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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:**

The Former Yugoslav Republic of Macedonia

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INTRODUCTION

1. The mandate and the overall objectives for the emission inventory review process under the LRTAP Convention are given 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 concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & 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 the Former Yugoslav Republic of Macedonia coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 27th June to 1st July 2011 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 – Anne Wagner (UK), Energy – Nina Holmengen (NO) and Giorgos Mellios (GR), Industry – Kees Peek (NL), Solvents – Ioannis Sempos (GR), Agriculture + Nature – Romain Joya (FR), Waste – Intars Cakaras (LIT).
4. Kevin Hausmann (DE) 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 Former Yugoslav Republic (FYR) of Macedonia provided active support to the ERT during the 2011 centralised stage 3 review replying to questions promptly. The FYR of Macedonia inventory covers most pollutants and partly covers the time series required under the UNECE guidelines. Based on the additional information provided by the Party, the ERT was able to get an overview of the current national inventory system in the FYR of Macedonia.

INVENTORY SUBMISSION

6. The inventory is partly in line with the EMEP EEA Inventory Guidebook and the UNECE Reporting Guidelines. The NFR tables are not reported for the complete time series.

7. In the 2011 submission, the FYR of Macedonia provided their national inventories in the NFR09 code for the year 2009 only. The 2011 CLRTAP submission is identical to the 2010 submission apart from 1A1a (NO_x) and 2C2 (NO_x & SO_x). A Tier 1 methodology is applied to the majority of sources. The ERT encourages the FYR of Macedonia to report emissions for the whole time series covering all CLRTAP pollutants in the future.

8. The ERT notes that the FYR of Macedonia does not submit emission estimates for projections. The ERT encourages the Party to submit projected emissions for the 'With measures' and 'With additional measures' scenarios together with the associated socio-economic data for 2010 and 2020 to 2050, if possible. The FYR of Macedonia is currently preparing a National Emission Reduction Programme specifying reduction measures until 2020 and the dynamics of their implementation. This document shall be completed by the end of 2011.

9. Further proposals for improvements identified during this review are presented in part B of this report.

KEY CATEGORIES

10. The FYR of Macedonia lists all emission sources of the main pollutants (SO₂, NO_x, CO, NMVOC, NH₃ and TSP) together with their associated percentage contribution to the overall emission total. A Key Category Analysis (KCA) consistent with the EMEP/EEA Guidebook should only include emission sources that contribute an accumulated 80% of the total emissions by pollutant. The ERT would like to point out that a Tier 2 or 3 methodology should be applied to all sources identified as key categories and thus would apply to all sources listed in Table 2 to 7. The data in Table 2 to 7 are not consistent with the latest 2011 CLRTAP submission; they are based on the 2010 submission.

11. The ERT encourages the FYR of Macedonia to update the IIR with the latest data, consistent with the 2011 CLRTAP submission.

12. The ERT encourages the FYR of Macedonia to present the key sources as trends and as percentage contributions to total emissions. To clarify this issue, the

ERT recommends that the FYR of Macedonia adds in the IIR paragraph “1.5 Key Source analysis” the trend for key sources over the time period. It is also recommended that only the sources contributing an accumulated 80% of the total emissions should be included in Table 2 to 7.

QUALITY

Transparency

13. Most of the information is provided at aggregated level; however, in each sector more information on assumptions, activity data time series, data sources, emission drivers and tiers of methods used could be included in the IIR to improve its transparency further. The ERT encourages the FYR of Macedonia to show the emission trends over the complete time series and not just for 2004 and 2008.

14. The quality control and quality assurance (QC/QA) procedures carried out by the FYR of Macedonia are documented in the IIR. However, the IIR only focuses on the reporting years 2006 (2004) and 2010 (2008). The ERT encourages the FYR of Macedonia to update the IIR with the latest QA/QC procedures, consistent with the current reporting year.

15. Information on recalculations and improvements are covered in very little detail in the IIR. The ERT encourages the FYR of Macedonia to list planned and performed improvements and recalculations by sector, year and pollutant in the IIR as well as to highlight the drivers and prioritisation of such improvements.

16. The ERT encourages the FYR of Macedonia to provide information in the tab 'Additional Info' in the reporting template, especially where 'NE' and 'IE' are used in the official submission.

17. The FYR of Macedonia does not perform an uncertainty analysis. The ERT encourages the FYR of Macedonia to report quantitative uncertainty estimates in their IIR in the future.

Completeness

18. The FYR of Macedonia does not report projected emissions. The ERT encourages the FYR of Macedonia to report projected emissions for the 'With measures' and 'With additional measures' scenarios and associated socio-economic data for 2010 and the years 2020 to 2050 where possible. The FYR of Macedonia has mentioned that this information will be included in their 2012 IIR.

19. The FYR of Macedonia does not report emissions of heavy metals and POPs in their 2011 submission. Heavy metals have been reported until 2002. During the stage 3 review the FYR of Macedonia explained that the available activity data were not sufficient to either continue reporting heavy metals or to report a time series for POPs. The ERT encourages the FYR of Macedonia to further pursue the collection of suitable activity data or use of surrogate data to report emissions for all CLRTAP pollutants.

20. The FYR of Macedonia reports emissions of TSP but does not report emissions of PM₁₀ or PM_{2.5}. Scaling or conversion factors for PM₁₀ and PM_{2.5} can be

found on the US EPA website. The ERT encourages the FYR of Macedonia to report emissions for PM₁₀ and PM_{2.5} in the future.

21. Road transport is a key source for TSP. NH₃ emissions also occur from road transport. The FYR of Macedonia does not report emissions from road transport for TSP and NH₃ under 1A3b, although EFs are available in the EMEP/EEA Guidebook (for PM_{2.5} and NH₃) and COPERT. The FYR of Macedonia intends to include these emissions in their 2012 submission.

22. The FYR of Macedonia reports NO_x and SO_x emissions from '6 C a Clinical waste incineration (do)' but does not report NMVOC and TSP. The FYR of Macedonia mentioned that these estimates would be included in their 2012 submission.

