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**Report of the individual review of the annual submission of  
the Russian Federation submitted in 2013\***

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\* In the symbol for this document, 2013 refers to the year in which the inventory was submitted, and not to the year of publication.

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## I. Introduction and summary

1. This report covers the review of the 2013 annual submission of the Russian Federation, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 16 to 21 September 2013 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Leif Hockstad (United States of America) and Mr. Marius Țăranu (Republic of Moldova); energy – Ms. Rayna Angelova (Bulgaria), Ms. Duduzile Nhlengethwa-Masina (Swaziland), Mr. Norbert Nziramasanga (Zimbabwe) and Ms. Songli Zhu (China); industrial processes and solvent and other product use – Ms. Valentina Idrisova (Kazakhstan), Mr. Joseph Baffoe (Ghana) and Mr. Takuji Terakawa (Japan); agriculture – Ms. Olga Gavrilova (Estonia) and Ms. Janka Szemesova (Slovakia); land use, land-use change and forestry (LULUCF) – Mr. Emil Cienciala (Czech Republic) and Mr. Mark McGovern (Canada); and waste – Ms. Detelina Petrova (Bulgaria) and Ms. Irina Yesserkepova (Kazakhstan). Mr. Hockstad and Mr. Țăranu were the lead reviewers. The review was coordinated by Mr. Stylianos Pasmajoglou (UNFCCC secretariat).

2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), 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. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2012 annual review report of the Russian Federation was published after the submission of the 2013 inventory submission.

3. In 2011, the main greenhouse gas (GHG) in the Russian Federation was carbon dioxide (CO<sub>2</sub>), accounting for 72.6 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> equivalent (CO<sub>2</sub> eq), followed by methane (CH<sub>4</sub>) (21.8 per cent) and nitrous oxide (N<sub>2</sub>O) (5.1 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 0.5 per cent of the overall GHG emissions in the country. The energy sector accounted for 82.7 per cent of total GHG emissions, followed by the industrial processes sector (7.5 per cent), the agriculture sector (6.2 per cent), the waste sector (3.5 per cent) and the solvents and other product use sector (0.02 per cent). Total GHG emissions amounted to 2,320,850.66 Gg CO<sub>2</sub> eq and decreased by 30.4 per cent between the base year<sup>2</sup> and 2011. The ERT concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors 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 natural gas and the reduced use of coal).

4. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as 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<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

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<sup>1</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Additional background data on recalculations by the Russian Federation in the 2013 annual submission, as well as information to be included in the compilation and accounting database, can be found in annex I to this report.

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<sup>a</sup> to 2011**

	Greenhouse gas	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change (%)	
			1990	1995	2000	2008	2009	2010	2011	Base year–2011	
Annex A sources	CO <sub>2</sub>	2 498 542.30	2 498 542.30	1 572 597.26	1 471 337.44	1 609 349.25	1 526 424.20	1 598 210.91	1 684 432.63	–32.6	
	CH <sub>4</sub>	593 593.03	593 593.03	461 185.79	434 639.59	492 923.97	464 769.11	491 094.75	506 648.26	–14.6	
	N <sub>2</sub> O	218 530.20	218 530.20	142 593.71	112 038.81	116 186.53	116 814.45	113 771.17	117 568.82	–46.2	
	HFCs	12 220.79	28 409.78	12 220.79	21 039.16	14 426.40	10 150.95	10 864.94	9 147.38	–25.1	
	PFCs	10 019.27	11 680.24	10 019.27	7 298.60	3 720.57	2 524.58	2 677.57	2 544.15	–74.6	
	SF <sub>6</sub>	416.27	1 202.49	416.27	696.52	830.88	790.63	667.52	509.42	22.4	
KP-LULUCF	Article 3.3 <sup>b</sup>	CO <sub>2</sub>				17 934.04	16 748.92	16 022.23	15 366.69		
		CH <sub>4</sub>				48.91	48.43	47.31	46.24		
		N <sub>2</sub> O				39.94	39.55	38.64	37.76		
	Article 3.4 <sup>c</sup>	CO <sub>2</sub>	NA				–498 560.77	–560 221.72	–567 491.29	–547 283.66	NA
		CH <sub>4</sub>	NA				10 906.15	11 620.25	10 386.61	10 521.48	NA
		N <sub>2</sub> O	NA				9 117.73	9 700.88	8 693.47	8 803.61	NA

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, 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, NA = not applicable.

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

<sup>b</sup> Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

<sup>c</sup> Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2  
Greenhouse gas emissions by sector and activity, base year<sup>a</sup> to 2011

Sector	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change (%)	
		1990	1995	2000	2008	2009	2010	2011	Base year– 2011	
Annex A										
Energy	2 714 711.14	2 714 711.14	1 777 993.92	1 668 022.95	1 834 144.32	1 737 236.12	1 824 316.80	1 920 401.47	–29.3	
Industrial processes	238 809.27	257 445.45	154 314.72	166 696.50	180 398.79	158 176.06	172 719.52	174 976.81	–26.7	
Solvent and other product use	561.61	561.61	511.68	522.89	543.67	557.59	564.92	570.87	1.6	
Agriculture	318 117.77	318 117.77	212 828.84	152 980.24	148 025.31	147 324.71	141 853.53	144 043.85	–54.7	
Waste	61 122.07	61 122.07	53 383.93	58 827.54	74 325.53	78 179.44	77 832.09	80 857.66	32.3	
LULUCF	NA	84 514.45	–219 321.10	–457 926.80	–578 461.27	–646 606.10	–650 612.83	–628 434.86	NA	
<b>Total (with LULUCF)</b>	<b>NA</b>	<b>3 436 472.50</b>	<b>1 979 711.99</b>	<b>1 589 123.31</b>	<b>1 658 976.34</b>	<b>1 474 867.82</b>	<b>1 566 674.02</b>	<b>1 692 415.80</b>	<b>NA</b>	
<b>Total (without LULUCF)</b>	<b>3 333 321.86</b>	<b>3 351 958.04</b>	<b>2 199 033.09</b>	<b>2 047 050.11</b>	<b>2 237 437.62</b>	<b>2 121 473.92</b>	<b>2 217 286.86</b>	<b>2 320 850.66</b>	<b>–30.4</b>	
Other <sup>b</sup>	NA	NA	NA	NA	NA	NA	NA	NA	NA	
KP-LULUCF	Article 3.3 <sup>c</sup>									
	Afforestation and reforestation					–5 200.77	–5 165.63	–5 092.56	–4 999.21	
	Deforestation					23 223.66	22 002.53	21 200.74	20 449.90	
	<b>Total (3.3)</b>					<b>18 022.89</b>	<b>16 836.90</b>	<b>16 108.18</b>	<b>15 450.69</b>	
	Forest management					–478 536.89	–538 900.60	–548 411.21	–527 958.57	
	Article 3.4 <sup>d</sup>									
	Cropland management	NA				NA	NA	NA	NA	
Grazing land management	NA				NA	NA	NA	NA		
Revegetation	NA				NA	NA	NA	NA		
<b>Total (3.4)</b>	<b>NA</b>					<b>–478 536.89</b>	<b>–538 900.60</b>	<b>–548 411.21</b>	<b>–527 958.57</b>	

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

<sup>a</sup> “Base year” for sources included in Annex A to the Kyoto Protocol refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

<sup>b</sup> 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 national totals.

<sup>c</sup> Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

<sup>d</sup> Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

## II. Technical assessment of the annual submission

### A. Overview

#### 1. Annual submission and other sources of information

6. The 2013 annual inventory submission was submitted on 13 April 2013; it contains a complete set of the common reporting format (CRF) tables for the period 1990–2011. The NIR was submitted on 23 May 2013. The ERT noted that this was after the submission deadline of 15 April as specified in decision 15/CMP.1. In response to a question raised by ERT during the review, the Russian Federation explained that the delay was due to late receipt of the energy balance from the Federal Service for State Statistics (Rosstat). The Party also stated that it will consider measures to prevent such delays in the future. The ERT recommends that the Russian Federation submit its next inventory by 15 April 2014, as required by decision 15/CMP.1.

7. The Russian Federation submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 13 April 2013.

8. The organization of the NIR, in general, follows the structure outlined in the updated “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines) following incorporation of the provisions of decision 14/CP.11, elaborated with an annotated outline of the NIR. However, some parts of the NIR have been restructured and the recommended structure has not been followed. For example, chapter 1 of the NIR does not provide supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (contained in chapter 10) nor information on “General assessment of the inventory completeness”; the NIR does not contain annex 5, “Assessment of completeness and (potential) sources and sinks of GHG emissions and removals excluded for the annual inventory submission and also for the KP-LULUCF inventory”. The ERT recommends that the Party, while preparing its next NIR, follow, to the extent possible, the NIR structure outlined in the UNFCCC reporting guidelines.

9. The Russian Federation officially submitted revised emission estimates on 4 November 2013 in response to the list of potential problems and further questions raised by the ERT (see paras. 48 and 52 below). The values used in this report are those submitted by the Party on 4 November 2013.

10. The full list of materials used during the review is provided in annex II to this report.

#### 2. Overall assessment of the inventory

11. Table 3 contains the ERT’s overall assessment of the annual submission of the Russian Federation. For recommendations for improvements related to cross-cutting issues for specific categories, please see the paragraphs cross-referenced in the table.

