UNITED NATIONS

Distr.
GENERAL

CEIP/S3.RR/2010/BELARUS
21/10/2011

ENGLISH ONLY

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

BELARUS

CONTENT

INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is provided by the UNECE document '*Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols'* [(1)] – hereafter referred to as the 'Methods and Procedures' document.

2. This annual review, has focussed on SO_2, NO_x, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time series years 1990 – 2009 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 reviews of the UNECE LRTAP Convention and EU NEC Directive inventories of Belarus coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 27th June 2011 to 1st July 2011 in Copenhagen, Denmark and was hosted by the European Environment Agency (EEA). The review has been carried out by the following team of nominated roster experts Generalist – John van Aardenne (EEA), Energy – Julien Vincent (France) and Emilia Hanley (Ireland), Transport – Michael Kotzulla (Germany), Industry – Valentina Idrissova (Kazakhstan), Solvents – Nadine Allemand (France), Agriculture – Jim Webb (UK), Waste – Magdalena Trajkovska Trpevska (Macedonia).

4. Kristina Saarinen (Finland) was the lead reviewer. The review was coordinated by Katarina Marečková, (EMEP Centre on Emission Inventories and Projections - CEIP).

[1] Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols. Note by the Task Force on Emission Inventories and Projections. ECE/EB.AIR/GE.1/2007/16 http://www.unece.org/env/documents/2007/eb/ge1/ece.eb.air.ge.1.2007.16.e.pdf

PART A: KEY REVIEW FINDINGS

5. The ERT acknowledges the effort Belarus has taken to provide estimates of emissions for all sub-sectors and all pollutants reviewed. The inventory is partly in line with the *EMEP/EEA Emission Inventory Guidebook* and UNECE Reporting Guidelines and includes emissions of the main pollutants, particulate matter, heavy metals and POPs in NFR09 format for 2009 (the latest year). It does not, however, comprise data from previous years, nor information regarding recalculations.

6. The ERT identifies the need for further improvements in transparency, completeness and consistency.

7. The ERT recommends Belarus to provide an IIR. The applicability of the IIR to support the review was, however, unsatisfying as the structure of the IIR does not correspond to the outline defined in the UNECE Reporting Guidelines (UNECE, 2009) The ERT recommends Belarus to respond to questions raised by the ERT before and during the review and to provide some background information on the preparation of the inventory and on the methodologies used in the calculations. While all the replies were not detailed enough, they still enabled the ERT to provide a number of recommendations that would not have been possible by only using the IIR.

8. Due to the absence of detailed information on methodologies and data, the ERT is unable to evaluate the completeness of the emission inventory. For some of the sectors reviewed the ERT considers the inventory as not yet complete due to the lack of availability of statistics to the inventory compilers. The ERT encourages Belarus to collect the required data to provide preferably the full time series of emissions, or at least emissions for the years 1990, 1995 and from the year 2000 onward.

INVENTORY SUBMISSION

9. The 2011 submission of Belarus includes emissions for 2009 (latest year) for the main pollutants, particulate matter, heavy metals and POPs in the NFR09 format both at total national and sector levels. While emission data for different pollutants and different sectors for some years are included, consistencyis lacking.The ERT recommends Belarus to report the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from year 2000 onwards.

10. The ERT recommends Belarus to submit an IIR. The information provided in the IIR was, however, insufficient and therefore could not provide support for conducting the review. Moreover, the IIR did not follow the outline defined in the UNECE Reporting Guidelines (Recommended Structure for Informative Inventory Report, Annex VI to ECE/EB.AIR/97, Version: 30 Sept 2009). Hence, the ERT encourages Belarus to improve the IIR in accordance with the UNECE Reporting Guideline 2009. The methodology used in the inventory submitted by Belarus is currently not in accordance with the EMEP/EEA Emission Inventory Guidebook,

2009. The ERT recommends Belarus to improve the inventory according to the methodologies presented in the EMEP/EEA Emission Inventory Guidebook, 2009.

KEY CATEGORIES

11. In its IIR Belarus has compiled a level Key Category Analysis (KCA) on the year 2009 emissions for the following pollutants: NO_x, CO, SO_x, NH_3, TSP, heavy metals and POPs. The documentation did not allow the ERT to determine if all sectors where included. The results of the KCA by Belarus are comparable with the KCA by the CEIP. The ERT encourages Belarus to include also emissions of NMVOC, PM_{10} and $PM_{2.5}$ in its next inventory submission.

12. Belarus does not state in the IIR if the KCA is used for prioritization of improvements to the inventory. The ERT encourages Belarus to use the results of the KCA a to prioritize improvements to the inventory.

QUALITY

Transparency

13. The inventory of Belarus does not provide satisfactory detail for review in regard to the process of inventory preparation, methods and data sources as well as assessment of completeness and trends For better transparency, the ERT encourages Belarus to include detailed description on methodologies and activity data applied with references to data sources in the future IIRs. Specific areas for improvement are included in later sections of this report.

14. Belarus reports zero values for a number of sources in the NFR tables. The ERT therefore encourages Belarus to use the appropriate notation keys (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimates” and IE where emissions are “Included Elsewhere”) for reporting where estimates are not available or necessary.

15. The use of the notation key IE in the NFR tables is inconsistent and not transparently explained in the IIR. The ERT encourages the Party to provide more detailed information of sources reported as IE in future submissions.

16. The transparency of the inventory from Belarus suffers from not being able to provide the energy balance to the ERT due to confidentiality reasons.

Completeness

17. The ERT acknowledges the effort Belarus has taken to provide estimates of emissions for all sub-sectors and all pollutants reviewed.

18. Due to the absence of detailed information on methodologies and data, the ERT cannot evaluate the completeness of the emission inventory. For some of the sectors reviewed the inventory is considered by the ERT as not yet complete due to lack of availability of statistics to the inventory compilers.

19. Emission data are available only for occasional years, and the notation key NE (not estimated) is used for many sources in the NFR for various pollutants, mainly due to lack of activity data (AD) or emission factors (EFs). The ERT encourages Belarus to collect the required data to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

Consistency, including recalculations and time-series

20. Belarus did not provide information on recalculations, and therefore the ERT is not able to comment on them. The ERT recommends that Belarus provides information on recalculations as part of their next submission.

21. The Belarus emission inventory submission does not include NFR tables for the previous years. The IIR mentions that there are no significant dips or jumps in the historic emissions except for SO_2 which emissions increased by 90.6% and for nickel (163%) compared to 2008 due to an increase of fuel oil combustion. However, no explanatory information was available to the ERT to evaluate these rather strong increases. In order to evaluate the consistency of the inventory and actual changes in emissions over time, the ERT encourages Belarus to submit the time series of emissions in the NFR tables and to provide information on the methodologies used to calculate emissions, related activity data and justifications for changes in actual emissions during the years.

Comparability

22. Belarus provided emission data for 2009 in the NFR09 format. Due to the frequent use of notation keys and the missing activity data, the inventory of Belarus is not comparable with other countries. The ERT acknowledges the response by Belarus stating that the lack of activity data for some sectors and the confidentiality issue with its energy balance is a problem. Nevertheless, the ERT encourages Belarus to improve the availability of activity data for its next inventory submission.

23. The IIR does not provide information on whether the inventory is consistent with the methodologies presented in the EMEP/EEA Guidebook.

CLRTAP/NECD comparability

24. Belarus does not report an inventory under the EU National Emission Ceilings (NEC) Directive.

Accuracy and uncertainties

25. Belarus did not provide a quantitative uncertainty analysis. The ERT encourages Belarus to undertake sector specific quantitative uncertainty analyses for the inventory in order support the improvement process and to provide an indication of the reliability of the inventory data, at least for key categories.

