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Report for the Stage 3 in-depth review of emission inventories submitted under the UNECE LRTAP Convention and EU National Emissions Ceilings Directive for:

STAGE 3 REVIEW REPORT
RUSSIAN FEDERATION

CONTENT

INTRODUCTION

1.   The mandate and overall objectives for the emission inventory review process under the LRTAP Convention are given by the UNECE document '*Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention*'[(1)] – hereafter referred to as the 'review guidelines 2018'.

2.   This annual review has checked all pollutants covered by the LRTAP Convention and its protocols (NOx, NMVOC, SOx, NH_3, plus $PM_{2.5}$, PM_{10}, BC, 3 HMs and POP_S) for the time series years 1990 – 2017, reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.

3.   This report covers the Stage 3 centralised review of the UNECE LRTAP Convention inventory of the Russian Federation coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 25th June 2019 to 28th June 2019 in Copenhagen (Denmark) and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: Generalist – Ms Elo Mandel (Estonia), Energy – Mr Kees Peek (Netherlands), Transport – Mr Jean-Marc André (France), IPPU Mr Julien Jabot (Norway), Agriculture – Ms Lotte Lagerwerf (Netherlands), Waste – Mr Intars Cakars (Latvia).

4.   Mr Germán Méndez Magaña (Spain) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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[1] Decision 2018/1 adopted by EB: *Updated methods and procedures for the technical review of air pollutant emission inventories reported under the Convention.* ECE/EB.AIR/142/Add.1
http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision_2018_1.pdf

PART A: KEY REVIEW FINDINGS

5.   The ERT thanks the Party for participating actively in the Stage 3 review process by answering the question raised. A number of the answers provided allowed the ERT to clarify certain issues. However, further engagement with the review process would be desirable – e.g. providing quicker and more complete answers to many questions, as well as providing further information and data when requested.

6.   During the review, the ERT encountered difficulties in assessing the accuracy and consistency of the reported emission data due to the general lack of transparency of reporting. When consulted, the Russian Federation reiterated the difficulties they faced in providing further details on activity data or on the methodology applied due to the way the inventory was compiled in general (official statistical office). The ERT considers that, for the review purposes, when emission and activity data depend on other bodies outside the inventory compiler, these bodies should be consulted in order to provide the requested information.

7.   The inventory is partly in line with the EMEP/EEA air pollutant emission inventory guidebook 2016 (hereafter referred to as the EMEP/EEA GB 2016) and the UNECE Reporting Guidelines (ECE/EB.AIR/125). Reported emission data only cover NOx, NMVOC, SOx, NH_3, $PM_{2.5}$, PM_{10}, TSP and CO for the period 2010-2017. Furthermore, emissions for a number of categories are reported as IE and NE, and activity data is only provided for a very limited number of categories.

8.   The ERT also noted a lack of quantification in the recalculations and the Party has not reported an uncertainty analysis nor an improvement plan. The ERT acknowledges that improvements performed by parties in their Inventories might have an impact on recalculations and uncertainties. For this reason, good monitoring, as well as the quantification and description of improvements, recalculations and uncertainties would contribute to the overall quality of the inventory.

9.   The ERT has identified significant quality issues during the review, so it proposes to the EMEP Steering Body that review periods should take place more frequently for the Russian Federation.

10.   The ERT acknowledges that the IIR can be submitted in one of the working languages of the United Nations Economic Commission for Europe (i.e. French, English or Russian). However, in order to facilitate its use by the ERT, the Party is encouraged to provide a courtesy translation into English.

INVENTORY SUBMISSION

11.   The Russian Federation submitted NFR tables under the CLRTAP on 13th February 2019 (by the deadline of 15th February). In the 2019 submission, the Russian Federation reported emissions in the NFR-2014-2 format including NOx, NMVOC, SOx, NH_3, $PM_{2.5}$, PM_{10}, TSP and CO from 2010 to 2017; therefore, the ERT was only partly able to review the Russian Federation inventory. The ERT commends the Party for its timeliness and reporting in the NFR14 format as requested. However, the ERT reiterates its previous recommendation to the Russian Federation that the whole time series should be reported since the year 1990 (except for particles since 2000) and for

all pollutants covered by the LRTAP Convention, in keeping with the Reporting Guidelines 2014.

12.   The IIR was submitted on 13th March 2019 (by the deadline of 15th March), and made a resubmission on 19th April.

13.   The Russian Federation submitted their LPS and gridded emissions data in their 2018 submission. Gridded data were submitted in a grid of 50 x 50 km^2. The ERT recommends that the Party should switch to a 0.1 x 0.1 degree grid as soon as it is technically and economically feasible, according to the latest version of the Reporting Guidelines. The submission did not include data on projections. The ERT encourages the Russian Federation to include data on projections in its future submissions.

KEY CATEGORIES

14.   The Russian Federation has carried out a level Key Category Analysis (KCA) that is consistent with the Guidebook by including NOx, NMVOC, SOx, NH_3, $PM_{2.5}$, PM_{10}, TSP and CO.

15.   The Russian Federation does not specify in the IIR if the results of the KCA are used to identify priorities for improvements of the inventory. The ERT recommends that the Russian Federation uses the results to prioritise improvements in the inventory.

QUALITY

Transparency

16.   The Russian Federation provides in its IIR some information about the trends in the main pollutants, a table on key categories and information on the completeness of the inventory. Information on how the emissions are estimated is only provided for some sectors. During the review week, the Party indicated that for confidentiality reasons they could not provide activity data for a number of subcategories. As a result of that the transparency of the Russian Federation emission inventory is limited and the ERT was not able to review the methods used and assumptions made or the choice of data used to estimate emissions in the Russian Federation inventory. The ERT understands that activity data for sources with emissions reported using official statistics are not available for reasons of confidentiality, and offered during the review several feasible ways of providing information so that the ERT could assess the data and associated information reported to the Convention. The ERT recommends that the Russian Federation should find feasible ways to provide information in its future submissions (or at least during the review process) to the ERT.

Completeness

17.   The Russian Federation reported emissions including NOx, NMVOC, SOx, NH_3, $PM_{2.5}$, PM_{10}, TSP and CO from 2010 to 2017. During the review week, the Party indicated that gathering data from regions in the European territory prior to 2010 was technically and administratively complex, and that calculating emissions from individual source categories for the previous years (up to 2010) was going to be the priority of the next inventory. The ERT commends the Russian Federation for that.

18.   The ERT notes that the Russian Federation uses notation keys in a way that is consistent with the Reporting Guidelines. The ERT commends the Party for it.

19.   The Russian Federation uses the notation keys "NE" (Not estimated) and "IE" (Included elsewhere) for a large number of categories, pollutants and years, and brief explanations for the use of these notation keys are provided in the 2019 IIR under the chapter on general assessment of completeness. However, the ERT finds that the information provided is insufficient.

20.   Furthermore, the ERT notes that these notation keys are used for potentially very relevant categories and pollutants, which considerably affects the completeness of the inventory. This might be disrupting the key categories analysis results and highly hampers the review process. For this reason, the ERT reiterates its previous recommendation to the Russian Federation that it checks the time series, paying attention to consistency issues, implements corrections if needed and calculates and reports the missing values according to the EMEP/EEA GB 2016.