Table 3  
**The expert review team's overall assessment of the annual submission**

<i>General findings and recommendations</i>		
The expert review team's (ERT's) findings on completeness of the 2013 annual submission		
Annex A sources <sup>a</sup>	Complete	<p>Mandatory: None missing</p> <p>Non-mandatory: "NE" was reported for: CO<sub>2</sub> and N<sub>2</sub>O emissions from coal mining and handling; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions for the solid fuel transformation; CO<sub>2</sub> and N<sub>2</sub>O emissions from refining/storage; CO<sub>2</sub> and CH<sub>4</sub> emissions from distribution of oil products; CO<sub>2</sub> emissions from asphalt roofing; CO<sub>2</sub> emissions from road paving with asphalt ; CH<sub>4</sub> and N<sub>2</sub>O emissions from glass production; CH<sub>4</sub> and N<sub>2</sub>O emissions from ammonia production; CH<sub>4</sub> emissions from calcium carbide; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from 'other' under chemical industry; CH<sub>4</sub> emissions from steel, pig iron and sinter production; CO<sub>2</sub> emissions from coke production; CH<sub>4</sub> emissions from ferroalloys production; CO<sub>2</sub> emissions from food and drink; CO<sub>2</sub> emissions from solvent and other product use; CH<sub>4</sub> direct and indirect agriculture soil emissions</p> <p>The ERT encourages the Party to estimate these emissions</p>
Land use, land-use change <sup>a</sup> and forestry	Not complete	<p>Mandatory: "NE" was reported for: carbon stock changes for cropland converted to grassland, other land converted to grassland, cropland converted to other land, wetlands converted to other land, settlements converted to other land; non-CO<sub>2</sub> emissions from drainage of soils and wetlands, CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning on wetlands</p> <p>The ERT strongly recommends that the Russian Federation estimate and report these emissions and removals</p> <p>Non-mandatory: "NE" was reported for: CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning on category other land</p> <p>The ERT encourages the Russian Federation to estimate these emissions</p>
KP-LULUCF	Complete	
The ERT's findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	The recalculations were not undertaken for all years of the time series. For specific recommendations, see paragraphs 27, 28 and 37 below



*General findings and recommendations*

The ERT's findings on verification and quality assurance/quality control procedures in the 2013 annual submission	Sufficient	There were some inconsistencies in the NIR (e.g. between information provided in chapter 1.6 and annex 5). The ERT recommends that the Russian Federation improve its verification and quality control procedures, in order to minimize such inconsistencies and errors (see paras. 35, 44, 50, 58 and 65 below)
The ERT's findings on the transparency of the 2013 annual submission	Generally transparent	The ERT recommends that the Russian Federation include in the NIR more detailed information on activity data, emission factors and background information for methodologies used (see paras. 29, 30, 40, 55, 56, 59, 64, 66, 67, 69, 77, 79, 81, 82, 84 and 85)

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, ERT = expert review team, 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, NE = not estimated, NIR = national inventory report.

<sup>a</sup> The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in 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*, or the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

### **3. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management**

#### 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 Rosstat (the main provider of activity data (AD)) and other agencies that provide additional information as well as 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 only under the relevant sectoral chapters. No consolidated information on the implementation of the planned improvements was provided in chapter 9 of the NIR ("Recalculations and improvement"), as outlined in the UNFCCC reporting guidelines. In response to a question raised by the ERT during the review, the Russian Federation provided the GHG inventory improvement plans for the 2012 and 2013 annual submissions. The plans are based on the results of the key category analysis and the uncertainty assessment undertaken for the 2012 and 2013 annual submissions and on the findings of and recommendations made in the 2011 and 2012 review reports. The plan for the 2012 annual submission outlines the timeline for the planned improvements for all sectors, except energy, while the plan for 2013 annual submission does not outline any timeline for the planned improvements. The ERT encourages the Party to provide in its

NIR the inventory improvement plan for the 2014 annual submission, including deadlines for all planned improvements.

Inventory preparation

14. Table 4 contains the ERT’s assessment of the Russian Federation inventory preparation process. For improvements related to specific categories, please see the paragraphs cross-referenced in the table.

Table 4

**Assessment of inventory preparation by the Russian Federation**

<i>General findings and recommendations</i>		
<i>Key category analysis</i>		
Was the key category analysis performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> (hereinafter referred to as the IPCC good practice guidance) and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	
Approach followed?	Tier 1	
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	
Does the Party use the key category analysis to prioritize inventory improvements?	No	The ERT reiterates the encouragement in the previous review report that the Russian Federation provide explanations in its NIR on how the results of the key category analysis are used to prioritize the development and improvement of the GHG inventory
Are there any changes to the key category analysis in the latest submission?	Yes	According to annex 1 of the NIR, in 2011, the following became key categories: refrigeration and air-conditioning equipment; direct N <sub>2</sub> O emissions from agriculture soils; CH <sub>4</sub> emissions from enteric fermentation; indirect N <sub>2</sub> O emissions from agriculture soils; and industrial wastewater handling Limestone and dolomite use, ammonia production, land converted to settlements and production of HCFC-22 were not identified as key categories

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*General findings and recommendations*


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*Assessment of uncertainty analysis*

Approach followed?	Both tier 1 and tier 2	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	The Party 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
Quantitative uncertainty (including LULUCF)	Level = 12.2% Trend = 8.5%	
Quantitative uncertainty (excluding LULUCF)	Level (not provided) Trend (not provided) The ERT encourages the Party to estimate the quantitative uncertainty introduced in the level and the trend excluding LULUCF	

*Abbreviations:* ERT = expert review team, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

Inventory management

15. 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 emission factors (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 quality assurance/quality control (QA/QC) procedures, external and internal reviews, documentation on annual key categories and key category identification, and planned inventory improvements. The ERT considered the information provided in the NIR to be suitably detailed and complete.

**4. Follow-up to previous reviews**

16. The ERT recognizes that the 2012 annual review report was not finalized prior to the submission of the Russian Federation's 2013 annual submission and, therefore, it may not have been possible for the Party to take into account in full the recommendations from the review of the 2012 annual submission. The ERT noted that there are recommendations made in previous review reports that have not yet been addressed by the Party. The ERT has reiterated recommendations made in the previous review reports in the relevant chapters of this report.

17. The Russian Federation has implemented several improvements based on recommendations made in previous review reports, such as:

(a) More comprehensive information on sector-specific QA/QC procedures and external reviews was included in the NIR (i.e. an independent source category-specific QC procedure was undertaken for the energy sector by the Centre for Efficient Use of Energy (CENEF), and the results of the assessment were presented during a joint IGCE and CENEF workshop);

(b) New and/or more detailed information was provided in the sectoral chapters of the NIR on category-specific QC procedures, specifically for the energy, solvent and other product use, agriculture and LULUCF sectors;

(c) Under the QC procedures section of the NIR, the Party provided a comparison of national data on fertilizers with data compiled by the Food and Agriculture Organization of the United Nations (FAO);

(d) More comprehensive and transparent information was provided in the sectoral chapters of the NIR on the assessment of uncertainties, the uncertainty analysis and its results, specifically for the energy, agriculture and LULUCF sectors;

(e) CO<sub>2</sub> emissions from glass production, under the category other (mineral products), were reported separately from the emissions from limestone and dolomite use.

## 5. Areas for further improvement identified by the expert review team

18. During the review, the ERT identified a number of areas for improvement, including some related to specific categories. These are listed in the relevant chapters of this report and in table 9.

## B. Energy

### 1. Sector overview

19. The energy sector is the main sector in the GHG inventory of the Russian Federation. In 2011 emissions from the energy sector amounted to 1,920,401.47 Gg CO<sub>2</sub> eq, or 82.7 per cent of total GHG emissions. Since 1990, emissions have decreased by 29.3 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 changes in the fuel mix (natural gas is now used more extensively in place of coal for energy production). In 2011, emissions from the energy sector increased by 5.3 per cent compared to 2010 levels. Within the sector, 46.8 per cent of the emissions were from energy industries, followed by 19.3 per cent from fugitive emissions from oil and gas, 14.8 per cent from transport and 7.6 per cent from other sectors. Manufacturing industries and construction accounted for 7.6 per cent and fugitive emissions from solid fuels accounted for 2.5 per cent. The remaining 1.4 per cent was from the category other (fuel combustion).

20. The Russian Federation has included additional information on the AD used in the individual subcategories at the level where the emission calculations are performed. 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.

21. The ERT noted that the use of notation keys is not consistent throughout the time series for some categories. For example: the implied emission factor (IEF) for CO<sub>2</sub> emissions from biomass in petroleum refining was reported as "IE" (included elsewhere) for 1990 and 1999–2004, as "NE" (not estimated) for the period 1991–1998, as "NA" (not applicable) for the period 2006–2011 and as 107.1 t/TJ for 2005. Also, energy consumption for other fuels in the category food processing, beverages and tobacco was reported as "NO" for 1990 and as "IE" for 1991–1999. The ERT reiterates the recommendation made in previous review reports that the Russian Federation review the use of notation keys for all categories in the energy sector and ensure the appropriate selection of notation keys for the complete time series.

22. The Russian Federation continues to use default carbon content values and oxidation factors for the estimation of emissions for several key categories in the energy sector. The ERT noted that the Party is working on the development of a country-specific EF for natural gas and gasoline. The ERT reiterates the strong recommendation made in previous review reports that the Russian Federation use a tier 2 method for key categories to improve accuracy and also provide sufficient information on the justification that the proposed country-specific EF for natural gas and gasoline better reflects the national circumstances than the Intergovernmental Panel on Climate Change (IPCC) default values.

## 2. Reference and sectoral approaches

23. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 24–31 below.

Table 5

### Review of reference and sectoral approaches

		<i>Paragraph cross-references</i>
Difference between the reference approach and the sectoral approach	Energy consumption: 2 226.44 PJ, 9.4%  CO <sub>2</sub> emissions: 20 520.33 Gg CO <sub>2</sub> eq, 1.4%	24
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	25–27
Are differences with international statistics adequately explained?	No	27, 28
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	29, 30
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	No	31

*Abbreviations:* CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”.

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

24. The ERT noted that the Russian Federation has reported apparent energy consumption (excluding non-energy use and feedstocks) for all fuels as “NA” in CRF table 1.A(c). The ERT recommends that the Party report this information. The differences between CO<sub>2</sub> emission estimates derived from using the reference approach and the sectoral approach have decreased from 8.2 per cent in 1990 to 1.4 per cent in 2011. However, for different types of fuel the difference is higher. For example, in 2011, the differences between the estimates of CO<sub>2</sub> emissions derived using the reference approach and the sectoral approach were 2.8 per cent for liquid fuels, –4.6 per cent for solid fuels and 5.9 per cent for gaseous fuels.

25. The reasons for the differences between the reference and sectoral approaches are provided in annex 4 of the NIR. The Party provided additional explanations during the review, according to which the differences observed in 2011 are due to the methodology of the reference approach, which estimates CO<sub>2</sub> emissions based on the apparent consumption of fuels. This approach assumes accounting of production only for primary fuels and ignores the process of transformation from primary to secondary fuels. Taking into account different net calorific values (NCVs) and other parameters of primary and secondary fuels, the primary fuel transformation industry in the Russian Federation is believed to be the main reason for the overestimation of apparent consumption of liquid fuels and underestimation of apparent consumption of solid fuels.

26. The explanation provided by the Russian Federation explains the discrepancies in the recent years, but not for the period 1990–2005, during which the discrepancies are larger than 4 per cent. This is particularly the case for natural gas, especially given that there was no transformation process for natural gas during those years. The ERT is of the view that these differences may be due to unrecorded consumption of gas and not taking into account distribution losses. The ERT recommends that the Party investigate further the underlying reasons for the discrepancies for the whole time series for all fuels and in particular for natural gas.

