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

STAGE 3 REVIEW REPORT
THE REPUBLIC OF SERBIA

CONTENT

INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is 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 SO_x, NO_x, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time series years 1990 – 2014 reflecting current priorities from 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 Republic of Serbia coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 20th June 2016 to 25th June 2016 in Copenhagen Denmark and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: generalist – Ms. Charlotte Vanpoucke (Belgium), Energy - Ms. Kristina Juhrich (Germany), Transport - Mr. Giorgos Melios (EU), Industry - Mr. Sebastian Plickert (German), Solvents - Ms. Maria Purzner (Austria), Agriculture - Mr. Juan José Rincón Cristóbal (Spain), Waste - Mr. Intars Cakars (Latvia).

4. Ms. Kristina Saarinen (Finland) was the lead reviewer. The review was coordinated by Ms. 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 PART A: KEY REVIEW FINDINGS

5. The inventory is generally in line with the 2013 EMEP/EEA Emission Inventory Guidebook (hereafter Guidebook 2013) and the UNECE Reporting Guidelines. Transport emissions are reported based on fuels sold.

6. The ERT recognises the effort undertaken by the Republic of Serbia in providing an emission inventory and an IIR with a significant level of information to undertake a detailed review. The ERT thanks the Party for participating actively in the Stage 3 review process by providing further information and data when requested. Based on that information, the ERT was able to review the inventory in detail and to provide a number of detailed recommendations.

7. The ERT found the 2016 submission to be of good quality and to show improvements for a number of issues. The ERT commends the Party for the work done. Nevertheless, the ERT identified some need for further improvements as described in Part B of the review report.

8. In this report there is a table in the beginning of the review of each sector. Please note that under the column titled “Recommendations provided” the cross marks both actual recommendations as well as encouragements.

INVENTORY SUBMISSION

9. The Republic of Serbia submitted NFR tables under the CLRTAP on 11th February 2016 by the set deadline date of 15th February. The submission, included data for the Protocols’ base years and a full time series 1990-2014 (the most recent year), for the Protocol pollutants in the NFR 2014-1 format. The ERT notes that a new template NFR 2014-2 is available and recommends that the Republic of Serbia report future submissions in this format.

10. The Informative Inventory Report (hereafter IIR) was submitted on 14th March 2016 within the deadline date of 15th March.

11. The Republic of Serbia did not report projected emissions in its 2016 submission. The ERT encourages Serbia to include projected emissions in its future submissions.

12. The Party did not include LPS or gridded emissions as part of the 2016 submission. The ERT recommends Serbia to include LPS and gridded data in their future submissions.

KEY CATEGORIES

13. The Republic of Serbia has compiled a level Key Category Analysis (KCA) according to the definition in the Guidebook. However, some differences were noted between the KCA carried out by CEIP and the KCA by the Party for SO_x, NH_3,

NMVOC and TSP emission data in 2014. The differences are small, except for TSP, where the ERT suspected that the sector *2.B.10.a Chemical industry: other,* which would be the most important key sector for TSP, was not included in the KCA. During the review week, the Party responded this might be a mistake and will be corrected for the next submission. The ERT welcomes this improvement and points out the importance of the KCA for determining the most important sectors.

14. A trend key category analysis was also reported but not fully carried out according the definition in the Guidebook because the change in years of each category's emissions was not compared to the change in national emissions. The ERT encourages Republic of Serbia to perform the trend assessment according to the Guidebook definition

15. The Republic of Serbia does not specify in the IIR if the results of the KCA are used to identify priorities in improvements of the inventory. The ERT recommends Serbia to use the results to prioritise improvements in the inventory.

16. During the review, the ERT pointed out that at least Tier 2 or higher tier methodologies should be used for key categories instead of Tier 1 methodologies which are used for most categories at this moment. The Republic of Serbia replied that they could not apply higher Tier levels due to time and source limitations, however, for the next year it is planned to move from Tier 1 to Tier 2 methodology in the category "Livestock and Manure Management". The ERT welcomes this improvement plan and points out that this should get high priority.

QUALITY

Transparency

17. The CLRTAP inventory submitted by the Republic of Serbia is generally transparent. The IIR is detailed and follows the recommended structure for an IIR according to Annex II of the Reporting Guidelines. However, as the assumptions and methodologies are described in a concise way the transparency, accuracy and completeness of the IIR can be further improved. The ERT encourages the Party to revise the IIR contents to correspond the new NFR codes and to complement the IIR with information indicated below at the sector level in part B of this report.

18. The Republic of Serbia provides explanations on the use of notation keys in the IIR, but this information is not up to date and refers to the old NFR09 categories. The ERT encourages the Republic of Serbia to update this information in the IIR by explaining why emissions could not be estimated and whether there are plans in the future to estimate or disaggregate them in the appropriate NFR categories, to improve transparency of the emission inventory.

Completeness

19. The ERT acknowledges the effort which the Republic of Serbia has taken to provide estimates of emissions for all pollutants in all sub-sectors. The ERT found that there is need to complete the inventory regarding some sources, pollutants and years. The inventory is complete regarding geographical coverage.

20. The ERT identified some missing emissions in the inventory. As the completeness of the inventory is essential for checking the compliance with obligations under the conventions, emission values or at least an assessment of the quantitative importance of the sources currently not estimated is needed. The ERT recommends the Party to complete the inventory by calculating and reporting missing emissions as explained under the sector chapters in Part B below.

21. To the question raised by the ERT on zero emission values in the NFR tables the Republic of Serbia replied that this will be verified and corrected for the next submission. The ERT recommends the Party to replace the zero values by the actual emissions or with an appropriate notation key.

22. Activity data for most sectors were provided in the IIR, but not in the NFR14 template. During the review the Party responded to the question on not reporting of activity data in the NFR table that it was simply an omission and will be provided in next submission. The ERT welcomes this improvement.

Consistency, including recalculations and time-series

23. The Republic of Serbia has undertaken recalculations for almost all sectors and carried out these recalculations consistently throughout the time series. The ERT commends the Party for this. However, the IIR does not provide justifications for recalculations nor quantitative information on differences to previous estimates. The ERT encourages the Party to include this information in the IIR.

24. A trend analysis for every pollutant is shown in the IIR including presentation of shares of aggregated sectors in total emissions. The trends are strongly fluctuating for most pollutants. Unfortunately, explanations for fluctuations, dips and jumps are not provided for the trends in the IIR. During the review week, the Republic of Serbia replied to the question raised by the ERT on the issue, that the fluctuations are the result of the fluctuation in activity data, especially in the industry sector due to an unstable situation. The ERT encourages the Party to include the reasons for the trends in the IIR.

25. The ERT identified some inconsistent use of notation keys in 2014 compared to the previous years. The ERT recommends the Party to use the appropriate notation keys as defined in the Reporting Guidelines.

