-specific carbon storage factors developed by the NEAT model and the reference approach not using information from the NEAT model. The results show that the use of the NEAT model decreases the difference between the CO_2 emissions estimated under the sectoral and reference approaches to approximately 2–3 per cent. The ERT commends the Russian Federation for this improvement and encourages the Party to complete the ongoing development of the NEAT model and use the resulting estimates in its next annual submission.

43. According to the information provided in the NIR, the Russian Federation is planning to increase the accuracy of the accounting of the carbon content of fuels for non-energy use, namely by developing the country-specific factors used to define the carbon stored and by further investigating the use of data on the stored carbon of other countries. The ERT recommends that the Russian Federation proceed with these improvements in order to improve the accuracy of its reporting and reflect the results in the emission estimates of its next annual submission.

3. Key categories

Stationary combustion: all fuels – CO_2, CH_4 and N_2O[8]

44. CO_2 emissions from the stationary combustion of fuels are calculated using IPCC default EFs for most of the categories and fuels (country-specific EFs are used for coal). Relevant data on fuel consumption are taken from the FEB. Rosstat collects data from companies in accordance with a national statistical survey and then aggregates these data according to the structure of the detailed FEB. The country-specific EFs for coal were derived from information on the origin of the coal (basins) and the corresponding fuel properties of 90 per cent of the coal used in electricity and heat generation in the Russian Federation. Plant-specific oxidation factors were used in the CO_2 emission estimates. In response to points raised in previous annual review reports, the Russian Federation has developed year-specific CO_2 EFs for coal to reflect the changes in, for example, the proportions of coal originating from different coal basins. However, the ERT notes that the country-specific CO_2 EFs for coal are only used for the energy industries category. In the NIR, the Party explains that, although it has explored the possibility of applying the improved country-specific EFs for coal for energy industries to other stationary combustion categories in line with the recommendations in the previous review report, it was not possible to do so because it cannot be assumed that the mixture of coal used in electricity generation can be applied to other categories. The ERT recommends that the Russian Federation gather further information on the use of coal in order to allow for the development of country-specific CO_2 EFs for all stationary sources using coal, and that the Party use these data to estimate CO_2 emissions for all categories under stationary combustion in its next annual submission.

[8] Not all emissions related to all gases under this category are key categories, particularly CH_4 and N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

45. Following the recommendations of the previous review report, the Russian Federation has reallocated fuel consumption, and hence CO_2 emissions (as well as CH_4 and N_2O emissions), by autoproducers from the energy industries category to the manufacturing industries and construction category. The ERT commends the Russian Federation for the improvement. However, the ERT noted that the improvement was performed for 2009 and 2010 only. In response to a question raised by the ERT during the review, the Party indicated that it is planning to apply this change to the whole time series in its next annual submission. The ERT strongly recommends that the Russian Federation undertake the reallocation of fuel consumption by autoproducers from the energy industries category to the manufacturing industries and construction category for the whole time series in its next annual submission.

46. The ERT noted that the Russian Federation has reported CO_2 emissions (as well as CH_4 and N_2O emissions) from the public electricity and heat production, petroleum refining and manufacture of solid fuels, and other energy industries subcategories for the years 2005–2010. However, for the years 1990–2004, a total for these emissions is reported under the public electricity and heat production subcategory, while emissions from the other subcategories are reported as "IE". In response to a question raised by the ERT during the review, the Russian Federation explained that the structure of the national statistics was changed in 2005 to allow for adaptation to international standards. Therefore, the AD that would enable the Party to disaggregate the emissions from energy industries into the required subcategories are not available for the years prior to 2005. The ERT recommends that the Russian Federation reallocate the emissions to the appropriate subcategories for the complete time series in its next annual submission, if necessary using the splicing techniques recommended in the IPCC good practice guidance.

47. The Russian Federation currently uses a country-specific CO_2 EF for natural gas combustion in public electricity and heat production, and default EFs for other categories. According to the information provided in the NIR, the Party is planning to improve the approach used to estimate emissions from the use of natural gas in other categories by using country-specific EFs. The ERT strongly recommends that the Russian Federation proceed with the planned improvement and use country-specific EFs for natural gas for all categories in its next annual submission.

48. The ERT noted fluctuations in the CO_2 IEF for liquid fuels used in food processing, beverages and tobacco under manufacturing industries and construction. The IEF is 74.4 t/TJ in 1991 and 256.8 t/TJ in 1992, then decreases to 137.9 t/TJ in 2003 and falls sharply to 73.7 t/TJ in 2004. In response to a question raised by the ERT during the review, the Russian Federation explained that there was an error owing to the manually inputted fuel consumption data for the period 1992–2003. The ERT recommends that the Party correct such errors and inconsistencies in the CRF tables of its next annual submission. In addition, the ERT recommends that the Russian Federation strengthen the QA/QC procedures associated with the checking of the CRF tables, in order to increase the accuracy of its reporting.

49. In the previous review report, the ERT identified that the CH_4 and N_2O emission estimates for liquid fuels and biomass were not being allocated to the correct subcategories, and that this resulted in variable IEFs across the time series. In response to recommendations in previous review reports, the Russian Federation has aligned the CH_4 and N_2O emission estimates to the same subcategories as the CO_2 emission estimates within both the energy industries and manufacturing industries and construction categories. The ERT commends the Russian Federation for this improvement in the consistency of the inventory.

50. The Russian Federation currently uses default EFs for the estimation of CH_4 and N_2O emissions from the energy industries. According to the information provided in the

NIR, the Party is planning to establish country-specific CH_4 and N_2O EFs for the energy industries. The ERT encourages the Russian Federation to proceed with this improvement in its next annual submission.

Road transportation: liquid fuels – CO_2, CH_4 and N_2O[9]

51. The ERT noted that the Russian Federation used the IPCC default CO_2 EFs (69.3 t CO_2/TJ for gasoline and 74.1 t CO_2/TJ for diesel oil (table 1-2 of Volume 2 of the Revised 1996 IPCC Guidelines) to estimate GHG emissions from road transportation for gasoline and diesel oil, using information from the COPERT road transport emissions model, for the complete time series. The ERT noted that tables 1–36 to 1–42 of Volume 3 of the Revised 1996 IPCC Guidelines provide default CO_2 EFs that are specific to road transportation (73.0 t CO_2/TJ for gasoline and 74.0 t CO_2/TJ for diesel oil). In response to the list of potential problems and further questions raised by the ERT during the review week, the Russian Federation provided revised emission estimates for gasoline. The ERT welcomed the recalculations for gasoline, but noted that only the estimate for CO_2 emissions from gasoline use for 2010 was revised. The ERT therefore strongly recommends that the Party apply the recalculations to the entire time series for emissions from gasoline-fuelled road vehicles in its next annual submission, in order to ensure time-series consistency. The Russian Federation also provided a detailed explanation of the parameters used in the estimates of emissions from diesel use. The ERT considered this explanation to sufficiently justify the use of the existing methodology, EFs and parameters in estimating the emissions from diesel-fuelled road vehicles. However, the ERT notes that the methodological descriptions in the NIR do not sufficiently explain the current choice of parameters, default EFs and methodology. The ERT therefore strongly recommends that the Russian Federation include a comprehensive and detailed explanation of the calculation methodology in the NIR and, in particular, that the Party include a reference to the COPERT methodology, as well as detailed definitions of the parameters used, in the NIR in order to ensure transparency, in time for its next annual submission.

52. The ERT noted that, in the revised estimates (see para. 51 above), the Party used default EFs from the Revised 1996 IPCC Guidelines. However, the ERT also noted that it is good practice to use country-specific values for the carbon content of fuels to estimate CO_2 emissions, as indicated in the IPCC good practice guidance, particularly considering that road transportation is a key category for the Russian Federation. The ERT therefore recommends that the Party compile data that allow for the country-specific carbon content to be determined for both gasoline and diesel oil in the road transportation category in its next annual submission.

53. The Russian Federation currently uses country-specific EFs for the estimation of CH_4 and N_2O emissions from road transportation. According to the information provided in the NIR, the Russian Federation is planning to improve the accuracy of the country-specific CH_4 and N_2O EFs to better reflect the specific mix of vehicles in the country. The NIR does not provide further detail on the shortcomings of the current data, but the ERT welcomes the planned improvements.

Coal mining and handling: solid fuels – CH_4

54. The Russian Federation reported, in the documentation box of CRF table 1.B, that CH_4 is recovered rather than flared. In response to a question raised by the ERT during the review, the Russian Federation provided clarifications that coal mine methane (CMM) is

[9] Not all emissions related to all gases under this category are key categories, particularly CH_4 and N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

primary utilized in boiler stations installed at the underground mines of the Pechora coal basin. In addition, a small quantity of methane was utilized in a 1 MW experimental electric power generation station deployed in that region in the late 1990s. The Party confirmed that all CMM utilized is accounted for in the CRF tables. The ERT considers this information to be important in ensuring transparency and therefore recommends that the Russian Federation include a detailed description of methane utilization in the NIR and in the CRF documentation box in its next annual submission and clearly indicate the subcategory(ies) under which the emissions are reported.