Consistency, including recalculations and time series

21.   The Russian Federation provides information on recalculations in the IIR under the chapter of recalculations and improvements. However, the IIR does not provide quantitative information on differences to previous estimates or on the impact of the recalculation on the time series or on the national total.

22.   The ERT had serious difficulties assessing the time series consistency of the emissions estimates as activity data and descriptions of the methodology applied were available only for a very limited number of categories. However, the ERT could detect several inconsistencies in the inventory as explained under "Sub-sector specific Recommendations" below.

Comparability

23.   The ERT notes that the inventory of the Russian Federation is comparable with those of other reporting Parties. The allocation to source categories follows mainly that of the EMEP/UNECE Reporting Guidelines. However, comparability was difficult to fully assess because of the limited information on the methods and activity data used.

Accuracy and uncertainties

24.   The ERT notes that Tier 1 methods are used for key some categories (i.e. Agriculture).

25.   The Russian Federation did not perform an uncertainty analysis as part of the 2019 submission. During the review week, the Party indicated that in connection with the restructuring of the reporting system in the Russian Federation, the uncertainty analysis had been postponed indefinitely. The ERT wishes to point out that the uncertainty analysis is a tool to measure the reliability of inventory emissions estimates which helps Parties, in connection with the key category analysis, to better plan future improvements.

Verification and quality assurance/quality control approaches

26.   The quality control and quality assurance (QA/QC) procedures carried out for the air pollutant inventory are briefly described in the IIR. Common statistical quality checks are carried out. However, sector-specific checks are not documented in the IIR. The ERT encourages the Party to provide information on sector-specific QA/QC procedures and their results in future submissions.

27.   The IIR does not provide information on the verification of the inventory.

Reporting of Condensable

28.   The Russian Federation provides information on condensable particles in the executive summary and chapter 3 (Energy sector). The ERT commends the Party for that.

FOLLOW-UP TO PREVIOUS REVIEWS

29.   Results from the Stage 1 and Stage 2 reviews of the 2019 emission data were used in this Stage 3 review. The ERT invites the Russian Federation to also refer to these previous reviews when examining this review report and when updating its improvement plans.

30.   The Russian Federation has improved its inventory since the 2010 CLRTAP S3 in-depth review by submitting NFR tables and IIR in a timely manner. However, there are some areas where the recommendations from previous reviews are not implemented. The Russian Federation still does not represent the full time series for all pollutants and also uses the notation key "NE" (Not estimated) in a number of areas. The ERT strongly recommends that the Russian Federation improves the completeness of its report for the next submission. The ERT identified issues that should be further improved in the General Issues as explained above and in sub-sector specific areas as explained in Part B.

31.   The ERT notes the importance of providing information on compliance with previous inventory reviews in the IIR. Despite not being specifically requested by the latest Reporting Guidelines, the ERT encourages the Russian Federation to include an appendix in the IIR assessing the status of implementation of the recommendations contained in the latest review report.

AREAS FOR IMPROVEMENTS IDENTIFIED BY THE RUSSIAN FEDERATION

32.   The IIR does not identify any area for improvement in the Party's inventory.

33.   The ERT welcomes the information provided by the Party during the review on the following future inventory improvements:

> (a)   To provide emissions from individual source categories for previous years (up to 2010) as a priority issue for the next inventory.

(b)   To provide further explanations in the IIR on emissions trends for some categories in the Transport sector

(c)   To estimate $PM_{2.5}$ and PM_{10} for categories 2.A.5.a, 2.A.5.b and 2.H.1 according to EMEP/EEA GB 2016

TECHNICAL CORRECTIONS CONSIDERED AND / OR CALCULATED BY ERT

34.   Overall, due to the limited activity and emission data reported by the Russian Federation, the ERT found it very difficult to assess the possible under- and overestimations of the Party's emissions estimates. The difference in geographical scope between the CLRTAP report and other reporting obligations (i.e. UNFCCC) also hampered the gathering of alternative sources of information which would be needed to perform verifications and technical corrections. The ERT strongly recommends that the Party should explore ways to face completeness and transparency issues, reducing the number of categories reported as NE or IE, and that it provides complete activity data which can explain fluctuations in emission trends.

35.   Using available data, the ERT was only able to propose a technical correction for BC emissions under category 2.H.1. For more detailed information, see the Industry chapter. The ERT strongly recommends that the Russian Federation implements the technical correction prepared by the ERT in their 2020 submission. The Party may also provide revised estimates instead of the technical correction. Detailed documentation of such revised estimates should be included in the 2020 IIR.

Table 1 Summary of potential technical corrections identified by ERT for the Russian Federation

NFR category (s)	Pollutants	Years	Calculated by Party/ Calculated by ERT/ Not calculated	Potential contribution to national total (%)
2.H.1	BC	2010-2017	ERT	100% (reported as NE)

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE RUSSIAN FEDERATION

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

36.   The ERT identifies the following cross-cutting issues for improvement:

(a)   To provide more detailed information on emission factors, activity data and a description of the methodologies in its IIR.

(b)   To find feasible ways to provide information requested by the ERT during the review process.

(c)   To include activity data in the NFR tables.

(d)   To provide a complete time series from 1990 onwards (for PM since 2000) including all pollutants.

(e)   To further develop section 1.8 of the IIR by providing additional information on the actual reasons for not estimating certain categories or allocating their emissions elsewhere. Additionally, an analysis of the percentage of categories/pollutants reported as "NE" or "IE" would help the Party and future ERTs to track progress towards the target of compiling a more complete inventory.

(f)   To undertake a trend assessment in the key category analysis for all pollutants.

(g)   To investigate the relevance of sources currently reported as "NE" and to estimate and report occurring emissions or to assess the quantitative importance of emissions from these sources, to provide a description of the source in the IIR and to document whether the activity existed in a certain year or not, or under which NFR it was included.

(h)   To further develop the information on the recalculations included in the IIR, including the quantification and impact in the IIR as a result of the emissions changes performed.

(i)   To use Tier 2 or higher methods for all key categories.

(j)   To carry out an uncertainty analysis, at least for the key categories, and to include a quantification of the uncertainties and the results in future submissions.

(k)   To provide information on sector-specific QA/QC procedures and their results in future submissions.

(l)   To further develop the information on the condensable component of PM emissions included in the IIR for the different sectors following guidance provided in Annex II (v.2018) of the 2014 Reporting Guidelines.

(m)   To provide a detailed improvement plan in the IIR, including all the needs for improvement identified by the Party itself as well as the recommendations derived from the review processes. Items included in the improvement plan should be specific (well defined), measurable (measure progress), achievable (realistic goals), relevant (set a priority order based on key categories and uncertainty analysis) and time-bound (to establish a timeframe).