Comparability

26. The ERT notes that the inventory of the Republic of Serbia is comparable with those of other reporting parties. The allocation of source categories follows that of the UNECE reporting Guidelines and the methodologies are consistent with the

Guidebook. The ERT commends the Republic of Serbia for this and encourages the Party to continue with this approach in the national inventory calculation.

CLRTAP/NECD comparability

27. The Republic of Serbia is not an EU country and therefore does not report emissions under the EU National Emission Ceilings (NEC) Directive.

Accuracy and uncertainties

28. In addition to some missing emissions, the ERT found some possible overestimates in the Industrial Processes and Manure Management sectors and possible overestimations regarding emissions from Manure Management as explained in part B of the report.

29. The Republic of Serbia did not perform an uncertainty analysis as part of the 2016 submission. During the review week, the Party indicated that they have no capacities to do this. The ERT regrets the difficult conditions in which the inventory work has to be established, but recommends the Party to carry out an uncertainty analysis, at least for key categories, and encourages the Party to describe the quantification of uncertainties and the results in the IIR.

30. For most sectors the most simple methodologies and default emission factors are used. The ERT strongly recommends the Republic of Serbia to improve their inventory by implementing higher Tier methodologies, and to investigate the possibility of developing national emission factors to increase the accuracy of the inventory.

Verification and quality assurance/quality control approaches

31. The IIR does not provide information on QA/QC procedures carried out in the preparation of the inventory. In response to the request by the ERT during the review week, the Republic of Serbia replied that no QA/QC procedures are established and that only normal statistical checks are carried out. As a first step the ERT recommends the Party to develop a QA/QC plan describing the procedures during the planning, preparation and management of the inventory and encourages the Party to include the plan and information on the results of its implementation in the IIR.

FOLLOW-UP TO PREVIOUS REVIEWS

32. Results from Stage 1 and Stage 2 reviews on the 2014 emission data have been used in this Stage 3 review. The ERT invites the Republic of Serbia also to refer to these previous reviews when examining this review report and when updating its improvement plans.

33. The ERT encourages the Republic of Serbia to reply on the findings of the Stage 2 review on CEIP's website.

34. The ERT commends the Republic of Serbia for the improvement of its inventory by implementation of most of the recommendations made in the previous Stage 3 review report.

AREAS FOR IMPROVEMENTS IDENTIFIED BY REPUBLIC OF SERBIA

35. The Republic of Serbia presents an inventory improvement plan per sector in the IIR. However, the ERT found the information provided to be limited and encourages the Party to establish a comprehensive inventory improvement plan and report it in the IIR.

36. The Party identified the following priorities for future inventory improvement in the IIR:

(a) to report on higher Tier level in sector 1.A.1.a;

(b) to collect missing data on styrene butadiene rubber production and make a recalculation for the whole period;

(c) to move to a higher Tier level for Livestock and Manure management;

(d) to estimate off-road mobile machinery in manufacturing industries and construction

(e) to establish the reporting of off-road vehicles

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

37. The ERT identifies the following cross-cutting issues for improvement in the inventory of the Republic of Serbia, and recommends the Party to:

(a) report emissions in the latest NFR 2014-2 format;

(b) include activity data in the NFR reporting templates;

(c) use higher Tier methodologies for key categories and investigate the possibility to develop national emission factors;

(d) elaborate the reasons for the trends in key categories in the IIR, explaining the fluctuations, dips and jumps;

(e) perform a trend assessment as part of the key category analysis;

(f) explain the use of notation keys “NE” and “IE”;

(g) provide a quantitative analysis of the recalculations done;

(h) consider an uncertainty assessment focusing on key categories;

(i) establish a QA/QC plan for future submissions.

38. The ERT also encourages the Party to develop an inventory improvement plan for future submissions.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO_x, NO_x, NMVOC, NH_3, TSP, PM_{10} & $PM_{2.5,}$ Cd, Hg, Pb, Dioxin, PAH, HCB, PCB		
Years		1990 – 2014		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1A1a	Public electricity and heat production	X		X
1A1b	Petroleum refining	X		
1A1c	Manufacture of solid fuels and other energy industries	X		
1A2a	Iron and steel	X		
1A2b	Non-ferrous metals	X		
1A2c	Chemicals	X		
1A2d	Pulp, Paper and Print	X		
1A2e	Food processing, beverages and tobacco	X		
1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals	X		X
1A2gviii	Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR)	X		
1A3ei	Pipeline transport	X		X
1A3eii	Other (please specify in the IIR)	X		
1A4ai	Commercial/institutional: Stationary	X		
1A4bi	Residential: Stationary	X		
1A4ci	Agriculture/Forestry/Fishing: Stationary	X		
1A5a	Other stationary (including military)	X		X
1B1a	Fugitive emission from solid fuels: Coal mining and handling	X		
1B1b	Fugitive emission from solid fuels: Solid fuel transformation	X		X
1B1c	Other fugitive emissions from solid fuels	X		
1B2ai	Fugitive emissions oil: Exploration, production, transport	X		X
1B2aiv	Fugitive emissions oil: Refining / storage	X		X
1B2av	Distribution of oil products	X		X
1B2b	Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other)	X		
1B2c	Venting and flaring (oil, gas, combined oil and gas)	X		
1B2d	Other fugitive emissions from energy production	X		X

General recommendations on cross cutting issues

Transparency

39. The IIR contains short descriptions of methodologies used to estimate emissions including basic information for all source categories. The ERT encourages the Republic of Serbia to extend the documentation of activities and methodologies in the IIR. In most of the cases default methodologies from the Guidebook were used. It's not necessary to include emission factors that are already published in the Guidebook, in the IIR, but other methods used in the calculations should be documented with references to the original information sources. In addition, information on industries that are relevant in the Republic of Serbia, technologies used (combustion and abatement) and information of fuels is needed. During the review the Party answered that all the assumptions in all emissions calculations are that no abatement technology is applied. The ERT recommends the Party to include this information in the IIR.

Completeness

40. The Energy Inventory of the Republic of Serbia is nearly complete. In the NFR tables only a few "NE" notation keys are used. The use of the notation key "NE" for source categories 1.A.2.a and 1.A.2.b is the result of using the Tier 2 method of the Guidebook, where no emission factors are provided. The ERT does not consider it as an underestimation.

41. The ERT notes that the Party does not report activity data in the NFR tables. In the IIR some production data is provided for source category 1.A.2 but no information on fuel consumption. The ERT recommends the Party to include activity data in the NFR tables, also for fugitive emissions.

Accuracy

42. The Republic of Serbia uses basically Tier 1 default values with a small number of exceptions. The ERT encourages the country to use a higher Tier method for key categories and to find out if measurement data is available for other pollutants than SO_x.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.1.a – lignite SO_x, Transparency

43. The ERT appreciates that the Republic of Serbia uses country specific SO_2 emission factors for lignite. Unfortunately the data source is not mentioned in the IIR. During the review the Party answered that two professors from the mechanical Facility Department developed the calculation method. The ERT encourages the country to include documentation of the EF derivation from measurements with references to data sources in the IIR.