23. The IIR does not list sources by pollutants that are currently not estimated. The ERT encourages the FYR of Macedonia to add more information as to why these sources are currently not reported (e.g. lack of activity data or the source does not exist in the FYR of Macedonia) and whether there are plans to report them in the future.

Consistency, including recalculations and time-series

24. The IIR does not provide explanations for recalculations for the latest CLRTAP submission. The ERT encourages the FYR of Macedonia to provide detailed and complete information on recalculations in the 2012 IIR.

Comparability

25. The ERT notes that the inventory of the FYR of Macedonia is comparable with those of other reporting parties. The allocation of source categories follows that of the EMEP/UNECE Reporting Guidelines.

26. The ERT encourages the FYR of Macedonia to provide further information on the methodologies used, as well as the activity data and emission factors used to enable a comparison of the FYR of Macedonia's emissions with other countries.

CLRTAP/NECD comparability

27. The FYR of Macedonia does not report emissions under NECD and UNFCCC. Thus it is not possible to perform the comparability test.

Accuracy and uncertainties

28. The FYR of Macedonia does not currently perform an uncertainty analysis. The ERT encourages the FYR of Macedonia to provide quantitative uncertainty estimates of the emission values, especially for key sources, in their 2012 submission.

29. The ERT further encourages the FYR of Macedonia to provide information on activity data, emission factors and the methodologies used to enable the ERT to verify the emissions provided.

Verification and quality assurance/quality control approaches

30. The IIR covers the institutional arrangements, the inventory preparation process and the QA/QC in good detail. The FYR of Macedonia has implemented a QA/QC plan in accordance with the EMEP/EEA Guidebook. The ERT encourages the FYR of Macedonia to elaborate further on planned improvements, data sources and QA/QC.

FOLLOW-UP TO PREVIOUS REVIEWS

31. The current stage 3 centralised review has used outputs from the stage 1 and stage 2 review processes. The ERT encourages the FYR of Macedonia to also refer to these previous reviews when examining this review report, and when updating its improvement plan.

AREAS FOR IMPROVEMENT IDENTIFIED BY THE FYR OF MACEDONIA

32. The FYR of Macedonia did not perform any improvements as part of the 2011 submission. During the stage 3 review the FYR of Macedonia mentioned that the 2011 submission was based on the 2010 CLRTAP submission and that emissions had only changed for 1A1a NO_x and 2C2 NO_x, SO_x.

33. During the centralised review and exchanges with the ERT, some potential improvements have been identified by the FYR of Macedonia:

- (a) Provide projected emissions for NO_x, SO_x, NMVOC and NH₃
- (b) Provide emissions for 1A1b for TSP and NH₃
- (c) Provide emissions for NMVOC and TSP for 6 C a Clinical waste incineration
- (d) Provide further information on recalculations
- (e) Calculate PM₁₀ and PM_{2.5} emissions from 2000 until 2009
- (f) Improvement of emission factors by selection of national EFs and improvement of the activity data, in accordance with the new EMEP / EEA Guidebook - 2009 as part of the next inventories

34. The ERT recognises the level of effort undertaken by the FYR of Macedonia in providing an inventory to undertake a stage 3 review. Any questions issued by the ERT to the Party were addressed promptly and descriptive responses were provided during the Review process.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

35. The ERT identifies the following cross-cutting issues for improvement:
36. The ERT recommends that the FYR of Macedonia reports all pollutants under the CLRTAP for all occurring sources.
37. The ERT recommends that the FYR of Macedonia provides the complete time series in line with the CLRTAP defined time period and the defined deadline.
38. The ERT recommends that the Party submits projected emissions for the 'With measures' and 'With additional measures' scenarios together with the associated socio-economic data for 2010, 2020 and up to 2050, if possible.
39. The ERT recommends that the FYR of Macedonia provides, for each sector, more information on assumptions, activity data time series, data sources, emission drivers and tiers of methods used.
40. The ERT encourages the FYR of Macedonia to provide more complete and detailed information on recalculations in the 2012 IIR.
41. The ERT recommends that improvements related to specific source categories are presented in the relevant NFR sections in the IIR report.
42. The ERT encourages the FYR of Macedonia to provide information on notation keys within the reporting template, especially where IE and NE is used.
43. The ERT encourages the FYR of Macedonia to include the improvement plan in the IIR, and to highlight how identified improvements are prioritised. The improvement plan should also cover information on missing sources and whether there are any plans to include these in the inventory.
44. The ERT recommends that the FYR of Macedonia updates the IIR with the latest data, consistent with the 2011 CLRTAP submission.
45. The ERT recommends that the FYR of Macedonia reports the trends and percentage contributions to the total emissions for all key sources.
46. The ERT encourages the FYR of Macedonia to provide more descriptions of the drivers in their IIR when explaining key trends, so as to fully explain significant dips and jumps.
47. The ERT encourages the FYR of Macedonia to provide an uncertainty analysis.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , TSP, CO		
Years		1990 – 2009		
NFR Code	CRF_NFR Name	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	NO		
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.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)			
1 A 3 e	Pipeline compressors?			
1.A.4.a.i	commercial / institutional: stationary	x		x
1.A.4.a.ii	commercial / institutional: mobile ?			
1.A.4.b.i	residential plants	x		x
1.A.4.b.ii	household and gardening (mobile)			
1.A.4.c.i	Agriculture/forestry/fishing. stationary	x		x
1.A.4.c.ii	off-road vehicles and other machinery?			
1.A.4.c.iii	national fishing?			
1.A.5.a	other, stationary (including military)	x		x
1.A.5.b	other, mobile (including military, land based and recreational boats)?			
1.B.1.a	coal mining and handling	x		x
1.B.1.b	solid fuel transformation	NO		
1.B.1.c	other fugitive emissions from solid fuels	x		
1 B 2 a i	Exploration, production, transport	x		
1 B 2 a iv	Refining / storage	x		
1 B 2 a v	Distribution of oil products	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 codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues.

Transparency:

48. The ERT commends the FYR of Macedonia for providing thorough information during the review process.

49. The ERT finds that the emission estimates are reported transparently, with a predominantly correct use of notation keys. The ERT commends the FYR of Macedonia for giving information about where emissions are included when the notation key IE is used, and recommends that information about the incentives for such an inclusion is included in the IIR (see sub-sector specific recommendation 7). Some minor issues have been identified concerning the use of notation keys; see sub-sector specific recommendations 1 and 3.