(n)   Recommended improvements relating to specific source categories are presented in the relevant sector sections of this report.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed	NOx, NMVOC, SOx, NH$_3$, PM$_{2.5}$, PM$_{10}$, TSP, CO		
Years	2010 – 2017		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
1A1a	Public electricity and heat production	x		x
1A1b	Petroleum refining	x		x
1A1c	Manufacture of solid fuels and other energy industries	x		x
1A2a	Iron and steel	x		x
1A2b	Non-ferrous metals	x		x
1A2c	Chemicals	x		x
1A2d	Pulp, Paper and Print	x		x
1A2e	Food processing, beverages and tobacco	x		x
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	x		x
1A2gviii	Stationary combustion in manufacturing industries and construction: Other	x		x
1A3ei	Pipeline transport	x		x
1A3eii	Other	x		x
1A4ai	Commercial/institutional: Stationary	x		x
1A4bi	Residential: Stationary	x		x
1A4ci	Agriculture/Forestry/Fishing: Stationary	x		x
1A5a	Other stationary (including military)	x		x
1B1a	Fugitive emission from solid fuels: Coal mining and handling	x		x
1B1b	Fugitive emission from solid fuels: Solid fuel transformation	x		x
1B1c	Other fugitive emissions from solid fuels	x		x
1B2ai	Fugitive emissions oil: Exploration, production, transport	x		x
1B2aiv	Fugitive emissions oil: Refining / storage	x		x
1B2av	Distribution of oil products	x		x
1B2b	Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)	x		x
1B2c	Venting and flaring (oil, gas, combined oil and gas)	x		x
1B2d	Other fugitive emissions from energy production	x		x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

37.   In the previous Stage 3 Review Report (from 2010) the ERT recommended that the Russian Federation provide all the information (used Tier methods, emission factors: country- or plant-specific) needed to understand the compilation of the Russian inventory within the next submission. Although the Russian Federation provided an IIR with this submission, the ERT notes that descriptions of the methodologies used for estimating emissions are still missing.

38.   When consulted, the Russian Federation responded that the estimation of emissions in sectors/plants was performed using a variety of industry-specific methods that could not be provided for practical (lengthy materials in Russian only) and copyright reasons. During a second consultation, the Party replied that they could not provide any additional information. The ERT, therefore, reiterates its recommendation that descriptions of the methodologies used for estimating emissions should be provided in the next submission.

39.   The ERT has noted that the Russian Federation has included a Table in its IIR with NFR codes which are included in other categories and commends the Party for this. However, the ERT has also noted that explanations for the use of "IE" for these NFR codes are missing and recommends that the Russian Federation include these explanations in the next submission.

Completeness

40.   The ERT considers the Energy sector to be incomplete (see also Transparency).

41.   The ERT noted that the Russian Federation only reported detailed activity data and emissions for sector 1.A.4.b.i in the NFR tables and the IIR 2019. For all other sectors, the Russian Federation did not report any detailed activity data (per fuel) in the NFR tables. When consulted, the Russian Federation responded that these data are not available for confidentiality reasons. During a second consultation the ERT asked the Russian Federation whether it was possible to provide these data only for review purposes to the ERT. But the Russian Federation replied that they could not provide any additional information. The ERT recommends that the Russian Federation include detailed activity data (per fuel) in the NFR tables in the next submission.

42.   For the missing years of the time series and the missing substances, see the general part of the report.

Consistency including recalculation and time-series

43.   As already mentioned, the Russian Federation has not provided a complete time series. Due to the lack of activity data and EFs used to calculate emissions, it was not possible for the ERT to assess the consistency of data. The ERT recommends that the Russian Federation include this information in its next submission.

44.   The ERT notes that the Russian Federation has not performed recalculations for the source categories within the Stationary Energy sector.

Comparability

45.   The ERT notes that the Russian Federation has submitted its emissions in the requested NFR format.

46.   The ERT notes that the activity data and EFs used to calculate emissions are not available. To improve comparability the ERT recommends that the Russian Federation include the missing activity data and EFs in the next submission.

Accuracy and uncertainties

47.   In the previous Stage 3 Review Report (from 2010) the ERT encouraged the Russian Federation to implement QA/QC procedures according to the EMEP/EEA GB 2016. The ERT notes that the Russian Federation has implemented QA/QC procedures in this submission and commends the Party for this.

48.   In the previous Stage 3 Review Report (from 2010) the ERT encouraged the Russian Federation to undertake uncertainty analysis for the Stationary Energy sector. The ERT notes that a quantitative uncertainty assessment has not been carried out for any pollutants or groups of pollutants relevant to this report and reiterates its recommendation that uncertainty analysis should be undertaken for the Stationary Energy sector, in the next submission

Condensable

49.   The ERT notes that at the moment there are no approved methodological documents for the inventory of $PM_{2.5}$ and PM_{10} emissions in the Russian Federation. The emissions of these substances from stationary sources have been estimated as a fraction of the solid particles emissions (TSP) obtained from national statistics, according to the following ratios recommended for EECCA countries: PM_{10} emission = 0.6 * TSP emissions; $PM_{2.5}$ = 0.4 emission * TSP emissions. The ERT recommends that the Russian Federation develop methods to determine PM_{10} and $PM_{2.5}$ emissions which can be used in the next/future submissions. The ERT also notes that emissions of condensable particles have been are taken into account in total particulate emissions (TSP). Thus the estimated PM_{10} and $PM_{2.5}$ emissions also take into account condensable material. The ERT commends the Russian Federation for this.

50.   In order to further improve reporting on information regarding the condensable fraction of PM, the ERT recommends that the Russian Federation include all the information related to condensable following guidance provided in Annex II (v.2018) of the 2014 Reporting Guidelines.

Improvement

51.   The ERT notes that the Russian Federation has expanded the inventory with emissions of NOx, NMVOC, SOx, NH_3, $PM_{2.5}$, PM_{10}, TSP, CO for 1.A.2.b "Non-ferrous metals" (stationary combustion in the manufacturing industry) for 2017 and compliments the Russian Federation on this improvement.

52.   Furthermore, the ERT has found that there are no planned improvements specified in the Energy section of the IIR. The ERT strongly encourages the Party to implement the recommendations derived from the review processes in order to improve its inventory. Encouragements and recommendations should be included in the IIR improvements plan.

Potential Technical Corrections

53.   Due to the lack of data and information, it was not possible for the ERT to assess possible under - and overestimations of the Party's emissions estimates. The ERT, therefore, did not prepare any technical corrections for the Russian Federation Energy Sector.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.1.b

54.   In the previous Stage 3 Review Report (from 2010) the ERT recommended that the Russian Federation should report emissions for category 1.A.1.b, which covers more than 20 refineries with a capacity of > 20.000 barrels/day (source: Oil and Gas Journal, Dec 2017). The ERT notes that this still has not been done. Furthermore, the ERT notes that national accounting in the Russian Federation is performed using a "bottom-up" approach (from individual plants to the federation level). For these reasons, the ERT has replaced its 2010 recommendation by "To improve transparency, the ERT strongly recommends reporting emissions for Category 1.A.1.b in the next submission".

Category issue 2: 1.A.2.c and 1.A.4.b.i

55.   In the previous Stage 3 Review Report (from 2010) the ERT recommended that the Russian Federation should report emissions for categories 1.A.2.c and 1.A.4.b. The ERT notes that the Russian Federation has reported emissions for categories 1.A.2.c and 1.A.4.b.i in this submission and compliments the Russian Federation on this.

Category issue 3: 1.A.2.d and 1.A.2.f

56.   The ERT notes that the Russian Federation has reported the notation key "IE" instead of emissions for these categories. Because national accounting in the Russian Federation is performed using a "bottom-up" approach (from individual plants to the federation level), the ERT recommends that the Russian Federation report emissions for these categories in the next submission.