Category issue 2: 1.A heavy fuel oil SO_x, Transparency

44. Regarding heavy fuel oil the Republic of Serbia uses a country specific emission factor. The ERT received a spreadsheet which contains all emission factors which were used for heavy fuel oil. The ERT recommends including these emission factors in the IIR in order to increase transparency. According to the IIR the sulphur content of heavy fuel oil is between 1 and 3 %, which are plausible values for heavy fuel oil. However, the SO_2 emission factor of 495 g/GJ, which was presented by the Party during the review, represents a heavy fuel oil of around 1 %. It's expected that the annual average sulphur content of heavy fuel oil for the whole country is higher, if all qualities of heavy fuel oil were considered. It's possible that the different plants use different oil qualities. The ERT recommends to check if the national total SO_x emissions from heavy fuel oil are consistent with the sulphur content of the heavy fuel oils used in the country and to include this information in the IIR.

Category issue 3: 1.A.2.fi Industrial Combustion – all pollutants, Transparency

45. As the reporting follows the old NFR structure, the subcategories Non-Metallic Minerals, Transport equipment, Machinery, Mining and Quarrying, Wood and wood products, textiles and leather as well as Non-specified industry are included under NFR 1.A.2.f.i. Emissions from NFR 1.A.2.g.viii are reported as "NE" for all pollutants in the NFR tables. The ERT encourages the Party to rearrange the IIR following the new NFR structure. According to the new NFR structure only Non-Metallic Minerals remains under NFR 1.A.2.f.i while all other branches (Transport equipment, Machinery, Mining and Quarrying, Wood and wood products, textiles and leather as well as Non-specified industry) are included under NFR 1.A.2.g.viii. Subsequently, the Republic of Serbia can avoid the notation key "NE" to be reported in NFR 1.A.2.g.viii.

Category issue 4: 1.A.3.e.i Pipeline transport – all pollutants, Completeness

46. Emissions from NFR 1.A.3.e.i are reported as "NO". The ERT encourages the Party to contact the gas supplier in order to find out which technics they use to maintain pressure in the pipelines. Depending on the organizational structure of the country, possible information could be available in the Ministry or Department of Infrastructure or Economic Affairs or Export Controls. The ERT encourages the Party to report the results of the investigation in the IIR and if possible, to estimate and report the missing emissions, to improve the completeness of the inventory.

Category issue 5: 1.A.5.a Military – all pollutants, Completeness

47. The ERT notes that only zero values are reported under NFR 1.A.5.a. As it is likely that the activity of NFR 1.A.5.a exists in the Republic of Serbia, the ERT recommends replacing the zero-values by actual emission data or by appropriate notation keys. The ERT is aware that military data can be confidential and that there may be some difficulties to reach the data. In many cases this data is already included in the national energy balance (commercial/ institutional sector).

Category issue 6: 1.B.1.b Fugitive emission from solid fuels: Solid fuel transformation, Accuracy

48. The ERT notes that the NFR tables contain a mix of notation keys “NA” and “NE” as well as zero-values. The ERT encourages the Party to replace the zero-values by actual emission values or by using the appropriate notation key. Besides, the ERT encourages the Party to compare the inventory data with data from other countries and the Guidebook in order to find out which pollutants are relevant and which notation keys can be used.

Category issue 7: 1.B.2.a.iv Fugitive emissions oil: Refining / storage, Accuracy

49. The NFR tables show exactly the same values for all heavy metals, which seems to be an error. The ERT recommends the Party to check the values and document the results in the IIR.

Category issue 8: 1.B.2.a.v & 1.B.2.a.i Fugitive emissions oil: Distribution of oil products & Exploration, production, transport, Accuracy

50. PCDD/F emissions are reported as “NE”. The ERT recommends changing the notation key from “NE” to “NA” as PCDD/F emissions cannot be expected from this source category.

Category issue 9: 1.B.2.d Other fugitive emissions from energy production, Accuracy

51. The NFR tables contain some zero-values which should be replaced by actual emission values or by the appropriate notation keys. The ERT encourages the Party to check if this source category exists in the Republic of Serbia.

TRANSPORT

Review Scope

Pollutants Reviewed		All		
Years		1990 – 2014		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1A2gvii	Mobile Combustion in manufacturing industries and construction: (please specify in the IIR)	x		
1A3ai(i)	International aviation LTO (civil)	x		
1A3ai(ii)	International aviation cruise (civil)	x		
1A3aii(i)	Domestic aviation LTO (civil)	x		
1A3aii(ii)	Domestic aviation cruise (civil)	x		
1A3bi	Road transport: Passenger cars	x		
1A3bii	Road transport: Light duty vehicles	x		
1A3biii	Road transport: Heavy duty vehicles and buses	x		
1A3biv	Road transport: Mopeds & motorcycles	x		
1A3bv	Road transport: Gasoline evaporation	x		
1A3bvi	Road transport: Automobile tyre and brake wear	x		
1A3bvii	Road transport: Automobile road abrasion	x		
1A3c	Railways	x		
1A3di(ii)	International inland waterways	x		
1A3dii	National navigation (shipping)	x		
1A4aii	Commercial/institutional: Mobile	x		
1A4bii	Residential: Household and gardening (mobile)	x		
1A4cii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	x		
1A4ciii	Agriculture/Forestry/Fishing: National fishing	x		
1A5b	Other, Mobile (including military, land based and recreational boats)	x		
1A3di(i)	International maritime navigation	x		
1A3	Transport (fuel used)	x		

General recommendations on cross cutting issues

Transparency

52. The ERT commends the Republic of Serbia for providing a detailed and generally transparent Transport emissions inventory. However no activity data have been reported in the NFR tables and only limited information on activity data and emission factors used for the estimation of emissions has been provided in the IIR. To further improve the transparency of the inventory, the ERT encourages the Party to include more information on the sector description, time series of emissions and explanations, activity data and emission factors used.

53. The Republic of Serbia uses zero-values in number of areas in the reporting tables. The ERT recommends the Party to include the actual emission values or to use the appropriate notation keys (e.g. “NO” where the activity does not exist in the country “Not Occurring”, “NE” where emissions are “Not Estimated” and “IE” where emissions are “Included Elsewhere”).

Completeness

54. The ERT considers the Transport sector to be complete and comprehensive. There are a couple of subsectors for which emissions have not been estimated. The ERT encourages the Republic of Serbia to include elements on how to increase the completeness of the transport sector inventory in a future inventory improvement plan.

55. The ERT notes there are a few “IE”s reported for a number of subsectors. The ERT encourages the Party to make an effort to report emissions for as many subsectors as feasible.