55. The ERT noted that the level of methane utilization has increased by more than 100 per cent in recent years. In the NIR, the Party reports that CH_4 recovery from mines amounted to 68.01 Gg CH_4 in 2009 and 78.77 Gg CH_4 in 2010, compared with 25.21 Gg CH_4 in 1990 and 32.32 Gg CH_4 in 2008. In response to a question raised by the ERT during the review, the Russian Federation explained that the increased level of CMM utilized in 2009–2010 was due to the commissioning of the new CMM utilization systems by the SUEK Mining Company which has launched a joint implementation project at its subsidiary, the Kirova mine in the Kuznetsky coal basin, which was put into operation in 2009 and where CMM is utilized at boiler stations and electricity production facilities. From 1990 to 2008, CMM utilization was only performed at the underground mines of the Pechora coal basin, operated by Vorkutaugol JSK; therefore, the data on CMM utilization were taken from the Vorkutaugol JSK reports. Both companies report on their activities to the Ministry of Energy; therefore, since 2009 the Russian Federation has used AD on the utilization of CH_4 provided by the Ministry of Energy. The ERT recommends that the Russian Federation provide an explanation of this issue in the NIR of its next annual submission in order to ensure transparency, especially in view of the fact that the CH_4 recovery trend shows a large inter-annual increase.

56. In response to recommendations in previous review reports, the Russian Federation has added detail to the explanations of the trends of CH_4 emissions from coal mining and handling. The Party has also explained the values used for the uncertainty estimates for the category and the rationale for the difference between the current and previous uncertainty estimates. The ERT commends the Russian Federation for these improvements.

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

57. In the NIR, the Party reported that recalculations of CO_2 and CH_4 fugitive emissions from natural gas were undertaken owing to an improvement in the accuracy of the parameters associated with the content of natural gas. Recalculations were made for all subcategories (with the exception of flaring) and for all years of the time series. The CH_4 emission estimates for 1990 and 2009 decreased by 5.7 and 4.9 per cent, respectively. However, these recalculations are not transparently described in the NIR and the ERT therefore encourages the Party to increase the transparency of the NIR by clearly describing the rationale for recalculations, including all changes in methodology, AD or EFs.

58. In accordance with the recommendations made in the previous review report, the Party has estimated fugitive emissions of CO_2, CH_4 and N_2O from previously missing activities, such as well-drilling and well-testing activities included under natural gas exploration. The ERT commends the Russian Federation for this improvement.

4. Non-key categories

Civil aviation: liquid fuels – CO_2

59. The fuel consumption in civil aviation in 1990 was more than twice the fuel consumption in 2010. In response to questions raised by the ERT during the review, the Russian Federation explained that the changes in fuel consumption depend on the intensity

of aviation activity. The Party further explained that in 1990 the passenger turnover was 141.0 billion passenger-km, compared with 59.6 billion passenger-km in 2010 for domestic flights. The Russian Federation provided additional information to support this observation.[10] The ERT acknowledges the response and detailed information provided by the Russian Federation during the review and encourages the Party to include this information in the NIR of its next annual submission in order to improve transparency and, where possible, to provide additional information that supports the input data.

C. Industrial processes and solvent and other product use

1. Sector overview

60. In 2010, emissions from the industrial processes sector amounted to 172,818.51 Gg CO_2 eq, or 7.8 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 564.92 Gg CO_2 eq, or 0.03 per cent of total GHG emissions. Since 1990, emissions have decreased by 32.9 per cent in the industrial processes sector, and increased by 0.6 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are the decrease in by-product emissions from hydrochlorofluorocarbon-22 (HCFC-22) production, the decrease in HFC emissions from aluminium production and the reductions in limestone and dolomite use and in cement production, lime production and iron and steel production. This has primarily been due to a reduction in production in recent years caused by the global economic downturn. Within the industrial processes sector, 46.3 per cent of the emissions were from iron and steel production, followed by 13.1 per cent from cement production, 9.5 per cent from ammonia production and 9.1 per cent from limestone and dolomite use. Aluminium production accounted for 5.4 per cent and lime production accounted for 4.2 per cent of the emissions. The remaining 12.4 per cent were from ferroalloy production, soda ash production and use, and consumption of halocarbons and SF_6.

61. The Russian Federation has made recalculations for the industrial processes sector between the 2011 and 2012 annual submissions for the whole time series following improvements in AD and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is negligible (a decrease in emissions of 0.1 per cent for 2009 and a decrease of 0.04 per cent for 1990). The main recalculations took place in the following categories:

(a) N_2O emissions from nitric acid production: an increase of 13.8 per cent for 2009, due to the use of new AD;

(b) HFC emissions from refrigeration and air-conditioning equipment under consumption of halocarbons and SF_6: a reduction of 9.4 per cent for 2009, due to the use of new AD;

(c) CO_2 emissions from cement production and lime production: a decrease of 1.8 per cent and 3.0 per cent, respectively, for 2009, due to the use of new AD.

62. The Russian Federation's NIR is comprehensive and transparent. The Party has provided justifications in the NIR for the assumptions made and the choice of data and methods used. The CRF tables include estimates of emissions for all categories in the industrial processes and solvent and other product use sectors for which methodologies are provided in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

[10] Grabar VA, Gitarskii ML, Dmitrieva TM, Glukhovskaya EP, Khor'kova NI and Kirichkov SV. 2011. Assessment of greenhouse gases emission from civil aviation in Russia. *Russian Meteorology and Hydrology*. 36(1).

Emissions have been reported for all gases, all years of the inventory time series and all geographical locations. The ERT commends the Russian Federation for its efforts to report a transparent and complete inventory.

63. During the review, the ERT noted that, owing to a newly introduced customs agreement between the Russian Federation and Kazakhstan which entered into force in July 2010, some AD on exports/imports might not be accounted for in the emission estimates, which could lead to the underestimation of emissions from soda ash use, calcium carbide production and iron and steel production. In response to a question raised by the ERT during the review, the Russian Federation confirmed that the data on pig iron for steel-making have not been taken into account in the customs statistics on exports/imports to and from Kazakhstan since July 2010. Later, during the review, the Party provided data and explanations indicating that the Russian Federation was a net exporter of pig iron for steel production to Kazakhstan in 2010 and that there was therefore no underestimation of CO_2 emissions from iron and steel production. The ERT agreed with the interpretation of the information presented but noted, however, that the existing institutional arrangements had not identified this issue, which could have led to an underestimation of emissions. The ERT therefore recommends that the Russian Federation improve the institutional arrangements and procedures to ensure that the impact of customs agreements are taken into account when determining input data for the GHG inventory, in order to avoid the potential underestimation or overestimation of emissions in future annual submissions. The other issues related to the new customs agreement with Kazakhstan leading to potential underestimations of emissions identified by the ERT during the review are discussed below (see paras. 68 and 70 below).

64. The ERT noted that limited information on the sector-specific QA/QC procedures applied to the individual categories in the industrial processes sector is provided in the NIR. The Party has provided information on the recalculations undertaken, as well as information on planned improvements. However, there are no explanations of, for example, sector-specific data-checking procedures, or independent verification studies. The ERT recommends that the Russian Federation report, in the NIR of its next annual submission, more comprehensive information on the sector-specific QA/QC procedures performed and, in particular, any external reviews, focusing on the key categories.

65. The Russian Federation has carried out a tier 1 uncertainty analysis, which includes the emission categories in the industrial processes sector. The largest contributor both to the trend and to the absolute uncertainty of emissions in the industrial processes sector is CO_2 emissions from iron and steel production.

2. Key categories

Aluminium production – PFCs

66. The Russian Federation has reported PFC emissions from aluminium production as "NE" (namely perfluoropropane (C_3F_8), perfluorobutane (C_4F_{10}), perfluorocyclobutane (c-C_4F_8), perfluoropentane (C_5F_{12}) and perfluorohexane (C_6F_{14}) in CRF table 2(II)). In response to questions raised by the ERT during previous stages of the review, the Russian Federation clarified that, according to the Revised 1996 IPCC Guidelines, only perfluoromethane (CF_4) and perfluoroethane (C_2F_6) are emitted during primary aluminium smelting. The Party also agreed that the notation key "NE" used in the CRF tables was wrong and that the notation key "NO" would be used to report the relevant PFC emissions under this category in its next annual submission. The ERT recommends that the Russian Federation use the correct notation keys and improve its QC procedures, in order to avoid the incorrect use of the notation keys in its next annual submission.

3. Non-key categories

Lime production – CO_2

67. The ERT noted that the NIR states that some small companies produce lime for their own needs and may not include lime production AD in the data reported to Rosstat. This results in a high uncertainty of the AD for this category (30 per cent). The ERT considers that this situation has the potential to cause an underestimation of CO_2 emissions from lime production. In response to a question raised by the ERT during the review in relation to the provision of additional information on AD that may be currently missing from the emission estimates, the Party explained that sugar plants are obliged to report lime production to Rosstat and that there was no evidence of unaccounted lime production in the Russian Federation. The ERT agreed with the explanation provided by the Party. However, the ERT recommends that the Russian Federation provide more detailed information on the AD for this category in the NIR and explain that there is no potential underestimation of emissions for this category. The ERT also noted that there are considerable uncertainties associated with the emission estimates for this category and recommends that the Russian Federation use the information on the uncertainty of the AD to investigate whether it is appropriate to prioritize the improvement of the AD in order to improve the accuracy of the emission estimates in its next annual submission.

Soda ash use – CO_2

68. As described in paragraph 63 above, the ERT noted that, in table 4.9 of the NIR, the AD on soda ash exports/imports do not account for the trading between the Russian Federation and Kazakhstan. In response to a request made by the ERT during the review for the data on exports/imports of soda ash between the Russian Federation and Kazakhstan for 2010, the Party provided information that indicated that the reported CO_2 emissions for this category had been overestimated, rather than underestimated. The ERT recommends that the Russian Federation include more thorough supporting information and an explanation of the AD used in its next annual submission, in order to demonstrate that there is no underestimation of emissions.