26. The ERT noticed that due to calculation of emissions from the agriculture sector using RAINS emission factors instead of those in the EMEP/EEA Emission Inventory Guidebook, Belarus is likely to over- or underestimate the emissions.

Verification and quality assurance/quality control approaches

27. No QA/QC plan was presented in the IIR. According to responses raised by the ERT during the review, Belarus explained that the QA/QC procedures included comparison of calculated and statistical emission data; comparison of emission values in Belarus and other countries; and verification of emission factors by using emission testing data. The ERT recommends that Belarus prepare a QA/QC plan and implements sector specific QA/QC procedures according to the EMEP/EEA Guidebook. QA/QC procedures are important especially when various sources of AD and EFs are used at every step of data collection from operators and statistics.

FOLLOW-UP TO PREVIOUS REVIEWS

28. No Stage 2 review for the Belarus inventory was possible to perform by the CEIP due to the lack of activity data.

AREAS FOR IMPROVEMENTS IDENTIFIED BY BELARUS

29. No improvement plans are presented in the IIR. In its reply to the ERT Belarus indicated the intention to improve both the reporting of emissions and the calculation of emissions estimates.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

Areas for cross-cutting improvements identified by the ERT

The ERT identifies the following cross-cutting issues for improvement of the Belarus inventory:

(a) to improve the IIR in accordance with the Recommended Structure for Informative Inventory Report (Annex VI to ECE/EB.AIR/97, Version: 30 Sept 2009) and the Guidebook to include more detailed descriptions on methodologies and data used in the calculations as well as on assumptions made in the preparation of the inventory;

(b) to ensure consistency of the methodologies with the EMEP/EEA Guidebook, 2009;

(c) to provide information on recalculations in the IIR as part of the next submission;

(d) to provide more detailed description of the time series of key sources ;

(e) to improve the availability of activity data forthe next inventory submission;

(f) to implement sector specific QA/QC procedures and to provide a description of the QA/QC system as well as a QA/QC plan;

(g) to provide an uncertainty analysis of the inventory and use the results in prioritizing improvements in the inventory;

(h) to provide an inventory improvement plan as part of the next submission;

(i) to complete the estimation of not estimated (NE) sources;

(j) to estimate emissions from the missing sources.

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

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY THE ERT

ENERGY

Review Scope

Pollutants Reviewed		SO_2, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2009 + (Protocol Years)		
NFRCode	**CRF_NFRName**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.1.a	public electricity and heat production	X		X
1.A.1.b	petroleum refining	X		
1.A.1.c	Manufacture of solid fuels and other energy industries		IE	
1.A.2.a	iron and steel	X		X
1.A.2.b	non-ferrous metals	X		X
1.A.2.c	chemicals	X		X
1.A.2.d	pulp, paper and print	X		X
1.A.2.e	food processing, beverages and tobacco	X		X
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	X		X
1.A.4.a.i	commercial / institutional: stationary	X		
1.A.4.b.i	residential plants	X		
1.A.4.c.i	Agriculture/forestry/fishing. stationary	X		
1.A.5.a	other, stationary (including military)	X		
1.A.5.b	other, mobile (including military, land based and recreational boats)?	X		
1.B.1.a	coal mining and handling		X	
1.B.1.b	solid fuel transformation		X	
1.B.1.c	other fugitive emissions from solid fuels)		X	
1 B 2 a i	Exploration, production, transport	X		X
1 B 2 a iv	Refining / storage		X	
1 B 2 a v	Distribution of oil products	X		X
1 B 2 b	Natural gas		X	
1 B 2 c	Venting and flaring		X	
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2		X	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues.

Transparency:

31. The energy sector inventory is not transparent as Belarus did neither provide activity data in the NFR tables, nor provided information on methodologies in the IIR. The ERT strongly encourages Belarus to improve the transparency of its inventory for the next submission.

32. The ERT notices that for the team in charge of the inventory, the “energy balance data" is treated as confidential. For the preparation of the inventory, various sources of data and different approaches and models are used split up into different source-sectors. There is no direct correspondence between the structure of reported emissions (NFR) and the structure of emission predictors (such as EFs). However, as fuel consumptions and IEF are provided in the CRF tables, the ERT strongly encourages Belarus to complete the NFR table with activity data so that IEFs can be calculated and checked and the transparency of the methodology can be improved.

33. Belarus has provided information on the use of Notation keys in the IIR.

Completeness:

34. Due to the lack of proper documentation of the energy sector inventory the ERT used CRF tables to verify the emissions reported by Belarus. The ERT found that emissions reported for the year 2009 are very different in the NFR and in the CRF tables at a sectoral level, and it is therefore not possible for the ERT to check the completeness of the inventory.

35. The emissions reported are mostly based on annual emission reports from enterprises (about 2,000 installations are concerned). To enable review of the inventory, the ERT recommends Belarus to include the explanations provided to questions raised by the ERT during the review week on how activity levels calculated from plant reports are completed with data from the national energy balance, in its IIR.

36. Belarus has not provided a full time series of emissions. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

The notation key NE is used for a few pollutants (HM, PM, DIOX, PAH-4) in the energy sector subcategories 1B1a, 1B1b, 1B1c, 1B2ai, 1B2aiv, 1B2av, 1B2c and 1B3. This is consistent with the EMEP/EEA Emission Inventory Guidebook 2009, which indicates 'Not estimated' for those pollutants.

Consistency including recalculation and time series:

37. While there are gaps in emission trend data for some sectors, other sectors only contain data for single years instead of a whole time series Belarus provided some explanations during the review week (see sub-sector recommendations below). The ERT encourages Belarus, however, to verify their emission trends at the sectoral level and to provide more extensive explanations for those inconsistencies in the IIR.

38. The Belarus inventory lacks sufficient information on recalculations. The ERT encourages Belarus to provide more details on the recalculations carried out between the last submissions.

Improvement:

39. Belarus provided general information on inventory improvement plans during the review week. Belarus confirms that maximum effort will be made to improve the next inventories but that it substantially depends on the availability on input data (emissions and activity statistics). The ERT encourages inventory compilers to work

closely with the energy statistics offices to improve the quality of input data. Such work could be part of the improvement plan.

Comparability:

40. Based on the information provided in the IIR it cannot be concluded whether the methodologies used in the energy sector inventory are in accordance with the EMEP/EEA Guidebook, 2009.

41. Belarus did not provide information on activity levels. Therefore, the ERT cannot check the IEFs.

42. The ERT noticed that at a sectoral level emissions reported under the CLRTAP are very different from those reported under the UNFCCC. An example of those discrepancies are NO_x emissions from sector “1 A 1 a Public electricity and heat production”: 82.5 Gg in the CRF tables in contrast to 25.7 Gg in the NFR tables. The ERT recommends Belarus to re-examine these data and explain the discrepancies in the IIR.

43. The ERT noticed that the inventory was prepared on basis of different data sources of such as plant reports, calculations based on the EMEP/EEA Emission Inventory Guidebook and emission calculations based on the RAINS model. Confronted with the question regarding the use of different data sources by the ERT during the review week, Belarus explained that it was thought that these sources could provide more representative information of the situation in the country. The ERT encourages Belarus to include more detailed information on the choice of data sources in its IIR.

Accuracy and uncertainties:

44. Belarus did not provide an uncertainty analysis. In answer to the queries raised by the ERT Belarus explained to have “no certain plans for this issue“. The ERT recommends Belarus to undertake uncertainty analyses for the Energy Sector in order to feed into the improvement process and to provide as proof of the reliability of the inventory data.