Consistency including recalculation and time series

56. The Republic of Serbia has recalculated the road transport sector using the latest version (v11.3) of the COPERT 4 model, however very little information has been provided in the IIR on the calculation. The Party has also recalculated the emissions from off road mobile machinery. The ERT encourages the Party to provide a more detailed explanation of recalculations, including the rationale, as well as information on the impact of the sector on total emissions and implication to trends for the Transport sector in its IIR.

57. The ERT considers the time series of emissions to be generally consistent.

Comparability

58. The ERT considers the description of methodologies used for the calculation of emissions from the transport sector to be comprehensive and consistent with the Guidebook.

Accuracy and uncertainties

59. The ERT did not identify any over or underestimates.

60. The ERT encourages the Party to undertake an uncertainty analysis and to use it as a tool for prioritising improvements in the inventory and for providing an indication of the reliability of the inventory data.

61. The Republic of Serbia did not provide information about the availability of a QA/QC system or a QA/QC plan for the Transport sector. The ERT encourages the Party to implement sector specific OA/QC procedures and to provide a description of the system and its results in the IIR.

Improvement

62. The ERT commends the Republic of Serbia for its improvement in the transport sector and in particular for using the latest COPERT 4 version for calculating road transport emissions.

63. The Party does not present planned improvements for the transport sector in the IIR. During the review, the Republic of Serbia indicated their intention to include the missing activity data in the NFR tables. The ERT welcomes this and encourages the Party to put an effort into further improving their inventory, such as using higher Tier methods for the non-road transport sector.

Sub-Sector Specific Recommendations

Category issue 1: 1.A.3.b Road Transport – Activity data, Transparency

64. The ERT noted that different versions of the COPERT 4 model, namely v9.1 and v11.3, are mentioned in different parts of the IIR and asked for clarification. During the review, the Republic of Serbia clarified that the latest COPERT 4 v11.3 has been used for calculating road transport emissions. The ERT encourages the Party to correct this information in the IIR.

Category issue 2: 1.A.2.g.v.ii Mobile Combustion in manufacturing industries and construction – All pollutants, Completeness

65. The ERT noted that emissions from off-road mobile machinery in manufacturing industries and construction have not been estimated and the "NE" notation key has been used. During the review, the Republic of Serbia has indicated that they will make an effort to estimate emissions from this sector for one of their next submissions. The ERT welcomes this plan and recommends that the Party complete the inventory with these estimates.

Category issue 3: 1.A.3.d.i(ii) International inland waterways – All pollutants, Transparency, Comparability

66. The ERT noted that emissions from international inland waterways are reported as "IE" and it is indicated that they are included in national navigation (1.A.3.d.ii). During the review, the Republic of Serbia indicated that they are unable to distinguish between international and national shipping emissions due to the lack of the necessary activity data. The ERT acknowledges the answer provided, and recommends that the Party makes an effort to allocate emissions in the respective subsectors in order to improve its national inventory.

Category issue 4: 1.A.4.a.ii, 1.A.4.b.ii, 1.A.4.c.iii, 1.A.5.b – All pollutants, Transparency

67. The ERT noted that emissions from off-road mobile machinery in these sectors are reported as "IE" and that it is indicated in the IIR that they are included under NFR 1.A.3 (transport (fuel used)). However, emissions under NFR 1.A.3 are

reported as “NO”. During the review, the Party acknowledged the mistake and indicated that they will ensure that the correct notation keys are used in their next submission. The ERT welcomes this plan and recommends to correct the notation keys.

Category issue 5: 1.A.3.a.i(ii) International aviation cruise – All pollutants, Transparency, Comparability

68. The ERT noted that emissions from international aviation Cruise are reported as IE, presumably included under NFR 1.A.3.a.ii(ii) (domestic aviation cruise). During the review, the Republic of Serbia indicated that they are unsure whether they will be able to distinguish between international and domestic aviation (Cruise) emissions. The ERT acknowledges the answer provided, and recommends that the Party makes an effort to allocate emissions in the respective subsectors in order to improve its national inventory.

Category issue 6: 1.A.3.b.v, 1.A.3.b.vi, 1.A.3.b.vii – All pollutants, Transparency

69. The ERT noted that the Republic of Serbia has reported zero emissions from gasoline evaporation for all pollutants except for NMVOC, and also from automobile tyre and break wear and road abrasion for all pollutants except for particulate matter. During the review, the Republic of Serbia acknowledged the mistake and indicated that they will ensure that the correct notation key (NA) will be used in their next submission. The ERT welcomes this plan and recommends to correct the notation key.

Category issue 7: 1.A.3.b.v, 1.A.3.b.vi – NMVOC and PM, Accuracy

70. The ERT noted that in the IIR it is indicated that the Republic of Serbia uses Tier 1 emission factors taken from the Guidebook 2013 for estimating emissions from gasoline evaporation and vehicle tire and brake wear. Since the Republic of Serbia already uses the COPERT model to calculate exhaust emissions from road transport (NFR 1.A.3.b.i-iv) and the model also calculates non-exhaust emissions (NFR 1.A.3.b.v-vi), the ERT strongly recommends that the Party uses the results of the model for reporting emissions from these subsectors.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		All		
Years		1990 – 2014 + (Protocol Years)		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2A1	Cement production			X
2A2	Lime production			X
2A3	Glass production			X
2A5a	Quarrying and mining of minerals other than coal			x
2A5b	Construction and demolition			
2A5c	Storage, handling and transport of mineral products			
2A6	Other mineral products (please specify in the IIR)			
2B1	Ammonia production			
2B2	Nitric acid production			
2B3	Adipic acid production			
2B5	Carbide production			
2B6	Titanium dioxide production			
2B7	Soda ash production			
2B10a	Chemical industry: Other (please specify in the IIR)			
2B10b	Storage, handling and transport of chemical products (please specify in the IIR)			
2C1	Iron and steel production			
2C2	Ferroalloys production			
2C3	Aluminium production			
2C4	Magnesium production			
2C5	Lead production			X
2C6	Zinc production			
2C7a	Copper production			
2C7b	Nickel production			
2C7c	Other metal production (please specify in the IIR)			
2C7d	Storage, handling and transport of metal products (please specify in the IIR)			
2H1	Pulp and paper industry			
2H2	Food and beverages industry			
2H3	Other industrial processes (please specify in the IIR)			X
2I	Wood processing			
2J	Production of POPs			
2K	Consumption of POPs and heavy metals (e.g. electrical and scientific equipment)			
2L	Other production, consumption, storage, transportation or handling of bulk products (please specify in the IIR)			X

General recommendations on cross cutting issues

Transparency

71. The Industrial Processes sector emissions inventory is in general transparent. Recommendations and encouragements to further improve the transparency are provided below and in the sector specific recommendations.