27. There are significant discrepancies between the reference approach data and the data reported to the International Energy Agency (IEA). The total apparent energy consumption reported in the CRF tables for the reference approach corresponds to that reported to the IEA, being within about 7 per cent for most years, with values in the CRF tables being lower for all the years except 1990 and 1991, when they were about 9 and 12 per cent larger respectively. In 2010 and 2011, the apparent consumption in the CRF tables was about 10 per cent and 8 per cent smaller, respectively. The growth rate for the period 1990–2011 for the total apparent consumption is significantly different (CRF tables: –33 per cent, IEA: –19 per cent). The ERT recommends that the Party continue its efforts to improve the consistency of the data reported in the CRF tables and to the IEA, by considering ways to improve the coordination between Rosstat and the organization that provides data to IEA.

28. The NIR indicates that AD from the fuel and energy balance (FEB) prepared by Rosstat are used for the GHG emission calculations for fuel combustion activities. However, a disaggregated FEB was not produced for the period 1992–1999; for these years the IEA energy balance was used. The ERT noted 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 should be lower. The ERT reiterates the recommendation made in the previous review report that the Russian Federation review its choice of AD for the period 1992–1999 and clearly explain the difference between national and international statistics, in order to ensure that the time-series consistency meets the requirements of the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and that the methodologies used are accurately reported in the NIR.

#### *International bunker fuels*

29. The fuel consumption for domestic/international flights was calculated based on annual flying times by aircraft type and average fuel flow rates (by aircraft type). The ERT noted that although the main assumptions used to estimate the emissions are described in the NIR under the relevant chapters, AD and background information for international bunker fuels are still not fully described. Specifically, the NIR does not contain sufficient information on AD and background information for international bunker fuels, on the fuel flow rates, the landing and take-off cycles (LTO) as well as the cruise phases, flight hours and on the methods used to extrapolate the available data to generate emission estimates for the period 1990–1999. In response to a question raised by the ERT, the Party confirmed that the average fuel flow rate includes LTO and cruise phases and the data on annual

flying time are confidential. With regards to detailed information on the methods used to extrapolate the available data to generate emission estimates for the period 1990–1999, the Party provided a paper.<sup>3</sup> The ERT recommends that the Party include in the NIR a summary of information from the provided paper and other information provided during the review in order to improve transparency.

30. The ERT noted that emissions from international and domestic navigation were estimated based on the data on overall fuel consumption used for navigation, which were obtained from the FEB prepared by Rosstat and the data on the proportions of domestic and international (export and import) cargo loading and unloading operations at the ports of the Russian Federation. The general data on fuel consumption are provided in annex 2 of the NIR, but data about the estimation of fuel consumption were not provided. In response to questions raised by the ERT during the review, the Party provided data on maritime cargo turnover at Russian Federation's ports. The ERT considers that background information on navigation is necessary for the review process and, therefore, in order to ensure sufficient transparency, the ERT recommends that the Russian Federation include this information in the NIR.

#### *Feedstocks and non-energy use of fuels*

31. The ERT noted some inconsistencies between CRF tables 1.A(b) and 1.A(d). Specifically, in CRF table 1.A(d), the Party uses the notation key "NO" (not occurring) for naphtha and ethane, while it uses "NO" and "NA" in CRF table 1.A(b). In response to a question raised by the ERT during the review, the Party explained that the correct notation key is "NO" for both tables. The ERT recommends that the Party make this correction in CRF table 1.A(b).

### **3. Key categories**

#### Stationary combustion: all fuels – CO<sub>2</sub>

32. CO<sub>2</sub> emissions from stationary combustion of fuels are calculated using a tier 1 method and IPCC default EFs for most of the subcategories and fuels except for public electricity and heat production for which a tier 2 approach and country-specific EFs were applied for black coal, brown coal, diesel oil, residual fuel oil and oil coke. According to the explanations provided in the NIR these country-specific EFs were derived from plant-specific data from power plants that accounted for 90 per cent of the electricity and heat production in the Russian Federation. Information used includes the origin of the coal (basins) and the corresponding fuel properties and fuel consumption. Relevant data on fuel consumption were 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. Plant-specific oxidation factors were used in the CO<sub>2</sub> emission estimates. In response to recommendations made in the previous review report, the Party has developed CO<sub>2</sub> EFs for coal to reflect inter-annual changes in coal quality taking into account the amounts of coal originating from different coal basins. However, the ERT noted that these country-specific CO<sub>2</sub> EFs are only used for the energy industries subcategory. In the NIR, the Party explained that, although it has explored the possibility of applying improved country-specific EFs for coal 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. In this regard, the ERT reiterates the recommendations made in the previous review report that the Party gather further information on the use of coal in

<sup>3</sup> 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*, 2011, 36(1): pp. 18–24.

order to allow for the development of country-specific CO<sub>2</sub> EFs for all stationary sources using coal, and that the Party use these data to estimate CO<sub>2</sub> emissions for all categories under stationary combustion.

33. The ERT noted that, while in previous submissions the Russian Federation used a country-specific CO<sub>2</sub> EF for natural gas combustion in public electricity and heat production, and default EFs for other categories, in the latest submission a default CO<sub>2</sub> EF was used in all categories, including natural gas combustion in public electricity and heat production. In response to a question raised by ERT, the Russian Federation explained that a country-specific CO<sub>2</sub> EF (55.26 t/TJ) for natural gas consumption in public electricity and heat production should have been used instead of the IPCC default value of 55.82 t/TJ that was incorrectly used for 2011. However, the Party noted that the IPCC default CO<sub>2</sub> EF is higher than the country-specific EF, so the mistake in the calculations leads to an overestimation of emissions. The Russian Federation noted that the development of country-specific CO<sub>2</sub> EF for natural gas combustion for other categories is included in the national improvement plan 2013 and the Party is planning to apply the country-specific CO<sub>2</sub> EF for natural gas in the 2014 annual submission. The ERT recommends that the Russian Federation correct the errors in the use of EFs, in order to improve the accuracy of its reporting.

34. Regarding other fuel types, in response to a question raised by the ERT during the review, the Party explained that it is working on the development of a country-specific CO<sub>2</sub> EF and it has also considered the possibility to move to tier 2 methods for other key subcategories. This work was initiated in response to recommendations made in previous review reports and involves the finalization of work on studies which are currently in progress. As soon as the final results are obtained and verified in line with the IPCC good practice guidance, the new country-specific EFs will be included in the national GHG inventory of the Russian Federation. The ERT commends the Russian Federation for this effort and recommends that the Party use the country-specific EFs as soon as they become available.

35. The ERT noted inter-annual fluctuations in the CO<sub>2</sub> IEF for liquid fuels used in food processing, beverages and tobacco under manufacturing industries and construction. In response to a question raised by the ERT during the review, the Russian Federation clarified that this is a misprint owing to the manual input of fuel consumption data for the years from 1992 to 2003. The ERT recommends that the Party report the correct values and reiterates the recommendation made in the previous review report that the Party enhance the QA/QC procedures to avoid such errors.

36. In response to a recommendation made in the previous review report, the Russian Federation reported AD and GHG emissions (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O) from autoproducers under the manufacturing industries and construction category instead of under the energy industries category. This improvement was performed only for the period 2005–2011. In response to a question raised by the ERT during the review, the Russian Federation explained that for other years (1990–2004) the emissions from autoproducers were already included in the manufacturing industries and construction category due to the different structure of the national energy balance for that period. Thus, the time series should now be considered consistent. The ERT commends the Party for the improvement and for the additional explanation provided and recommends that the Russian Federation explain this issue clearly in its NIR.

#### Road transportation: liquid fuels – CO<sub>2</sub>

37. In response to a recommendation made in the previous review report, the Russian Federation recalculated the CO<sub>2</sub> emission estimates from gasoline using the CO<sub>2</sub> EFs of 73.0 t CO<sub>2</sub>/TJ instead of 69.3 t CO<sub>2</sub>/TJ, but only for the years 2010 and 2011. In response to a question raised by the ERT, the Russian Federation acknowledged the problem of inconsistency in the time series and informed the ERT that it will include the development



of a country-specific EF for gasoline combustion by road vehicles in the inventory improvement plan. The ERT recommends that the Party implement this improvement.

38. The ERT noted that although CO<sub>2</sub> emissions from liquid fuels in road transportation is a key category, the Party continues to use default carbon content values and oxidation factors from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). The ERT also noted that the Russian Federation is working on the development of a country-specific EF for diesel oil and gasoline and is considering the possibility to move to a tier 2 method. The ERT commends the Russian Federation for its efforts to develop a country-specific EF for CO<sub>2</sub> emissions for diesel oil and gasoline in accordance with the IPCC good practice guidance and recommends that the Party complete this task.

39. The ERT noted some inconsistencies in the AD and CO<sub>2</sub> emissions from pipeline transport – liquid fuel. For 1990 and 1991, the AD and CO<sub>2</sub> emissions were reported as “NO”, while for the period 1992–2011 actual values for AD and CO<sub>2</sub> emission were reported. During the review, the Russian Federation confirmed that this activity occurred in the country in 1990 and 1991 but the AD and associated CO<sub>2</sub> emissions were included in other categories because the FEB for those years did not separately report these data. The ERT recommends that the Party report separately these AD and CO<sub>2</sub> emissions for 1990 and 1991 or, if this is not possible, to report them as “IE”. The ERT also recommends that the Party include a description of this issue in its NIR.

#### Coal mining and handling: solid fuels – CH<sub>4</sub>

40. The ERT noted that in the NIR, the Party reported that CH<sub>4</sub> recovery from mines amounted to 78.77 Gg CH<sub>4</sub> in 2010 and 82.00 Gg CH<sub>4</sub> in 2011, compared with 25.21 Gg CH<sub>4</sub> in 1990. No explanation was provided in NIR for this large increase despite the recommendation in the previous review report. The ERT reiterates the recommendation made in the previous review report that the Russian Federation provide an explanation of this issue in the NIR in order to ensure transparency.