45. The ERT noticed that Belarus has an “emission inventory report QA/QC system" which includes activities such as cross-checks of emission values for different pollutantstime series consistency checks, comparisons of emission values with economic indicators, comparisons of calculated EFs emission and statistical emission data; comparison of emission values from Belarus with other countries for similar activities etc. Data are periodically duplicated and archived. The ERT encourages Belarus to elaborate a description of the QA/QC activities and add this description into its IIR.

Improvement:

46. The ERT acknowledges the intention of Belarus intention to improve the comparability between the NFR and CRF sectors 1A1b Refinery (SNAP 010300) and to collect data on abatement techniques installed in catalytic cracking (FCC) in the sub-sector 1B2aiv. The ERT encourages Belarus to implement the foreseen

improvements and to continue the QC activities to avoid gaps and to improve time series consistency.

Sub-Sector Specific Recommendations.

Category issue 1: 1A1a Public electricity and heat production – SO_2 and TSP

47. The ERT noticed that emissions for SO_2 and TSP were very high in 2009 compared to the other years. This point was explained by Belarus during the review week by the fact that the consumption had increased and the fuel quality had changed in these years. The ERT recommends Belarus to explain this type of development in the IIR to make the inventory more transparent.

Category issue 2: 1A2x Stationary combustion in manufacturing industries and construction – all

48. The ERT noticed inconsistencies (gaps, dips, jumps, etc.) in time series for industry sub-sectors . During the review week Belarus explained that for some of the years insufficient data were available for being able to assess emissions from the sub-sectors separately. Therefore, emissions were aggregated in one subsector 1A2fi (which is not consistent for all years). More data for subsectors 1A2a and 1A2fi seem to be reported for the last few years of the time series. However, issues such as inconsistencies in NMVOC emissions as well as gaps in SO_2 and Hg emissions in 2000 remain for the sector 1A2. The ERT encourages Belarus to improve the consistency of the time series and recommends to explain the remaining discrepancies in its IIR.

Category issue 3: 1B2ai and 1B2aiv – NMVOC, SO_x

49. The ERT noticed zero values for emissions. The ERT encourages Belarus to use appropriate notation keys instead of zero values (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimates” and IE where emissions are “Included Elsewhere”).

TRANSPORT

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2006 + (Protocol Years)		
NFRCode	**CRF_NFRName**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.3.a.i.(i)	international aviation (LTO)	x		x
1.A.3.a.i.(ii)	international aviation (cruise)	x		x
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)	x		x
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)	x		x
1.A.3.b.i	road transport, passenger cars	x		x
1.A.3.b.ii	road transport, light duty vehicles	x		
1.A.3.b.iii	road transport, heavy duty vehicles	x		
1.A.3.b.iv	road transport, mopeds & motorcycles	x		x
1.A.3.b.v	road transport, gasoline evaporation	x		
1.A.3.b.vi	road transport, automobile tyre and brake wear	x		
1.A.3.b.vii	road transport, automobile road abrasion	x		
1.A.3.c	railways	x		
1.A.3.d.i (ii)	international inland navigation			
1.A.3.d.ii	national navigation	x		
1.A.4.a.ii	commercial/institutional (mobile)	x		x
1.A.4.b.ii	household and gardening (mobile)	x		x
1.A.4.c	agriculture / forestry / fishing		x	
1.A.4.c.ii	off-road vehicles and other machinery		x	
1.A.4.c.iii	national fishing		x	
1.A.5.b	other, mobile (including military, land based and recreational boats)		x	
1 A 3 d i (i)	International maritime navigation		x	
1 A 3	Transport (fuel used)			
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues

Transparency:

50. The IIR provided by Belarus includes only basic information on the methods applied and the description of transparency is vague. The ERT therefore encourages the Party to improve the transparency of its inventory by providing all necessary information to enable review of the data in future submissions.

51. The Party also uses zero values in the reporting tables. The ERT encourages Belarus to use the appropriate notation keys (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimates” and IE where emissions are “Included Elsewhere”) for indicating where estimates are not available or necessary. Otherwise, real data should be used instead of zero-values even though estimates are negligible.

52. Furthermore, the use of the notation key IE is inconsistent and is not explained enough. The ERT encourages the Party to provide more detailed information on the use of notation keys in future submissions.

53. To further improve the transparency of the inventory, the ERT encourages Belarus to include as much information as possible on methodologies (the Tier applied, AD and EFs used), time-series of emissions and information on recalculations.

Completeness:

54. For the sectors reviewed, the ERT considers the Party's inventory as not yet complete due to statistics being not available to the inventory compilers.

55. The ERT cannot confirm the completeness of the Party's inventory due to the frequent and inconsistent use of the notation key “IE”.

56. Belarus uses zero-values in a number of areas in the inventory where emissions are likely to occur. The ERT encourages the Party to check all zero-values and to correct them by i) estimating actual emissions or by ii) using an appropriate notation keys instead (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimated” and IE where emissions are “Included Elsewhere”).

57. Belarus has not provided a full time series of emissions. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years1990, 1995 and from the year 2000 onward.

Consistency including recalculation and time series:

58. The level of disaggregation follows the disaggregation of AD available from statistics hence presenting emissions estimates in an inconsistent way within the time series provided. The ERT encourages the Party to provide the entire time series as soon as new data are available.

59. So far Belarus uses the COPERT III model. As this is not in line with the latest reporting guidelines the ERT asks the Party to use the latest version of the COPERT software (i.e. v. COPERT 4 version 8.1 from May 2011) for its next submission.

60. Information on recalculated data including reasons for the recalculations are not in the IIR. The ERT encourages the Party to provide information and data for justifying recalculations in future IIRs.

61. The time series of emissions is inconsistent for the different pollutants. The ERT encourages Belarus to recalculate the emissions and provide disaggregated data for the different sub-categories.

Comparability:

62. Due to the lack of transparency of the inventory the ERT is unable to conclude whether the methods used for the calculation of transport sector emissions are consistent with the EMEP/EEA Guidebook.

63. As information on data sources or methodologies applied is limited, the transport sector inventory is incomparable with the data of other countries. The ERT encourages the Party to provide more detailed information in future IIRs to improve transparency and comparability.

Accuracy and uncertainties:

64. No uncertainty analysis is provided for the transport sector. The ERT encourages Belarus to carry out an uncertainty analysis to feed into the improvement process and to provide an indication of the reliability of the inventory data. The ERT advises to refer to the default uncertainties provided in the IPCC reporting guidelines (rev1996 GL: Reporting Instructions, Annex 1, A 1,4; 2006 GL: Vol. 1, Chapter 3: 3.44ff). Information on uncertainty levels used in other countries' inventories might be a reference for uncertainty data as well.

65. No information on QA/QC procedures or internal reviews in the transport sector are provided. Therefore, the ERT encourages the Party to establish QA/QC procedures and to provide all necessary information on these procedures in the next IIR.

Improvement:

66. No information on planned improvements is provided. The ERT encourages the Party to include information on planned improvements in the future IIRs.

67. Furthermore, the ERT encourages the Party to elaborate an inventory improvement plan to schedule issues for further improvement as well as to monitor the improvements' progress.

68. During the review week the Party explained its intentions to improve its inventory in certain areas.

69. No improvements seem to be foreseen for reporting emissions from transport and other mobile sources. Nevertheless, during the review the Party declared its willingness to improve its inventory and that it is planned to elaborate an improvement plan. The ERT warmly welcomes this plan encouraging the Party to put further effort into inventory improvement.

Sub-Sector Specific Recommendations.