72. The ERT noted that the notation keys used in the NFR table – namely "NE" and "NA" – strictly follow the categorisation of the pollutants in the corresponding section of the Guidebook: e.g. for NFR 2.A.2, where only emissions of PM are estimated, the main pollutants are reported as "NE", while all other pollutants are reported as "NA" according to the Guidebook. However, as according to the Guidebook, and also the Party's IIR, emissions of NO_x, CO and SO_x from lime production are reported under NFR 1.A.2.f, therefore it would be appropriate to use the notation key "IE" for NO_x, CO and SO_x emissions from NFR 2.A.2. The same applies to all industrial sectors where emissions of NO_x, CO and SO_x are reported under NFR 1.A.2. Accordingly, the ERT recommends that Serbia corrects the use of notation keys to "IE" for all cases where emissions are reported under the corresponding source category under NFR 1.A.2 or NFR 2 categories, and encourages to document in the IIR under which source category the emissions are actually reported.

73. The ERT appreciates the presentation of sectors (NFR codes) regarding where the different notation codes apply, however, the information in these tables of the IIR does not always correspond to the actual situation in the NFR table. E.g. according to Table 1.6 of the IIR the notation key "IE" is used i.a. for NFR code 2.C.5.f, but there is no such code, neither in the NFR table nor elsewhere in the IIR. The same applies to the NFR codes 2.B.5.b, 2.C.5.d and 2.C.5.d.e mentioned in Table 1.7. The ERT encourages Serbia to revise and update these tables when preparing the next submission.

74. The ERT notes that no activity data was available for NFR 2.A.3 according to Table 1.7, although such data is presented on p. 68 of the IIR. The NFR codes mentioned in Table 1.8 do not reflect correctly source categories that are reported as "not occurring' in the NFR table. The ERT encourages Serbia to revise these tables when preparing the next submission.

Completeness

75. The ERT considers the industry sector to be in general complete and comprehensive with good levels of detail regarding the descriptions in the IIR. However, the ERT encourages Serbia to complete the inventory by estimating emissions so far reported as "NE", e.g. on the basis of available monitoring data.

Consistency including recalculation and time series

76. The ERT found the time-series to be in general consistent and has given some recommendations to explain apparent inconsistencies in the sub-sector specific recommendations.

77. The ERT noted that no recalculations were performed for emissions from industrial processes.

Comparability

78. The methods used by Serbia are consistent with the EMEP/EEA Guidebook and country specific methods are sufficiently described in the IIR.

79. The ERT noted that activity data for all industrial sectors is documented in the IIR, but no activity data for industrial sectors is included in the NFR table. In order to improve the transparency and comparability of the inventory, the ERT encourages Serbia to report activity data also in the NFR table, where appropriate.

Accuracy and uncertainties

80. The ERT found a possible overestimate regarding emissions from lead production as explained under sector-specific recommendations below.

81. Serbia uses Tier 2 methods for all key categories but NFRs 2.A.5.a and 2.K. NFR 2.A.5.a Quarrying and mining of minerals other than coal is a key category for PM_{10} in Serbia, and according to the IIR the emissions are estimated using a Tier 1 method. However, as the Tier 1 and Tier 2 emission factors provided in the Guidebook equal, the ERT encourages the Party to categorize the emission calculation for NFR 2.A.5.a as a Tier 2 method in the IIR. Regarding NFR 2.K which is a key category for PCBs in Serbia, a Tier 1 method from the Guidebook is used. However, the EF is a rough estimate in grams per capita with high level of uncertainty and so high that NFR 2.K automatically becomes a key category in every country that uses this factor. As no Tier 2 method is presented in the Guidebook, and it is not clear how to apply the Tier 3 EFs presented in the Guidebook, an option to check the level of emissions would be that Serbia would develop its own method to calculate PCBs from this source.

82. The ERT encourages Serbia to undertake uncertainty analysis for the industry Sector in order to support the improvement process and to provide an indication of the reliability of the reported data.

Improvement

83. The ERT noted that no improvements were planned regarding emissions from industrial processes.

Sub-Sector Specific Recommendations

Category issue 1: 2.C.5 Lead production - Accuracy, transparency

84. The ERT noted that emissions from lead production, in particular of PM, heavy metals and POPs are reported for the whole time series except for 2014. According to the IIR, primary lead production was phased out in 2003. Possibly secondary lead production was phased out in 2013, but that was not stated in the IIR. Additionally, the ERT noted that in the section on NFR 2.C.5 of the IIR reference is made to secondary *copper* production instead of secondary *lead* production. The issue was discussed during the Stage 3 review and Serbia clarified that in 2014 Serbia neither had copper plants, nor primary or secondary lead production. The ERT recommends that Serbia corrects the overestimated emissions for all years concerned. The ERT also encourages the Party to improve the transparency of the inventory by including information on changes in industrial production in future IIRs.

Category issue 2: 2.H.3 Other industrial processes and 2.L Other production, consumption, storage, transportation or handling of bulk products - Transparency

85. Both NRFs 2.H.3 and 2.L are summary categories for such industrial sources not already covered by other NFR codes. Serbia does not report emissions for these source categories and thus no information of these NFR codes is included in the IIR. Nevertheless, the ERT noted that different notation keys are used for both of the above mentioned source categories in the NFR table ("NE" vs. "NA"). The ERT recommends that Serbia improves the transparency of the inventory by correcting the use of notation keys in NFRs 2.H.3 and 2.L according to the notation key definitions provided in the Reporting Guidelines, and encourages the Party to explain the choice of notation keys in the IIR.

SOLVENTS

Review Scope

Pollutants Reviewed		SO_x, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2014 + (Protocol Years)		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2D3a	Domestic solvent use including fungicides	x		x
2D3b	Road paving with asphalt	x		x
2D3c	Asphalt roofing	x		x
2D3d	Coating applications	x		x
2D3e	Degreasing	x		x
2D3f	Dry cleaning	x		x
2D3g	Chemical products	x		x
2D3h	Printing	x		x
2D3i	Other solvent use (please specify in the IIR)	x		x
2G	Other product use (please specify in the IIR)	x		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

86. The ERT considers the Solvent sector to be generally complete, but due to the lack of information in the IIR about activity data, methods and details of sources, a thorough assessment cannot be made. Throughout the Solvent chapter of the IIR, the Republic of Serbia indicates that Tier 2 methods have been applied, however no EFs are presented in the IIR. During the review, the Republic of Serbia sent to the ERT on request an Excel file with activity data and the corresponding EFs. A check of most EFs indicated that they correspond to the Tier 1 default EFs of the Guidebook 2013. The ERT recommends that the Party assesses the EFs used, and corrects the documentation in the IIR regarding the use of Tier 1 and Tier 2 methods.

87. The Republic of Serbia has provided an emissions inventory which is partly transparent but also shows some gaps. The Party indicates in their IIR that statistical data was used, however, no background information on what kind of data was used, nor any kind of verification of the data use is provided.