## **4. Non-key categories**

### Stationary combustion: gaseous fuels – CH<sub>4</sub> and N<sub>2</sub>O

41. As stated in the previous review report, the Russian Federation was planning to establish country-specific CH<sub>4</sub> and N<sub>2</sub>O EFs for energy industries for natural gas. In response of a question raised by the ERT regarding whether the Party plans to proceed with this improvement, the Party responded that the development of country-specific EFs for CH<sub>4</sub> and N<sub>2</sub>O has been included in the 2013 national improvement plan. It also informed the ERT that this is a very complex and complicated task requiring detailed information about technologies used at about 500 power plants. In addition, the application of these country-specific EFs for the GHG inventory requires the disaggregation of fuel combustion AD by different technologies used, which is also very complicated. As a first step, the Party decided to develop country-specific CO<sub>2</sub> EFs for natural gas, owing to the significant amount of operations with this fuel type in the country. IGCE, in cooperation with Gazprom JSC, initiated a study on this particular issue and the first outcome of this work was expected by the end of 2013. The ERT commends the Russian Federation for its efforts and encourages the Party to also develop country-specific CH<sub>4</sub> and N<sub>2</sub>O EFs for natural gas for energy industries.

## C. Industrial processes and solvent and other product use

### 1. Sector overview

42. In 2011, emissions from the industrial processes sector amounted to 174,976.81 Gg CO<sub>2</sub> eq, or 7.5 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 570.87 Gg CO<sub>2</sub> eq, or 0.02 per cent of total GHG emissions. Since the base year (1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for fluorinated gases (F-gases)), emissions have decreased by 26.7 per cent in the industrial processes sector, and increased by 1.6 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 reduction in by-product emissions from the production of hydrochlorofluorocarbon-22 (HCFC-22), the decrease in HFC emissions from aluminium production and the decrease in production mainly of cement, metals and ammonia.

43. Within the industrial processes sector, 52.9 per cent of the emissions were from metal production, followed by 28.6 per cent from mineral products and 12.9 per cent from chemical industries. Emissions from consumption and production of halocarbons and SF<sub>6</sub> accounted for 3.4 per cent and 2.2 per cent, respectively.

44. The Russian Federation has followed most of the recommendations made in the previous review report. However, the ERT noted that the text of the NIR has not been edited properly to address recent changes in tables with AD, EFs and emissions, which leads to limited transparency and inconsistencies between the CRF tables and the NIR. The ERT recommends that the Russian Federation update the information in its NIR and improve its QA/QC procedures to ensure that final editorial checks are done every time the NIR is updated.

45. The ERT noted that the only improvement planned for the whole sector relates to the estimation of CO<sub>2</sub> emissions from the use of magnesite. In response to a question raised by the ERT, the Russian Federation clarified that the national inventory team is preparing its 2015 NIR and it is considering the availability of data to enable it to apply the methods from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines). The Party also informed the ERT that a peer review of the iron and steel production category was completed by the National Carbon Sequestration Foundation<sup>4</sup> in February 2014. The ERT commends the Russian Federation for its efforts and encourages the Party to implement similar peer reviews for limestone and dolomite use as well as coke consumption for pig iron production (see para. 46 below).

### 2. Key categories

#### Iron and steel production – CO<sub>2</sub> and CH<sub>4</sub><sup>5</sup>

46. The ERT noted that, to estimate CO<sub>2</sub> emissions from pig iron production, the Russian Federation applied the average coke consumption for 2000–2004 (0.538 kg of coke/t of pig iron produced) for 2005 onwards with no evidence that this value did not increase over time. In response to questions raised by the ERT, the Russian Federation explained that no disaggregated data on coke consumption were available for 2005–2011 and that according to expert judgement the standard deviation for coke consumption data was less than 2 per cent. The ERT is of the view that this may not be the case and

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<sup>4</sup> See <<http://www.ncsf.ru/en>>.

<sup>5</sup> Not all emissions related to all gases under this category are key categories, particularly CH<sub>4</sub> emissions. However, since the calculation procedures for issues related to this category are discussed as whole, the individual gases are not assessed in separate sections.

recommends that the Party make efforts to obtain AD for the consumption of coke for 2005 onwards.

47. The ERT noted that the Russian Federation reported CH<sub>4</sub> emissions from coal coke production in the iron and steel production category that were estimated using the default EF (0.5 kg CH<sub>4</sub>/t of coke produced) from the Revised 1996 IPCC Guidelines (Volume 2, table 2.9). However, the ERT notes that the Revised 1996 IPCC Guidelines do not specify the type of coke to which this EF applies. The ERT is of the view that coal coke produced at the integrated iron and steel plant should not be attributed to chemical industry. The ERT recommends that the Russian Federation report CH<sub>4</sub> emissions from coking in metallurgy under the energy sector (iron and steel) using the national or default EF for coke ovens of 1 kg CH<sub>4</sub>/TJ of energy intake (Revised 1996 IPCC Guidelines, Volume 3, table 1-17).

### 3. Non-key categories

#### Other (chemical industry) – CH<sub>4</sub>

48. The Russian Federation reported in its NIR petrol coke consumption for production of silicon carbide (table 4.21). However, no CH<sub>4</sub> emissions from petrol coke production were reported under other (chemical industry). In response to questions raised by the ERT, the Russian Federation explained that CH<sub>4</sub> emissions from petrol coke production are reported under fugitive CH<sub>4</sub> emissions from oil refineries, and that it believes that methodologies for the production of upgraded petroleum coke (calcined or needle) are not provided in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. The ERT noted that table 2-9 of the Revised 1996 IPCC Guidelines (Volume 2) provides the EF to be used in chemical industry and that could be applied to estimate CH<sub>4</sub> emissions from the upgraded petrol coke production, although the type of coke produced is not specified in the table. The issue was included in the list of potential problems and further questions raised by the ERT. In response to this list the Russian Federation resubmitted the CRF tables for the whole time series and provided to the ERT the calculation sheets with the upgraded coke production and EF. Based on these data, the ERT considers the issue resolved, as the Party estimated CH<sub>4</sub> emissions from upgraded coke production. The ERT recommends that the Party include information on all methodological changes in its NIR. Recalculations resulted in an increase of CH<sub>4</sub> emissions from the category by 11.04 Gg CO<sub>2</sub> eq or less than 0.01 per cent of the total emissions from the industrial processes sector in 2011.

#### Aluminium production – CO<sub>2</sub> and PFCs

49. The ERT noted that although the Russian Federation used detailed data to estimate PFC emissions from aluminium production, it used the tier 1b IPCC method to estimate CO<sub>2</sub> emissions, as CO<sub>2</sub> emissions from aluminium production have not been identified as a key category. The ERT encourages the Russian Federation to collect plant-specific data on the reducing agent used for aluminium production in order to move to a higher tier methodology in estimating CO<sub>2</sub> emissions and improve the accuracy of its inventory.

50. The Russian Federation has reported the notation key “NE” for PFC emissions from aluminium production (namely perfluoropropane (C<sub>3</sub>F<sub>8</sub>), perfluorobutane (C<sub>4</sub>F<sub>10</sub>), perfluorocyclobutane (C<sub>4</sub>F<sub>8</sub>), perfluoropentane (C<sub>5</sub>F<sub>12</sub>) and perfluorohexane (C<sub>6</sub>F<sub>14</sub>) in CRF table 2(II)). In its NIR and in response to questions raised by the ERT during the review the Russian Federation clarified that, according to the Revised 1996 IPCC Guidelines, only perfluoromethane (CF<sub>4</sub>) and perfluoroethane (C<sub>2</sub>F<sub>6</sub>) 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 reiterates the recommendation

made in the previous review report that the Russian Federation use the correct notation keys and improve its QC procedures, in order to avoid the incorrect use of notation keys.

#### Consumption of halocarbons and SE<sub>6</sub> – HFCs

51. In its NIR (p. 157 and table 4.57) the Party reports a significant decrease in the production of refrigerators using HFC-134a between 2010 and 2011 with no explanation of the refrigerant type that was used instead of HFC-134a. In response to a question raised by the ERT, the Russian Federation explained that the largest domestic refrigerator producer reduced production of HFC-134a-filled refrigerators and switched to using R-600a. The ERT recommends that the Party add this explanation into the NIR.

52. In the NIR the Russian Federation explained that it uses the tier 1 approach from the 2006 IPCC Guidelines to estimate emissions of HFCs and PFCs from foam blowing and fire extinguishers based on consumption data for HFCs and PFCs. In response to questions raised by the ERT, the Party confirmed that imported HFC/PFC-filled closed-cell foams and fire extinguishers were not accounted for when estimating emissions, as these data were not available in national import statistics. The ERT considers that this is a potential underestimation of emissions. This issue was included in the list of potential problems and further questions raised by the ERT. In response to this list, the Russian Federation resubmitted the CRF tables for the whole time series and provided the calculation sheets with updated AD including imports of closed-cell foams and fire extinguishers. The ERT considers that the issue has been resolved. The ERT recommends that the Party include information on all methodological changes in its NIR. The recalculations resulted in an increase of HFC and PFC emissions from the category by 5.24 Gg CO<sub>2</sub> eq or less than 0.01 per cent of the total emissions from the industrial processes sector in 2011.

53. In its NIR (p. 162) the Russian Federation explained that 40 per cent of HFC-23 is used as feedstock, with no clarification of whether it is 40 per cent of production or consumption. In CRF table 2(II) HFC-23 emissions were reported as “NA” with an explanation in the NIR that no IPCC methodology is available. According to the UNFCCC reporting guidelines, the notation key “NE” should be used for sources where emissions have not been estimated, including due to absence of an IPCC methodology, with proper explanation in the NIR and in CRF table 9(a). The ERT noted that 40 per cent of total consumption (table 4.55 of the NIR) is a significant figure given the high global warming potential (GWP) of the HFC-23 (11,700). The ERT encourages the Party to investigate the occurrence of these HFC-23 emissions. If these emissions do not occur, the ERT recommends that the Party report them as “NO”. If these emissions occur, the ERT encourages the Russian Federation to consider the possibility of developing a country-specific methodology to estimate emissions from this category, or, if this is not possible, the ERT recommends that the Party report these emissions as “NE”.

## **D. Agriculture**

### **1. Sector overview**

54. In 2011, emissions from the agriculture sector amounted to 144,043.85 Gg CO<sub>2</sub> eq, or 6.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 54.7 per cent. The key drivers for the fall in emissions are the reductions in the livestock population and cultivated areas and consequently the amount of synthetic fertilizers applied on agricultural soils. Within the sector, 56.5 per cent of the emissions were from agricultural soils, followed by 26.3 per cent from enteric fermentation, 16.4 per cent from manure management and 0.7 per cent from rice cultivation.