Category issue 1: 1.A.3 – all pollutants

70. For the different pollutants missions are reported for different time scales . No entire time series for a certain pollutant in the transport sector seems available for review and only little information on emission trends is provided. Based on Belarus` considerations of recalculating the time series back to 1990/1995, the ERT encourages Belarus to proceed accordingly based on available activity data thus making the inventory more transparent and comparable

Category issue 2: 1.A.3 – SO_2, NH_3, HM

71. The ERT noted that within the NFR tables the Party uses zero-values in several cases Belarus explained that the emissions mentioned are negligible. The

ERT acknowledges the answer provided. However, the ERT encourages the Party to provide data on even low emissions instead of zero-values.

Category issue 3: 1.A.3.a – all pollutants

72. Belarus has reported emissions since 2006 only. The emissions trends show a strong dip in values reported for 2008. Belarus explained that emissions of the main pollutants from the transport sector are calculated on the basis of activity data (fuel consumption, number of LTO circles) and that the changes in the emissions are therefore consistent. The ERT also asked the Party to provide explanation for the strong decrease in the 2008 activity data in the future IIRs.

Category issue 4: 1.A.3a i(i) and ii (i) Air Transport -SO_2, NH_3

73. The Party uses zero-values for SO_x and NH_3 in the NFR tables for the transport sector. In response to the question raised by the ERT the Party stated that the emissions from the sub-sectors of NFR 1A3a are negligible. The ERT encourages the Party to provide data on even very low emissions instead of zero-values.

Category issue 5: 1.A.3.b.i Road Transport - main pollutants

74. Despite of the lack of the entire time-series, the ERT was able to identify several unclear trends in the development of emissions from the sub-sector 1A3bi. According to these were due to instable methodologies used until 2005, the application of the COPERT model only after 2005 and the trends being mostly based on statistical input data. The ERT acknowledges the response and recommends Belarus to put further efforts into developing entire time-series using the COPERT model wherever activity data allow recalculations, and to provide information on the methodologies in the IIR.

75. In response to the issue on unclear trends, Belarus stated that for the future efforts will be made to provide detailed information on emissions trends. The ERT warmly welcomes this perspective.

Category issue 6: 1.A.3.b.i Road Transport – Lead (Pb)

76. The ERT noted that results from Stage 2 review show a strong downward trend in the (incomplete) time series for Pb emissions from 1A3bi with a sharp reduction between 1995 and 2001 (minus 99%) whereas, on the other hand, Pb emissions rise again between 2004 and 2006 and to drop by about 75% in 2007. In its response Belarus explained that the dramatic reduction of Pb road transport emissions was due to the phasing out ofleaded gasoline (end 1997). Therefore, for this period Pb emission was estimated for leaded gasoline only. Lead emissions after 1997 are due to the trace content of Pb in gasoline. The data on the Pb content in unleaded gasoline are extremely uncertain so emission estimates are also uncertain and may vary from year to year (within the limit 1-3 tons/year for the sector, while in 1990 Pb emissions from road transport were 734.4 tons). Belarus reported all Pb emissions for the years 2004-2006 from road transport under NFR 1A3b; from 2007 on emissions are reported separately by sub-sectors 1A3bi – 1A3biii. Total Pb emissions for 1A3b do not show a significant increase - The ERT acknowledges the

answer provided on lead emissions from road transport. In order to improve the transparency of the inventory, the ERT nevertheless encourages the Party to recalculate all aggregated sectors showing emissions from included sub-sectors separately, where data are available and transparent. .

Category issue 7: 1.A.3.b.iv Road Transport – Mopeds & Motorcycles – TSP, PM, (HM)

77. The ERT noted that in the NFR tables, only emissions of NO_x, SO_x, NMVOC and CO are provided for the transport sector whereas TSP and PM fractions as well as HM are reported as IE in 1.A.3.b.i. The ERT encourages the Party to report in future submissions data separately for each pollutant.. In its response the Party stated that emissions of PM fractions, HM and PAH from 1.A.3.b.iv are negligible and therefore are reported in 1.A.3b.i and that emissions in this sector will be reported separately as soon as they become significant. The ERT acknowledges the response by Belarus. However, the ERT encourages Belarus to report all emission estimates under the sub-category where they occur, even when they would be very low.

Category issue 8: 1.A.3.b.v.i & v.ii Road Transport – Abrasion - HM

78. In its IIR Belarus states that statistical activity data or EFs for estimating these emissions are unavailable. The Party stated that HM emissions from road abrasion do not belong to the well-studied processes in Belarus and that any estimates will be highly uncertain. Belarus explained further that this sector is not a key contributor to the total emissions of heavy metals, however, more attention will be paid on that issue in the future. The ERT acknowledges the answer provided, welcoming the Party's future effort to put more attention to the issues underlining that HM emissions especially from abrasion are often be a major source of emissions, depending on the country-specific circumstances. For further reference, default emission factors for heavy metals are available in the EMEP/EEA Guidebook as well as in the IIRs submitted by other countries.

Category issue 9: 1.A.3.c Railways – all pollutants

79. The ERT noted that Belarus did not estimate emissions from railways prior to 2006. The ERT encourages the Party to provide recalculated data back to 1990 as soon as statistics allow, and to improve the completeness of the inventory.

Category issue 10: 1.A.3.d.ii National Navigation – all pollutants

80. The ERT noted that Belarus states in the IIR and in the NFR tables that statistics or EFs for this sector are unavailable. Belarus explained that navigation is not a significant activity in the country and therefore statistical data are lacking but that such reporting is intended for future submissions. The ERT commends this foreseeable improvement.

Category issue 11: Mobile sources in 1.A.2, 1.A.4, and 1.A.5 – all pollutants

81. The ERT noted that all emissions from mobile sources reported under these sub-categories are included elsewhere (as part of 1A3b). To the question raised by the ERT on the issue, Belarus replied that current statistics (mainly the fuel consumption structure) for 1A2, 1A4, and 1A5 do not allow estimating emissions separately for all those sectors and that no certain plans of reporting emission by

these sectors are in place. The ERT acknowledges the reply and encourages the Party to put more attention to these issues as soon as capacities allow. According to the Party's reply it is impossible to find out the distribution of emissions for 1A4aii, 1A4bii which, according to the current statistical collecting methodology, are reported as part of 1A3bi, 1A3bii and 1A3biii. The ERT acknowledges the answer, commending the Party's will to take into account the recommendation for future improvement of the inventory.

Category issue 12: 1.A.3.e Pipeline Transport – NMVOC, SO_x, TSP, PM, (HM)

82. The ERT noted that in the NFR tables only emissions of NO_x and CO are provided for this sub-category whereas all other main pollutants as well as TSP, PM and HM are reported as IE under 2G and 3D3. The ERT considers this to be inconsistent and encourages the Party to report emission data for each pollutant separately in future submissions. The ERT welcomes the Party's willingness to take this recommendation into account for future submissions.

Category issue 13: 1.A.4.cii -SO_x

83. The ERT noted that the results from the Stage 2 review show a strong downward trend in the (incomplete) time series for SO_x emissions from 1A4cii. Belarus pointed out that until 2004 emissions for 1A4c sub-sectors were reported on an aggregated level only, whereas from 2005 on emissions are reported disaggregated by sub-sectors. In order to improve the inventory transparency, the ERT encourages the Party to recalculate all aggregated sectors in a way that emissions from the sub-categories can be provided separately for the entire time-series where data allows.