88. Trends (dips and jumps) of emissions are not described in the IIR. The ERT recommends that the Party includes this information in their IIR in order to make a full assessment of transparency possible.

Completeness

89. The ERT considers the Solvents sector to be of good quality and almost complete, however, no emissions are reported under several sources as indicated in the sub-sector specific findings below.

90. No indication is given in the IIR on what statistical data has been used for the estimation of emissions. Thus, no check on the completeness of data was possible. The ERT recommends that Serbia includes more information on the sources of data used in their IIR.

Consistency including recalculation and time series

91. According to the IIR, the time line is consistent and no information on recalculations was included.

Comparability

92. From the IIR it is unclear if the methods used are in line with the Guidebook and thus comparable with other reporting Parties. The ERT encourages the Party to correct the information in the IIR according to findings presented under Transparency on the use of Tier 1 and Tier 2 methods.

Accuracy and uncertainties

93. The Republic of Serbia has not undertaken an uncertainty analysis; neither does it provide information on QA/QC procedures in the solvent sector. The ERT encourages the Republic of Serbia to carry out an uncertainty analysis for the solvent sector, as well as to implement sector-specific QA/QC procedures, and to provide information on these in their IIR.

Improvement

94. No information on sector specific improvements are presented in the IIR.

Sub-Sector Specific Recommendations

Category issue 1: 2.G Other Product Use, Completeness

95. Emissions from NFR 2.G. area are reported as “NA”. The ERT recommends that the Republic of Serbia explores activities that occur in the country under NFR 2.G and calculates and reports emissions for this sector in the next submission.

Category issue 2: 2.D.3 Several Sub-sectors, Completeness

96. The Republic of Serbia reports several pollutants under NFRs 2.D.3.b, 2.D.3.c, 2.D.3.g, and 2.D.3.i as “NE”, because the EFs for Tier 1 in Guidebook are presented as “NE”. The ERT encourages the Republic of Serbia to find EFs from the literature for sources that exist under these NFRs in the country and to estimate emissions.

Category issue 3: 2.D.3.a Domestic Solvent Use including Fungicides – NMVOC

97. The Republic of Serbia presents in the IIR regarding NFR 2.D.3.a, that the source for activity data is the Statistical Office of the Republic of Serbia, and refers to

“Zinc production”. The ERT encourages the Serbia to change the wording, as this paragraph has been copied from NFR 2.C, to include sector specific information in the IIR.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO_x, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2014 + (Protocol Years)		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
3B1a	Dairy cattle	X		X
3B1b	Non-dairy cattle	X		X
3B2	Sheep	X		X
3B3	Swine	X		X
3B4a	Buffalo	X		X
3B4d	Goats	X		X
3B4e	Horses	X		X
3B4f	Mules and asses	X		X
3B4gi	Laying hens	X		X
3B4gii	Broilers	X		X
3B4giii	Turkeys	X		X
3B4giv	Other poultry	X		X
3B4h	Other animals (please specify in IIR)	X		X
3Da1	Inorganic N-fertilizers (includes also urea application)	X		X
3Da2a	Animal manure applied to soils	X		X
3Da2b	Sewage sludge applied to soils	X		
3Da2c	Other organic fertilisers applied to soils (including compost)	X		
3Da3	Urine and dung deposited by grazing animals	X		X
3Da4	Crop residues applied to soils	X		
3Db	Indirect emissions from managed soils	X		
3Dc	Farm-level agricultural operations including storage, handling and transport of agricultural products	X		
3Dd	Off-farm storage, handling and transport of bulk agricultural products	X		
3De	Cultivated crops	X		
3Df	Use of pesticides	X		
3F	Field burning of agricultural residues	X		X
3I	Agriculture other (please specify in the IIR)	X		
11A	Volcanoes		X	
11B	Forest fires		X	

General recommendations on cross cutting issues

Transparency

98. The Republic of Serbia has provided a detailed and generally transparent emissions inventory. Estimates are provided for most of the categories in the Agriculture sector. The Party's methodology and emission factors in the IIR are considered by the ERT to be generally transparent. The ERT encourages the Party

to include more details in the IIR regarding the information on methodologies and EFs and the explanation of the rationale of selecting the notation keys.

99. The ERT found some non-appropriate uses of the notation keys and encourages the Republic of Serbia to use the notation keys strictly according to their definitions (e.g. “NO” where the source does not exist in the country (Not Occurring), “NE” where emissions are “Not Estimated”, “NA” where the source exist but does not emit the pollutant in question and “IE” where emissions are “Included Elsewhere”).

Completeness

100. The ERT considers the Agriculture sector to be generally complete. However, the ERT noted that there are some categories and pollutants not covered by the current estimations as explained under sub-sector specific findings below, and recommends that the Party estimates and reports these emissions.

Consistency including recalculation and time series

101. In the IIR the Republic of Serbia did not report any recalculation of emissions in this submission.

Comparability

102. The Republic of Serbia has used the Guidebook 2013 methodologies for almost all of its emission estimates and most of the methods are Tier 1.

Accuracy and uncertainties

103. There might be overestimation of manure management emissions for several pollutants as explained in the sub-sector specific recommendations below. The ERT recommends that the Party checks the methodology and recalculates emissions for the next submission.

104. The Republic of Serbia did not report an uncertainty analysis of the Agriculture sector. The ERT encourages the Party to carry out an uncertainty analysis for the Agriculture Sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

105. The Republic of Serbia did not provide information on QA/QC procedures for the inventory. The ERT encourages the Party to implement sector specific OA/QC procedures and include the information on these in the IIR.

Improvement

106. The Republic of Serbia did not present information on planned improvements for the agriculture sector in its IIR. However, during the review the Party expressed their intention to improve the estimates and their transparency in several categories for the next submission. The ERT welcomes these improvements.

Sub-Sector Specific Recommendations

Category issue 1: 3.B Manure management, All animals - NMVOCs, Accuracy

107. The ERT noted that the NMVOC emission factors used by the Republic of Serbia for NFR 3.B – Manure Management originate from the Guidebook 2013 EF table 3.3 in the column "with silage feeding". In the IIR there is no information regarding the selection of this column. The ERT considers that in this case the emissions could be overestimated and therefore encourages the Party to provide the rationale for selection of EFs in the IIR or to recalculate the emissions using the mix of with/without silage of the country in its next submission taking into account the possible changes of the silage feeding in the time series.

Category issue 2: 3.B.1.b Manure management, None Dairy Cattle - Particulate Matter, Accuracy

108. The ERT noted that the emission factors used by the Party for particulate matter emissions from NFR 3.B.1.b – Manure Management Non-dairy cattle originate from the Guidebook 2013 table 3.3 row "other cattle", not taking into account the information provided in row "calves". In the IIR there is no further information regarding the selection of the EF. The ERT considers that in this case the emissions could be overestimated and therefore encourages the Republic of Serbia to recalculate and report the emissions in its next submission.