Glass production – CO_2

69. In the CRF tables, the Russian Federation reported CO_2 emissions from glass production as "IE", as they are included under the category limestone and dolomite use. The ERT noted that table 4.7 in the NIR includes data for metal and glass production separately. In response to a question raised by the ERT during the review, the Party informed the ERT that it would consider reporting emissions from glass production separately from the emissions from limestone and dolomite use in its next annual submission. The ERT encourages the Russian Federation to report these CO_2 emissions under the category other (mineral products) in its next annual submission, in order to improve transparency.

Carbide production – CO_2

70. As described in paragraph 63 above, the AD on calcium carbide exports/imports do not account for the trading between the Russian Federation and Kazakhstan, owing to a customs agreement that came into force in July 2010. In response to a request made by the ERT during the review, the Russian Federation provided data on exports/imports of calcium carbide with Kazakhstan for 2010 that indicated an underestimation of CO_2 emissions in this category.

71. Following the recommendation included in the list of potential problems and further questions raised by the ERT during the review week, the Russian Federation submitted

revised CO_2 emission estimates for 2010. As a result of the recalculation, the CO_2 emissions from this category increased by 8.71 Gg, or 4.3 per cent, for 2010 (from 202.13 Gg to 210.84 Gg). The ERT is of the view that the revised estimates have been performed in accordance with the IPCC good practice guidance and commends the Russian Federation for implementing this recalculation.

D. Agriculture

1. Sector overview

72. In 2010, emissions from the agriculture sector amounted to 137,401.76 Gg CO_2 eq, or 6.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 56.8 per cent. The key drivers for the fall in emissions are the reduction of the livestock population and sown areas and the amount of synthetic fertilizer applied as a result of the break-up of the Soviet Union and following the reorganization of the agriculture sector. Within the sector, 53.6 per cent of the emissions were from agricultural soils, followed by 28.1 per cent from enteric fermentation and 17.6 per cent from manure management. The remaining 0.7 per cent were from rice cultivation. The ERT is of the opinion that the Party's use of the notation keys in the reporting on the agriculture sector is correct and in line with the IPCC good practice guidance.

73. The Russian Federation has made recalculations for the agriculture sector for all years of the time series between the 2011 and 2012 annual submissions following changes in AD in order to update data on the poultry population as well as areas of pastures and hayfields. The impact of these recalculations on the agriculture sector is an increase in emissions of 0.4 per cent for 2009 and an increase in emissions of 0.3 per cent for 1990. The recalculations took place in the following categories:

(a) CH_4 emissions from enteric fermentation: an increase in emissions of 0.6 per cent for 2009;

(b) CH_4 and N_2O emissions from manure management: an increase in emissions of 1.4 per cent and 0.4 per cent, respectively, for 2009;

(c) Direct soil N_2O emissions: an increase in emissions of 0.1 per cent for 2009;

(d) N_2O emissions from pasture, range and paddock manure: an increase in emissions of 0.6 per cent for 2009;

(e) Indirect N_2O emissions: an increase in emissions of 0.3 per cent for 2009.

74. The Russian Federation performs sector-specific QA/QC procedures for all key categories in the agriculture sector. These annual procedures include: a comparison of cattle feed intake in units of kilograms of dry matter per day with the weight of the typical animal in the subcategory (the resulting daily dry matter intake should be of the order of 1–3 per cent of the body weight of the animal); a comparison between the statistical data from the statistical database of the Food and Agriculture Organization of the United Nations (FAOSTAT) and the national statistical data on livestock populations; an analysis of the synthetic fertilizer balance (exports and imports, production and consumption trends); and a cross-check of emission estimates for crop residues using country-specific methods with the results obtained by applying default IPCC methodologies. The ERT acknowledges the efforts of the Russian Federation to ensure high-quality data for GHG inventory purposes and encourages the Party to continue with these efforts.

75. The ERT noted that the tier levels used to estimate emissions from several categories are not transparently indicated in the NIR. In particular, it is unclear which tiers from the IPCC good practice guidance (1a or 1b) were applied to estimate direct N_2O emissions

from animal manure applied to soils and indirect emissions. The ERT considers that this information is important for the inventory review process and therefore recommends that the Russian Federation clearly indicate, in the NIR of its next annual submission, the tier levels used to estimate the emissions per category in the agriculture sector.

76. The Russian Federation has used tier 2 methods with country-specific methodologies and EFs for the majority of the key categories in the sector. The ERT recognizes that the Party has made a number of improvements to the emission estimates in the agriculture sector and commends the Russian Federation for these improvements. The ERT encourages the Party to continue with the collection and implementation of the best available scientific data and methodologies, in order to further improve the accuracy of future GHG inventories, and to ensure that tier 2 or higher methods are used for all key categories.

77. The average annual data on the population of the main animal species (e.g. cattle, swine, sheep and goats) are based on highly accurate statistical monthly data on livestock turnover.[11] Seasonal births (usually in spring) and the slaughtering of young animals (usually in autumn) are only relevant for cattle, swine, sheep and goats. The slaughtering of young animals is not a common practice in the Russian Federation for other animal species and, therefore, the population on 1 January is a precise estimate of the average annual numbers of, for example, horses. In the case of poultry, rabbits and fur animals, new births and slaughtering happen within the same year. Consequently, the population of these animal species for a single date is used as an approximation for the average annual population. The procedures for population data collection and processing by Rosstat are transparently described in the NIR. The ERT welcomes the efforts made by the Russian Federation to collect, systematize and adopt the huge array of statistical data on the livestock population for the purposes of the GHG inventory.

78. The ERT noted that the allocation of dairy and non-dairy cattle manure in animal waste management systems (AWMS) for the years 2006–2008 and 2010 provided in the additional information table (for tier 2) of CRF table 4.B(a) (CH_4 emissions from manure management) do not add up to 100 per cent. This issue was raised in previous review reports. During the review, the Russian Federation informed the ERT that it had concluded that this was due to a problem associated with the CRF Reporter software, because the fractions of manure for each AWMS are correctly inputted, but are not correct in the generated CRF tables. Following this reply from the Russian Federation, the ERT has reviewed this issue and notes that the Party entered the numerical data with commas to represent decimal points instead of a full stop, which results in incorrect reporting. The ERT notes that this has no impact on the emissions reported in the CRF tables, but recommends that the Russian Federation use full stops for decimal points, not commas, in its next annual submission and improve its QC procedures in this regard.

79. The average typical animal mass data reported in CRF table 4.B(a) are not consistent across the period 1990–2010. In particular, for the years 1990–2002 and 2006–2009 the notation key "NE" was used without any explanation, while for the other years the mass values are reported. In response to questions raised by the ERT during the review, the ERT was informed that data on the typical animal mass for some animal categories are available in the national statistics only for a few years, and that this parameter is not included in the periodical statistical surveys of Rosstat. The animal mass values were not used in the calculations, because the methodologies are based on feed intake data. Hence, the mass data are provided for information purposes only. The ERT recommends that the Russian Federation include this explanatory information regarding the use of the notation key "NE"

[11] <http://www.gks.ru>.

for animal mass data in the documentation box of the relevant CRF table in its next annual submission, in order to improve transparency.

80. The ERT noted that the Russian Federation used the value 18.4 MJ/kg of dry matter to calculate the gross energy values of animal feed (equation 6.1 of the NIR). However, the IPCC good practice guidance and the Revised 1996 IPCC Guidelines provide a default energy density factor of 18.45 MJ/kg of dry matter. The calculation used for the estimation of GHG emissions for many different categories is based on data on the amount and composition of feed consumed by animals, as well as the energy density of the feed. During the review, in response to a question raised by the ERT, the Russian Federation acknowledged that this was a transcription error. This error resulted in an underestimation of the gross energy intake, an underestimation of the CH_4 EF and, hence, an underestimation of the CH_4 emissions from enteric fermentation, the CH_4 and N_2O emissions from manure management and the N_2O emissions from agricultural soils. In response to the list of potential problems and further questions raised by the ERT during the review week, the Russian Federation provided revised estimates for all years, using the default density factor of 18.45 MJ/kg of dry matter in the estimation of emissions for all relevant categories in the agriculture sector. The overall impact of the recalculations on the emission estimates for the agriculture sector was an increase of 0.4 per cent (600.22 Gg CO_2 eq) for 2010. The ERT welcomes this revision to the emission estimates for the agriculture sector.

81. The ERT noted that there is a lack of detailed information in the NIR on the improvements planned for future annual submissions. In response to questions raised by the ERT during the review, the Party informed the ERT that, in accordance with the annual inventory improvement plan, the following measures are planned for the agriculture sector in time for the compilation of the 2013 annual submission:

(a) A check of the changes, corrections and updates made to all statistical information used in the agriculture sector of the GHG inventory and a correction of the data and respective recalculations, if necessary;

(b) An analysis of new scientific and reference literature to search for new data and/or parameters, in order to improve the accuracy of the emission estimates in the agriculture sector;

(c) The fulfilment of the recommendations of the ERT from the 2012 annual review report and the performance of recalculations, if necessary;

(d) An analysis of the availability of all AD for the period 1990–2011 to assess whether additional data will need to be obtained to allow for the use of the methodologies from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* for the estimation of emissions from the agriculture sector (in order to prepare for the reporting after 2014);

(e) A review of available information on biogas equipment that might be used on husbandry farms in the Russian Federation, for CH_4 recovery.

82. The ERT welcomes the improvement plan; however, the ERT notes that the actions in that plan are general in nature, and therefore encourages the Russian Federation to prepare an improvement plan including, for example, specific detailed actions, with timescales, that lead to direct improvements in the emission estimates for specific categories, as well as information on the parameters used in the estimation methodologies, in time for the next annual submission.