Category issue 4: 1.A.4.a.i, 1.B.1.b, 1.B.1.c, 1.B.2.a.i, 1.B.2.a.iv, 1.B.2.b, 1.B.2.d

57.   To improve transparency, the ERT recommended in the previous Stage 3 Review Report (from 2010) that the Russian Federation report emissions instead of the notation key "IE" for these categories The ERT notes that this still has not been done. The ERT, therefore, reiterates its recommendation that the Russian Federation should estimate and report emissions instead of the notation key "IE" for these categories in the next submission.

Category issue 5: 1.A.4.c.i

58.   The ERT notes that the notation key NE has been used several times in 1.A.4.c.i. To avoid underestimations, the ERT recommends that the Russian Federation includes plans to address the missing emissions (NE) in its IIR, either by obtaining data to allow an emission estimate or by reporting the emissions as not applicable (NA).

TRANSPORT

Review Scope

Pollutants Reviewed			NOx, NMVOC, SOx, NH$_3$, PM$_{2.5}$, PM$_{10}$, TSP, CO		
Years			2010 – 2017		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**	
1A2gvii	Mobile Combustion in manufacturing industries and construction	x		x	
1A3ai(i)	International aviation LTO (civil)	x		x	
1A3ai(ii)	International aviation cruise (civil)	x		x	
1A3aii(i)	Domestic aviation LTO (civil)	x		x	
1A3aii(ii)	Domestic aviation cruise (civil)	x		x	
1A3bi	Road transport: Passenger cars	x		x	
1A3bii	Road transport: Light duty vehicles	x		x	
1A3biii	Road transport: Heavy duty vehicles and buses	x		x	
1A3biv	Road transport: Mopeds & motorcycles	x		x	
1A3bv	Road transport: Gasoline evaporation	x		x	
1A3bvi	Road transport: Automobile tyre and brake wear	x		x	
1A3bvii	Road transport: Automobile road abrasion	x		x	
1A3c	Railways	x		x	
1A3di(ii)	International inland waterways	x		x	
1A3dii	National navigation (shipping)	x		x	
1A4aii	Commercial/institutional: Mobile	x		x	
1A4bii	Residential: Household and gardening (mobile)	x		x	
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	x		x	
1A4ciii	Agriculture/Forestry/Fishing: National fishing	x		x	
1A5b	Other, Mobile (including military, land based and recreational boats)	x		x	
1A3di(i)	International maritime navigation	x		x	
1A3	Transport (fuel used)		x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.					

General recommendations on cross-cutting issues

Transparency

59.   Since the last review, the Russian Federation has provided an IIR and NFR tables with the latest NFR nomenclature (NFR 2014-2). The ERT commends Russian Federation for these efforts.

60.   The IIR describes (while not giving all the details), the methodologies used and Transport sector trends. The ERT encourages the Party to include more detail in the IIR, including details of the used methodologies together with activity data, explanations

for trends in both activity data and emissions for all subsectors (e.g. aviation, road transport, railways, etc.), in order to improve the inventory's transparency and comparability.

Completeness

61.   The ERT considers the Transport sector to be almost complete and comprehensive with first level detail methodology descriptions in the IIR.

62.   The ERT notes that there are no emissions for 1.A.3.b.iv (mopeds and motorcycles), even though there are emission factors and a methodology in the EMEP/EEA GB 2016. The ERT encourages the Russian Federation to improve this subsector by developing the national methodology.

Consistency including recalculation and time-series

63.   The Russian Federation has recalculated its inventory for sectors 1.A.3.c/SOx (Railways) and 1.A.4.c.ii/NOx, NMVOC, PM, CO (Agriculture/Forestry/Fishing: Off-road vehicles and other machinery) for the period 2010-2016, and 1.A.3.c/ NOx, NMVOC, NH_3, PM, CO (Railways) for the year 2015. The IIR includes all the necessary explanations about the causes of the recalculations. The ERT recommends that the Russian Federation provide more detailed explanations for the recalculations, including the impact on the sector and the implication for trends in the Energy and Transport sectors in the IIR.

Comparability

64.   The Russian Federation does not provide - in its IIR and NFR tables - enough activity data to help the ERT to compare implied emission factors with other countries. The ERT encourages the Russian Federation to improve both the IIR and NFR tables with activity data (including explanations in trends) and emission factors.

Accuracy and uncertainties

65.   The ERT encourages the Russian Federation to undertake an uncertainty analysis for the Transport sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

66.   The Party has performed some basic QA/QC checks. The ERT encourages Party to implement Transport sector-specific QA/QC procedures for improved reporting.

Condensable

67.   The Party has provided explanatory information on the condensable component of PM for categories 1.A.4.c.ii, and has written in its IIR that particulate emissions for source categories based on national statistics include both filtered and condensable materials. The ERT recommends that the country improve its IIR by clearly listing which sector includes (or does not include) the condensable component in the next submission, according to Annex II (v.2018) of the 2014 Reporting Guidelines.

Improvement

68.   The ERT commends the Russian Federation for its improvements since the last review and encourages the Party to improve road transport emissions by including mopeds and motorcycle emissions in its next IIR submission. The ERT strongly encourages the Party to implement recommendations derived from the review processes in order to improve the inventory. Encouragements and recommendations should be included in the IIR improvement plan.

Potential Technical Corrections

69.   The ERT has not prepared any technical corrections for the Transport sector inventory of the Russian Federation.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.2.g.vii – Mobile Combustion in manufacturing industries and construction – TSP, PM$_{10}$, PM$_{2.5}$ – Notation Key

70.   The ERT noted that for the pollutants in this category, the Russian Federation reported an "IE" notation key for the year 2017 only. During the review, the Russian Federation clarified that the emissions were included in sector 2.A.5.b. This might lead to inconsistencies in the time series for categories 1.A.2.g.vii and 2.A.5.b where different methodologies and criteria have been applied for the different years. The ERT recommends that the Russian Federation ensure consistency with the guidebook and within the time series, and encourages the Party to clearly explain in the IIR where the emissions are included, and to provide the rationale for this decision.

Category issue 2: 1.A.2.g.vii – Mobile Combustion in manufacturing industries and construction – Activity data – Completeness/transparency

71.   The ERT noted that for this sector, the Russian Federation did not report activity data for the year 2017. During the review, the Russian Federation clarified that the collection of statistical data on fuel consumption by road-building equipment was no longer performed in the country. Therefore, the data sets for the years from 2017 onwards do not contain such information. Instead, official emission statistics from construction has been used. The ERT encourages the Party to clearly explain in the IIR how emissions are estimated, how time-series consistency is ensured and why activity data are no longer reported.

Category issue 3: 1.A.3.b.iv – Road transport: Mopeds & motorcycles – All pollutants – Completeness/comparability

72.   The ERT noted that the Russian Federation did not estimate emissions from mopeds and motorcycles. During the review, the Russian Federation clarified that emissions from vehicles were calculated in accordance with a national methodology. The input data for the calculations are the number of vehicles and average annual mileage. Until recently, there had been no separate statistical accounting of two-wheel vehicles in the Russian Federation and emissions from these vehicles had not been assessed. Now these data are available, and emissions can be calculated; however, adding this component to the calculation will substantially affect the overall picture and

will require amendments to the historical data series, a recalculation of which is not possible due to the lack of data in the past. Unfortunately, the national methodology does not include emission factors for mopeds and motorcycles. The Russian Federation explained that the recommendations would be considered for the next inventory. The ERT encourages the Russian Federation to improve the inventory by adding the emissions from these vehicles to the next submission.