Category issue 3: 3.B.1.a and 3.B.1.b Manure management, Dairy and None Dairy Cattle - NH_3 and NO_x, Accuracy

109. The ERT noted that the NH_3 and NO_x emission factors used by the Party for NRFs 3.B.1.a and 3.B.1.b – Dairy and non-Dairy cattle originate from the Guidebook 2013 tables 3.1 and 3.2 in row "slurry" and that there is no further information in the IIR regarding the manure management systems or the selection of the EF from this row. The ERT considers that the emissions could be either overestimated or underestimated. The ERT also considers that the manure management systems could have changed since 1990. The ERT encourages the Party to provide the rationale of the selection of the EF in the IIR or to recalculate the emissions according with the mix of slurry/solid of the country in its next submission taking into account the possible changes of the manure management systems in the time series.

Category issue 4: 3.B Manure management - All pollutants, Transparency

110. The ERT noted that the methodology description for calculation of emissions from NFR 3.B Manure Management is not clear in the IIR. During the review the Republic of Serbia acknowledged the issue and informed the ERT that there will be a revision of the description in its next submission. The ERT welcomes the palnned improvement.

Category issue 5: 3.B.4.d Manure management, Goats - NO_x, NH_3, NMVOC, Particles, Completeness, consistency

111. The Party reports NO_x, NH_3, NMVOC and PM emissions from NFR 3,B,4,d - Manure Management Goats for all the years in the time series. The ERT also noted that the number of goats is reported in the IIR Table 3.44 for all the years but 1990-1992. During the review, the Party explained that they have no data for 1990-1992. The ERT recommends that Serbia solves the lack of data by the use of expert judgement or data gap techniques. The ERT recommends that the Republic of Serbia estimates the number of animals for the years 1990-1992 and recalculates emissions from these years in its next submission.

Category issue 6: 3.B.4.f Manure management, Mules and Assess - Transparency

112. Emissions from NFR 3.B.4.f - Manure Management Mules and Assess are reported as “NO”, without further explanation in the IIR. The ERT noted that FAO reports mules and asses in the former Republic of Yugoslavia for the years 1990 and 1991. During the review, the Party explained that these animals were located in what today is Croatia and Herzegovina and that there are no mules and assess in the statistical data in the Republic Serbia. The ERT encourages the Party to provide an explanation of the selection of this notation key in the IIR in its next submission.

Category issue 7: 3.B.4.g.iv Manure management, Other Poultry - NO_x, NH_3 and PM, Transparency

113. The ERT noted that the emission factors used for estimating emissions from NFR 3.B.4.g.iv – Manure management Other Poultry are taken on different animals amongst the ones that compose this category (ducks, geese and turkey). Additionally, the information about the number of heads of these animals is not presented in the IIR, impairing the transparency of the EF used. The ERT encourages the Party to provide detailed information on the breakdown of the numbers of the different species included in the category “Other poultry” and to recalculate emissions using correct EFs for each species.

Category issue 8: 3.B.4.g.iv Manure management, Other Poultry - $PM_{2.5}$, Transparency

114. The ERT noted that the $PM_{2.5}$ implied emission factor from NFR 3.B.4.g.iv - Manure management - Other poultry was low compared to the default EF in the Guidebook 2013. During the review, the Republic of Serbia acknowledged the mistake and provided the ERT the recalculated estimates. The Party also informed the ERT to correct the issue in its next IIR. The ERT welcomes this initiative and recommends that Serbia corrects this in the next submission.

Category issue 9: 3.D.1.a Inorganic N-fertilizers - All pollutants, Transparency

115. The ERT noted that in the 2012 Stage 3 Review Report it was recommended that Serbia provides detailed information on the breakdown of national fertiliser

consumption into the relevant compounds in use. This information was not provided in the IIR either. During the review, the Party informed the ERT to include this information in its next IIR. The ERT welcomes this improvement.

Category issue 10: 3.D.1.a Inorganic N-fertilizers - NMVOC, Transparency

116. The ERT noted that the NMVOC implied emission factor from NFR 3.D.1.a - Inorganic N-fertilizers was very low compared to the default EF in the Guidebook 2013. The ERT encourages the Party to recalculate these emissions and to report the estimates or the rationale of selection of the emission factor used in the next submission.

Category issue 11: 3.D.a.2.a Animal manure applied to soils and NFR 3.D.a.3 (Urine and dung deposited by grazing animals) 3.D.1.a Inorganic N-fertilizers -– NH_3 and NO_x, Transparency

117. The ERT noted that the Republic of Serbia reports NH_3 and NO_x emissions from activities under NFR 3.D.a.2.a (Animal manure applied to soils) and NFR 3.D.a.3 (Urine and dung deposited by grazing animals) as “IE” in the NFR tables and that no information is provided in the IIR about the allocation of emissions. During the review, the Party acknowledged the issue and informed the ERT that it will include the missing information in the IIR in the next inventory reporting cycle. The ERT welcomes this plan and encourages the Party to undertake this improvement.

Category issue 12: 3.D.a.4 Crop residues applied to soils, 3.D.b Indirect emissions from managed soils, 3.D.c Farm-level agricultural operations including storage, handling and transport of agricultural products, 3.D.d Off-farm storage, handling and transport of agricultural products, 3.D.e Cultivated crops - All pollutants, Transparency

118. The Republic of Serbia reports NO_x, NMVOC, NH_3 and PM emissions from activities under NFR 3.D.a.4 Crop residues applied to soils; NFR 3.D.b Indirect emissions from managed soils; NFR 3.D.c Farm-level agricultural operations including storage, handling and transport of agricultural products; NFR 3.D.d Off-farm storage, handling and transport of bulk agricultural products and NFR 3.D.e Cultivated crops categories as “IE” in the NFR tables. The ERT also noted that no information is provided in the IIR about the allocation of emissions. During the review, the Party acknowledged the issue and informed that it will include the missing information in the IIR in the next inventory reporting cycle. The ERT welcomes this plan and encourages the Party to undertake this improvement.

Category issue 13: 3.F Field burning of agricultural residues

119. The Republic of Serbia reports the emissions from NFR 3.F - Field burning of agricultural residues as “NO” for all pollutants and years. The ERT noted that some information on field burning could be found in FAO statistics and in national literature. During the review, the Party explained that the information sources provided by the ERT were not sound, but it did not provide information to support the notation key

used. The ERT encourages the Party to provide an explanation on the selection of the notation key in IIR in its next submission.