Category issue 11: 1.A.4.a.ii, b.ii – main pollutants

84. The ERT noted that this sub-sector includes mobile sources and that all emissions are reported as IE in the NFR categories 1A3bi, 1A3bii and 1A3biii. The ERT encouraged Belarus to report the emissions separately, as these emissions might include small mobile equipments such as lawn mowers. However, the ERT acknowledges that availability and quality of data (AD, EF) might be a problem.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, CO		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2.A.1	Cement production	x		
2.A.2	Lime production	x		
2.A.3	Limestone and dolomite use	x		
2.A.4	Soda ash production and use	x		
2.A.5	Asphalt roofing	x		
2.A.6	Road paving with asphalt	x		
2.A.7.a	Quarrying and mining of minerals other than coal	x		
2.A.7.b	Construction and demolition	x		
2.A.7.c	Storage, handling and transport of mineral products	x		
2.A.7.d	Other Mineral products	x		
2.B.1	Ammonia production	x		
2.B.2	Nitric acid production	x		
2.B.3	Adipic acid production	x		
2.B.4	Carbide production	x		
2.B.5.a	Other chemical industry	x		x
2.B.5.b	Storage, handling and transport of chemical products	x		
2.C.1	Iron and steel production	x		x
2.C.2	Ferroalloys production	x		
2.C.3	Aluminium production	x		
2.C.5.a	Copper Production	x		
2.C.5.b	Lead Production	x		
2.C.5.c	Nickel Production	x		
2.C.5.d	Zinc Production	x		
2.C.5.e	Other metal production	x		
2.C.5.f	Storage, handling and transport of metal products	x		
2.D.1	Pulp and paper	x		
2.D.2	Food and drink	x		
2.D.3	Wood processing	x		
2.E	Production of POPs	x		
2.F	Consumption of HM and POPs (e,g. Electrical and scientific equipment)	x		
2.G	Other production, consumption, storage, transportation or handling of bulk products	x		

General recommendations on cross-cutting issues

Transparency:

85. The information providedis insufficient and not transparent. During the review Belarus provided answers to the questions raised by the ERT. The ERT recommends

that Belarus includes more detailed information on the assumptions, EFs, choice of method and EFs, AD in its IIR to increase the transparency of the estimates.

86. Many sources are reported aggregated (e.g. chemical industry) as well as NMVOC emissions from metal, pulp and paper industries and from food and drink production). Due to the aggregated reporting, the accuracy of the estimates cannot be reviewed. In the CRF tables however, Belarus reports disaggregated AD and emissions for the chemical industry, metal industry and pulp and paper production. The ERT encourages Belarus to report emissions in more transparent and consistent way.

Completeness:

87. The ERT considers the information on industrial processes to be incomplete. Emissions are reported for occasional years and in the NFR for various pollutantsthe notation key NE is widely used. This is mainly due to the lack of AD or EFs (as explained in the NFR tables). The ERT encourages Belarus to collect the required data and to fill in the gaps for the reported emissions.

88. Belarus has not provided a full time series of emissions. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

Consistency including recalculation and time series:

89. The time series of emission data is inconsistent over the years for the different pollutants. The ERT encourages Belarus to provide disaggregated data for the different sub-categories.

90. Belarus did not provide information on recalculations. The ERT encourages Belarus to provide more details on recalculations made between the last submissions.

Comparability:

91. The ERT noticed that different sources of data were used in the preparation of the inventory, such as plant reports and calculations based on EMEP/EEA Emission Inventory Guidebook. The ERT encourages Belarus to include more information on the choice of data sources in its IIR.

92. Due to the lack of transparency the ERT is unable to conclude if the inventory is in accordance with the methods provided in the EMEP/EEA Emission Inventory Guidebook.

Accuracy and uncertainties:

93. In The IIR states that reported emissions were mostly deducted from statistics covering mainly large point sources that exceed reporting thresholds for emissions. In its reply to the ERT Belarus provided the underlying Guidelines to Enterprises on emission reporting (in Russian), which contain mostly measures. Belarus explained further that emissions from enterprises below the threshold were estimated using the 2009 version of the EMEP/EEA Emission Inventory Guidebook.

The ERT encourages Belarus to include detailed information of methodologies used to estimate emissions reported by the plants and information to justify the choice of EFs for plants not reporting their emissions.

94. Not even for the key categories a quantitative uncertainty analysis was performed . The ERT encourages Belarus to undertake sector specific quantitative uncertainty analyses aiming at industrial processes in order to support the improvement process and to provide an indication of the reliability of the inventory data.

95. No QA/QC plan was presented in the IIR. According to the IIR, QA/AC procedures include comparison of calculated and statistical emission data, comparison of emission values from Belarus with other countries and verification of emission factors by using emission testing data. The ERT recommends Belarus to introduce sector specific QA/QC procedures particularly when various sources of AD and EFs are used at all stages of data collection from operators and statistics considering uncertainty levels to improve the accuracy and reliability of the reported emissions.

96. Improvement: An improvement plan is not provided in the IIR. In its reply to the ERT, however, Belarus articulated the intention to improve the reporting and emissions estimates. Belarus informs that in order to prioritize inventory improvements comparisons of calculated and reported statistic emission datatogether with emissions reported by other countries are used.. The ERT encourages Belarus to develop a sector specific improvement plan paraticularly for the key source categories.

Sub-Sector Specific Recommendations.

Category issue 1: 2C1 Iron and steel production and 2B5a Other chemical industry

The ERT noted that the information on iron and steel production as well as on other chemical industry production includes emissions from several sub-categories. The aggregated reporting of emissions in these categories is not transparent and makes it difficult to assess the accuracy of estimates for the individual sources . Provided that thos categories are major sources of several pollutants, the ERT recommends that Belarus considers the possibility of reporting disaggregated emission data for the productions of iron and steel (2C1), aluminium (2C3), as well as for ammonia (2B1), nitric acid n and other substances from the chemical industry, and provides detailed descriptions of the methods and EFs applied to estimate the emissions.

SOLVENTS

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2006 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
3.A.1	Decorative coating application	NMVOC emissions	Methods	x
3.A.2	Industrial coating application			X
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)			X
3.B.1	Degreasing			X
3.B.2	Dry cleaning			X
3.C	Chemical products,			X
3.D.1	Printing			X
3.D.2	Domestic solvent use including fungicides			X
3.D.3	Other product use			x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues

97. Belarus has estimated NMVOC emissions from the Solvent and Other Product Use Sector for 2009. Total NMVOC are also reported for the years 1990-2009. The description in the IIR is, however, unsatisfactory because the methodologies applied by Belarus are insufficiently described.. Belarus did not reply to questions raised by the ERT on the methodologies for NMVOC but explained the difficulties encountered by adressing these sectors. As a result, the review could not be carried out accordinglyHowever, some source-specific recommendations are provided.

98. The sub-categories Solvent and Other Product Use are usually key sources of NMVOC emissions. The ERT encourages Belarus to provide information on methodologies used to estimate emissions. This will significantly improve the transparency of the inventory.

99. The ERT takes note of difficulties encountered by Belarus for mapping solvent uses. The ERT recommends Belarus to try to set up a step-by-step programme for improvement, beginning with the largest contributors of NMVOCs emissions.

100. Transparency: The description of the sector in the IIR is not sufficiently developed to make the inventory transparent. The ERT encourages Belarus to improve this issue within the IIR to be more transparent in the coming years.

Completeness:

101. Belarus has not provided a full time series of emissions. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

102. Due to the absence of information on methodologies used in the calculation of the emissions the ERT is unable to evaluate the completeness of the NMVOC emissions inventory for the Solvent and Other Product Use Sector.

Consistency including recalculation and time series:

103. Belarus did not provide information on any recalculations under this sector in the IIR.

104. Belarus fails to provide time series for the Solvent and Other Product Uses sector. The ERT encourages Belarus to develop time series to enable future analysis and highlighting the role of some key sources. Jumps in the trend of the reported total NMVOC emissions there should be explained and clarified whether they originate in the Solvent Use or in other sectors. The ERT encourages Belarus to provide such sectoral trends.