## 2. Key categories

### Enteric fermentation – CH<sub>4</sub>

55. The ERT noted that considerable inter-annual variations in CH<sub>4</sub> EFs for enteric fermentation of dairy cattle have occurred in many regions of the Russian Federation between the 2011–2013 annual submissions. For example, according to the data presented in the NIR, CH<sub>4</sub> EFs for dairy cattle of the Novosibirskaja Oblast, the Republic of Khakassia, the Chechen Republic and the Republic of Dagestan doubled between 2009 and 2011; CH<sub>4</sub> EFs for dairy cattle of the Republic of Buryatia and the Republic of Kalmykia have declined by more half during the same period. In response to questions raised by the ERT, the Russian Federation explained that there had been an error in the calculations for the 2011 and 2012 annual submissions for some regions – namely, a problem related to confusion regarding the insertion of AD on consumed feed between some oblasts (including oblasts in the South region, the Povoljsky region, the Ural region and the Siberian region). The Russian Federation also stated that these mistakes were corrected in the 2013 annual submission, and provided a file on the recalculated CH<sub>4</sub> EF during the review week. However, the Party did not provide in its 2013 annual submission any explanatory information regarding recalculations due to corrections of AD on gross feed intake for dairy cattle. The ERT recommends that the Party include in its NIR complete information related to the recalculations that were carried out. The ERT also recommends that the Party improve the transparency of the inventory of the agricultural sector by including data (in an annex of the NIR) on gross energy intake, milk yield, CH<sub>4</sub> EF for enteric fermentation of dairy cattle, and gross energy intake and CH<sub>4</sub> EF for enteric fermentation of non-dairy cattle for each region/oblast of the Russian Federation.

56. The Russian Federation estimates gross feed intake by livestock for each of the 83 regions of the country based on data on five main feed intake categories collected by Rosstat. However, the ERT noted that it is not clear from the NIR whether the amount of fresh grasses consumed by livestock was estimated or collected by Rosstat. In response to a question raised by the ERT, the Russian Federation explained that data on the amounts of grasses consumed are estimated by all types of agricultural enterprises (farms, private organizations and individual holdings) based on a common methodology approved by Rosstat, which takes into account the area of cattle pastures, time spent by livestock on these pastures during the year, number of animals (by category) and productivity of above-ground biomass of pastures. The ERT commends the Party for this information and recommends that the Russian Federation improve the transparency of its reporting by including a clear explanation in the NIR of how it accounts for feed intake by cattle livestock during grazing.

### Agricultural soils – N<sub>2</sub>O

57. The ERT noted that the Russian Federation does not indicate what tier (tier 1a or tier 1b) was used to estimate direct or indirect emissions from manure applied to agricultural soils. The ERT considers that this information is important for the inventory review process and therefore reiterates the recommendation made in the previous review report that the Russian Federation clearly indicate, in the NIR, the tier levels used to estimate the emissions for this category.

58. The ERT noted that total amount of nitrogen (N) that volatilized due to atmospheric deposition does not correspond to the sum of the amounts of N contained in synthetic fertilizers and the amount of N excreted by livestock for 1992, 1994–1997, 2002, 2005 and 2007. In response on a question raised by the ERT, the Russian Federation explained that

mistakes were made when adding data to the CRF reporter.<sup>6</sup> The ERT notes that the mistakes have led to an overestimation of the amount of N that volatilized due to atmospheric deposition and also due to leaching and run-off in all the years mentioned above. The ERT recommends that the Russian Federation correct the mistakes and improve its QC procedures in this regard.

### 3. Non-key categories

#### Field burning of agricultural residues – CH<sub>4</sub> and N<sub>2</sub>O

59. The ERT noted that the Russian Federation does not calculate CH<sub>4</sub> and N<sub>2</sub>O emissions from burning of crop residues for the entire time period, because it claims that laws prohibit the burning of residues. In response to a question raised by the ERT, the Russian Federation provided a list of the laws that prohibit the burning of agricultural residues. The ERT noted that, according to this list, burning of crop residues was legally prohibited for the first time in 1995. The ERT recommends that the Russian Federation improve the transparency of its reporting and include in its NIR references to relevant national legislation. It also recommends that the Party provide evidence that burning of agricultural residues in 1990–1994 was prohibited or estimate and report CH<sub>4</sub> and N<sub>2</sub>O emission estimates from field burning of agricultural residues for the period 1990–1994.

## E. Land use, land-use change and forestry

### 1. Sector overview

60. In 2011, net removals from the LULUCF sector amounted to 628,434.86 Gg CO<sub>2</sub> eq. Since 1990, the sector has changed from a net source to a net sink (in 1990, the LULUCF sector represented a net source of emissions that amounted to 84,514.45 Gg CO<sub>2</sub> eq). The key drivers for this increase of net removals are:

(a) The reduction in forest harvesting during the 1990s and the associated reduction in net emissions due to biomass carbon stock loss. The net removals from forest land amounted to 213,292.24 and 655,377.44 Gg CO<sub>2</sub> eq in 1990 and 2011, respectively;

(b) The changes in cropland management caused predominantly by the abandonment of cropland areas, leading to a large decrease in CO<sub>2</sub> emissions from soils. The estimated net emissions from cropland amounted to 268,572.42 and 82,868.65 Gg CO<sub>2</sub> eq in 1990 and 2011, respectively;

(c) The increase in CO<sub>2</sub> removals associated with significant areas of cropland converted to grassland that took place in the early 1990s. The estimated net removals in grassland amounted to 7,088.47 and 78,274.88 Gg CO<sub>2</sub> eq in 1990 and 2011, respectively.

61. Within the sector, net removals of 655,377.44 Gg CO<sub>2</sub> eq were from forest land, followed by 78,274.88 Gg CO<sub>2</sub> eq from grassland. Net emissions of 82,868.65 Gg CO<sub>2</sub> eq were from cropland, followed by 22,253.64 Gg CO<sub>2</sub> eq from settlements and 95.17 Gg CO<sub>2</sub> eq from wetlands. Emissions and removals from other land and other (LULUCF) have been reported as “NE, NO” and “IE”, respectively.

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<sup>6</sup> Specifically: for 1992, 1994, 1995, data on N excretion of deer were inserted incorrectly; for 1995 and 1996, an error was made in the amount of N fertilizers applied; for 2007 a mistake was made when reporting the mules and asses population for N excretion; for 2005 a mistake was made when reporting the horse population for calculating the amount of N excretion; and for 2002 there was double reporting of the amount of N excreted by nutria.

62. The Russian Federation improved the completeness of its reporting. Specifically, there are notable improvements in AD and EFs, and emissions for the category of cropland converted to settlements were estimated for the first time. However, there are pending issues identified in previous review reports that include some missing estimates for cropland and other land converted to grassland, and cropland, wetland and settlements converted to other land, which are reported as “NE”. For previously unreported pools in land converted to wetlands and settlements, the notation key “NA” is used based on the assumption that the conversions concerned are not anthropogenic. The ERT strongly recommends that the Russian Federation improve the completeness of its inventory by including estimates of all mandatory pools.

63. The ERT welcomes the efforts of the Russian Federation to improve the transparency of its reporting. The ERT noted that the Party has used a country-specific method to estimate the carbon stock changes in the biomass pool, and reported areas and conversion factors at a disaggregated level. The ERT also noted that these country-specific conversion factors cannot be readily compared with the default values in the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for annual biomass increment by species, age category and region. Therefore, to increase comparability with other Parties, the ERT encourages the Party to explore the possibility to report the country-specific parameters used in terms of annual increment (in volume or biomass). The ERT notes significant improvement in the NIR structure, which follows the IPCC land-use categories. However, the ERT recommends that the Party make further revisions to the NIR text structure in chapter 7.4 concerning the methodologies used for estimating carbon stock change so as to be organized by individual carbon pools within individual land-use categories instead of separate subchapters on absorption and emissions encompassing all carbon pools, as currently used in the NIR. The ERT also recommends that the Party provide additional information on AD and the verification efforts undertaken to increase confidence in the adopted biomass increment estimation approach, such as the underlying mean growing stock volume increment and comparison with the growth and yield tables or other models available for particular forest tree species, age categories and regions.

64. The ERT acknowledges the efforts undertaken so far by the Party to provide adequate, consistent, complete and transparent information on land use and land-use transitions in the Russian Federation. In response to questions raised by the ERT, the Party provided additional information describing the complexity of the task of area reconciliation in the Russian Federation, concluding that reporting other than at country level is not practicable. The ERT takes note of this information and encourages the Russian Federation to continue its effort to establish a reporting system capable of addressing the regional differences, which would lead to significantly increased transparency.

65. While recognizing the improvements made by the Russian Federation in rectifying inconsistencies and resolving issues identified in previous review reports, the ERT recommends that the Party continue to strengthen its QA/QC procedures in the LULUCF sector, paying particular attention to checking that any unexpected trends in AD and emissions across the time series are explained in the NIR (see para. 67 below).

## 2. Key categories

### Forest land remaining forest land – CO<sub>2</sub>

66. All pools are reported for managed forests and the accuracy of the estimates has significantly improved following the work undertaken by the Party based on recommendations made in previous review reports. In particular, the NIR contains more detailed information and the AD on forest stands (areas, volumes, as well as the conversion

factors, disaggregated at the regional level by age category, major tree species and climatic zones). 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 improving the transparency of emission estimation, most notably for the biomass and soil carbon stock changes. The ERT recommends that the Russian Federation continue to improve the transparency of the reported estimates.

67. The ERT noted that although the overall area of managed forest land increased by over 52 million ha between 1990 and 2011, between 2010 and 2011 about 4.5 million ha of managed forest land was transferred to unmanaged areas. In response to a question raised by the ERT, the Russian Federation explained that this particular event concerned unproductive shrub lands in the Kamchatka region. The ERT recommends that the Party include additional descriptions of the changes in areas of managed and unmanaged forest land in the NIR to increase transparency.

#### Cropland remaining cropland – CO<sub>2</sub>

68. The ERT commends the Russian Federation for its progress in improving emission estimates of the carbon stock changes in the category cropland remaining cropland for both mineral and organic soils as a result of its adoption of country-specific EFs and improved AD. The ERT recommends that the Russian Federation continue these efforts in developing and verifying country-specific EFs for the estimation of emissions/removals for the carbon pools in this land-use category and report revised estimates for these pools.