50. The Macedonian IIR is written in a transparent and clear manner, and it is comprehensively describing the methodologies used. The IIR contains thorough information concerning activity data and emission factors used in the inventory. The ERT suggests that descriptions of allocations between the sub-sectors could be improved, see sub-sector specific recommendation 8.

51. The IIR has focused on the differences between 2004 and 2008 in the reported estimates. The ERT recommends that trends are described in more detail in order to increase the transparency in the inventory. See sub-sector specific recommendation 10.

Completeness:

52. The ERT considers the energy sector to be relatively complete and with good levels of detail in the methodology descriptions. The ERT commends the FYR of Macedonia for using the energy balance to ensure that the inventory accounts for total fuel consumption and for the usage of data from the cadastre of polluters and air pollutants in the FYR of Macedonia.

53. The main issue concerning the energy sector is the lack of completeness when it comes to the pollutants included and the time series of the inventory. Ideally, the ERT will recommend that emissions are reported for all gases, heavy metals, POPs and particles (including PM_{2.5} and PM₁₀). However, the ERT recognizes the need for prioritizing, and thus commends the FYR of Macedonia for the priorities made concerning the inclusion of pollutants in the inventory.

54. For CO, NO_x and SO_x emissions within the energy sector have been reported from 2001 onwards, while the TSP time series starts with 2003 and NMVOC and NH₃ with 2004. The ERT recommends that emissions are reported for the entire time series for all pollutants. For more details concerning the completeness of the Macedonian inventory, please see sub-sector specific recommendations 4, 7, 8, 11, and 12.

Consistency including recalculation and time series:

55. The ERT notes that no recalculations are performed in the Macedonian inventory. This leads to a lack of time series consistency, and errors of previous years have not been corrected. See sub-sector specific recommendations 5, 6, and 9. The ERT thus strongly recommends that recalculation routines are implemented in the inventory preparation process, and that recalculated data are reported with the next submission.

56. No recalculations have been performed in the Macedonian inventory. The ERT recommends that recalculation routines are implemented in the inventory preparation process, and that recalculated data are reported with the next submission. The ERT thus commends the FYR of Macedonia for their plan to recalculate emissions for 2004 and 2008 in the future.

Comparability:

57. The ERT finds that the methodologies used in the Macedonian inventory are for the most part in accordance with those proposed in the Guidebook. However, newer versions of the Guidebook are available than the one used for preparing the Macedonian inventory, and both methodologies and emission factors have been altered for some sub-sectors within the stationary energy sector. The ERT suggests that the FYR of Macedonia utilizes the newest Guidebook edition 2009 when calculating emissions from new sources/pollutants within the energy sector, and that current estimates are quality assured by checking the emission factors and methodologies against those proposed in the newest version of the Guidebook.

58. It is good practice to incorporate higher tier methodologies for key categories. The FYR of Macedonia uses Tier 1 methodologies for many of the key category sub-sectors within the energy sector. The ERT recommends that a Tier 2 methodology (or higher) is used for key categories within the energy sector. See sub-sector specific recommendation 2.

Accuracy and uncertainties:

59. The ERT encourages the FYR of Macedonia to undertake an uncertainty analysis for the energy sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data. The FYR of Macedonia performs QA/QC checks for certain sectors of the inventory and for specific pollutants. The ERT commends the FYR of Macedonia for performing comparisons of the energy balance and data for the cadastre of polluters and air pollutants in the FYR of Macedonia. The ERT encourages the FYR of Macedonia to implement further QA/QC procedures for the energy sector.

Improvement:

60. The ERT encourages the FYR of Macedonia to include sector-specific improvements in their improvement plan. The planned improvements (calculating

PM₁₀ and PM_{2.5} emissions and performing recalculations of 2004 and 2008 emissions) are welcomed by the ERT.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.1.c Manufacture of solid fuels and other energy industries - All pollutants

61. The ERT notes that emissions in 1A1c have been reported as Not Estimated. This sector is potentially a large emission source for many pollutants. The FYR of Macedonia has informed the ERT that this was an erroneous use of notation keys, and that this source is Not Occurring in the FYR of Macedonia. The ERT recommends that this notation key is changed for the next submission.

Category issue 2: 1.A.1.a, 1.A.2.a, 1.A.2.b, 1.A.2.f.i, 1.A.4.b.i - NO_x, NMVOC, SO_x, TSP

62. 1A1a is a key category for SO₂, NO_x, NMVOC, TSP. 1A2a is a key category for NO_x, 1A2b a key category for TSP, 1A2fi a key category for NO_x, and 1A4bi a key category for NMVOC, TSP and CO. Macedonia uses a Tier 1 methodology for calculating emissions from these sources. It is good practice to use higher tier methodologies for calculating emissions from key categories, and the ERT encourages the FYR of Macedonia to incorporate a higher tier methodology for these sources.

Category issue 3: 1.A.4.b.i Residential: Stationary plants - All pollutants

63. There are no activity data on biomass in the NFR tables (reported as NE). In the IIR activity data on wood have been reported. The FYR of Macedonia informed the ERT during the review process that wood was reported as solid fuel. The ERT recommends that wood consumption is reallocated from solid fuel to biomass, in order to increase the transparency of the inventory. This is also recommended for all other sources where wood is used as energy source.

Category issue 4: 1.B.1.a Fugitive emission from solid fuels: Coal mining and handling - NMVOC

64. The FYR of Macedonia does not estimate fugitive emissions from coal mining and handling. While this is not likely to be a big source of NMVOC emissions, the EMEP/EEA Guidebook provides emission factors for a Tier 1 methodology. The ERT encourages the FYR of Macedonia to calculate NMVOC emissions from 1B1a.

Category issue 5: 1.A.2.f.i Stationary combustion in manufacturing industries and construction: Other - SO_x

65. The SO_x emissions in 1A2fi are considerably higher in 2003-2007 than in the other years in the time series. The FYR of Macedonia informed the ERT that this was due to a typing error in 2008 and 2009. The ERT recommends that the FYR of Macedonia performs recalculations of the time series, and reports new time series when the methods have been changed or the errors have been corrected.