Comparability:

105. Belarus did not provide sufficient information on the use of methodologies used in the Solvent and Other Product Use sector. Accordingly, the ERT is unable to assess the comparability of the inventory.

106. The IIR does not indicate if the methods recommended in the EMEP/EEA Guidebook were used for the preparation of the inventory. The ERT encourages Belarus to document which methodologies are used and to provide details on those methodologies that are not presented in the EMEP/EEA Emission Inventory Guidebook.

Accuracy and uncertainties:

107. The ERT cannot evaluate the accuracy of the emission inventory for the Solvent and Other Product Use Sector due to the absence of detailed information.

108. The IIR lacks information on uncertainty analysis or QA/QC activities in the sector.

109. The ERT encourages Belarus to complete the IIR with information regarding QA/QC activities, to establish a QA/QC plan and to carry out an uncertainty analysis to prioritize improvements in the inventory.

Improvement:

110. Belarus did not provide information on an inventory improvement plan or on improvements already made in the inventory.

111. The ERT encourages Belarus to especially take into account the recommendations sector by sector and to provide an inventory improvement plan.

Sub-Sector Specific Recommendations.

Category issue 1: 3.A. Paints and Coatings – NMVOC

112. The ERT encourages Belarus to provide a more complete description of the sector and of methods used in the inventory. The use of paints is a key source for NMVOC emissions. The ERT encourages Belarus to try to set up a Tier 2 method for calculation of the emissions.

113. Useful sources of information could come from the Belarussian federation of paint producers, experts from paint manufacturing and paint users.

114. Belarus could also envisage the preparation of a mandatory report for the solvent balance for the largest industrial.

Category issue 2: 3.B. Dry Cleaning and Degreasing – NMVOC

115. The ERT encourages Belarus to provide a more complete description of the sector and methods used in the inventory .

Emissions from NFR 3B1 (Degreasing and dry cleaning) have not been estimated individually but are indicated to be *included elsewhere*. The ERT encourages Belarus to try to set up a methodology particularly for this activity, which is often a large consumer and emitter of solvents.

116. The Belarussian Association of Chemical Idustry might serve as a source of information for the use of chlorinated solvents in dry cleaning and degreasing activities. Information on the characteristics of machines used for dry cleaning could be collected from the Belarussian Federation of Dry Cleaners, from dry cleaning machine manufacturers and from Technical Centres and.

Category issue 3: 3.C. Chemical Products, Manufacture & Processing – NMVOC

117. The ERT encourages Belarus to provide a more complete description of the sector and methods used in the inventory.

118. The ERT encourages Belarus to provide emission data from the different activities covered by NFR 3C and to explain the trends observed over the time.

Category issue 4: 3.D. Other uses of products – NMVOC

119. The ERT encourages Belarus to provide a more complete description of the sector and methods used in the IIR.

120. The ERT encourages Belarus to provide emission data from the different activities covered by NFR 3D and to explain the trends observed over the time.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2006 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
4 B 1 a	Cattle dairy	NH_3, $PM_{2.5}$, PM_{10}		
4 B 1 b	Cattle non-dairy	NH_3, $PM_{2.5}$, PM_{10}		
4 B 2	Buffalo			
4 B 3	Sheep	NH_3, $PM_{2.5}$, PM_{10}		
4 B 4	Goats			
4 B 6	Horses	NH_3, $PM_{2.5}$, PM_{10}		
4 B 7	Mules and asses			
4 B 8	Swine	NH_3, $PM_{2.5}$, PM_{10}, TSP		
4 B 9 a	Laying hens	NH_3, $PM_{2.5}$, PM_{10}, TSP		
4 B 9 b	Broilers			
4 B 9 c	Turkeys			
4 B 9 d	Other poultry			
4 B 13	4 B 13 Other			
4 D 1 a	Synthetic N-fertilizers	NH_3, $PM_{2.5}$, PM_{10}		
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products			
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products			
4 D 2 c	N-excretion on pasture range and paddock unspecified (Please specify the sources included/excluded in the notes column to the right)			
4 F	Field burning of agricultural wastes			
4 G	Agriculture other(c)	NO_x, NH_3, $PM_{2.5}$, PM_{10}, TSP		
11 A	(11 08 Volcanoes)			
11 B	Forest fires			
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues

121. The accuracy of the inventory could be improved if emissions of all pollutants were calculated using EFs as provided by the EMEP/EEA Emission Inventory Guidebook as these are more up-to-date than those used by RAINS.

122. The transparency of the reporting can be increased by providing justification for sources not reported.

Transparency:

123. The inventory of the agricultural sector is not transparent which could be ameliorated by providing livestock numbers and annual N fertilizer se. Methodologies for the estimation of emissions from agricultural sources are provided in the EMEP/EEA Emission Inventory Guidebook, 2009.

124. The NH_3 trend for provided did not indicate any unexpected pattern in NH_3 emissions between 1990 and 2009. The trend towards a decrease is what is to be expected of a country whose economy is in transition and for which emissions are estimated using a Tier 1 methodology. This methodology estimates NH_3 emissions in proportion to livestock numbers. The NH_3 emissions correspond to the ivestock numbers, which have first decreased and then stabilizedThe ERT is, however, unable to make a robust assessment of consistency of the emissions time-series because a relevant AD is lacking.

125. No explanations are provided on the rationale for the use of notation keys. Emissions of NO_x for 4B (manure management), 4D2c (livestock N excretion on pasture and paddocks), and 4F (field burning of agricultural wastes) are reported as IE. There is a value for NO_x entered under 4G (Agriculture, other) which was explained by the Party that 'NO_x emission from livestock were not estimated'. NH_3 emissions from broilers (NFR 4B9b) are reported as IE. It is likely that these are reported under NFR 4B9a.

Completeness:

126. Belarus has not provided a full time series of emissions in this sector. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

Comparability:

127. The methods applied are not always consistent with those proposed in the EMEP/EEA Emission Inventory Guidebook (for instance EFs for PM according to RAINS). The IIR does not provide descriptions of country specific methods for estimating agriculture emissions and/or gaining agricultural activity data.

128. Emissions of PM are calculated using emission factors (EFs) as presented in the RAINS/GAINS methodology.

Consistency including recalculation and time series:

129. There is no reference to recalculations in the IIR. The ERT encourages Belarus to undertake recalculations using the methodologies provided in the EMEP/EEA Emission Inventory Guidebook and to include recalculated emissions in future submissions.

Accuracy and uncertainties:

130. The IIR does not provide information regarding an uncertainty analysis for the Agricultural sector. The ERT encourages Belarus to undertake uncertainty analyses for the agricultural sector in order to feed into the improvement process and to provide an indication of the reliability of the inventory data.

131. The IIR provides some information on general QA/QC and verification methods such as comparison of calculated and statistical data, comparison of emission values between Belarus and other countries and verification of emission factors by using emission testing data.

132. The IIR does not provide evidence that sector specific QA/QC procedures are carried out for the Agriculture sector, neither via a review by independent experts nor by reviewing key categories or inventory preparation. The ERT encourages Belarus to implement sector specific OA/QC procedures for the agricultural sector. As indicated above, under-/over estimations might occur due to the use of RAINs EFs instead of those provided by the EMEP/EEA Emission Inventory Guidebook.

133. Improvement: The IIR does not provide information on any plans for sectoral improvements or improvements already carried out. The ERT encourages Belarus to adopt the use of EFs as stated in the EMEP/EEA Emission Inventory Guidebook to calculate emissions from the agricultural sector in future submissions.

Sub-Sector Specific Recommendations.