WASTE

Review Scope:

Pollutants Reviewed		All		
Years		1990 – 2014		
Code	**Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
5A	Biological treatment of waste - Solid waste disposal on land	X		X
5B1	Biological treatment of waste - composting		X	X
5B2	Biological treatment of waste - Anaerobic digestion at biogas facilities		X	
5C1a	Municipal waste incineration		X	X
5C1bi	Industrial waste incineration		X	X
5C1bii	Hazardous waste incineration		X	X
5C1biii	Clinical waste incineration		X	X
5C1biv	Sewage sludge incineration		X	X
5C1bv	Cremation	X		
5C1bvi	Other waste incineration (please specify in the IIR)		X	
5C2	Open burning of waste		X	X
5D1	Domestic wastewater handling	X		X
5D2	Industrial wastewater handling	X		X
5D3	Other wastewater handling		X	
5E	Other waste (please specify in IIR)		X	

General recommendations on cross cutting issues

Transparency

120. The Republic of Serbia provides brief descriptions of the calculation of emissions in the IIR including some general references to activity data and EF sources. The ERT encourages the Party to explain in more detail the calculation methods, EFs and data sources in the IIR.

121. The Republic of Serbia does not provide activity data in the NFR tables and thus the ERT was not able to check the correctness of emissions levels. The ERT reiterates the recommendation of the previous S3 report that the Party provides activity data in the NFR tables for those sub-categories where emissions are reported.

Completeness

122. The inventory for the Waste sector is not complete for all years and for all sub-categories.

123. For the year 2014 the notation key “NO” is reported for all other sectors than NFRs 5.A, 5.C.1.b.iv and 5.D.2. The ERT recommends that the Republic of Serbia documents the existence of the activities under the waste sector NFRs and explains

more in details the use of the notation keys in the IIR. The ERT encourages the Party to include a short explanation about each sub-category in the IIR.

Consistency, including recalculation and time series

124. Based on information given in the NFR tables and in the IIR the ERT concluded that the inventory for the Waste sector is not completely consistent because of the varying use of notation keys between the years reported. No further explanation is provided in the IIR. The ERT encourages the Republic of Serbia to examine the use of notation keys and to provide explanations on their application in the IIR.

125. In the IIR waste sector specific recalculations are not mentioned. The ERT encourages the Party to include justifications for recalculations in the IIR.

Comparability

126. The methods used for estimating emissions from the waste sector are not fully comparable to other reporting Parties, because the Guidebook 2013 methodology is not used to calculate emissions and no information on the used methods is provided in the IIR. Emissions from NFR 5.C.1.bv Cremation are, however, comparable, because they are calculated using methods in the Guidebook. The ERT encourages the Republic of Serbia to include documentation of methods used to calculate all emissions in the IIR.

Accuracy and uncertainties

127. The Republic of Serbia does not report an uncertainty analysis for the waste sector emissions. The ERT encourages Serbia to assess and report uncertainty of the Waste sector emissions.

128. The IIR does not provide information on QA/QC procedures in the Waste sector. The ERT encourages the Party to explain what kind of QA/QC procedures have been introduced for the waste sector inventory. For activity data default uncertainties available in the Guidebook could be used.

Improvement

129. The Republic of Serbia states in its IIR that it does not intend to perform any improvements in this sector. The ERT encourages the Party to consider sub-sector recommendations as mentioned in the section below.

130. The ERT noted that the Republic of Serbia has recalculated the NMVOC time series of solid waste disposal on land since 1990 according to the recommendation of the previous Stage 3 report. The ERT commends the Party for this improvement.

Sub-Sector Specific Recommendations

Category issue 1: 5.A. Solid waste disposal on land – NMVOC, Transparency

131. The Republic of Serbia reports NMVOC emissions from Solid waste disposal on land. The ERT found the description of the calculation of emissions to not be transparent and that the model (Ukrainian LFG model) used for landfill gas estimation does not give a full overview of possible NMVOC emissions from Solid waste disposal on land. The ERT encourages the Party to provide a more detailed explanation about the model for landfill gas estimation, including the general assumptions of the model.

Category issue 2: 5.A. Solid waste disposal on land –$PM_{2.5}$, PM_{10} and TSP, Completeness

132. The Republic of Serbia does not estimate $PM_{2.5}$, PM_{10} and TSP emissions from Solid waste disposal on land. To the question raised by the ERT during the review the Party replied that waste statistics are available in the country. The ERT recommends that the Party calculate $PM_{2.5}$, PM_{10} and TSP emissions according to Guidebook 2013 methodology using the disposed annual waste amounts

Category issue 3: 5.B.1 – Biological treatment of waste - Composting, Completeness

133. The Republic of Serbia does not report emissions from composting. As household composting occurs in every European country, the ERT recommends that the Party establishes a data collection or estimation system for the composted waste amounts and estimates and reports the emissions using the methodology provided in the Guidebook.

Category issue 4: 5.C – Waste incineration - All pollutants, Completeness

134. The Republic of Serbia reports “NO” most of the waste incineration sub-categories. The ERT recommends that the Party investigates the existence of these sources in the country and estimates and reports emissions from existing sources using the Guidebook methodologies.

Category issue 5: 5.C.2 Open burning of wastes

135. The Republic of Serbia does not report emissions from open burning of wastes. The ERT encourages the Party to investigate the existence of the activity in the country and to estimate and report emissions for the next submission.

Category issue 6: 5.D.1 Domestic Wastewater handling – NH_3, Transparency

136. The Republic of Serbia does not provide a description of the methodology used for the calculation of emissions. The ERT recommends that the Party provides

a detailed description of the methodology used in emissions calculations and activity data acquisition in IIR in the next submission.

Category issue 7: 5.D.1 Domestic Wastewater handling – NH_3, Completeness

137. The Party reports zero values under NFR 5.D.1. for all other years except 2014. The ERT recommends that the Republic of Serbia reports the actual emissions instead of zero values for these years, or uses the appropriate notation keys.

Category issue 8: 5.D.2 Industrial Waste water handling – NMVOC, Transparency

138. The Republic of Serbia reports NMVOC emissions from Industrial wastewater handling since the year 2000, however, no description of the methodology used is provided in the IIR. The ERT encourages the Party to explain the source of activity data and to document the methodology used for calculation of emissions in the IIR.

139. According to the CEIP Data Reviewer Tool NMVOC emissions from industrial waste waters decrease from year 2004. The ERT recommends that the Party explains this decrease of emissions in the next IIR.

Category issue 9: 5.D.2 Industrial Waste water handling – NMVOC, Completeness

140. The Republic of Serbia does not report NMVOC emissions for the years 1990 – 2003. The ERT recommends that the Party completes the inventory by estimating and reporting these emissions in its next submission or alternatively encourages the Party to explain the missing estimates in the IIR.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Responses to questions raised prior to and during the review

2. Stage 1 2016 report for the Republic of Serbia

3. Stage 2 S&A 2016 report for the Republic of Serbia
4. The Republic of Serbia IIR 2016
5. Energy
   Serbia ERT Question 2016_3.xls