Category issue 6: 1.A.4.a.i Commercial / institutional: Stationary - CO

66. The CO emissions in 1A4ai for 2003 are considerably higher than for the other years in the time series. The FYR of Macedonia informed the ERT that emissions in 2003 were reported without using Corinair methodology. There is thus a time series inconsistency. This seems to be the case for other pollutants as well. The FYR of Macedonia also informed the ERT that for the future the FYR of Macedonia had intentions to improve this issue with recalculations and to comply with the latest Guidebook. The ERT welcomes these improvements, as they will greatly improve the consistency and comparability of the Macedonian inventory.

Category issue 7: 1.A.2.c – 1.A.2.e - All pollutants

67. 1A2c-1A2e is included in 1A2fi in the Macedonian inventory, and no explanation for this is provided in the IIR. The FYR of Macedonia has informed the ERT that the reason is the non-availability of relevant data in the reports from the Macedonian State Statistical Office, as there is no complete separate data on fuel consumption for none of these categories within the statistical reports. The ERT encourages the FYR of Macedonia to collect additional data to perform this split, in order to improve the completeness and transparency of the inventory. Until such a split is made possible, the ERT suggests that the information as to why these sub-sectors are included in 1A2fi is included in the IIR to improve the transparency of the inventory.

Category issue 8: 1.A.2 and 1.A.4 - All pollutants

68. The FYR of Macedonia states in its IIR that*"the used quantities of fuels in this sub-sector have been calculated as a difference of total quantities for 2008 and quantities consumed by other sectors for Area and Facilities"*.... for both of these sectors. The ERT was concerned as to how emissions could be calculated from residuals for several sub-sectors. The FYR of Macedonia informed the ERT that due to the lack of separate data in different sub-categories, data obtained directly from the consumers and from the cadastre of air pollutants of the FYR of Macedonia had been used.

69. Categories for which there was no separate available data, expert estimations had been performed to calculate the difference between the total quantities for 2008 and the quantities consumed by other sub-sectors. The ERT finds that this is a good approach when data availability is limited. However, the ERT encourages the FYR of Macedonia to collect additional data to render the split possible in the energy balance. Until such a split is possible, the ERT suggests that the information provided during the review process (concerning the methodology used) is included in the IIR to improve the transparency of the inventory.

Category issue 9: 1.A.4.b.i Residential: Stationary plants - All pollutants

70. The time series from 2004-2009 are constant for all pollutants within the sub-sector 1A4bi. The FYR of Macedonia has informed the ERT that this is due to the fact that, according to the energy balance, the use of firewood and coal was constant throughout this time period. This sub-sector is a key category for several pollutants, and the ERT encourages the FYR of Macedonia to quality assure the activity data time series and to ensure especially that the trend is real.

Category issue 10: 1.A.2.a Stationary combustion in manufacturing industries and construction: Iron and steel - NO_x, SO_x, TSP, NMVOC and CO

71. The ERT noted that there was a large increase in the emissions of NO_x, SO_x, TSP, NMVOC and CO from 2006 to 2007, and this jump was not explained in the IIR. The FYR of Macedonia informed the ERT that this jump in emissions was a result of an increased production process for 2007 in this sector (in comparison with 2006). The ERT finds that this is a good example of information that would increase the understanding of emission trends if included in the IIR, and encourages the FYR of Macedonia to include more information about trends in emissions in their next IIR submission.

Category issue 11: 1.A.2.f.i and 1.A.2.f.ii - All pollutants

72. In the Macedonian IIR it is stated that SNAP code 0808 (Other mobile sources and machinery / Industry) has been allocated to 1A2fi. Currently, emissions in 1A2fii are reported as NE. The ERT has suggested that activity in this SNAP code should be allocated to 1A2fii. Macedonia has informed the ERT that a mistake has been made, and that 1A2fii is the right place for activities in this SNAP code. The ERT recommends that the emissions of SNAP code 0808 are reallocated to 1A2fii for the next submission.

Category issue 12: 1.A.4.c.i and 1.A.5 - All pollutants

73. Emissions in 1A4ci and 1A5 are not estimated. The ERT recommends that emissions from these sources are reported in the future.

TRANSPORT

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, CO, activity data		
Years		1990 – 2009		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1.A.3.a.i.(i)	international aviation (LTO)	x		
1.A.3.a.i.(ii)	international aviation (cruise)	x		
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)		NA	
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)		NA	
1.A.3.b.i	road transport, passenger cars	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		
1.A.3.b.v	road transport, gasoline evaporation		NE	x
1.A.3.b.vi	road transport, automobile tyre and brake wear		NE	x
1.A.3.b.vii	road transport, automobile road abrasion		NE	x
1.A.3.c	railways	x		
1.A.3.d.i (ii)	international inland navigation		NO	
1.A.3.d.ii	national navigation		NA	
1.A.4.b.ii	household and gardening (mobile)	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		NA	
1.A.5.b	other, mobile (including military, land based and recreational boats)		NE	
1 A 3 d i (i)	International maritime navigation		NO	
1 A 3	Transport (fuel used)		NE	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:

74. The FYR of Macedonia did not submit an IIR in 2011 but in 2010. Assuming that the methodology and emission factors for estimating emissions have not changed from previous submissions, the ERT understands that the Tier 1 method of the Guidebook has been used. The calculation method is described and the relevant emission factors for the pollutants reported are presented in the IIR 2010. Since road transport is a key source for most pollutants, the ERT recommends that the Party uses a higher tier method for calculating emissions.

75. The Party is still using the old SNAP categorisations, then aggregating to NFR. Although this is not a problem in principle, the ERT recommends that the FYR of Macedonia uses the relevant NFR coding system.

Completeness:

76. The ERT considers the transport sector to be generally complete for most of the main pollutants (NO_x, NMVOC and SO_x) and CO. The other pollutants, i.e. NH₃,

particulate Matter, heavy metals and POPs are not estimated. The ERT encourages the Party to provide a description of plans to estimate these pollutants in the IIR.