Category issue 4: 1.A.3.b.vi – Road transport: Automobile tyre and brake wear – & 1.A.3.b.vii – Road transport: Automobile road abrasion – Completeness/comparability

73.   The ERT noted that the Russian Federation did not report any activity data for these sectors, which hampers comparability with other countries. During the review, the Russian Federation provided activity data (traffic in veh.km) for the time series. The ERT encourages Russian Federation to report these activity data in the NFR tables and in the IIR with associated explanations for trends in the next submission.

Category issue 5: 1.A.3.e.i – Pipeline transport – SOx – Trend

74.   The ERT noted a big dip in SOx emissions for year 2011. During the review, the Russian Federation explained that there was an error in the NFR tables for the year 2011, the correct value being 0.7 instead of 0.007. The ERT notes that the error is below the threshold of significance (0.06% of SOx National Total) and recommends that the Russian Federation correct the value in the next submissions and implement sector-specific QA/QC procedures in order to improve data reporting in future submissions.

Category issue 6: All transport categories – All pollutants – Trend

75.   The ERT noted that no (sub)sectoral explanation of emissions and activity data trends were given in the IIR. During the review, the Russian Federation provided some explanations, stating that the IIR gives some indications. The IIR explains the trends at the Transport sector level in chapter 2 (explanation of key trends), which is a good beginning. The ERT recommends that the Russian Federation should further explain sector-specific trends of emissions and activity data in the next submission in order to understand the jumps and dips observed at the subsector level.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed			NOx, NMVOC, SOx, NH$_3$, PM$_{2.5}$, PM$_{10}$, TSP, BC, CO		
Years			2010 – 2017		
Code	**Name**		**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2A1	Cement production		x(IE)		x
2A2	Lime production		x(IE)		x
2A3	Glass production		x(IE)		x
2A5a	Quarrying and mining of minerals other than coal		x		x
2A5b	Construction and demolition		x		x
2A5c	Storage, handling and transport of mineral products		x(IE)		x
2A6	Other mineral products		x		x
2B1	Ammonia production		x(IE)		x
2B2	Nitric acid production		x(IE)		x
2B3	Adipic acid production		x(IE)		x
2B5	Carbide production		x(IE)		x
2B6	Titanium dioxide production		x(IE)		x
2B7	Soda ash production		x(IE)		x
2B10a	Chemical industry: Other		x(IE)		x
2B10b	Storage, handling and transport of chemical products		x(IE)		x
2C1	Iron and steel production		x(IE)		x
2C2	Ferroalloys production		x(IE)		x
2C3	Aluminium production		x(IE)		x
2C4	Magnesium production		x(IE)		x
2C5	Lead production		x(IE)		x
2C6	Zinc production		x(IE)		x
2C7a	Copper production		x(IE)		x
2C7b	Nickel production		x(IE)		x
2C7c	Other metal production		x(IE)		x
2C7d	Storage, handling and transport of metal products		x(IE)		x
2D3b	Road paving with asphalt		x(IE)		
2D3c	Asphalt roofing		x(IE)		
2H1	Pulp and paper industry		x		x
2H2	Food and beverages industry		x		x
2H3	Other industrial processes		x(IE)		x
2I	Wood processing		x		
2J	Production of POPs		x(IE)		
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)		x(NE)		
2L	Other production, consumption, storage, transportation or handling of bulk products		x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.					

General recommendations on cross-cutting issues

Transparency

76.   The Russian Federation has provided emission data for the period 2010-2017 but has not provided any data for the years prior to 2010. The IIR does not provide any explanation regarding the choice of the reported time series.

77.   The Russian Federation uses country-specific methodologies for almost all emission calculations in the Industry sector or plant-specific emissions. The IIR provided by the Russian Federation does not give detailed information regarding the methodology used to estimate emissions.

78.   The NFR tables provided by the Russian Federation contain emission data or use notation keys where estimates are not available for all source categories within the Industrial Processes sector. The Russian Federation uses the notation key "IE" for numerous source categories and the use of these notation keys is well documented in the IIR. The ERT commends the Russian Federation for this.

79.   The Russian Federation has not provided activity data for all categories where emissions have been reported in the NFR table. For those categories, it has not been possible to compare implied emission factors with values recommended by the EMEP/EEA GB 2016.

80.   During the review, the Russian Federation did not provide any additional information on methodologies to the ERT, because of confidentiality issues.

81.   The Russian Federation has not provided a detailed and generally transparent emission inventory for the Industrial Processes sector. The information about the methodologies used that was made available to the ERT before and during the review was not enough. The ERT recommends that the Russian Federation should submit a transparent IIR including detailed descriptions of methodologies, especially the country-specific methodologies, emission factors and activity data used to estimate emissions for all source categories.

Completeness

82.   The Russian Federation has not estimated emissions of black carbon even though methodologies are available in the EMEP/EEA GB 2016.

83.   The Russian Federation has reported emission data for seven different source categories in the NFR tables provided to the ERT. The Russian Federation uses the notation keys "IE" for almost all other source categories. As not enough information on methodologies is provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the completeness of the Russian inventory could not be assessed by the ERT.

Consistency including recalculation and time series

84.   The Russian Federation has reported emission data for seven different source categories in the NFR tables provided to the ERT. The Russian Federation uses the

notation keys "IE" for almost all other source categories. As not enough information on methodologies is provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the consistency of the Russian inventory could not be assessed by the ERT.

Comparability

85.   As not enough information on methodologies is provided in the IIR, and as the Russian Federation did not provide the ERT with the necessary information during the review, and as emissions are reported as aggregated either in the Industry or in the Energy sector, the ERT considers the Russian inventory as not being comparable.

Accuracy and uncertainties

86.   As not enough information on methodologies has been provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the accuracy of the Russian inventory could not be assessed by the ERT.

Condensable

87.   The Russian Federation did not provide any information on the condensable component of PM for the Industry sector. The ERT did not find any information about whether $PM_{2.5}$ includes or excludes the condensable component in the IIR. The ERT recommends that the Russian Federation include such information in the next submission according to Annex II (v.2018) of the 2014 Reporting Guidelines.

Improvement

88.   The ERT noted that the Russian Federation did not include any category from the Industrial sector in its improvement plan. The Russian Federation confirmed to the ERT during the review that no improvement was planned for the Industry sector in the nearest future. The ERT encourages the Russian Federation to set up an improvement plan for the Industry sector and to include in it the recommendations of the ERT.

Potential Technical Corrections

89.   Overall, due to the limited activity and emission data reported by the Russian Federation, the ERT found it very difficult to assess the possible under- and overestimations of the Party's emissions estimates.

90.   The ERT noted that BC emissions are missing in the reported NFR tables. The ERT has prepared a technical correction for BC emissions from pulp and paper production using $PM_{2.5}$ reported by the Russian Federation in the NFR tables submitted in 2019 and the Tier 1 emission factor recommended by the EMEP/EEA GB 2016. The ERT encourages the Russian Federation to apply the calculated technical correction proposed by the ERT.