#### Land converted to grassland – CO<sub>2</sub>

69. The Russian Federation uses the Rothamsted Carbon Model (RothC) model<sup>7</sup> for the assessment of mineral and organic soils pools. The use of the model equates to a tier 3 methodology, with the use of some country-specific input parameters. The model has been adapted and tested in different climatic zones of the country and provides a combined estimate of emissions/removals for both pools. Because of this, the carbon stock changes in organic soils for cropland converted to grassland were reported as “IE”. The ERT reiterates the encouragement made in the previous review report that the Russian Federation 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<sub>2</sub>

70. The ERT noted that the Russian Federation provided previously unreported emissions from cropland converted to settlements. However, the ERT noted that there is still a pending issue: the Party is using average carbon stock changes for soils in settlements that are assumed to be representative of the situation across the whole country. The ERT acknowledges the efforts of the Russian Federation and reiterates the recommendation made in the previous review report that the Party improve the accuracy 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 for LULUCF.

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<sup>7</sup> For more information see <<http://www.rothamsted.ac.uk/sustainable-soils-and-grassland-systems/rothamsted-carbon-model-rothc>>.



## F. Waste

### 1. Sector overview

71. In 2011, emissions from the waste sector amounted to 80,857.66 Gg CO<sub>2</sub> eq, or 3.5 per cent of total GHG emissions. Since 1990, emissions have increased by 32.3 per cent. After 1996, the emissions from the sector grew continuously with a slightly decrease in 2010. The key drivers for this rise in emissions were increases of the amount of solid municipal waste deposited at solid waste disposal sites (SWDS), associated mainly with the growing food and paper production. Within the sector, 63.4 per cent of the emissions were from solid waste disposal on land followed by 36.6 per cent from wastewater handling. Waste incineration takes place in the Russian Federation but the emissions are reported under the energy sector.

72. Compared with the 2012 annual submission the ERT considers the 2013 annual submission to be sufficiently improved in terms of transparency, as it now includes AD and EFs on solid waste composition and wastewater handling. However, the EFs are not always accompanied by a reference to the source of information or justification. The ERT recommends that the Russian Federation provide corresponding references and/or the rationale for selecting specific EF values in its NIR.

73. The Russian Federation provided a plan of improvements to the emission estimates for the waste sector in the 2013 annual submission. It includes the estimation of CH<sub>4</sub> emissions from industrial solid waste at SWDS, the collection and analysis of AD for unmanaged SWDS, the collection of data on technical characteristics of wastewater handling systems, as well as the provision of technology information for improving the accuracy of emission estimation from waste incineration. The ERT noted that one of the key issues in improving the GHG inventory of the waste sector is the use of a tier 2 methodology for CH<sub>4</sub> emissions from industrial solid waste. The ERT commends the Party for providing information on the planned improvements, which improves transparency.

### 2. Key categories

#### Solid waste disposal on land – CH<sub>4</sub>

74. The ERT noted that the Party has used the IPCC tier 1 default method and default parameters except for country-specific degradable organic carbon (DOC) values for the estimation of CH<sub>4</sub> emissions from industrial solid waste disposed to SWDS. The ERT reiterates the recommendation made in the previous review report that the Party apply the IPCC tier 2 (first order decay) method to estimate CH<sub>4</sub> emissions from industrial solid waste disposed to SWDS.

75. In CRF table 6.A the Russian Federation reported the value of 23.65 per cent for both the “DOC degraded per cent” and for the “fraction of DOC in MSW” under additional information. The ERT noted for the former, the value reported should be 0.55 (including lignin), which is what the Party used in its calculations. The ERT provided further guidance on the reporting of these parameters and explained that the value of “DOC degraded per cent” and “fraction of DOC in MSW” in CRF table 6.A are not the same. The ERT recommends that the Party make this correction in the CRF tables.

76. The ERT noted that, in the NIR, the waste from parks and gardens is classified as industrial waste and, in response to a question raised by the ERT, the Russian Federation confirmed this fact. The ERT is of the view that this should be corrected and recommends that the Party improve the classification of this type of waste taking into account its composition and origin.

**3. Non-key categories**

Industrial wastewater handling – CH<sub>4</sub>

77. The ERT noted that CH<sub>4</sub> emissions from industrial wastewater sludge were reported as “IE” in CRF table 6.B but no explanation was provided regarding the category under which these emissions are reported or in CRF table 9(a) where information on the use of notation keys should be presented. The ERT reiterates the recommendation made in the previous review report that the Russian Federation explain under which category these emissions have been reported in the relevant CRF tables and in the NIR to ensure transparency.

78. The ERT noted that the value of CH<sub>4</sub> emissions from wastewater handling is 8.43 kg per capita in 2011, which is the second highest value of CH<sub>4</sub> emissions from this activity among the reporting Parties. In response to a question raised by the ERT, the Russian Federation explained that the reason for this is the high production of the paper and pulp industry and speculated that other reporting Parties may have another structure of industrial production that may lead to a lesser contribution of the industrial sector to the total CH<sub>4</sub> emission from wastewater treatment (and correspondingly, to lower per capita emissions) or they could use wastewater technologies with less CH<sub>4</sub> emissions. The ERT took note of the explanations and recommends that the Party provide explanatory information in the NIR to improve the comparability of its emissions with the emissions reported by other Parties.

Waste incineration – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

79. The ERT noted that the Russian Federation reported AD and emissions as “IE” in CRF table 6.C and reported emissions from this activity under the energy sector (included in biomass used for subcategory other (energy)). The ERT encourages the Party to report disaggregated AD on the amount of incinerated waste (without energy recovery) and emissions in CRF table 6.C to increase transparency.

**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

80. Table 6 provides an overview of the information reported and parameters selected by the Party under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6

**Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol**

	<i>Findings and recommendations</i>
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1?	Sufficient
Identify any elected activities under Article 3, paragraph 4, of the Kyoto Protocol	Forest management Years reported: 2008, 2009, 2010, 2011
Identify the period of accounting	Commitment period accounting

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Assessment of the Party's ability to identify areas of land and areas of land-use change	Sufficient
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Activities under Article 3, paragraph 3, of the Kyoto Protocol

*Afforestation and reforestation – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O*

81. The ERT recognizes that the model currently used by the Party to estimate emissions and removals of CO<sub>2</sub> from afforestation uses default parameters and EFs, and information taken from the NIR of Canada. The ERT recommends that the Party include a specific reference to the Canadian NIR to improve transparency. It also 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.

82. As noted in previous review reports, the Russian Federation uses a conservative approach for the assessment of biomass losses on afforested/reforested lands by assuming that all losses are a consequence of wildfires and by reporting CH<sub>4</sub> and N<sub>2</sub>O emissions under afforestation and reforestation (units of land not harvested). However, 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<sub>2</sub> are also reported as "IE" for this subcategory. The ERT is of the opinion that reporting 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 reiterates the recommendation made in the previous review report that the Russian Federation report the AD (in terms of the assessed amount of biomass burned, as no explicit data on areas of wildfires on afforested/reforested lands exist) for wildfires under afforestation/reforestation units of land not harvested in CRF table 5 (KP-II)5, in order to improve completeness.

*Deforestation – CO<sub>2</sub>*

83. 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. However, the AD on the deforested area are being 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 notes from the previous review report that the Russian Federation plans to improve the emission estimates in its 2014 annual submission. The ERT welcomes this effort and recommends that the Party continue to improve the accuracy of the emission estimates for deforestation by obtaining and using more disaggregated input data.

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

*Forest management – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O*

84. The methods, approach and parameters used for the estimation of emissions and removals from forest management generally follow the IPCC good practice guidance for LULUCF. The transparency of the information provided, which is related to the activity forest management, further increased as a result of the rectified NIR structure. The ERT welcomes this effort and recommends that the Party continue to improve the transparency of its reporting, specifically by: providing information related to biomass increment (see para. 63 above); providing information on forest areas that are unaccounted under forest management because they do not belong to forest land under the Russian land-use

categorization, but are potentially deforested and reported as deforestation under the Kyoto Protocol; rectifying the text in the NIR section 10.3.4.3 and elsewhere as feasible; and addressing the issue of the reported areas of forest management (see para. 85 below).

85. The ERT observed that between 2008 and 2009 the area of forest management significantly increased by allocating about 42 million ha of previously unmanaged forest land. The ERT also noted that the carbon gain in living biomass increased as a result of this, which means that productivity of the previously unmanaged forest areas would be higher when compared with those intentionally utilized for forest management. In response to a question raised by the ERT, the Party clarified that the areas newly allocated into forest management include some very productive middle-aged forests (previously categorized as lands used for agricultural purposes), which resulted in the increase of the IEF for carbon gain. The ERT strongly recommends that, in its NIR, the Russian Federation provide additional transparent information based on the analysis of forest type composition, age structure and associated biomass increment of the newly included, previously unmanaged forests to justify the reported higher carbon gain in biomass, which might otherwise represent an overestimation of removals. Related to this issue, it remains unclear whether the highly productive middle-aged forests on lands used for agricultural purposes represent the previously unmanaged forest areas, which is the only case when the area of forest management can increase during the Kyoto Protocol reporting period. The ERT strongly recommends that the Party also clarify this issue in its NIR.

## **2. Information on Kyoto Protocol units**

### Standard electronic format and reports from the national registry

86. 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 standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.<sup>8</sup> 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.

87. 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

88. 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

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<sup>8</sup> The SEF comparison report is prepared by the international transaction log (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.

accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

89. Table 7 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 7

**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<sub>2</sub> eq**

	2013 submission <sup>a</sup>		2010, 2011 and 2012 submissions <sup>b</sup>		Net accounting quantity <sup>c</sup>
	As reported	Revised estimates	Final	Final	
Afforestation and reforestation	-20 458 173		-20 458 173	-15 457 860	-5 000 313
Non-harvested land	-20 458 173		-20 458 173	-15 457 860	-5 000 313
Harvested land	0		0	0	0
Deforestation	86 876 835		86 876 835	66 423 511	20 453 324
Forest management	-671 418 662		-671 418 662	-655 965 650	-15 453 012
Article 3.3 offset <sup>d</sup>	-66 418 662		-66 418 662	-50 965 650	-15 453 012
Forest management cap <sup>e</sup>	-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

*Abbreviations:* CRF = common reporting format, 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.

<sup>a</sup> The values included under the 2013 submission are the cumulative accounting values for 2008, 2009, 2010 and 2011, as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2011.

<sup>b</sup> The values included under the 2010, 2011 and 2012 submissions are the final accounting values as a result of the 2012 review and are included in table 6 of the 2012 annual review report (FCCC/ARR/2012/RUS) in the column “2012 annual submission”, “Final”.

<sup>c</sup> 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 2013 submission and where the quantities issued or cancelled based on the 2012 annual review report have been subtracted (“net accounting quantity” = final 2013 – final 2012 annual review report).