77. The ERT has found that non-exhaust sources (fuel evaporation, tyre, brake and road surface wear) and other mobile sources (1A5b) are missing in the transport sector. The ERT considers that these sources have little influence on the national total but encourages the FYR of Macedonia to provide a rationale for excluding them and/or descriptions of plans to estimate these sources in the IIR.

Consistency including recalculation and time series:

78. A comparison to 2004 is provided in the IIR. The ERT encourages the FYR of Macedonia to include complete time series and provide descriptions of trends in the IIR.

79. The FYR of Macedonia has not recalculated emissions for any of the pollutants reported in the inventory. The ERT welcomes the Party's intention to recalculate emissions for 2004 and 2008 and include these in future submission.

Comparability:

80. The methods and emission factors which have been used are consistent with the latest version of the Guidebook, although the use of SNAP codes is discouraged.

81. Based on the reported activity data and emission factors, emissions from passenger cars seem to be considerably overestimated. Presumably, the activity data for passenger cars is underestimated as it is considerably lower compared to previous year (consumption of all liquid fuels reduced from approximately 8GJ in 2008 to 1GJ in 2009) and it is also very low compared to the respective value for heavy duty vehicles. The ERT recommends that the Party checks both the activity data and the estimated emissions for passenger cars.

Accuracy and uncertainties:

82. The Party has not provided any uncertainty estimates. The ERT encourages the FYR of Macedonia to undertake uncertainty analysis in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

83. The Party has performed QA/QC activities, which are summarised in the IIR. The ERT encourages the Party to provide sector specific information on QA/QC procedures in future submissions.

Improvement:

84. The ERT welcomes the Party's intention to include estimates of PM emissions and encourages the FYR of Macedonia to implement planned improvements in next year's submission.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.3.b Road Transport - All Pollutants

85. According to the UNECE Reporting Guidelines, emissions from road transport should be calculated and reported on the basis of fuel sold on the territory of the Party concerned. The ERT recommends that the Party uses total fuel sold as the basis for calculations, which may have an impact on emissions from road transport due to possible fuel tourism.

Category issue 2: 1.A.3.b.i Passenger cars - All Pollutants

86. There is a sudden jump in the emissions of passenger cars for the year 2003 for all reported pollutants; this is, however, not explained in the IIR. The ERT recommends that the FYR of Macedonia checks the activity data and emission factors for 2003 and corrects emissions where appropriate.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ & TSP		
Years		1990 – 2009		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.A.1	cement production	x		x
2.A.2	lime production		NE	
2.A.3	limestone and dolomite use	x		x
2.A.4	soda ash production and use		NE	
2.A.5	asphalt roofing		NE	
2.A.6	road paving with asphalt	x		x
2.A.7.a	Quarrying and mining of minerals other than coal		NE	
2.A.7.b	Construction and demolition		NE	
2.A.7.c	Storage, handling and transport of mineral products		NE	
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)	x		x
2.B.1	ammonia production		NO	
2.B.2	nitric acid production		NO	
2.B.3	adipic acid production		NO	
2.B.4	carbide production		NE	
2.B.5.a	Other chemical industry (Please specify the sources included/excluded in the notes column to the right)	x		x
2.B.5.b	Storage, handling and transport of chemical products (Please specify the sources included/excluded in the notes column to the right)		NE	
2.C.1	iron and steel production	x		x
2.C.2	ferroalloys production	x		x
2.C.3	aluminium production		NE	
2.C.5.a	Copper Production		NE	
2.C.5.b	Lead Production		NE	
2.C.5.c	Nickel Production		NE	
2.C.5.d	Zinc Production		NE	
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes column to the right)		NE	
2.C.5.f	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)		NE	
2.D.1	pulp and paper		NE	
2.D.2	food and drink	x		x
2.D.3	Wood processing		NE	
2.E	production of POPs		NO	
2.F	consumption of HM and POPs (e.g. electrical and scientific equipment)		NA	
2.G	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)		NE	

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

87. The ERT notes that the FYR of Macedonia did not deliver an Informative Inventory Report or the Inventory files (NFR) in 2011. So, the ERT had to rely on the Inventory Report and the Inventory files (NFR) of 2010.

Transparency:

88. The industrial processes inventory is generally transparent and well organised. Only information on which tier methods have been used is missing. The ERT encourages the FYR of Macedonia to add this information in the next submissions. Furthermore the ERT has noticed that tables with activity data and emission factors are included in all paragraphs of the industrial processes chapter and commends the Party for this.

89. The emission factors which have been used are default or plant specific factors. Plant specific emission factors have been used only for the calculation of emissions from the only key source in the industrial processes sector. Additional details and specific recommendations are given in the sub-sector section below.

90. Because only data for the years 2004 and 2008 are available (see also completeness) it has not been possible to analyse the emission time series of the sub-sectors of the industrial processes sector. If complete time series are available, the ERT encourages the FYR of Macedonia to include at least explanations for dips/jumps or other changes in the emission time series of the key sources in the industrial processes sector chapter.

Completeness:

91. The ERT has noted that only the main pollutants for the years 2004 and 2008 are included and that a lot of sources are not estimated in the 2010 submission. Besides, the ERT considers the descriptions of the other sources to be quite complete for the main pollutants and comprehensive with good levels of detail in the methodology descriptions.

92. The explanations for the use of the notation key NE are not provided, neither in the IIR nor in the NFR tables. After consultation, the FYR of Macedonia replied that because of a lack of available data it was not possible to calculate these emissions.

93. To avoid under-estimations, the ERT recommends that the FYR of Macedonia includes plans to address the missing emissions (NE) in its IIR, either by obtaining data allowing an emission estimate to be made, or by reporting the emissions as not applicable.

Consistency including recalculation and time series:

94. The ERT notices that the FYR of Macedonia has not performed recalculations for the industrial processes sector in this submission. The Party is planning to make recalculations of emissions for 2004 and 2008 in the future.