83. The Russian Federation has carried out a tier 1 uncertainty analysis, and a limited tier 2 uncertainty analysis for the agriculture sector (a Monte Carlo analysis has been undertaken for the emission estimates for 2004 as a test study). The results from both the

tier 1 and tier 2 assessments have been combined to provide uncertainty estimates for 2010. The results of the uncertainty analysis are in line with the expectations of the ERT.

2. Key categories

Enteric fermentation – CH_4

84. The Russian Federation has applied different CH_4 EFs according to region for dairy cattle in the estimation of CH_4 emissions from this category. The values of those EFs for 2010, presented in table 6.4 of the NIR, vary significantly, from 26.69 kg CH_4/head/year for Dagestan to 149.96 kg CH_4/head/year for Ingushetia. In response to a question raised by the ERT during the review, the Party explained that large differences in the total amount of food consumed by non-dairy and dairy cattle among the regions of the Russian Federation cause these variations in the EFs. Influencing factors for the differing levels of food consumption, such as the ratio of large agricultural enterprises to private holdings, the number of days animals spend on pastures during the year and the financial situation in the respective regions (i.e. the ability to purchase the more expensive concentrate fodder), vary by region. In Dagestan, for example, the statistical data indicate that the daily milk production is the lowest among all the regions (only 3.1 kg/head/day) and the average animal live weight at farms is also among the lowest in the country (289 kg for dairy cattle against a national average of 478 kg). The higher proportion of young heifers in Dagestan compared with other regions of the Russian Federation explains this difference. All of these explanations provided by the Russian Federation were supported by statistical data from sources that the ERT considered to be reliable. The ERT is satisfied with the explanations provided by the Party and recommends that the Russian Federation present this information explaining the large fluctuations in the enteric fermentation EFs between regions (with supporting charts or tables and references to published sources) in its next annual submission, in order to improve the transparency of its reporting.

85. The CH_4 IEF for enteric fermentation for dairy cattle varies considerably across the time series. The value of the CH_4 IEF in 1990 is reported as 99.63 kg CH_4/head/year, and steadily falls to 89.14 kg CH_4/head/year in 1996. This is followed by a general increase over the period 1999–2006 (peaking in 2006 at 103.25 kg CH_4/head/year). Over the period 2007–2010, the IEF shows a slight decrease, with a value of 100.84 kg CH_4/head/year in 2010. Throughout the reporting years, the IEFs of the Russian Federation are higher than the IPCC default value (81 kg CH_4/head/year). The ERT encourages the Russian Federation to perform a detailed analysis of the key drivers influencing the trends in the IEFs and recommends that the Party include supporting explanatory information in the NIR of its next annual submission, in order to improve the transparency of the reporting.

Manure management – N_2O

86. The ERT noted that the Party states in the NIR that only 6.5 per cent of poultry manure remains on paddocks, while the other 93.5 per cent is stored in solid form. The ERT requested that the Russian Federation describe the peculiarities of poultry manure management practice in public enterprises and households that lead to such a low percentage of poultry droppings on pastures compared with neighbouring countries and the values provided in the Revised 1996 IPCC Guidelines. In response to the question raised by the ERT during the review, the Russian Federation explained that all droppings from poultry on paddocks and pastures remain untreated in households, but the main portion of poultry is kept at large farms, which usually do not practice any pasturing of poultry. During the review, the Party provided the ERT with a document[12] that describes in detail

[12] Gytarsky et al. 2001. The Greenhouse Gases Emission in the Agricultural Sector of Russia. *Agricultural Biology*. No. 6.

the manure management practices that are common for Russian conditions, as well as the methodology used to estimate the data on the allocation of poultry manure to AWMS. The ERT recommends that the Russian Federation include the explanatory information provided during the review in its next annual submission.

Direct soil emissions – N_2O

87. The ERT noted that the data on the amount of nitrogen (N) fertilizer consumed in the Russian Federation for 1991 and 1992 are reported in the FAOSTAT database. However, the Party uses interpolation to obtain the data applied to the calculations for these years. During the review, in response to a question raised by the ERT, the Russian Federation stated that for 1991 and 1992 statistical data on fertilizers were not collected in the Russian Federation. Therefore, any information presented in the FAOSTAT database for 1991 and 1992 is estimated by FAO and could not be considered as reliable data. Additionally, the Party provided the results of a comparative analysis between the FAO data and the national data used for the inventory emission estimates on the amount of synthetic fertilizer consumed. As recommended by the IPCC good practice guidance, the data were accompanied by explanations of the substantial discrepancies observed. The ERT considered the analysis provided by the Russian Federation and is of the view that the national data used to calculate the synthetic fertilizer applied are of sufficient quality for use in the inventory. The ERT recommends that the Russian Federation include the reasons for using interpolation techniques to obtain the data for 1991 and 1992 and the results of the comparative analysis between the FAO data and the national data under the QC procedures section in the NIR of its next annual submission, in order to ensure that the reporting is transparently presented in line with the IPCC good practice guidance.

88. The ERT noted that, in the additional information table of CRF table 4.D, the Party has reported as "NE" the fractions of total above-ground biomass of N-fixing crops, the residue dry biomass and the above-ground crop biomass that is removed from the field as a crop product. The Russian Federation explained in the NIR that a country-specific methodology is used to estimate emissions from crop residue and N fixation. The ERT also noted that, in the additional information table of CRF table 4.E, the fraction of above-ground biomass, the fraction oxidized and the carbon fraction in living biomass and in dead biomass are reported as "NE". However, the emissions from this category are reported as "NO". Taking into account the fact that the notation key "NE" is associated with a lack of completeness, the ERT is of the view that it would be good practice to use the notation key "NA" for these fractions. The Russian Federation revised the CRF tables in response to the list of potential problems and further questions raised by the ERT during the review week, and replaced the notation key "NE" with the notation key "NA" for the fractions of total above-ground biomass of N-fixing crops, the residue dry biomass and the above-ground crop biomass in CRF table 4.D, and replaced the notation key "NE" with the notation key "NO" for the fraction of above-ground biomass, the fraction oxidized and the carbon fraction in living biomass and in dead biomass in CRF table 4.E. The ERT welcomed the revision to the use of the notation keys, and considers the current use of notation keys to be correct.

3. Non-key categories

Rice cultivation – CH_4

89. The ERT noted that there is no information in the NIR on the type of organic amendments that are used for rice cultivation in the Russian Federation. In response to a question raised by the ERT during the review, the Party indicated that the exact statistical information on the types of organic amendments for rice fields is not collected, although, in

accordance with the reference literature,[13] animal waste might be applied as organic amendments for rice. The ERT considers that this limited information is not in line with the IPCC good practice guidance, because the level of CH_4 emissions from rice fields are highly dependent on the type of organic amendments used (e.g. fresh manure, compost, fermented mass). The ERT encourages the Russian Federation to further investigate this issue by collecting and documenting data to report on the use of fermented or non-fermented fertilizers in the country, in particular to demonstrate that there is no underestimation of emissions. For example, official data may be obtained through contacts with agricultural institutes, the International Rice Research Institute or directly from rice farms.

E. Land use, land-use change and forestry

1. Sector overview

90. In 1990 and 1991, the LULUCF sector was a net source of GHG emissions. In 1992, the LULUCF sector became a net removal of GHG emissions (27,876.55 Gg CO_2 eq) for the first time; these removals have steadily increased over time, amounting to 652,436.95 Gg CO_2 eq in 2010. The key drivers for this increase in net removals are:

(a) The reduction in forest harvesting, including a reduction in emissions from timber harvesting in the late 1990s and the early 2000s. Removals from forest land amounted to 213,292.24 Gg CO_2 eq and 690,825.68 Gg CO_2 eq in 1990 and 2010, respectively;

(b) The changes in cropland management caused by the abandonment of agricultural land, leading to a large decrease in CO_2 emissions from cropland soils, which amounted to 268,572.42 Gg CO_2 eq and 97,565.21 Gg CO_2 eq in 1990 and 2010, respectively;

(c) The increase in removals of CO_2 from large areas of cropland converted to grassland that mainly took place in the early 1990s. Removals from grassland soils amounted to 11,536.09 Gg CO_2 eq in 1990 and 82,380.82 Gg CO_2 eq in 2010.

91. Emissions from land converted to settlements decreased between 1990 and 2010, when they amounted to 36,175.39 Gg CO_2 eq and 23,114.64 Gg CO_2 eq, respectively. Wetlands were responsible for emissions of 147.27 Gg CO_2 eq and 89.70 Gg CO_2 eq in 1990 and 2010, respectively. Emissions and removals from land converted to other land have been reported as "NE" and "NO".

92. The Russian Federation has made recalculations for the LULUCF sector between the 2011 and 2012 annual submissions for all years of the time series based on implemented inventory improvement initiatives by the national inventory team. Specifically, changes were made to the AD, EFs and methodologies applied and identified errors were rectified. The impact of these recalculations on the LULUCF sector is a decrease in net emissions of 0.27 per cent for 1990, and an increase in net removals of 0.32 per cent for 2009. The main recalculations took place in the following categories:

(a) Forest land: an increase in total removals of 0.8 per cent for 2009, due to the revision of AD at a detailed level. For example, there is little change in the total removals for forest land remaining forest land, but the subcategories, such as managed and unmanaged forest land, have been revised, based on a more detailed assessment. The area of cropland converted to forest land has also been revised;

[13] Mineev VG. 2006. *Agrohimiya*. Moscow.