<sup>d</sup> “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 emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

<sup>e</sup> 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.

90. Based on the information provided in table 7 for the activity afforestation/reforestation, the Russian Federation shall issue 5,000,313 removal units (RMUs) in its national registry.

91. Based on the information provided in table 7 for the activity deforestation, the Russian Federation shall cancel 20,453,324 assigned amount units, emission reduction units, certified emission reduction units and/or RMUs in its national registry.

92. Based on the information provided in table 7 for the activity forest management, the Russian Federation shall issue 15,453,012 RMUs in its national registry.

#### Calculation of the commitment period reserve

93. The Russian Federation reported its commitment period reserve to be 11,604,171,915 t CO<sub>2</sub> eq based on the national emissions in its most recently reviewed inventory (2,320,834,383 t CO<sub>2</sub> eq). After the submission of revised estimates, the Russian Federation calculated its commitment period reserve to be 11,604,253,309 t CO<sub>2</sub> eq based on the national emissions in its most recently reviewed inventory (2,320,850,662 Gg CO<sub>2</sub> eq). The ERT agrees with this figure.

### **3. Changes to the national system**

94. The Russian Federation reported that there is no change in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

### **4. Changes to the national registry**

95. The Russian Federation reported that there is no change in its national registry since the previous annual submission. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

96. The ERT noted that the NIR includes descriptions of international interactions aimed at reducing the adverse impacts of anthropogenic climate change and on training provided to MSc and PhD students from developing countries. Compared with the previous annual submission, the Party provided updated information on the provision of scholarships for hydrometeorology, meteorology and climatology specialties in 2011. However, the Party did not provide a formal statement on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The ERT reiterates the recommendation made in the previous review report that the Russian Federation provide, in the NIR, information 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.

## **III. Conclusions and recommendations**

### **A. Conclusions**

97. Table 8 summarizes the ERT's conclusions on the 2013 annual submission of the Russian Federation, in accordance with the Article 8 review guidelines.

Table 8  
Expert review team's conclusions on the 2013 annual submission of the Russian Federation

	<i>Paragraph cross-references</i>	
The ERT concludes that the inventory submission of the Russian Federation is complete (categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2011)	Complete	
Annex A sources <sup>a</sup>	Complete	
LULUCF <sup>a</sup>	Not complete	Table 3
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of the Russian Federation has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	
The Party's inventory is in accordance with the <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i> , the <i>IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and the <i>IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>	Generally	22, 32
The Party has reported information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	
The Party 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	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
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	Yes	
Did the Party provide information in the NIR on any changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	96

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

<sup>a</sup> The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in 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*, or the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

## B. Recommendations

98. The ERT identified the issues for improvement listed in table 9. All recommendations are for the next annual submission, unless otherwise specified.

Table 9

### Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
Cross-cutting	Timeliness	Submit the next inventory by 15 April 2014, as required by decision 15/CMP.1	6
	Transparency	Organize the next NIR following, to the extent possible, the structure outlined in the updated UNFCCC reporting guidelines	8
	LULUCF	Estimate and report mandatory emissions and removals	Table 3
	QA/QC	Improve verification and QC procedures, in order to minimize inconsistencies and errors	Table 3
	Transparency	Include in the NIR more detailed information on AD, EFs and background information for methodologies used	Table 3
Energy	Overview	Review the use of notation keys for all categories and time series and ensure that the choice of notation keys is correct	21
		Use tier 2 method for major key categories to improve accuracy and also provide sufficient information on the justification that the proposed country-specific EF better reflects the national circumstances, than the IPCC default values	22
	Reference and sectoral approaches	Report apparent energy consumption (excluding non-energy use and feedstocks) for all fuels in CRF table 1.A(c)	24
		Investigate further the underlying reasons for the discrepancies for the whole time series for all fuels and in particular for natural gas	26
	Comparison with international statistics	Continue efforts to improve the consistency of the data reported in the CRF tables and to the IEA	27
		Review the choice of AD and clearly explain the difference between national and international statistics, in order to ensure that the time-series consistency meets the requirements of the IPCC good practice guidance and that the methodologies used are accurately reported in the NIR	28
	International bunker fuels	Include in the NIR a summary of information on the methods used to extrapolate the available data to generate emission estimates for the period 1990–1999	29
		Include in the NIR background information on navigation that is necessary for the review process	30



<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
	Feedstocks and non-energy use of fuels	Correct the notation key for naphtha and ethane in CRF table 1.A(b)	31
	Stationary combustion: all fuels – CO <sub>2</sub>	Gather further information on the use of coal in order to allow for the development of country-specific CO <sub>2</sub> EFs for all stationary sources using coal, and use these data to estimate CO <sub>2</sub> emissions for all categories under stationary combustion	32
		Correct the errors in the use of EFs in order to improve the accuracy of the reporting	33
		Use country-specific EFs for all fuels as soon as they become available	34
		Report the correct values for the CO <sub>2</sub> IEF for liquid fuels used in food processing, beverages and tobacco under manufacturing industries and construction; and enhance QA/QC procedures to avoid such errors	35
		Explain in the NIR how the emissions from autoproducers are reported for all years of the time series	36
	Road transportation: liquid fuels – CO <sub>2</sub>	Correct the inconsistency in the CO <sub>2</sub> emission estimates from gasoline combustion by road vehicles	37
		Develop a country-specific EF for CO <sub>2</sub> emissions for diesel oil and gasoline in accordance with the IPCC good practice guidance	38
		Report separately the AD and CO <sub>2</sub> emissions from pipeline transport (liquid fuel) for 1990 and 1991 or, if this is not possible, report them as “IE”	39
	Coal mining and handling: solid fuels – CH <sub>4</sub>	Include a description of this issue in the NIR	40
Industrial processes and solvent and other product use	Overview	Provide an explanation of the CH <sub>4</sub> recovery trends in order to ensure transparency	40
	Iron and steel production – CO <sub>2</sub> and CH <sub>4</sub>	Improve QA/QC procedures to ensure that final editorial checks are done every time the NIR is updated	44
		Make efforts to obtain AD for the consumption of coke for 2005 onwards	46
		Report CH <sub>4</sub> emissions from coking in metallurgy under the energy sector (1.A.2.a iron and steel) using the national or default EF for coke ovens	47

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
	Other (chemical industry) – CH <sub>4</sub>	Include information on all methodological changes in the NIR	48
	Aluminium production – CO <sub>2</sub> and PFCs	Use the correct notation keys and improve QC procedures, in order to avoid the incorrect use of notation keys	50
	Consumption of halocarbons and SF <sub>6</sub> – HFCs	Include in the NIR the explanation of the dramatic changes in the emission trend for refrigerators using HFC-134a, to improve transparency	51
		Include information on all methodological changes in the NIR	52
Agriculture	Enteric fermentation – CH <sub>4</sub>	Include in the NIR complete information related to the recalculations that were carried out	55
		Improve the transparency of the inventory of the agricultural sector by including data (in an annex of the NIR) on gross energy intake, milk yield, CH <sub>4</sub> EF for enteric fermentation of dairy cattle and gross energy intake and CH <sub>4</sub> EF for enteric fermentation of non-dairy cattle for each region/oblast of the Russian Federation for the period of 2008–2012	
		Improve the transparency of its reporting by including a clear explanation in the NIR of how it accounts for feed intake by cattle livestock during grazing	56
	Agricultural soils – N <sub>2</sub> O	Clearly indicate, in the NIR, the tier levels used to estimate the emissions for this category	57
		Correct the mistakes that have led to an overestimation of the amount of N volatilized due to atmospheric deposition and also due to leaching and run-off; and improve QC procedures in this regard	58
	Field burning of agricultural residues – CH <sub>4</sub> and N <sub>2</sub> O	Include in the NIR references to relevant national legislation	59
		Provide evidence that burning of agricultural residues in 1990–1994 was prohibited or estimate and report CH <sub>4</sub> and N <sub>2</sub> O emission estimates from field burning of agricultural residues for the period 1990–1994	
LULUCF	Overview	Improve the completeness of the inventory by including estimates of all pools for the mandatory categories	62

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		Make further revisions to the NIR text structure in chapter 7.4 concerning the methodologies used for estimating carbon stock change so as to be organized by individual carbon pools within individual land-use categories instead of separate subchapters on absorption and emissions encompassing all carbon pools, as currently used in the NIR	63
		Provide additional information on AD and the verification efforts undertaken to increase confidence in the adopted biomass increment estimation approach	
		Continue to strengthen QA/QC procedures in the LULUCF sector, paying particular attention to checking that any unexpected trends in AD and emissions across the time series are explained in the NIR	65
	Forest land remaining	Continue to improve the transparency of the reported estimates	66
	forest land – CO <sub>2</sub>	Include additional descriptions of the changes in areas of managed and unmanaged forest land in the NIR to increase transparency	67
	Cropland remaining	Continue efforts in developing and verifying country-specific EFs for the estimation of emissions/removals for the carbon pools, and report revised estimates	68
	cropland – CO <sub>2</sub>		
	Land converted to settlements – CO <sub>2</sub>	Improve the accuracy 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 for LULUCF	70
Waste	Overview	Provide corresponding references and/or the rationale for selecting specific EF values in its NIR	72
	Solid waste disposal on land – CH <sub>4</sub>	Apply the IPCC tier 2 (first order decay) method to estimate CH <sub>4</sub> emissions from industrial solid waste disposed to SWDS	74
		Report correctly the value of “DOC degraded per cent” and “fraction of DOC in MSW” in CRF table 6.A	75
		Improve the classification of waste taking into account its composition and origin	76
	Industrial wastewater handling – CH <sub>4</sub>	Explain under which category the emissions from industrial wastewater sludge have been reported in the relevant CRF tables and in the NIR to ensure transparency	77
		Provide explanatory information in the NIR to improve the comparability of its emissions with the emissions reported by other Parties	78

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
KP-LULUCF	Afforestation and reforestation – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Include a specific reference to the Canadian NIR to improve transparency	81
		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	82
	Deforestation – CO <sub>2</sub>	Continue to improve the accuracy of the emission estimates for deforestation by obtaining and using more disaggregated input data	83
	Forest management – CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O	Continue to improve the transparency of reporting, specifically by: providing information related to biomass increment; providing information on forest areas that are unaccounted under forest management because they do not belong to forest land under the Russian land-use categorization, but are potentially deforested and reported as deforestation under the Kyoto Protocol; rectifying the text in the NIR section 10.3.4.3 and elsewhere as feasible; and addressing the issue of the reported areas of forest management	84
		Provide in the NIR additional transparent information based on the analysis of forest type composition, age structure and associated biomass increment of the newly included, previously unmanaged forests to justify the reported higher carbon gain in biomass	85
	Clarify in the NIR whether the highly productive middle-aged forests on lands used for agricultural purposes represent the previously unmanaged forest areas	85	
Article 3, paragraph 14, of the Kyoto Protocol		Provide in the NIR information 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	96

*Abbreviations:* AD = activity data, CRF = common reporting format, EF = emission factor, IE = included elsewhere, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, 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, N = nitrogen, NIR = national inventory report, QA/QC = quality assurance/quality control, UNFCCC reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”.