NFR	Pollutants	Years	Calculated by Party/ ERT	Potential contribution to national total
2.H1	BC	2010-2017	ERT	100% (reported as NE)

Sub-Sector Specific Recommendations

Category issue 1: 2.A- Mineral product

91.   The ERT noted, in the NFR tables submitted by the Russian Federation, that emissions from cement production, lime production, glass production and storage, the handling and transport of mineral products have been reported together with emissions from other mineral products in sector 2.A.6. As no detailed information on activity data, emission factors or methodology was provided by the Russian Federation to the ERT before or during the review, the ERT could not assess the emissions from the mineral industry. The ERT encourages the Russian Federation to report activity data in the NFR tables and emissions for each source category for the whole time series and not combined as in the 2019 submission. The ERT recommends that the Russian Federation include a detailed description of the methodologies for each category in the IIR.

Category issue 2: 2.B- Chemical industry

92.   The ERT noted, in the NFR tables submitted by the Russian Federation, that emissions from chemical industrial processes have been reported together with the emissions from combustion in the chemical industry in sector 1.A.2.c. As no detailed information on activity data, emission factors or methodology was provided by the Russian Federation to the ERT before or during the review, the ERT could not assess the emissions from chemical industrial processes. The ERT encourages the Russian Federation to report activity data in the NFR tables and emissions for each source category for the whole time series and not combined as in the 2019 submission. The ERT recommends that the Russian Federation include a detailed description of the methodologies for each category in the IIR.

Category issue 3: 2.C- Metal production

93.   The ERT noted, in the NFR tables submitted by the Russian Federation, that emissions from metal production have been reported together with emissions from combustion in the iron and steel industry in sector 1.A.2.a. As no detailed information on activity data, emission factors or methodology was provided by the Russian Federation to the ERT before or during the review, the ERT could not assess the emissions from metal production. The ERT encourages the Russian Federation to report activity data in the NFR tables and emissions for each source category for the whole time series and not combined as in the 2019 submission. The ERT recommends that the Russian Federation include a detailed description of the methodologies for each category in the IIR.

Category issue 4: 2.H.1- pulp and paper production

94.   The ERT noted, according to data reported in NFR table (AD and emissions), that the Russian Federation had estimated emissions of PM_{10} and $PM_{2.5}$ as constant fractions of TSP. The ERT notes that the EMEP/EEA GB 2016 recommends the use of emission factors which correspond to higher fractions. During the review, the Russian Federation confirmed to the ERT that the values provided by the guidebook should be applied and would be applied in the next submissions. The ERT commends the

Russian Federation for that and recommends that the Russian Federation update its emission factors in the next submission.

Category issue 5: 2.H.2- food and beverages industry

95.   The ERT noted that NMVOC emissions from that category have been reported in the NFR table. The IIR provided by the Russian Federation gives a list of activities included in that category and production values for 2017. Nevertheless, no information is given in the IIR regarding emission factors. During the review, the Russian Federation provided the ERT with the emission factors used to estimate NMVOC emissions. The ERT commends the Russian Federation for this and recommends that the Russian Federation include this information in the IIR to enhance the transparency of the report.

Category issue 6: 2.H.3- Other industrial processes

96.   The ERT noted, in the NFR tables submitted by the Russian Federation, that emissions from other industrial processes have been reported together with emissions from other stationary combustion in the manufacturing industries and construction in sector 1.A.2.g.viii. As no detailed information on activity data, emission factors or methodology was provided by the Russian Federation to the ERT before or during the review, the ERT could not assess the emissions from that category. The ERT recommends that the Russian Federation include detailed descriptions of the methodologies for each category in the IIR.

SOLVENTS

Review Scope

Pollutants Reviewed	NOx, NMVOC, SOx, NH$_3$, PM$_{2.5}$, PM$_{10}$, TSP, CO		
Years	2010 – 2017		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2D3a	Domestic solvent use including fungicides	x		
2D3d	Coating applications	x		
2D3e	Degreasing	x		
2D3f	Dry cleaning	x(IE)		
2D3g	Chemical products	x		
2D3h	Printing	x		
2D3i	Other solvent use	x(IE)		
2G	Other product use	x(IE)		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Transparency

97. The Russian Federation has provided emission data for the period 2010-2017 but has not provided any data for the years prior to 2010. The IIR does not provide any explanation about the choice of the reported time series.

98. The NFR tables provided by the Russian Federation contain emission data or use notation keys where estimates are not available for all source categories within the Solvent sector. The Russian Federation uses the notation key IE for three source categories and the use of these notation keys is well documented in the IIR. The ERT commends the Russian Federation for this.

99. The Russian Federation uses country-specific methodologies for almost all emission calculations within the Solvent sector. The IIR provided by the Russian Federation does not give detailed information on the methodology used to estimate emissions.

100. The Russian Federation has provided activity data for only one source category where emissions have been reported in the NFR table. For the four other source categories where emissions have been reported, it was not possible to compare the implied emission factors with the values recommended by the EMEP/EEA GB 2016.

101. During the review, the Russian Federation did not provide any additional information on the methodologies used to the ERT, because of confidentiality issues.

102. The Russian Federation has not provided a detailed or generally transparent emission inventory for the Solvent sector. The information about the methodologies used that was made available to the ERT before and during the review was not enough. The ERT recommends that the Russian Federation report a transparent IIR including

detailed descriptions of methodologies, especially the country-specific methodologies, emission factors and activity data used to estimate emissions for all source categories.

Completeness

103.   The Russian Federation has reported emission data for five different source categories in the NFR tables provided to the ERT. The Russian Federation uses the notation key "IE" for the three other source categories. As not enough information regarding methodologies is provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the completeness of the Russian inventory could not be assessed by the ERT.

Consistency including recalculation and time-series

104.   The Russian Federation has reported emission data for five different source categories in the NFR tables provided to the ERT. The Russian Federation uses the notation key "IE" for the three other source categories. As not enough information regarding methodologies is provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the consistency of the Russian inventory could not be assessed by the ERT.

Comparability

105.   As not enough information on methodologies is provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, and as the emissions are reported as aggregated for some source categories, the ERT considers the Russian inventory as not being comparable.

Accuracy and uncertainties

106.   As not enough information on methodologies has been provided in the IIR and as the Russian Federation did not provide the ERT with the necessary information during the review, the accuracy of the Russian inventory could not be assessed by the ERT.

Improvement

107.   The ERT noted that the Russian Federation did not include any source category from the Solvent sector in its improvement plan. The ERT encourages the Russian Federation to set up an improvement plan for the Solvent sector and to include in it the recommendations of the ERT.

Potential Technical Corrections

108.   Due to the limited amount of activity and emission data reported by the Russian Federation, the ERT could not assess any possible under- and overestimations of the Party's emissions estimates.

Sub-Sector Specific Recommendations

109.   The ERT notes that the general lack of transparency of the Russian Federation hampers the reviewing of other quality aspects of the inventory (completeness, consistency etc). For these reasons, no sub-sector specific recommendations are provided.