(b) Cropland: an increase in total emissions of 0.2 per cent for 2009, due to the use of an improved EF;

(c) Settlements: an increase in CO_2 emissions of 14.3 per cent for 2009. The total settlements area has not changed, but improved AD on the areas of managed and unmanaged subcategories have been used, leading to this increase.

93. The Russian Federation has significantly improved the completeness of its reporting following recommendations in the previous two review reports. The ERT notes, in particular, that more detailed AD and EFs have been used in the estimation of emissions, which has allowed for the calculation of more accurate emission estimates for some land-use categories. However, the ERT notes that there are still some issues for improvement. The emission and removal estimates for mandatory pools in the following categories are reported as "NE": other land converted to grassland; cropland converted to wetlands; other land converted to wetlands; cropland and other land converted to settlements; cropland converted to other land; and wetlands converted to other land. In response to questions raised by the ERT during the review, the Russian Federation explained that these issues are due to difficulties associated with the collection of disaggregated AD and the assessment of the carbon stock changes in different categories. The Russian Federation also explained that some conversions are considered to be natural processes (such as cropland converted to wetlands and other land converted to wetlands.) During the review, the Party confirmed that, in line with the existing improvement plan, it is planning to report the carbon stock changes in all relevant pools under land converted to settlements in the 2014 annual submission. The ERT recommends that the Russian Federation further improve the completeness of its inventory by including estimates of all pools for the mandatory categories in its next annual submission.

94. The Russian Federation has significantly improved the transparency of its reporting, in line with recommendations from the previous review reports, by including additional information on the methodologies used for the different categories and subcategories of the LULUCF sector. However, the ERT still observed examples of a lack of transparency in the reporting of AD of disaggregated levels. For example, the input data and parameters that were used to calculate the average annual increment of biomass were not fully reported by species, age class and region. Furthermore, the method for the estimation of this average annual increment of biomass is not explained to a sufficient level of transparency. The full detail of the input data has not been reported. The reference material provided on page 224 of the NIR[14] does not clearly explain how the average annual increment of biomass was estimated. It indicates that, because the final inventory should be submitted in carbon units, the assessment of biomass volume was skipped in order to reduce intermediary steps. However, it is not clear whether this refers to skipping the description of this calculation or skipping the calculation itself. Moreover, not all categories are reported in separate subchapters of the NIR, in particular settlements, which is a key category. The ERT recommends that the Russian Federation further improve the transparency of the inventory reporting by including, in the NIR of its next annual submission, the more disaggregated background data that are used for the calculation of the biomass stock changes to estimate the carbon stock changes, and a more detailed methodology description to accompany those data.

95. The Russian Federation has reported an uncertainty analysis for 2010 that includes the LULUCF sector (see para. 17 above). In the NIR, the Party reports that the tier 2 uncertainty estimates are mainly based on expert judgement. The uncertainties of the assumptions used at the different stages of the development of the inventory for the LULUCF sector (starting with the land representation matrix) are not included in the

[14] <http://www.cepl.rssi.ru/programms.htm>.

uncertainty assessment. The ERT recommends that the Russian Federation make additional efforts to include, in the uncertainty assessment, the uncertainties for all assumptions used for the inventory of the LULUCF sector.

96. The ERT is of the opinion that several of the issues identified in the review report of the 2010 in-country review (e.g. the incorrect use of notation keys, the omission of methodological descriptions for some categories in the NIR) could have been avoided with the use of more comprehensive and thorough QA/QC procedures. Comprehensive QC procedures would also have indicated unexpected trends in the AD across the time series which require an explanation in the NIR. While recognizing the improvements made by the Russian Federation since the previous annual submission, the ERT recommends that the Party further strengthen its QA/QC procedures in the LULUCF sector, paying special attention to the following:

(a) Ensuring that the land representation matrix (that is based on national land-use definitions) can be accurately converted to a land representation matrix of land-use definitions given in the IPCC good practice guidance for LULUCF;

(b) Checking that unexpected trends in AD and emissions across the time series are explained in the NIR.

97. The ERT noted that very limited verification activities are undertaken on the AD and EF data. For future annual submissions, the ERT encourages the Russian Federation to undertake AD and EF verification activities using independent data to ensure that the emission/removal estimates are accurate.

2. Key categories

Forest land remaining forest land – CO_2, CH_4 and N_2O[15]

98. This key category is the largest source/sink in the LULUCF sector. The Party has used a tier 2 methodology with country-specific EFs to estimate CO_2 emissions from this category. All pools are reported for managed forests, and the accuracy of the estimates for this category has significantly improved following the development work undertaken by the Party based on recommendations in previous review reports. In particular, the land representation matrix containing the changes in land application has been improved through the inclusion of more detailed information 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 Russian Federation in order to be fully consistent with the IPCC good practice guidance for LULUCF, such as reporting and using data disaggregated at the regional level (see para. 94 above) in order to ensure the sufficient accuracy of the emission estimate calculations; and strengthening the activities associated with the verification of the assumptions used in the construction of the land representation matrix (see the text on deforestation and afforestation on page 212 of the NIR) to demonstrate that the current method and inherent assumptions provide an approach that leads to sufficiently accurate estimates. The ERT recommends that the Russian Federation continue to improve the quality of the reported estimates, in its next annual submission, by using more detailed emission calculations which take regional variations into account in a comprehensive manner (see para. 94 above), and also by conducting verification studies in order to demonstrate the accuracy of the land representation matrix.

[15] Not all emissions related to all gases under this category are key categories, particularly CH_4 and N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

Cropland remaining cropland – CO_2

99. The Party uses a tier 1 approach with default EFs to calculate the emissions from the above-ground biomass pool for cropland remaining cropland. The ERT recognizes that the Russian Federation has made improvements to the estimates of the carbon stock changes in mineral soils for the same category since the previous annual submission. However, the ERT notes that the Party uses a tier 1 method with default EFs for the estimation of emissions from the above-ground biomass pool of this key category. The ERT considers that further improvements can be made to the accuracy of the net carbon stock change estimates and encourages the Russian Federation, in its next annual submission, to continue with its ongoing improvement efforts, outlined in the NIR, to develop country-specific EFs for the carbon stock losses from mineral soils and to develop a country-specific EF assessment of the carbon stock accumulation and losses in the above-ground biomass pool.

100. The Russian Federation uses a tier 1 default EF to estimate the carbon stock changes in organic soils in cropland remaining cropland. The ERT considers, as already noted in previous review reports, that if a tier 2 EF similar to that used by reporting Parties with similar circumstances (e.g. Finland, Latvia or Sweden) were used, the emission estimates for organic soils might increase. The ERT recommends that the Russian Federation develop country-specific EFs for organic soils for the key category cropland remaining cropland, use the country-specific EFs with a higher-tier method, and report revised emission estimates in its next annual submission. If it is not possible to develop country-specific EFs in time for the next annual submission, the ERT encourages the Russian Federation to consider using EFs from reporting Parties with similar circumstances in its next annual submission, and to include, in the NIR, information on the activities and timescales for the development and delivery of the country-specific EFs.

Land converted to grassland – CO_2

101. The Russian Federation uses the RothC model for the assessment of the mineral and organic soils pools together. The model has been adapted and tested in different climatic zones of the country. The use of the model equates to a tier 3 methodology, with the use of some country-specific input parameters. Details of the methodology applied and parameters used are provided in the NIR. Consequently, the carbon stock changes in organic soils for cropland converted to grassland are reported as "IE". The ERT encourages the Russian Federation to improve the transparency of its inventory by reporting the carbon stock changes in organic and mineral soils separately in CRF table 5.C.

Land converted to settlements – CO_2

102. This category became a key category in 2009 due to increases in the areas associated with infrastructure development and construction. These areas, which are converted into settlements, are considered by the Party to be an indicator of deforestation. The corresponding CO_2 emission estimates are reported for forest land converted to settlements only. The recalculations made for the 2011 annual submission were primarily due to the availability of new, updated statistics on settlement areas. In response to a question raised by the ERT during the review, the Russian Federation informed the ERT that data on the average carbon stocks in soils in settlement areas is used in the inventory, and that they are assumed to be representative of the situation across the whole country. However, the Party also indicated that it has already started studies to evaluate this factor at a disaggregated level, and that the results of these studies will be used in the compilation of the 2014 annual submission. The ERT acknowledges the efforts of the Russian Federation and recommends that the Party improve the detail and completeness of the AD and EFs for all pools and categories presented in the CRF tables, in line with the IPCC good practice guidance.

3. Non-key categories

Land converted to forest land – CO_2, CH_4 and N_2O

103. The Party uses a tier 2 method to estimate emissions and removals from land converted to forest land. The NIR indicates that some parameters for the estimation of emissions from forest fires are taken from the NIR of Canada. The ERT noted that the Russian Federation has undertaken a range of development activities to improve the reporting of land converted to forest land for all GHGs since the previous annual submission, and commends the Party for the significant improvements to the accuracy and completeness of the emission estimates. The ERT encourages the Russian Federation to continue with its improvement activities and, if possible, with the development of country-specific EFs and parameters for the estimation of emissions from forest fires.

F. Waste

1. Sector overview

104. In 2010, emissions from the waste sector amounted to 72,687.23 Gg CO_2 eq, or 3.3 per cent of total GHG emissions. Since 1990, emissions have increased by 23.9 per cent. The key drivers for the rise in emissions are the increases in the amount of waste disposed to solid waste disposal sites and the volume of industrial wastewater treated. Within the sector, 64.1 per cent of the emissions were from solid waste disposal on land followed by 35.9 per cent from wastewater handling. Waste incineration is used for energy purposes and the corresponding emissions are reported in the energy sector.