#### IV. Questions of implementation

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

## Annex I

## Background data on recalculations and information to be included in the compilation and accounting database

Table 10  
Recalculations in the 2013 annual submission for the base year and the most recent year

<i>Greenhouse gas source and sink categories</i>	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		<i>Reason for the recalculation</i>
	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	
<b>1. Energy</b>	<b>-39.31</b>	<b>193.04</b>	<b>-0.001</b>	<b>0.01</b>	Changed AD
A. Fuel combustion (sectoral approach)	-39.31	-36.66	-0.002	-0.003	
1. Energy industries					
2. Manufacturing industries and construction					
3. Transport		9.69		0.0004	
4. Other sectors					
5. Other	-39.31	-46.35	-0.01	-0.2	
B. Fugitive emissions from fuels		229.70		0.1	
1. Solid fuels					
2. Oil and natural gas		229.70		0.1	
<b>2. Industrial processes</b>	<b>14.03</b>	<b>-98.99</b>	<b>0.005</b>	<b>-0.06</b>	Changed AD
A. Mineral products		-63.79		-0.1	
B. Chemical industry	14.03	18.69	0.06	0.09	
C. Metal production					
D. Other production					
E. Production of halocarbons and SF <sub>6</sub>					
F. Consumption of halocarbons and SF <sub>6</sub>		-53.89		-1.1	
G. Other					
<b>3. Solvent and other product use</b>					
<b>4. Agriculture</b>	<b>-251.40</b>	<b>4 451.77</b>	<b>-0.1</b>	<b>3.8</b>	Changed AD and EF
A. Enteric fermentation					
B. Manure management	-115.01	-45.80	-0.2	-0.2	
C. Rice cultivation					
D. Agricultural soils	-136.40	4 497.57	-0.1	6.1	
E. Prescribed burning of savannas					
F. Field burning of agricultural residues					
G. Other					
<b>5. Land use, land-use change and forestry</b>	<b>4 447.70</b>	<b>1 824.11</b>	<b>5.6</b>	<b>-0.3</b>	Changed AD, EF and methodology
A. Forest land		10.98		-0.002	
B. Cropland		2 513.00		2.6	
C. Grassland	4 447.62	-707.01	-38.6	0.9	
D. Wetlands		7.11		7.9	

<i>Greenhouse gas source and sink categories</i>	<i>1990</i>	<i>2010</i>	<i>1990</i>	<i>2010</i>	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO<sub>2</sub> eq)</i>		<i>Per cent change</i>		
E. Settlements	0.08	0.04	0.0002	0.0002	
F. Other land					
G. Other					
<b>6. Waste</b>	<b>2 474.17</b>	<b>5 144.86</b>	<b>4.2</b>	<b>7.1</b>	Changed AD and EF
A. Solid waste disposal on land	-19.96	2 147.51	-0.1	4.6	
B. Wastewater handling	2 494.13	2 997.35	8.2	11.5	
C. Waste incineration					
D. Other					
<b>7. Other</b>					
<b>Total CO<sub>2</sub> equivalent without LULUCF</b>	<b>2 197.49</b>	<b>9 690.68</b>	<b>0.1</b>	<b>0.4</b>	
<b>Total CO<sub>2</sub> equivalent with LULUCF</b>	<b>6 645.18</b>	<b>11 514.80</b>	<b>0.2</b>	<b>0.7</b>	

*Abbreviations:* AD = activity data, EF = emission factor, LULUCF = land use, land-use change and forestry.

Table 11  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2011, including the commitment period reserve**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Commitment period reserve</b>	11 604 171 915	11 604 253 309		11 604 253 309
<b>Annex A emissions for 2011</b>				
CO <sub>2</sub>	1 684 432 632			1 684 432 632
CH <sub>4</sub>	506 637 219	506 648 261		506 648 261
N <sub>2</sub> O	117 568 816			117 568 816
HFCs	9 142 147	9 147 384		9 147 384
PFCs	2 544 152			2 544 152
SF <sub>6</sub>	509 417			509 417
<b>Total Annex A sources</b>	<b>2 320 834 383</b>	<b>2 320 850 662</b>		<b>2 320 850 662</b>
<b>Activities under Article 3, paragraph 3, for 2011</b>				
3.3 Afforestation and reforestation on non-harvested land for 2011	-4 999 212			-4 999 212
3.3 Afforestation and reforestation on harvested land for 2011	NA			NA
3.3 Deforestation for 2011	20 449 900			20 449 900
<b>Activities under Article 3, paragraph 4, for 2011<sup>c</sup></b>				
3.4 Forest management for 2011	-527 958 567			-527 958 567
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2010**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2010</b>				
CO <sub>2</sub>	1 598 210 912			1 598 210 912
CH <sub>4</sub>	491 083 843	491 094 753		491 094 753
N <sub>2</sub> O	113 771 165			113 771 165
HFCs	10 859 905	10 864 938		10 864 938
PFCs	2 677 573			2 677 573
SF <sub>6</sub>	667 517			667 517
<b>Total Annex A sources</b>	<b>2 217 270 914</b>	<b>2 217 286 858</b>		<b>2 217 286 858</b>
<b>Activities under Article 3, paragraph 3, for 2010</b>				
3.3 Afforestation and reforestation on non-harvested land for 2010	-5 092 560			-5 092 560
3.3 Afforestation and reforestation on harvested land for 2010	NA			NA
3.3 Deforestation for 2010	21 200 738			21 200 738
<b>Activities under Article 3, paragraph 4, for 2010<sup>c</sup></b>				
3.4 Forest management for 2010	-548 411 212			-548 411 212
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.



Table 13  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2009**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2009</b>				
CO <sub>2</sub>	1 526 424 197			1 526 424 197
CH <sub>4</sub>	464 722 366	464 769 107		464 769 107
N <sub>2</sub> O	116 814 450			116 814 450
HFCs	10 146 027	10 150 954		10 150 954
PFCs	2 524 584			2 524 584
SF <sub>6</sub>	790 630			790 630
<b>Total Annex A sources</b>	<b>2 121 422 253</b>	<b>2 121 473 922</b>		<b>2 121 473 922</b>
<b>Activities under Article 3, paragraph 3, for 2009</b>				
3.3 Afforestation and reforestation on non-harvested land for 2009	-5 165 628			-5 165 628
3.3 Afforestation and reforestation on harvested land for 2009	NA			NA
3.3 Deforestation for 2009	22 002 532			22 002 532
<b>Activities under Article 3, paragraph 4, for 2009<sup>c</sup></b>				
3.4 Forest management for 2009	-538 900 598			-538 900 598
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 14  
**Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq for 2008**

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>
<b>Annex A emissions for 2008</b>				
CO <sub>2</sub>	1 609 349 253			1 609 349 253
CH <sub>4</sub>	492 911 340	492 923 974		492 923 974
N <sub>2</sub> O	116 186 533			116 186 533
HFCs	14 421 612	14 426 403		14 426 403
PFCs	3 720 571			3 720 571
SF <sub>6</sub>	830 882			830 882
<b>Total Annex A sources</b>	<b>2 237 420 191</b>	<b>2 237 437 615</b>		<b>2 237 437 615</b>
<b>Activities under Article 3, paragraph 3, for 2008</b>				
3.3 Afforestation and reforestation on non-harvested land for 2008	-5 200 773			-5 200 773
3.3 Afforestation and reforestation on harvested land for 2008	NA			NA
3.3 Deforestation for 2008	23 223 665			23 223 665
<b>Activities under Article 3, paragraph 4, for 2008<sup>c</sup></b>				
3.4 Forest management for 2008	-478 536 891			-478 536 891
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation in the base year				

*Abbreviations:* Annex A sources = sources included in Annex A to the Kyoto Protocol, NA = not applicable.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

## Annex II

### 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 2013. Available at <http://unfccc.int/resource/docs/2013/asr/rus.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2013. Available at <http://unfccc.int/resource/webdocs/sai/2013.pdf>.

FCCC/ARR/2012/RUS. Report of the individual review of the annual submission of the Russian Federation submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/rus.pdf>.

Standard independent assessment report, parts 1 and 2. Available at [http://unfccc.int/kyoto\\_protocol/registry\\_systems/independent\\_assessment\\_reports/items/4061.php](http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php).

**B. Additional information provided by the Party**

Responses to questions during the review were received from Mr. Alexander Nakhutin (Institute of Global Climate and Ecology), including additional material on the methodology and assumptions used. The following documents<sup>1</sup> 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“, 2012 г. План мероприятий по совершенствованию национального кадастра парниковых газов Российской Федерации в 2013 году. Москва.

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.

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Васильев Б.В., Григорьева Ж.Л. Обработка и утилизация осадков сточных вод в Санкт-Петербурге. Водоснабжение и санитарная техника, 2006, №9, ч.1, с.58-62.

Госстрой России 2001 Методические рекомендации по расчету количества и качества принимаемых сточных вод и загрязняющих веществ в системы канализации населенных пунктов МДК 3-01.2001. Приложение 6.

Гринин А.С., Новиков В.А. Промышленные и бытовые отходы: хранение, утилизация и переработка. – М., ФАИР-ПРЕСС, 2002. 336 с.

Гюнтер Л.И., Гольдфарб Л.Л. Метантенки. М., Стройиздат, 1991. 128 с.

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<sup>1</sup> Reproduced as received from the Party.

## Annex III

### Acronyms and abbreviations

AD	activity data
CH <sub>4</sub>	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
FAO	Food and Agriculture Organization of the United Nations
FEB	fuel and energy balance
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF
GWP	global warming potential
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
kt	kilotonne
LTO	landing and take-off cycle
LULUCF	land use, land-use change and forestry
N	nitrogen
N <sub>2</sub> O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 <sup>15</sup> joule)
QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal systems
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)
UNFCCC	United Nations Framework Convention on Climate Change