Category issue 1: e.g. 4.B Manure management:- PM

134. The ERT noted that for the estimation of PM emissions from sector 4b the EFs from RAINS were used i stead of the method provided in the EMEP/EEA Emission Inventory Guidebook (Chapter 10, Agriculture, Table 3-4). In response to the question raised by the ERT on that issue Belarus replied that 'RAINS/GAINS methodology and in most cases also EFs from RAINS/GAINS databases were used for all sectors to estimate PM specific emissions and that there were no specific PM emissions from agriculture which would require specific routine.

135. The ERT encourages Belarus to use the EMEP/EEA Emission Inventory Guidebook methods to estimate PM from agricultural sources for future submissions as those EFs have been updated more recently than those of RAINS/GAINS.

Category issue 2: e.g. 4B6 Horses:- $PM_{2.5}$ and PM_{10}

136. Belarus indicated that no EFs for estimating PM emissions from horses are available. EFs for $PM_{2.5}$ and PM_{10} emissions are provided in the EMEP/EEA Emission Inventory Guidebook (Table 3-4). As noted in response to the Category Issue 1 above, Belarus stated that all PM emissions are calculated using RAINS/GAINS methodology. The ERT encourages Belarus to use the EFs from the EMEP/EEA Emission Inventory Guidebook or the calculation of PM emissions for all agricultural sources in future submissions as the EFs of the EMEP/EEA Emission Inventory Guidebook have been updated more recently than those of RAINS/GAINS.

Category issue 2: e.g. 4D2c Pasture range and paddock:- NH3

137. Emissions under 4D2c, Pasture range and paddock are reported as NE. In the EMEP/EEA Emission Inventory Guidebook, the EFs of Tier 1 NH_3 Table 3-) are annual and include emissions during grazing. The same applies for NO (Table 3-2). Consequently, the explanation to NE (no entry) under this category for NH_3 and NO should be amended as IE with the explanation that 'emissions during grazing are included as part of the total emissions from each livestock category'.

Category issue 3: e.g. 4B4 Goats:- NH_3, $PM_{2.5}$ and PM_{10}

138. Belarus explains that there are no EFs available to estimate these emissions. However, EFs are available for $PM_{2.5}$ and PM_{10} in the EMEP/EEA Emission Inventory Guidebook (Table 3-4). Belarus states that no statistics on the number of goats in Belarus are available. The ERT recommends Belarus to explain the use of NE (not estimated) in the IIR as a result of lacking available statistics.

Category issue 4: e.g. 4B9c Turkeys; 4B9d Other poultry; 4B13 Other livestock:- NH_3

139. The ERT noted that turkeys, poultry and other livestock are in the IIR listed as having no EF. However, the EMEP/EEA Emission Inventory Guidebook provides EFs to estimate NH_3 emissions (Table 3-1). Belarus points out that there statistics for the number of turkeys, other poultry and other livestock are inexistent. The ERT recommends that Belarus provides this explanation for the use of the notation key NE in the IIR.

Category issue 5: e.g. 4D2c N-excretion on pasture range and paddock:- NO_x and NH_3

140. The ERT noted that the EFs for NH_3 in Table 3-1 of the EMEP/EEA Emission Inventory Guidebook are annual factors which include emissions during grazing. Annual EFs, including grazing, are also provided in Table 3-2 for NO. The ERT recommends to amend the explanation for the use of the notation key NE for NH_3 and NO under this category to 'emissions during grazing are included as part of the total emissions from each livestock category'.

Category issue 6: e.g. 4.F Field burning of agricultural wastes:- All

141. The ERT noted that these emissions have not been estimated in the IIR although a comprehensive set of EFs is available from the EMEP/EEA Emission Inventory Guidebook. In reply to the question Belarus explains that field burning is prohibited and that there are no statistical accounts and estimates of residues burned; however, an emission assessment could be possible in future. The ERT appreciates the response and encourages Belarus to collect activity data for the calculation of these emissions in the future.

Category issue 7: e.g. 4B1a, 4B1b, 4B3, 4B4, 4B6, 4B8, 4B9a:- NO_x

142. The ERT noted that NO_x emissions for sources 4B1a, 4B1b, 4B3, 4B4, 4B6, 4B8, 4B9a are reported under 4G. The EMEP/EEA Emission Inventory Guidebook provides EFs for all these livestock categories under 4B. Since numbers of these animals are available and the Guidebook provides the EFs to enable the calculation of emissions from these sources the ERT recommends Belarus to undertake the calculations in future Inventory submissions.

WASTE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
6.A	solid waste disposal on land	x		yes
6.B	waste-water handling	x		yes
6 C a	6 C a Clinical waste incineration (d)	x		yes
6 C b	Industrial waste incineration (d)	x		yes
6 C c	Municipal waste incineration (d)	x		yes
6 C d	Cremation	x		yes
6 C e	Small scale waste burning	x		yes
6.D	other waste (e)	x		yes
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues.

144. The ERT encourages Belarus to improve the IIR in accordance with the Recommended Structure for Informative Inventory Report (Annex VI to ECE/EB.AIR/97, Version: 30 Sept 2009) and the EMEP/EEA Emission Inventory Guidebook.

Transparency:

145. NO_x, NMVOC, SO_x, NH_3 and CO emissions from 6Ca, 6Cb, 6Cc, 6Ce are repeated as "IE". In reply to this question Belarus responded that the emissions are included in 1A1a and 6Cb or 6Cd. The ERT encourages Belarus to improve the explanations on allocation of emission data indicated with "IE" in the sub-chapters.

146. Belarus does not provide information concerning methodologies used to estimate emissions, the emission sources used and assumptions made. The ERT recommends Belarus to improve the description of methodologies, activity data and emission factors used in the waste sector.

Completeness:

147. Belarus has not provided a full time series of emissions. The ERT encourages the Party to provide preferably the full time series of emissions, at the minimum emissions for the years 1990, 1995 and from the year 2000 onward.

148. The Waste sector inventory is incomplete and not fully consistent with the Reporting Guidelines and the EMEP/EEA Emission Inventory Guidebook. The ERT encourages the Party to improve the completeness of the inventory by including more detailed explanation about the methodology applied and to provide in its IIR a detailed description for NFR 6 Waste sector key sources.

149. The ERT also recommends Belarus to estimate emissions for those sources that are currently reported in the NFR tables as not estimated (NE).

Consistency, including recalculation and time series:

150. The ERT noted that zero-values are reported, and that notation keys were used in different ways for various years of one subsector. There No further explanations are provided in IIR.. The ERT encourages Belarus to use the appropriate notation keys in the future inventories and to provide explanations for their uses in the IIR.

151. The IIR submitted by Belarus does not provide detailed description regarding changes in emissions within different years. In the review week, however, Belarus provided clarification on the differences in the emissions from 1995 until 2009.

152. Belarus does not provide explanations if the recalculations were justified and if they resulted in real improvements of the inventory. The ERT encourages Belarus to include detailed information on any recalculations carried out as well as the reasons for it in the future IIRs.

Comparability:

153. The ERT recommends Belarus to use the methods provided in the EMEP/EEA Emission Inventory Guidebook for the waste sector inventory and to provide completed NFR tables for the waste sector with minimal use of notation keys.

Accuracy and uncertainties:

154. Belarus has carried out some basic QA/QC analyses but has not provided a detailed description on the QA/QC activities performed in the waste sector. Also, it is not stated which tier approach is used for the calculations in waste sector. The ERT encourages the Party to implement sector specific OA/QC procedures for the waste sector and to describe the tier level of the chosen methodology.

155. Belarus has not provided an uncertainty analysis for the waste sector. The ERT encourages the Party to undertake an uncertainty analysis for the waste sector in order to support the improvement process and to provide an indication of the reliability of the inventory data.