AGRICULTURE

Review Scope

Code	Name	Reviewed	Not Reviewed	Recommendation Provided
Pollutants Reviewed		NOx, NMVOC, NH$_3$, PM$_{10}$ & PM$_{2.5}$		
Years		2010 – 2017		
3B1a	Dairy cattle	x		x (NH$_3$)
3B1b	Non-dairy cattle	x		x (NH$_3$)
3B2	Sheep	x		x (NH$_3$)
3B3	Swine	x		x (NH$_3$)
3B4a	Buffalo	x		x (NH$_3$)
3B4d	Goats	x		x (NH$_3$)
3B4e	Horses	x		x (NH$_3$)
3B4f	Mules and asses	x		x (NH$_3$)
3B4gi	Laying hens	x		x (NH$_3$)
3B4gii	Broilers	x		x
3B4giii	Turkeys	x		x
3B4giv	Other poultry	x		x (NH$_3$)
3B4h	Other animals	x		x (NH$_3$)
3Da1	Inorganic N-fertilizers (includes also urea application)	x		
3Da2a	Animal manure applied to soils	x		x
3Da2b	Sewage sludge applied to soils	x		x
3Da2c	Other organic fertilisers applied to soils (including compost)	x		x
3Da3	Urine and dung deposited by grazing animals	x		x
3Da4	Crop residues applied to soils	x		x
3Db	Indirect emissions from managed soils	x		x
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products	x		
3Dd	Off-farm storage, handling and transport of bulk agricultural products	x		x
3De	Cultivated crops	x		
3Df	Use of pesticides	x		
3F	Field burning of agricultural residues	x		x
3I	Agriculture other	x		
11A	Volcanoes	x		
11B	Forest fires	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

110.   The ERT notes that for all key sources a Tier 1 calculation method has been used. The key sources have a great impact on the national total, which makes it even more important to calculate these emissions with a greater level of detail. The ERT recommends that the Russian Federation calculate all key sources with a Tier 2 or higher calculation method, as requested by the Reporting Guidelines.

Transparency

111.   The ERT notes that the Russian Federation uses the 'total emission factor' for the calculation of NH_3 emissions. There are more detailed emission factors available, in which the emissions are disaggregated. The ERT recommends that the Russian Federation use the disaggregated emission factors provided in the guidebook for the calculation of 3.B, 3.D.a.2.a and 3.D.a.3 emissions to make the impact of the different categories more transparent.

112.   The ERT notes that the use of notation keys is not always correct. For example, emissions of 3.D.a.2.a are reported as 'Not Estimated' (NE), while the emissions are included with the 3.B emissions, therefore the notation key should be 'Included Elsewhere' (IE).The ERT recommends that the Russian Federation use the appropriate notation keys as outlined in the Reporting Guidelines.

Completeness

113.   The ERT notes that the Russian Federation uses a notation key for 13 (14 for PM emissions) of the 25 NFR categories. Not reporting these emissions could lead to an underestimation of emissions. The ERT recommends that the Russian Federation include all these emissions. In cases where the emissions are not reported, the ERT encourages the Russian Federation to provide a justification in the IIR.

Consistency including recalculation and time-series

114.   The Russian Federation has recalculated its inventory for almost agriculture from the year 2010 and onwards. However, the IIR does not include all the necessary explanations. The ERT recommends that the Russian Federation provide a more detailed explanation of recalculations in its IIR, including the rationale for the recalculations, the impact on the sector and the implication for trends in the Agriculture sector.

Comparability

115.   The ERT notes that the Russian Federation uses methods as described in the guidebook. The ERT commends the Russian Federation for that, as it makes the inventory comparable to those of other countries.

Accuracy and uncertainties

116.   The ERT notes that no uncertainties are reported in the IIR. The ERT encourages the Russian Federation to undertake an uncertainty analysis for the Agriculture sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Condensable

117.   The ERT notes that nothing is mentioned about the condensable component of PM in the IIR. The ERT is aware that there are no condensable emissions from the Agriculture sector and encourages the Russian Federation to state this in its IIR, as requested by Annex II of the Reporting Guidelines.

Improvement

118.   The ERT notes that there are no planned improvements mentioned in the IIR. The ERT recommends that the Russian Federation include an improvement plan together with a work plan for the Agriculture sector for the next submission. Recommendations from inventory reviews should be included in this improvement plan.

Potential Technical Corrections

119.   The ERT has not prepared any technical corrections for the Agriculture sector of the Russian Federation's inventory.

Sub-Sector Specific Recommendations

Category issue 1: 3.B Manure management - NH_3

120.   The ERT notes that 3.B.1.a, 3.B.1.b 3.B.3 and 3.B.g.iv are key sources for NH_3 emissions. These emissions are calculated using a Tier 1 method. The ERT recommends using a Tier 2 or higher method for the calculations of NH_3 emissions from 3.B.1.a, 3.B.1.b 3.B.3 and 3.B.g.iv as requested in the Reporting Guidelines.

Category issue 2: 3.B Manure management – NOx

121.   The ERT notes that an average emission factor is used for NOx emissions from manure management. The ERT encourages the Russian Federation to collect more data on the manure management system for 3.B NOx, so that a difference can be made between solid and liquid manure to obtain a better estimate of the emissions.

Category issue 3: 3.B Manure management - NMVOC

122.   The ERT notes that an average emission factor is used for NMVOC emissions from manure management. The ERT encourages the Russian Federation to collect more data on the feeding system for 3.B NMVOC, so that an estimation can be made of the number of animals eating silage, in order to include this in the calculation of the emission factor.

Category issue 1: 3.B Manure management - PM_{10}

123.   The ERT notes that 3.B.4.g.iv is a key source for PM_{10} emissions. These emissions are calculated using a Tier 1 method. The ERT recommends using a Tier 2 or higher method for the calculation of PM_{10} emissions from 3.B.4.g.iv as requested in the Reporting Guidelines.

Category issue 4: 3.D.1 Agricultural Soils - NH_3, PM, NOx and NMVOC

124.   The Russian Federation reports emissions from inorganic N fertilisers in category 3.D. However, for all other categories in 3.D (3.D.a.2.b, 3.D.a.2.c, 3.D.b, 3.D.c and 3.D.f) emissions are reported as 'Not Estimated' (NE). The ERT recommends that the Russian Federation include these emissions where possible. If it is not possible, an explanation for not including these emissions should be given and the notation key should be updated.

125.   The ERT notes that the amount of nitrogen used in mineral fertilisers, which is used as activity data for the estimation of NH_3 and NOx emissions, is given in the NFR table. The ERT recommends that the Russian Federation include a table in the IIR showing the N content of fertilisers.

126.   The ERT notes that 3.D.e is a key source for NMVOC and 3.D.c is a key source for TSP, PM_{10} and $PM_{2.5}$. The ERT recommends using a Tier 2 or higher method for the calculation of NMVOC from 3.D.e and TSP, PM_{10} and $PM_{2.5}$ from 3.D.c as requested in the Reporting Guidelines.

Category issue 5: 3.F Field burning of agricultural residues – NOx, NMVOC, SOx, NH_3, PM, CO, HM, POPs

127.   The ERT notes that the Russian Federation reports emissions from 3.F category as "NE". When consulted, the Russian Federation responded that from 2012 onwards, the burning of fields had been prohibited in the country. The ERT recommends including emissions from field burning before 2012, since fields had been burned in the Russian Federation in the years before 2012.