105. The Russian Federation has made recalculations for the waste sector between the 2011 and 2012 annual submissions following updates to the AD of industrial wastewater for the entire time series. The impact of these recalculations on the waste sector is a decrease in emissions of 1.08 Gg CO_2 eq, or 0.002 per cent, for 2009, and an increase in emissions of 29.15 Gg CO_2 eq, or 0.05 per cent, for 1990. In CRF table 8(b), the Russian Federation has reported a recalculation of CH_4 emissions from industrial wastewater for the period 1990–2009 due to the correction of AD on the food and beverage industry. However, the NIR states that no recalculations were performed in the industrial wastewater category. The ERT strongly recommends that the Russian Federation ensure the consistency of the information between the CRF tables and the NIR in its next annual submission, and improve the related QC procedures in order to ensure that inconsistencies do not occur.

106. The descriptions in the NIR are generally transparent. However, the ERT considers that the explanations of the AD and parameters, particularly how they are derived, the assumptions used and the information on the actual values used in the emission estimates, are not sufficiently described in the NIR (see paras. 109 and 110 below). The ERT recommends that the Russian Federation improve the transparency of its reporting by providing more thorough explanations of how the AD are derived and by detailing the parameters used in the emission estimates in the NIR of its next annual submission.

107. The Russian Federation has implemented category-specific QC procedures, such as checks of the initial data and emission estimates for the waste sector. However, the ERT identified some inconsistencies between the CRF tables and the NIR (see para. 105 above) and strongly recommends that, in its next annual submission, the Russian Federation strengthen the QC procedures in general, in order to avoid such inconsistencies.

108. The Russian Federation has carried out a tier 1 uncertainty analysis, which includes the emission categories in the waste sector. The subcategory with the largest contribution to the combined sectoral uncertainty is CH_4 emissions from unmanaged waste disposal sites.

2. Key categories

Solid waste disposal on land – CH_4

109. The Party has used the IPCC tier 1 default method and default parameters with country-specific degradable organic carbon values in the estimation of CH_4 emissions from industrial solid waste disposed to solid waste disposal sites. The AD were provided by the Federal Service for Ecological, Technological and Nuclear Supervision (Rostekhnadzor) and the Federal Nature Management Supervision Service (Rosprirodnadzor) for the years 2006–2009 and 2010, respectively. The AD for the years prior to 2006 are not available and are therefore estimated using the gross domestic product (GDP) as a driver. However, information on GDP indices and the amount of industrial solid waste used are not provided in the NIR. In response to questions raised by the ERT during the review, the Party provided data on normalized GDP indices and the amount of industrial solid waste disposed to solid waste disposal sites during the period 1990–2006 and explained how these data are derived and used for the emission estimates. The ERT recommends that the Russian Federation include this information and an explanation of why the normalized GDP indices were chosen as a driver in the NIR of its next annual submission. The ERT further recommends that, in its next annual submission, the Party apply the IPCC tier 2 (first order decay) method to estimate CH_4 emissions from industrial solid waste disposed to solid waste disposal sites.

Industrial wastewater handling – CH_4

110. In the NIR, the Party explains that the weighted average methane correction factor (MCF) used for CH_4 emissions from industrial wastewater treatment is estimated using literature data. However, the weighted average value used in the estimation of emissions and an explanation of how the value is derived are not provided in the NIR. In response to a question raised by the ERT during the review, the Russian Federation provided references to the literature data and an explanation of the MCF, including how the MCF value was derived. The ERT recommends that the Russian Federation include the information provided to the ERT during the review and the MCF value actually used in the estimation of emissions in its next annual submission.

111. The ERT noted that CH_4 emissions from industrial wastewater sludge are reported as "IE", but no explanation is provided in CRF tables 6.B or 9(a) regarding the category under which these emissions are reported. The ERT recommends that the Russian Federation provide an explanation in the relevant CRF tables and in the NIR of its next annual submission, in order to ensure transparency.

3. Non-key categories

Wastewater handling – N_2O

112. The Russian Federation reported that data on per capita protein consumption for the estimation of N_2O emissions from human sewage are taken from the FAOSTAT database for the years 1990–2003. Data for the years 2004–2009 were not available, and were therefore estimated using national data on household protein consumption. However, the ERT noted that the FAO data on per capita protein consumption are available for the years 1990–2007. The ERT recommends that the Russian Federation review the available data sets on protein consumption and consider ways in which their use might be amended to improve consistency across the time series, and report thereon in its next annual submission.

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

113. The Russian Federation reported emissions and removals from afforestation and reforestation, deforestation and the elected activity of forest management under activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in accordance with the requirements set out by decisions 15/CMP.1 and 16/CMP.1. Each of the requirements outlined in paragraphs 5–9 of the annex to decision 15/CMP.1 have been met and reported, although the ERT identified some recommendations detailed in paragraphs 118, 120, 121, 122, and 124 below.

114. The total area subject to afforestation and reforestation, and deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol in 2010 covered 0.1 per cent of the forest land of the Russian Federation and the total net emissions from these activities in 2010 were equivalent to 2.3 per cent of the total national GHG emissions in the same year (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 at the regional and more detailed levels. The Party assessed the AD for deforestation based on the data on areas allocated for construction and infrastructure development, following the recommendations made in the 2010 annual review report. Owing to the minimal occurrence of forest land conversions, the uncertainty of the land data is quite high (the NIR does not specify an uncertainty for the land data, but the uncertainty of the CO_2 emissions from afforestation and reforestation, deforestation and forest management derived using expert judgement are estimated to be 30 per cent, 30 per cent and 15 per cent, respectively). The ERT considers that the methods and approaches used by the Russian Federation are generally in accordance with the IPCC good practice guidance for LULUCF. However, the ERT notes that some improvements could be made, in particular in relation to the accuracy of the emission estimates for deforestation, through the use of more accurate input data.

115. In 2010, the Russian Federation reported total net emissions of 16,107.35 Gg CO_2 eq for activities under Article 3, paragraph 3, of the Kyoto Protocol, and net removals of 548,411.21 Gg CO_2 eq for forest management for activities under Article 3, paragraph 4, of the Kyoto Protocol.

116. The Russian Federation has made recalculations for the KP-LULUCF activities between the 2011 and 2012 annual submissions, due to the use of improved AD. Under Article 3, paragraph 3, of the Kyoto Protocol, recalculations were made for afforestation and reforestation, and deforestation. As a result of the recalculations, total removals from afforestation and reforestation increased by 21.2 per cent for 2009. The recalculations for deforestation activities were based on improved AD for the period 1998–2009, resulting in an increase in total emissions of 14.1 per cent for 2009. The recalculations for afforestation were based on improved AD for afforested areas (erosion protection and field-protecting forests). Under Article 3, paragraph 4, of the Kyoto Protocol, recalculations were made for forest management, based on changes to the ways in which different land-use areas were allocated to the land-use categories defined under Article 3, paragraph 4. The impact of these recalculations was an increase of 0.8 per cent in total removals for 2009.

117. During the review, in response to a request made by the ERT for information on the methodologies and statistics used to convert the "on-the-ground forest density" estimated in the national forest inventory to the "crown cover" required by the forest definition under the Kyoto Protocol, the Russian Federation provided details of the methodology and

parameters used and confirmed that, when assessing the forest density for the purposes of the Kyoto Protocol, bushes are excluded from this density. The ERT recommends that the Party transparently include this detailed explanation and information in its next annual submission, as recommended in the initial review report published in 2008.[16]

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

Afforestation and reforestation – CO_2, CH_4 and N_2O

118. The Russian Federation uses a model for the estimation of the carbon stock changes in afforested lands (agricultural lands afforested for the purposes of field and land erosion protection and 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 of afforested lands, and, therefore, losses of carbon stocks and non-CO_2 emissions are underestimated by the model. Following the recommendations from the 2009 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. The ERT considers that the action taken by the Party addresses the issue of underestimation and welcomes this improvement, which ensures that the model is consistent with the IPCC good practice guidance for LULUCF.

119. The Russian Federation uses a conservative approach for the assessment of losses, assuming that all losses are a consequence of fire. The ERT recognizes that the approach applied by the Russian Federation is conservative and constitutes an improvement in comparison with the methodologies used previously. However, the ERT notes that the Party has reported the AD for wildfires under afforestation/reforestation units of land not harvested as "IE" in CRF table 5(KP-II)5. Emissions of CO_2 are also reported as "IE" for this subcategory. The ERT is of the opinion that reporting the AD for wildfires in areas subject to afforestation and reforestation under Article 3, paragraph 3, of the Kyoto Protocol in CRF table 5(KP-II)5 would improve transparency. The ERT therefore recommends that, in its next annual submission, the Russian Federation report the AD for wildfires under afforestation/reforestation units of land not harvested in CRF table 5 (KP-II)5, in order to improve completeness.

120. The ERT recognizes that the model currently used by the Party to estimate removals of CO_2 from afforestation uses default parameters and EFs, and information taken from the NIR of Canada. The ERT also notes that the AD and associated carbon stock changes disaggregated per year of conversion are not reported. The ERT encourages the Russian Federation to continue with its activities to further develop the model and, in particular, incorporate country-specific data, in order to improve the accuracy of its reporting.