95. The activity data and emission factors for both 2004 and 2008 have been obtained from the same data sources.

Comparability:

96. The FYR of Macedonia has reported its emission inventory in accordance with the reporting requirements and submitted it in the requested NFR format. However, the ERT has noted that the FYR of Macedonia has not always used the available EFs from the EMEP/EEA Emission Inventory Guidebook 2009. To avoid under/over estimates, the ERT recommends that Macedonia uses the available EFs from the EMEP/EEA Emission Inventory Guidebook 2009 or verified country/plant specific EFs in the future.

Accuracy and uncertainties:

97. The ERT notes that the FYR of Macedonia has performed some QA/QC activities, which are stated in the IIR. The ERT encourages the Party also to implement sector specific OA/QC procedures for the industrial processes sector in the next submissions.

98. So far, no quantitative uncertainty assessment for any of the pollutants of the Macedonian emission inventory has been made. The ERT encourages the FYR of Macedonia to perform uncertainty checks for the industrial processes sector in the next submissions.

Improvement:

99. The ERT has found that the FYR of Macedonia has plans to cover PM₁₀ and PM_{2.5} emissions in its inventory in the future and compliments the Party on this.

100. Furthermore the ERT encourages the Party to calculate emissions for the entire time series and to cover also emissions of priority heavy metals and POPs.

Sub-sector Specific Recommendations.**Category issue 1: 2.B.1, 2.B.2 & 2.B.3 - Ammonia, Nitric acid and Adaptic Acid Production**

101. The ERT has noted that in the NFR table the notation key NO has been used in the activity cell and NA in a number of pollutant cells with the same NFR code. The ERT recommends that the FYR of Macedonia uses the notation key "NA" where the source exists but relevant emissions are considered never to occur and "NO" where sources do not occur.

Category issue 2: 2.C.2 - Ferroalloys production

102. The ERT has noted that the FYR of Macedonia has used plant-specific emission factors from a ferro silicon company (key source for TSP; EF TSP=0.288 kg/Mg alloy produced) and checked these against the ones recommended in the EMEP/EEA Emission Inventory Guidebook. According to the Guidebook, the default emission factor of TSP is 1 kg/Mg alloy produced with a lower value of 0.1 kg/Mg and an upper value of 10 kg/Mg. The ERT commends the Party on this approach.

SOLVENTS

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} , Heavy Metals, CO, PAHs		
Years		1990 – 2009		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
3.A.1	Decorative coating application	x		x
3.A.2	Industrial coating application	x		x
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)	x		x
3.B.1	Degreasing	x		x
3.B.2	Dry cleaning	x		x
3.C	Chemical products	x		x
3.D.1	Printing	x		x
3.D.2	Domestic solvent use including fungicides	x		x
3.D.3	Other product use	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:

103. The ERT commends the FYR of Macedonia for the transparent way in which emission estimates were reported in the IIR submitted in 2010. However, the emissions reported in 2011 are identical for 2009 and 2008, although the related activity data (included in the reports of the FYR of Macedonia's State Statistical Office) are not the same for the two years. The ERT encourages the FYR of Macedonia to prepare emission estimates based on each year's activity data and report accordingly in the next submission.

104. The ERT also encourages the FYR of Macedonia to fill in the worksheet entitled "Additional info" of the CLRTAP template (where the use of NE and IE notation keys is explained) for next year's submission.

Completeness:

105. The ERT commends the FYR of Macedonia for the comprehensive report, with good levels of detail of activity data and methodology descriptions included in the IIR. However, the ERT has noted that NMVOC emissions from the source categories 3B1, 3B2 and 3D2 have been reported as NE. Moreover, the ERT have noted that NMVOC emissions from the 3C and 3D3 source categories are underestimated, since the emissions of a number of SNAP categories have not been included in the reported emissions. NO_x, PM₁₀ & PM_{2.5}, heavy metals, PAHs and CO from the 3C and 3D3 categories have not been estimated either. The ERT recommends that the FYR of Macedonia improves the completeness of solvent

sector reporting by including the above-mentioned (not estimated) emissions in next year's submission.

106. The ERT has noted that emissions for the years 1990-2003 have not been reported. The ERT encourages the FYR of Macedonia to estimate the respective emissions. If the required data are limited, the FYR of Macedonia could apply simple drivers such as population figures or the GDP to provide an estimation of these years' emissions.

Consistency including recalculation and time series:

107. The ERT has identified some time series inconsistencies in the 3A, 3C and 3D source categories. During the review, the FYR of Macedonia responded that it has intentions to improve time series consistency for reported emissions, with a focus on both the activity data sources and the EFs in accordance with the latest Guidebook. The ERT encourages the FYR of Macedonia to include such recalculations in the next submission.

108. The ERT notes that no recalculations have been reported in the IIR.

Comparability:

109. The ERT has found that NMVOC emissions from the 3A, 3C and 3D3 source categories have been underestimated due to the use of EFs that are not in accordance with the latest Guidebook. In case a different EF (other than the ones described in the Guidebook) is used, the FYR of Macedonia is encouraged to describe the rationale behind the selection of the emission factor. More information about this issue is included in the sub-sector specific recommendations section.

Accuracy and uncertainties:

110. The ERT notes that no uncertainty analysis has been performed by the FYR of Macedonia for the solvent sector. The ERT encourages the FYR of Macedonia to undertake an uncertainty analysis for the solvent sector in order to prioritize improvement actions and to provide an indication of the reliability of the inventory data.

111. The Party performs some general QA/QC procedures and internal reviews between the members of the inventory team. The ERT encourages the FYR of Macedonia to implement sector specific OA/QC procedures for the NMVOC emissions of the solvent sector.

Improvement:

112. The ERT notes that no specific improvements for the solvents sector have been reported in the IIR. During the review, the FYR of Macedonia responded that it has intentions to make improvements that will cover recalculations from 2000 until 2009 (concerning activity data and EFs and in compliance with the latest Guidebook). These improvements will cover both the recalculations of reported emissions and the estimations for the first time series of the source categories that were reported as NE in the 2011 submission. The ERT encourages the FYR of Macedonia to proceed with this improvement plan and report on its progress in the next submission.

Sub-sector Specific Recommendations.