156. In its IIR Belarus indicates that the inventory is validated by comparing calculated and statistical emission data, comparing emission values in Belaruswith other countries and by verifying the emission factors by using emission testing data. The IIR does not specify how these procedures have been carried out for the waste sector inventory.

Improvement:

157. Belarus did not provide an inventory improvement plan or information on improvements already carried out in the inventory. The ERT encourages Belarus to provide additional information on planned and expected improvements in the inventory.

158. During the review week Belarus informed the ERT that they are making effort to complete the IIR for the next inventory submissions.

Sub-Sector Specific Recommendations.

Category issue 1: e.g. 6A1 Solid waste disposal on land: – NH_3

159. In category 6A only NH_3 emissions are reported. The IIR does not provide information about the AD, the EFs and the methodology used in calculating emissions. However, it is stated in the IIR that statistical data for the category 6A was not available.

160. The ERT recommends Belarus to estimate NMVOC emissions from landfills using the methodology provided in the EMEP/EEA Emission Inventory Guidebook, 2009.

Category issue 2: e.g. 6B Wastewater handling – NH3

161. Emissions of NH_3 are reported by Belarus for sector 6B. The IIR does not provide information about the AD, the EFs and the methodology used for calculation of emissions. However, it is stated within the IIR that statistic data for 6B category were not available. The ERT recommends the Party to provide more detailed explanations related to this sector and to describe the approach for estimating emissions. Moreover, the ERT encourages Belarus to improve in future the Inventories in accordance with the EMEP/EEA Emission Inventory Guidebook.

Category issue 3: e.g. 6.Ca Clinical waste incineration:

162. Only Pb emissions are reported in NFR 6Ca. The IIR does not provide appropriate information about EFs and the methodology applied for this sub-category. The ERT recommends the Party to provide more explanations related to this sector and to describe the methods used to estimate emissions.

163. During the review week Belarus explained that the emissions of main pollutants from clinical waste incineration are included mainly in the energy sector because of missing specific statistical data for fuel combustion emissions. However, the ERT encourages Belarus to calculate emissions in this category in accordance with the EMEP/EEA Emission Inventory Guidebook 2009.

164. The ERT recommends Belarus to provide appropriate explanations in the IIR regarding the use of the notation key "IE" (in 1A1a and 6Cd) for NO_x, NMVOC, SO_x, NH_3, CO emissions.

165. The ERT encourages the Party to use notation keys instead of zero-values, or to provide an explanation for the use of zero-values in the IIR.

Category issue 4: e.g. 6.Cb Industrial waste incineration:

166. Pb , Cd, Cu, Ni, Zn, PCDD/ PCDF (dioxines/furanes), benzo(b) fluoranthene, Total PAH-4, HCB and PCBs emissions are reported in NFR 6Cb. The IIR does not provide appropriate information about the EFs and the methodology used in the calculation of emissions. The ERT recommends the Party to provide more explanations related to this sector and to describe the methodologies used for estimating emissions.

167. During the review week Belarus explained that the emissions of the main pollutants from industrial waste incineration are mostly included in the energy sectors because of the lack of specific statistical data for fuel combustion emissions. The ERT encourages Belarus to calculate th emissions under this category in accordance with the EMEP/EEA Emission Inventory A Guidebook, 2009.

168. The ERT recommends Belarus to provide relevant explanation in the IIR regarding the use of the notation key "IE" (in 1A1a and 6Cd) for NO_x, NMVOC, SO_x, NH_3, CO emissions.

169. The ERT encourages th Party to use appropriate notation keys instead of zero-values.

Category issue 5: e.g. 6.Cc Municipal waste incineration:

170. In the IIR it is stated that NO_x, NMVOC, SO_x, NH_3, CO, Pb, Cd, As, Cr, Cu, Ni, Zn, PCB, DIOX, PAH-4, HCB emissions from 6Cc are "IE". There are no explanations on the justifications to include them in 1A1a and 6Cb.

171. In response to the questions raised by the ERT Belarus explained during the review week that emissions of main pollutants from municipal waste incineration are included mostly in the energy sector because of lack of specific statistical data for fuel combustion emissions. The ERT encourages Belarus to calculate emissions under this category in accordance with the EMEP/EEA Emission Inventory Guidebook 2009. The ERT recommends Belarus to provide relevant explanation in the IIR concerning the use of the notation key "IE".

172. In the NFR 6Cc the notation key "NO" is used for activity data, although the emissions are reported as "IE". The ERT recommends the Party to correct such mistakes or provide appropriate explanation for the reason of using this notation.

Category issue 6: e.g. 6 C d Cremation:

173. In NFR 6Cd, Belarus has covered the main pollutants from crematories according the EMEP/EEA Emission Inventory Guidebook 2009. The IIR does not provide appropriate information about the EFs and methodologies used. he ERT recommends the Party to provide more explanations related to this sector and to describe the methodologies used for estimation of emissions.

174. Belarus reports zero-values for cremation explanations are missing.. The ERT encourages the Party to use notation keys instead of zero-values.

Category issue 7: e.g. 6 C e Small scale waste burning

175. In this sub-category no emissions were reported. Only the notation keys “IE”, and “NE” were provided without further explanation. In the IIR emissions from 6Ce are reported as “IE”. Explanations on why they are included in 1A1a and 6Cb are missing. The ERT recommends Belarus to provide appropriate explanation in the IIR regarding the use of the “IE” notation key.

176. During the review week Belarus explained that the emissions of main pollutants from small scale waste burning are included mostly in the energy sector because of missing specific statistical data for fuel combustion emissions. The ERT encourages Belarus to calculate emissions in this category in accordance with the EMEP/EEA Emission Inventory Guidebook, 2009.

177. In the NFR 6Ce, the notation key “NA” is used for activity data, although pollutant emissions are reported as “IE”. The ERT encourages the Party to correct such inconsistencies or explain the reason of the notation used.

Category issue 8: e.g. 6 D Other waste

178. Belarus provides emission data for NMVOC, NH3 and PCDD/ PCDF (dioxines/ furanes) under this category, but in NFR 6D, the notation key “NA” is used for the activity data. The ERT encourages the Party to correct the inconsistencies or explain the reasons.

179. In the IIR it is not stated from which sources the emissions originate (ex. compost production, biogas production etc. in accordance with the EMEP/EEA Emission Inventory Guidebook). The ERT recommends Belarus to provide in the IIR a detailed description of the emission sources, as well as of the methodologies and EFs used to estimate the emissions.

7 A Other (included in national total for entire territory)

180. Belarus does not report emissions under NFR category Other.

List of additional materials provided by the Country during the Review

1 Party NFR tables 2011::
http://webdab1.umweltbundesamt.at/Inventory_Review_2011/02_Belarus/CLRTAP%20submission/emission_reporting_2009_Belarus.xls

2 Party IIR 2011:
http://webdab1.umweltbundesamt.at/Inventory_Review_2011/02_Belarus/IIR/IIR%20Belarus%202009.doc

3 Party Stage 1 report:
http://webdab1.umweltbundesamt.at/Inventory_Review_2011/02_Belarus/Stage%201%20report/BY_Stage1_Report_2011.htm

4 Party Stage 2 S&A report:
http://webdab1.umweltbundesamt.at/Inventory_Review_2011/02_Belarus/S&A%20data/

5 Response to preliminary questions raised prior to the review: Belarus Energy Stationary_09 06 2011_Q1 to Q3_reply.docx

6 Response to questions in the solvent sector.

7 Response to questions in the agriculture sector:
Belarus_Agric_Quest_tem_290611_reply2.doc.