Deforestation – CO_2

121. The Russian Federation has applied the 20-year IPCC default transition period to account for the carbon stock changes in the soil organic matter associated with deforestation and has assumed that the carbon stocks in litter and soil organic matter are completely oxidized as a consequence of the land-use change. Following recommendations in previous review reports, the AD on the deforested area have been improved based on updated statistics on the areas converted from forest land to settlements provided by Rosstat. However, these data are still provided at an aggregated level, since they were obtained by examining the increase in the area of settlements and not directly deforested areas. The ERT recognizes the recent efforts made by the Russian Federation to improve the emission

[16] <http://unfccc.int/resource/docs/2007/irr/rus.pdf>.

estimates and recommends that the Party continue to improve the accuracy of the emission estimates for forest land conversion by obtaining and using more accurate and detailed input data.

122. The ERT noted that the Russian Federation has not included deforestation as a key category in CRF table NIR-3 for the KP-LULUCF activities. In response to a question in this regard raised by the ERT during the review, the Russian Federation confirmed that this is an error and will be corrected in its next annual submission.

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

Forest management – CO_2, CH_4 and N_2O

123. The ERT is of the view that the methods, approach and parameters used for the estimation of emissions from forest management follow the IPCC good practice guidance for LULUCF. The ERT noted that the CH_4 and N_2O IEFs for biomass burning (152.32 Mg/ha for CH_4 and 8.43 Mg/ha for N_2O) in CRF table 5(KP-II)5 are inconsistent with those reported under the Convention in CRF table 5(V), owing to an error in the units of the AD (data in kha were used as input in CRF table 5(V) for biomass burning instead of data in ha, as required). The ERT recommends that the Russian Federation ensure that its QC procedures efficiently identify and eliminate any errors in data inputs in its next annual submission, in order to avoid any inconsistencies.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

124. 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.[17] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

125. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, 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 referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/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

126. 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.

[17] 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.

127. Table 6 shows the accounting quantities for KP-LULUCF as reported by the Russian Federation and the final values after the review.

Table 6
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2012 submission[a]			*2010 and 2011 submissions*[b]	*"Net" accounting quantity*[c]
	As reported	*Revised estimates*	*Final*	*Final*	
Afforestation and reforestation	–15 457 860		–15 457 860	–8 511 131	–6 946 729
Deforestation	66 423 511		66 423 511	41 853 535	24 569 976
Forest management	–605 000 000		–605 000 000	–605 000 000	0
Article 3.3 offset[d]	–50 965 650		–50 965 650	–33 342 404	–17 623 246
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.

[a] The values included under the 2012 submission are the cumulative accounting values for 2008, 2009 and 2010 as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2010.

[b] The values included under the 2010 and 2011 submissions are the final accounting values as a result of the 2010 and 2011 reviews and are included in table 4 of the 2011 annual review report (FCCC/ARR/2011/RUS/Corr.1) in the column "2011 annual submission, Final".

[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 2012 – final 2010 and 2011).

[d] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas (GHG) 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 GHG 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 decision 16/CMP.1, annex, paragraph 11, 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, of the Kyoto Protocol after the application of decision 16/CMP.1, annex, paragraph 10, 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.

128. Based on the information provided in table 6 for the activity afforestation/reforestation, the Russian Federation shall issue 6,946,729 removal units (RMUs) in its national registry.

129. Based on the information provided in table 6 for the activity deforestation, the Russian Federation shall cancel 24,569,976 assigned amount units, emission reduction units, certified emission reduction units and/or RMUs in its national registry.

130. Based on the information provided in table 6 for the activity forest management, the Russian Federation shall issue 17,623,246 RMUs in its national registry.

National registry

131. 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

132. In the 2012 annual submission, the Russian Federation has reported its commitment period reserve as 11,009,425,225 t CO_2 eq, based on the national emissions in its most recently reviewed inventory (2,201,885.044 Gg CO_2 eq). The ERT disagreed with this figure; its calculation of the commitment period reserve is 11,009,425,222 t CO_2 eq. In response to the list of potential problems and further questions raised by the ERT during the course of the review week, the Russian Federation revised its commitment period reserve as 11,037,980,885 t CO_2 eq based on its most recently reviewed inventory (2,207,596.17 Gg CO_2 eq). The ERT agrees with this figure.

3. Changes to the national system

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

134. The Russian Federation reported that there has been a change to its national registry since the previous annual submission. The Russian Federation reported in its NIR a minor change relating to the deployment to the production environment of updates of the SERINGAS software used by the national registry. The ERT concluded that, taking into account the confirmed change to the national registry, the Russian Federation'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). The ERT encourages the Russian Federation to clearly and separately report in its annual submission any changes to its national registry in accordance with chapter I.G of the annex to decision 15/CMP.1.

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

135. The Russian Federation did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its 2012 annual submission. However, the ERT noted that, compared with the previous annual submission, the Party provided more detailed information in the NIR on the supply of natural gas and crude oil to developing countries and the provision of scholarships for hydrometeorology students from developing countries. The ERT recommends that the Russian Federation, in its next annual submission, include information in its NIR on any changes that have occurred, compared with the information provided

under Article 3, paragraph 14, reported in its last submission, in accordance with chapter I.H of the annex to decision 15/CMP.1.

136. The Russian Federation included in its NIR a brief description of planned and implemented policies and measures to prevent anthropogenic climate change. In particular, the NIR includes descriptions of international interactions and training aimed at reducing the adverse impacts of anthropogenic climate change. The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent.

III. Conclusions and recommendations

A. Conclusions

137. The Russian Federation made its annual submission, containing the CRF tables, on 13 April 2012. The NIR was submitted on 25 May 2012. 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.

138. The ERT concludes that the inventory submission of the Russian Federation has generally been prepared and reported in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". The ERT identified several inconsistencies within the NIR, discrepancies between the NIR and the CRF tables, errors in the default EFs used, errors in the units used, and errors in the use of the notation keys (see paras. 32, 38 and 88 above). The inventory submission is complete and the Russian Federation has submitted a complete set of CRF tables for the period 1990–2010 and an NIR; these are complete in terms of geographical coverage, years, sectors and gases, as well as generally complete in terms of categories. Some issues associated with the reporting of some pools as "NE" have also been noted in the LULUCF sector (see paras. 91 and 93 above). The ERT also noted that the Party reported some categories as "NE" for which methodologies are not available in the IPCC good practice guidance, for example CO_2 emissions from coal mining and handling (see para. 35 above).

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

140. The Russian Federation has made significant improvements to the inventory to ensure that it is in line with the relevant reporting requirements. The ERT commends the Party for the progress made in recent years. The ERT considers that the Russian Federation's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, but noted several issues. Firstly, in some cases, the key categories are not estimated using country-specific EFs (see paras. 44, 51 and 52 above for examples relating to the energy sector; and paras. 99 and 100 above, which identify the use of a tier 1 approach with default EFs in relation to the LULUCF sector). The ERT also noted examples where the use of country-specific or improved EFs and parameters would lead to a significant improvement (see paras. 50 and 98 above).

141. The Russian Federation has made recalculations for the inventory between the 2011 and 2012 annual submissions for the entire time series (1990–2009). The recalculations

were made in response to the 2010 annual review report (the 2011 annual review report was not available prior to the compilation and submission of the 2012 annual submission), and also as part of the ongoing emissions inventory improvement programme to obtain and use better quality input parameters and AD. The impact of these recalculations on total GHG emissions including LULUCF is a decrease of 0.6 per cent for 1990 and a decrease of 1.2 per cent for 2009. The recalculations were performed in all sectors with the exception of the solvent and other product use sector. The main recalculations took place in the following sectors/categories:

(a) CH_4 emissions from natural gas under fugitive emissions from fuels: a decrease of 5.6 per cent for 2009;

(b) CH_4 emissions from coal mining and handling: a decrease of 1.6 per cent for 2009;

(c) HFC emissions from refrigeration and air-conditioning equipment: a decrease of 9.4 per cent for 2009;

(d) Numerous categories in the LULUCF sector: an increase in removals of 0.3 per cent for 2009.

142. The Russian Federation has reported emissions and removals from afforestation and reforestation, deforestation and the elected activity of forest management under activities under Article 3, paragraphs 3, and 4, of the Kyoto Protocol in accordance with the requirements set out by decisions 15/CMP.1 and 16/CMP.1. The ERT recognizes that the Russian Federation has made improvements to the model used to estimate the carbon stock changes in afforested lands, although further improvements are necessary, as explained in paragraphs 118–120 above. The ERT also noted the need to improve the emission estimates for deforestation (see para. 121 above) and the QC procedures associated with the reporting (see para. 123 above).

143. The Russian Federation has made recalculations for KP-LULUCF activities between the 2011 and 2012 annual submissions in response to the 2010 annual review report (the 2011 annual review report was not available prior to the compilation and submission of the 2012 annual submission) and has also undertaken methodological improvements as part of the ongoing inventory improvement programme. The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows:

(a) Net CO_2 removals from afforestation and reforestation: an increase of 21.2 per cent;

(b) Net CO_2 emissions from deforestation: an increase of 14.1 per cent;

(c) Net CO_2 removals from forest management: an increase of 0.8 per cent.

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

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

146. 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.

147. The Russian Federation has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14",

as part of its 2012 annual submission. The information is considered complete and transparent.

B. Recommendations

148. The ERT identifies issues for improvement as listed in table 7 below. The recommendations are for the next annual submission, unless otherwise specified.