WASTE

Review Scope

Pollutants Reviewed		NOx, NMVOC, SOx, NH$_3$, PM$_{2.5}$, PM$_{10}$, TSP, CO		
Years		2010 – 2017		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
5A	Biological treatment of waste - Solid waste disposal on land	x		x
5B1	Biological treatment of waste - composting		x	x
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities		x	x
5C1a	Municipal waste incineration		x	
5C1bi	Industrial waste incineration	x		x
5C1bii	Hazardous waste incineration		x	
5C1biii	Clinical waste incineration		x	
5C1biv	Sewage sludge incineration		x	
5C1bv	Cremation		x	
5C1bvi	Other waste incineration (please specify in the IIR)		x	
5C2	Open burning of waste		x	
5D1	Domestic wastewater handling	x		x
5D2	Industrial wastewater handling	x		x
5D3	Other wastewater handling		x	x
5E	Other waste (please specify in IIR)		x	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency

128. The Russian Federation provides a brief description of emissions calculated according to CLRTAP requirements. The main data source for the Waste sector calculations is the Russian Federation's Satistical office. According to the IIR, the statistical office provides emissions, not only activity data. From the IIR is not clear how the emissions are calculated (methodology, EF). The ERT encourages the Russian Federation to provide a more transparent and coherent IIR. For a better overview of the emissions calculations, the IIR structure needs follow CLRTAP requirements. The ERT encourages the Party to increase the transparency of its IIR.

Completeness

129. The Russian Federation reports emissions for years 2010- 2017 in 4 sub-categories from 15 in the waste sector. The notation keys "NA", "IE" and "NE" are used for other sub-categories. The ERT recommends that the Party explain the use of its notation keys in next IIR with clear references to the chosen notation keys.

Consistency, including recalculation and time-series

130. In the IIR recalculations are not mentioned. The ERT recommends that the Party provide a description of all recalculations in the next submissions if changes are made to emission estimations. If the changes in activity data are due to changes in a primary data source, appropriate references should be made in the IIR.

Comparability

131. The emissions provided are not comparable to other countries. A clear methodology of the calculations is not provided in the IIR.

Accuracy and uncertainties

132. From the provided information is not possible to check the accuracy of the calculations. The ERT recommends that the Russian Federation t provide activity data in NFR tables. Furthermore, an uncertainty analysis has not been performed. The ERT recommends that the Russian Federation start to estimate uncertainties according to EMEP/EEA GB 2016. Activity data uncertainties could be obtained from activity data source owner. If it is the Russian Federation State Statistical Office, an uncertainty analysis of their summarised data has to be carried out.

Condensable

133. The Russian Federation has not provided explanatory information on the condensable components of PM for the Waste sector in the IIR, and there is no clear information on whether $PM_{2.5}$ includes or excludes the condensable component. The ERT recommends that the Russian Federation include such information in the next submission according to Annex II (v.2018) of the 2014 Reporting Guidelines.

Improvement

134. No improvements are mentioned in the IIR. The ERT encourages the Party to improve the inventory of Waste sector emissions according to the EMEP/EEA GB 2016.

Potential Technical Corrections

135. The ERT has not prepared any technical corrections for the Waste sector of the Russian Federation's inventory.

Sub-Sector Specific Recommendations

Category issue 1: 5.A Solid waste disposal on land

136. The Russian Federation reports, in this sub-category, NMVOC, $PM_{2.5}$, PM_{10} and TSP emissions. No information is provided in the IIR about the methodology or EFs.

Category issue 2: 5.B Biological treatment of waste

137. The Russian Federation does not report emissions in this sub-category. The ERT recommends establishing a system for activity data collection. Household waste composting is a commonly used method for waste management all around the world.

An estimation of composted amounts in households could be performed on the basis of selected studies and the results could be extrapolated across the whole country. The lifestyle of the inhabitants (private house, rural areas or multi-storey building) needs to be taken into account. Also, information about biological treatment in biogas facilities could be obtained and the emissions calculated. According to information from internet sources, such activities do take place in the country. The ERT encourages the Party to carry out estimations of emissions from waste biological digestion.

Category issue 3: 5.C Waste incineration

138. The Russian Federation reports emissions from industrial waste incineration. All other sub-categories are reported using the notation key "IE". The ERT has assessed the emissions values provided. However, a more detailed explanation about the source category would be appreciated. Information from the Russian Federation State Statistical Office needs to be reassessed and uses of notation key "IE" need to be reviewed.

Category issue 4: 5.D Wastewater handling

139. The Russian Federation reports emissions in both sub-categories – industrial and domestic wastewater handling. The ERT appreciates the effort that the Russian Federation has made to calculate the emissions under these sub-categories; however, more detailed information about activity data and the calculation methodology would be appreciated. The Russian Federation reports emissions of gases ($PM_{2.5}$, PM_{10}, TSP) which are not mentioned in EMEP/EEA GB 2016. The ERT has strong doubts that such emissions are possible in wastewater handling. The ERT recommends that the Russian Federation provide a clear methodology for these emissions calculations. For sub-category 5.D.3 the Russian Federation reports "IE" for NH_3, NMVOC and particulate matters. No explanation is provided as to what kind of emission source is taken into account in this sub-sector. The ERT recommends providing a clear description of 5.D.3 sources. If there is no emission source the notation key "NO" could be used.

140. Emission time series show a double increase in NMVOC emissions in 5.D.1 between the years 2014 and 2015. There is no explanation in the IIR. The ERT strongly encourages the Russian Federation to provide an explanation for this sharp increase in emissions in the next IIR. If the sharp increase is due to methodology changes, then recalculations for all time series are necessary.

141. Emission time series show a double decrease in NH_3 emissions in 5.D.1 between the years 2012 and 2013. There is no explanation in the IIR. The ERT strongly encourages the Russian Federation to provide an explanation for this sharp decrease in emissions in the next IIR. If the sharp decrease is due to methodology changes, then recalculations for all time series are necessary.

Category issue 5: 5.E Other waste

142. The Russian Federation reports "IE" for category 5.E. According to the EMEP/EEA GB 2016, accidental fires could be included in this sector. It is not clear from the IIR if these emissions are included in category 6.A. The ERT encourages the

Russian Federation to provide an explanation for fire emissions estimations in the next IIR.

INFORMATION SUBMITTED BY THE PARTY IN 2019

Filename	Short description of content
RU_CLRTAP_2019_ANNEX_I_2010-2017.xlsx	Annex I, **MS Excel file**, years 2010-2017
IIR_RU_2019.pdf	**IIR 2019, pdf-document in Russian**; 90 pg

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to preliminary question raised prior to the review (wiki)
2. Response to questions raised during the review (wiki)
3. Excel file: Fuel_Use_2017_1A4bi_NFR vs CRF (Q6_12_06_2019).xlsx (wiki)

ANNEX I POTENTIAL TECHNICAL CORRECTIONS

A technical correction was proposed by the ERT during the review week for the IPPU sector (NFR 2H1, BC, 2010-2017). A summary table is provided below for the years 2010, 2015 and 2017. Detailed related information for all calculated years is provided separately in the Excel file **TC-RU-NFR_2_Review_2019.xlsx**

	Description	Reference	Pollutant estimates (kt)		
			2017	2015	2010
TC|REVISED ESTIMATES	**PM$_{2.5}$**				
	National total as reported 2019 (row 141)	**Annex I, 04/02/2019**	**NE**	**NE**	**NE**
	Difference between original estimate and revised estimates provided by Party and accepted by the ERT				
			NA	NA	NA
	Difference between original estimate and technical correction deemed necessary by the ERT				
	2H1-Pulp and paper production		0.2325	0.2264	0.2953
	National total (row 141) including revised estimates and technical corrections accepted by MS	**Calculated using data above**	**0.2325**	**0.2264**	**0.2953**