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

113. The ERT has identified a possible issue of overestimation / underestimation of NMVOC emissions from the 3A source category. According to the IIR, the activity data used is the total quantity of paints manufactured in the FYR of Macedonia. It seems that imports, exports and stock changes were not taken into account. This may lead to an overestimation / underestimation of emissions. The ERT encourages the FYR of Macedonia to tackle this issue in the next submission.

114. The ERT notes that the EF used for the NMVOC emissions estimation (250 kg/Mg) for the 3A source category is not in line with the proposed Tier 1 EFs from the EMEP/EEA Air Pollutant Emission Inventory Guidebook 2009 (EFs are 150, 400 and 200 kg/Mg for the 3A1, 3A2 and 3A3 source categories, respectively). The FYR of Macedonia is encouraged to recalculate the emissions from this source category in accordance with the latest Guidebook. In case a different EF (other than the ones described in the Guidebook) is used, the FYR of Macedonia is encouraged to describe the rationale behind the selection of this EF.

115. Emissions from the 3A1 and 3A2 source categories are reported under 3A3 (IE). The ERT encourages the FYR of Macedonia to reallocate these emissions to the proper source categories (3A1 and 3A2).

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

116. The ERT notes that the emissions from the source categories 3B1 and 3B2 are reported as NE. The ERT encourages the FYR of Macedonia to estimate these emissions and report them in the next submission. In case activity data are not available, the FYR of Macedonia may use EFs per capita, as described in the Guidebook.

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

117. The ERT has found that the NMVOC emissions from the following activities have not been estimated: 060303 Polyurethane foam processing, 060304 Polystyrene foam processing, 060305 Rubber processing, 060306 Pharmaceutical products manufacturing, 060307 Paints manufacturing, 060308 Inks manufacturing, 060311 Adhesive, magnetic tapes, films and photographs manufacturing and 060312 Textile finishing. Therefore, NMVOC emissions from the 3C source category are underestimated. The “Statistical Review: Industry and Energy” report from the FYR of Macedonia’s State Statistical Office includes production data on the most of these (not estimated) categories. The ERT encourages the FYR of Macedonia to use these data with the respective emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2009), to estimate the missing emissions and report them in the next submission.

118. The ERT notes that the emissions from 3C of TSP, heavy metals and PAHs have been reported as NE. However these pollutants are emitted during asphalt blowing. The ERT encourages the FYR of Macedonia to calculate these emissions and report them in the next submission. The Party can use the EFs that are included

in the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2009) and the activity data that are included in the “Statistical Review: Industry and Energy” report from the FYR of Macedonia’s State Statistical Office.

119. The ERT has also identified an underestimation of NMVOC emissions from asphalt blowing. The EF used by the FYR of Macedonia is 400g/Mg, while the proposed Tier 2 emission factor from the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2009) is 27200g/Mg. The Party has acknowledged it as an error which was made in the emissions calculations. The ERT encourages the FYR of Macedonia to recalculate the emissions from asphalt blowing and report them in the next submission.

Category issue 4: 3.D.2 and 3.D.3 – NMVOC, PM₁₀ & PM_{2.5}, Heavy metals, PAHs

120. The ERT has found that the NMVOC emissions from the 3D2 source category have been reported as NE. The FYR of Macedonia is encouraged to apply the per capita EF from the Guidebook and report the respective emissions in the next submission.

121. The ERT has found that the NMVOC emissions from the following activities in the 3D3 source category have not been estimated: SNAP 060404 Fat edible and non edible oil extraction, SNAP 060406 preservation of wood, SNAP 060602 tobacco combustion, SNAP 060409 car dewaxing, SNAP 060411 Domestic use of pharmaceutical products. Therefore, the NMVOC emissions from the 3D3 source category are underestimated. The “Statistical Review: Industry and Energy” report from the FYR of Macedonia’s State Statistical Office includes production data on most of these (not estimated) categories. The ERT encourages the FYR of Macedonia to use these data with the respective emission factors from the EMEP/EEA Air Pollutant Emission Inventory Guidebook (2009), to estimate the missing emissions and report them in the next submission.

122. The ERT notes that NO_x, PM₁₀ & PM_{2.5}, heavy metals, PAHs and CO from the 3D3 category have not been estimated either. The ERT encourages the FYR of Macedonia to include these (not estimated) emissions in next year’s submission.

123. The ERT notes that the EF used for NMVOC emission estimations from the activity SNAP 060405 “Application of glues and adhesives” (3D3) is not in line with the proposed Tier 2 EFs from the EMEP/EEA Air Pollutant Emission Inventory Guidebook, 2009 (the EF used is 150 instead of 780 kg/Mg). The FYR of Macedonia is encouraged to recalculate the emissions from this source category in accordance with the latest Guidebook. In case a different EF (other than the ones described in the Guidebook) is used, the FYR of Macedonia is encouraged to describe the rationale behind the selection of this EF.

AGRICULTURE

Review Scope:

Pollutants Reviewed		NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		All the years submitted by the country		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	x		x
4 B 1 b	Cattle non-dairy	x		x
4 B 2	Buffalo		x	
4 B 3	Sheep	x		x
4 B 4	Goats		x	
4 B 6	Horses	x		x
4 B 7	Mules and asses		x	
4 B 8	Swine	x		x
4 B 9 a	Laying hens		x	
4 B 9 b	Broilers		x	
4 B 9 c	Turkeys		x	
4 B 9 d	Other poultry		x	
4 B 13	4 B 13 Other		x	
4 D 1 a	Synthetic N fertilizers		x	
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products		x	
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products		x	
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)		x	
4 F	Field burning of agricultural wastes		x	
4 G	Agriculture other(c)		x	
11 A	(11 08 Volcanoes)		x	
11 B	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

Transparency:

124. The ERT thanks the FYR of Macedonia for providing comprehensive and quick responses during the review process about how the calculations were made for the agriculture sector.

125. The ERT encourages the Party to use appropriate notation keys (e.g. NO where sources 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. It appeared that, during the Stage 3 review, the FYR of Macedonia often used "NA" instead of "NE" but planned to change this for the next year. Thus, the ERT thanks the Party for its willingness to provide appropriate notation keys in the submissions to come.

126. The FYR of Macedonia does not provide the required level of detail for the method used in the current IIR. The ERT recommends that the Party provides complete information in the next submission.