Table 7
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph reference*
General	Cross-cutting	Take measures to ensure that the next annual inventory is submitted by 15 April, including both the CRF tables and the NIR	6
	Completeness	Estimate emissions from categories currently reported as "NE"	10(d) and 93
	Inventory planning	Ensure that sufficient resources are available for the timely implementation of the planned improvements	13
	Uncertainty assessment	Provide comprehensive information in the NIR on the assessment of uncertainty, the uncertainty analysis and its results	18
	Recalculations	Undertake recalculations for all years of the time series where the relevant issue applies	20
	QA/QC	Improve the QC procedures for the energy, industrial processes and agriculture sectors, in order to minimize inconsistencies between the NIR and the CRF tables	21
		Provide more transparent and detailed information on QA procedures across all sectors, and on how peer reviews lead to real improvements in the inventory	22
Energy	QA/QC	Correct the errors and inconsistencies in the NIR and in the CRF tables	31
	Notation keys	Review the use of the notation keys for all categories and years and ensure that they are correct	32 and 33
	All subcategories	Increase the transparency of the NIR by including explanations of the sources and processing of the AD used for each of the subcategories	34
	Tiers	Use country-specific values for the carbon content of fuel and country-specific oxidation factors for the estimation of CO_2 emissions from the key categories	36
	All subcategories	Fully and correctly complete CRF tables 1.A(b) and 1.A(c)	38
		Review the choice of AD, in order to ensure that the	39

Sector	*Category*	*Recommendation*	*Paragraph reference*
		time series is consistent and that the methodologies are accurately reported in the NIR	
	Non-energy use of fuels	Investigate the use of data on the stored carbon of other countries, in order to develop the country-specific factors	43
	Stationary combustion all fuels – CO_2, CH_4 and N_2O	Develop and use country-specific CO_2 EFs for all stationary sources using coal	44
		Reallocate emissions from autoproducers from the energy industries category to the manufacturing industries and construction category for the whole time series	45
		Reallocate the emissions to the appropriate subcategories in this category for the complete time series	46
		Improve the methodology used to calculate the country-specific EFs for natural gas	47
		Correct the inconsistencies in the CRF tables and strengthen the QA/QC procedures associated with the checking of the data in the CRF tables	48
	Road transportation – CO_2, CH_4 and N_2O	Perform recalculations for all years of the time series, revise the emission estimates, and provide a sufficient methodological explanation in the NIR	51
		Compile data that allow country-specific carbon content values to be determined and used for the estimation of emissions both from gasoline and from diesel use	52
	Coal mining and handling: solid fuels – CH_4	Include a detailed description on methane utilization in the NIR and in the CRF documentation box	54
		Provide an explanation of the AD in the NIR	55
Industrial processes and solvent and other product use	Sector overview	Improve the institutional arrangements and procedures to ensure that the impact of customs agreements are taken into account	63
		Report, in the NIR, more comprehensive information on the sector-specific QA/QC procedures and any external reviews	64
	Aluminium production – PFCs	Improve the QC procedures to avoid the incorrect use of the notation keys	66
	Lime production – CO_2	Include, in the NIR, a more detailed explanation of the AD, in order to demonstrate that there is no underestimation of emissions, and investigate whether it is possible to improve the AD	67
	Soda ash use – CO_2	Include, in the NIR, a more thorough explanation of the AD to demonstrate that there is no underestimation of emissions	68

Sector	*Category*	*Recommendation*	*Paragraph reference*
Agriculture	Sector overview	Clearly indicate in the NIR the methodological tier levels that have been used	75
		Report data in the CRF tables using full stops rather than commas as decimal points	78
		Include explanatory information regarding the use of the notation key "NE" for animal mass data in the footnotes of the CRF tables	79
	Enteric fermentation – CH_4	Present, in the NIR, information explaining the large fluctuations in the enteric fermentation EFs between regions	84 and 85
	Manure management – N_2O	Include, in the NIR, information that supports the selection of data regarding poultry manure practices	86
	Direct soil emissions – N_2O	Include the results of the comparison between the national data and the fertilizer data compiled by the Food and Agriculture Organization of the United Nations in the next NIR under the QC procedures section	87
LULUCF	Sector overview	Improve the completeness of the reporting of land uses and land-use changes by including estimates of all mandatory LULUCF categories in the NIR of the next annual submission	93
		Improve the transparency of the inventory by including, in the NIR, more disaggregated background data used for the calculation of the biomass stock changes and a detailed methodology description to accompany those data	94
		Make additional efforts with regard to the estimation of the uncertainties in the LULUCF sector by including an assessment of the uncertainties for all assumptions used	95
		Strengthen the QA/QC procedures in the LULUCF sector	96
	Forest land remaining forest land – CO_2, CH_4 and N_2O	Use more detailed emission calculations and undertake verification studies to demonstrate the accuracy of the land representation matrix	98
		Develop country-specific EFs for organic soils for the key category cropland remaining cropland, and use the country-specific EFs with a higher-tier method	100
	Land converted to settlements – CO_2	Improve the detail and completeness of the AD and EFs for all pools and categories presented in the CRF tables, in line with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*	102
Waste	Sector overview	Ensure the consistency of the information provided in the CRF tables with that contained in the NIR	105

Sector	*Category*	*Recommendation*	*Paragraph reference*
		Improve the transparency of the reporting by providing more thorough explanations in the NIR of the sources of and assumptions underlying the AD	106
		Strengthen the QC procedures in general, in order to avoid inconsistencies between the CRF tables and the NIR	107
	Solid waste disposal on land – CH_4	Include information on the method and data used for the estimation of the amount of industrial solid waste disposed to solid waste disposal sites for the period 1990–2006	109
		Apply the IPCC tier 2 first order decay method to estimate CH_4 emissions from industrial solid waste disposed to solid waste disposal sites	109
	Industrial wastewater handling – CH_4	Provide additional information on industrial wastewater treatment and methodologies in the NIR	110
		Provide, in CRF table 6.B, an indication of the category under which the emissions from industrial wastewater sludge are included	111
	Wastewater handling – N_2O	Review the available data sets on per capita protein consumption to improve the consistency of the time series of data	112
Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol	Forest density parameters	Include, in the NIR, an explanation of how the "on-the-ground forest density" estimated in the national forest inventory is converted to the "crown cover" required by the forest definition under the Kyoto Protocol	117
	Wildfires – CO_2	Report the AD for wildfires under afforestation/reforestation units of land not harvested in CRF table 5(KP-II)5	119
	Deforestation – CO_2	Continue to improve the accuracy of the emission estimates for forest land conversion by obtaining and using more accurate and detailed input data	121
	Forest management – CO_2, CH_4 and N_2O	Ensure that the QC procedures efficiently identify and eliminate any errors in data inputs	123
	Minimization of adverse impacts	Include information in the NIR on any changes that have occurred, compared with the information provided under Article 3, paragraph 14, reported in submission	135

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, LULUCF = land use, land-use change and forestry, NE = not estimated, NIR = national inventory report, QA/QC = quality assurance/quality control, UNFCCC = United Nations Framework Convention on Climate Change.

IV. Questions of implementation

149. 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 2012. Available at <http://unfccc.int/resource /docs/2012/asr/rus.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2012. Available at <http://unfccc.int/resource/webdocs/sai/2012.pdf>.

FCCC/ARR/2011/RUS. Report of the individual review of the annual submission of the Russian Federation submitted in 2011. Available at <http://unfccc.int/resource/docs/2012 /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 and Mr. Mikhail Gytarsky (Institute of Global Climate and Ecology) and Ms. Veronika Kuznetsova (Federal Service for Hydrometeorology and Environmental Monitoring), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by the Russian Federation:

ГУ „Институт глобального климата и экологии Росгидромета и РАН“, 2011 г. *План мероприятий по совершенствованию национального кадастра парниковых газов Российской Федерации в 2012 году*. Москва.

ГУ „Институт глобального климата и экологии Росгидромета и РАН“, 2007 г. *Регламент хранения и архивирования в ГУ ИГКЭ данных и материалов относящихся к Национальному кадастру антропогенных выбросов из источников и абсорбции поглотителями парниковых газов РФ. Москва.*

ГУ „Институт глобального климата и экологии Росгидромета и РАН“, 2007 г. *Изменение №1 к Регламенту хранения и архивирования в ГУ ИГКЭ данных и материалов относящихся к Национальному кадастру антропогенных выбросов из источников и абсорбции поглотителями парниковых газов РФ. Москва.*

Gytarsky et al., 2001. The Greenhouse Gases Emission in the Agricultural Sector of Russia. Agricultural biology, 2001, No6,

Grabar V. A., Gitarskii M. L., Dmitrieva T. M., Glukhovskaya E. P., Khor'kova N. I. and Kirichkov S. V., 2011. Assessment of Greenhouse Gases Emission from Civil Aviation in Russia. ISSN 1068-3739, Russian Meteorology and Hydrology, 2011, Vol. 36, No. 1, pp. 18–24.

Vomperskiy et al., 1999. ЗАБОЛОЧЕННОСТЬ ТЕРРИТОРИИ РОССИИ КАК ФАКТОР СВЯЗЫВАНИЯ ЯТМОСФЕРНОГО УГЛЕРОДА

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management system
C	carbon
c-C_4F_8	perfluorocyclobutane
CF_4	perfluoromethane
C_2F_6	perfluoroethane
C_3F_8	perfluoropropane
C_4F_{10}	perfluorobutane
C_5F_{12}	perfluoropentane
C_6F_{14}	perfluorohexane
CH_4	methane
CMM	coal mine methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	the statistical database of the Food and Agriculture Organization of the United Nations
FEB	fuel and energy balance
GDP	gross domestic product
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
HCFC-22	hydrochlorofluorocarbon-22
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
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
LULUCF	land use, land-use change and forestry
MCF	methane correction factor
Mg	megagram (1 Mg = 1 tonne)
MJ	megajoule
MW	megawatt
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NEAT	non-energy use accounting tables
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons

QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change