127. In chapter 6.1.4 of the Macedonian IIR it is stated that the NH₃ emission factors for the 4B sector have been taken from the IPCC Guidelines. It is generally admitted that greenhouse gases emissions are estimated with IPCC Guidelines whereas air pollutant emissions should be estimated with EMEP / EEA Guidelines. Indeed, the IPCC Guidelines do not propose an appropriate methodology for estimating emissions from 4B whereas EMEP 2009 does. The ERT recommends that the FYR of Macedonia provides a transparent description of the methodologies applied and mentions systematically, in the report, the origins of methodologies and data.

Completeness:

128. The inventory is complete with respect to ammonia emissions from 4B.

129. Although the FYR of Macedonia consumes 15 790 tonnes of mineral nitrogen (according to FAO-STAT, 2011), ammonia emissions from 4D have not been estimated, nor have emissions of the other main pollutants (NO_x, PM, NMVOC) from the whole agriculture sector been estimated. The ERT encourages the FYR of Macedonia to improve the completeness of its UNECE inventory by providing estimates for all the main pollutants, especially those arising from animal husbandry and synthetic fertiliser application sources. The ERT reminds the Party that the EMEP / EEA 2009 Guidebooks offer a good framework for implementing Tier 1 or 2 methodologies.

Consistency including recalculation and time series:

130. No issues were raised during the stage 3 review.

Comparability:

131. No issues were raised during the stage 3 review.

Accuracy and uncertainties:

132. The ERT encourages the FYR of Macedonia to undertake an uncertainty analysis for the agriculture sector (quantitative if possible) in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Improvement:

133. Planned improvements are not specified in the Macedonian IIR but the Party explained during the review week that improvements are planned for the agriculture chapter, including an uncertainty analysis. The ERT thanks the Party for its willingness to implement more detailed methodologies complemented with uncertainty analysis and reminds the Party that the EMEP 2009 Guidebooks provide a good framework for carrying out these estimates.

Sub-sector Specific Recommendations.

134. No sub-sector specific recommendations were noted during the stage 3 review.

WASTE

Review Scope:

Pollutants Reviewed		All pollutants		
Years		2009		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
6.A	solid waste disposal on land			x
6.B	waste-water handling			x
6 C a	6 C a Clinical waste incineration (d)	x		x
6 C b	Industrial waste incineration (d)			x
6 C c	Municipal waste incineration (d)			x
6 C d	Cremation			x
6 C e	Small-scale waste burning			x
6.D	other waste (e)			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:

135. For the waste sector, the FYR of Macedonia describes only clinical waste incineration and solid waste disposal. Where emissions regarding CLRTAP are not calculated, reference is given to UNFCCC CH₄ calculations. The notification key NE is used for 5 waste sub-sectors. The ERT recommends reviewing the use of NE, collecting information about the general situation in the country and changing the notation keys from NE to data or another notation key.

Completeness:

136. The FYR of Macedonia only reports emissions from clinical waste incineration. Other waste sectors are reported as NE. The ERT encourages Macedonia to review NFR 6 and to include missing sources in its inventory. If it is not possible to calculate emissions, explanations should be provided in the IIR.

Consistency, including recalculation and time series:

137. Data is reported for two years (2008, 2009). For these years emission data on pollutants (NO_x, SO_x, CO) are consistent.

138. No recalculations have been carried out by the FYR of Macedonia for their last submission (2011).

Comparability:

139. Clinical waste incineration emissions are comparable. The emission factors have been taken from the EMEP/EEA Emission Inventory Guidebook 2009.

Accuracy and uncertainties:

140. Procedures of QA/QC are described in the IIR 2010. The FYR of Macedonia does not provide an uncertainty analysis for its inventory. The ERT recommends

estimating uncertainties for the activity data and emission factors which have been used for the emissions calculations.

Improvement:

141. No improvements have been mentioned in the FYR of Macedonia's IIR 2010. The ERT suggests adding emission calculations for the waste sub-sectors (other than clinical waste incineration) to the inventory.

Sub-sector Specific Recommendations.

Category issue 1: 6.A - Solid waste disposal on land

142. The ERT recommends that the FYR of Macedonia estimates air pollutants emitted from solid waste disposal (especially NMVOC) using the 2009 EMEP/EEA Guidebook default emission factors. A pollutant/CH₄ ratio could be applied to CH₄ emission estimates available from UNFCCC.

Category issue 2: 6.B - Waste-water handling

143. The FYR of Macedonia does not estimate emissions from waste-water handling. The ERT encourages the Party to estimate NH₃ and NMVOC emissions according to the EMEP/EEA Emission Inventory Guidebook 2009. If it is not possible due to missing data on waste-water treatment, the FYR of Macedonia is encouraged to describe its problems in the IIR.

Category issue 3: 6.C.a – Clinical waste incineration

144. The ERT encourages the FYR of Macedonia to calculate all pollutants from clinical waste incineration for which emission factors are available in the EMEP/EEA Emission Inventory Guidebook 2009.

Category issue 4: 6.C.b - Industrial waste incineration

145. The ERT encourages the FYR of Macedonia to explain the situation for industrial waste incineration in the IIR. If national emission factors are not available, factors from the EMEP/EEA Emission Inventory Guidebook 2009 could be used.

Category issue 5: 6.C.c - Municipal waste incineration

146. The ERT encourages the FYR of Macedonia to explain the situation for municipal waste incineration in the IIR. If national emission factors are not available, factors from the EMEP/EEA Emission Inventory Guidebook 2009 could be used.

Category issue 6: 6.C.d - Cremation

147. The FYR of Macedonia does not calculate emissions from cremation. The ERT encourages the Party to provide an explanation for this activity in its IIR.

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

148. The FYR of Macedonia reports NE for small-scale waste burning. The ERT encourages the Party to provide an explanation for this activity in its IIR.

Category issue 8: 6.D - Other waste

149. The FYR of Macedonia reports NE for this sub-sector. The ERT recommends that a description is given of the kind of activities that take place in the FYR of Macedonia, and - if there is no other waste activity - that NE is changed to NO.

**LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING
THE REVIEW**

1. No additional material has been provided.