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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
SLOVENIA**

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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 SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} for the time series years 1990 – 2013 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 Slovenia coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 22nd June 2015 to 26th June 2015 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 – Charlotte Vanpoucke (Belgium), Energy - Garnt Jans Venhuis (Netherlands), Transport - Melanie Hobson (EU), Industry - David Kuntze (Germany), Solvents - Kees Peek (Netherlands), Agriculture + Nature - Hakam Al-Hanbali (Sweden), Waste - Dirk Wever (Netherlands).
4. Anne Misra (United Kingdom) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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

PART A: KEY REVIEW FINDINGS

5. The ERT recognises the effort made by Slovenia to provide an inventory with a significant level of information to allow a thorough review.
6. Slovenia submitted a good quality inventory in 2015 covering the complete time series for historical and projected emissions for the majority of pollutants. The inventory is generally in line with the 2013 EMEP/EEA inventory guidebook and UNECE Reporting Guidelines. Emissions reported under CLRTAP and NECD are different, but this was explained by the Party during the review.
7. The 2015 submission shows a great improvement on previous years. Nevertheless, the ERT has identified a need for further improvements described in part B.
8. Slovenia actively participated in the Stage 3 review process providing further information and data when requested, with a fast turnaround of questions. Based on this information provided by the Party, the ERT was able to perform an in-depth review of the inventory within the given period.

INVENTORY SUBMISSION

9. In the 2015 submission, Slovenia reported emissions for the full time series 1980-2013 for NO_x, SO₂ and CO, for 1986-2013 for NH₃, for 1990-2013 for priority heavy metals and POPs and for 2000-2013 for particulate matter in the NFR14 categories. Emissions from other heavy metals and BC are missing. No 'NE' (Not Estimated) were reported and only few IE (Included Elsewhere) were reported and explained in the IIR. The ERT commends Slovenia for providing projected emissions in NFR14 categories and associated socio-economic data up to 2030 for the NECD pollutants.
10. The IIR submitted by Slovenia includes most of the required information in the IIR structure as recommended in Annex II of the revised Guidelines. Assumptions and methodologies are described clearly and in detail for the majority of sources. The ERT also notes that recalculations have been applied consistently throughout the entire time series. A Tier 1 approach has been applied to most key categories. Further improvements identified during this review are presented in part B of this report.
11. The CLRTAP inventory submitted by Slovenia is of good quality and is generally well documented in the informative inventory report (IIR).

KEY CATEGORIES

12. Slovenia has compiled a Key Category Analysis (KCA) consistent with the EMEP/EEA Guidebook and identical to the CEIP analysis for emissions of all reported pollutants in 2013. The ERT encourages Slovenia to present the key sources also by trend assessment and to use Tier 2 or 3 methods for all key sources in line with the 2013 EMEP/EEA Guidebook.

QUALITY

Transparency

13. Slovenia clearly lists the data sources used by NFR code (Table 2.1.1). The IIR also includes a concise and detailed presentation of key trends by pollutant over the time series with clear explanations for the reasons of fluctuations, dips and jumps. During the review, Slovenia answered an additional question on the increasing trend of Cd emissions between 1994 and 2008. The ERT recommends adding this information in the next IIR.

14. The ERT commends Slovenia for providing clear information on the methodology used in the form of equations for occurring pollutants and NFR sectors. However, in each sector more information on missing sources (either the source or the pollutant does not exist) could be included in the IIR to further improve transparency. The ERT encourages Slovenia to provide replies to the Stage 1 and 2 reviews.

15. To enhance the transparency of the Slovenian inventory related to missing sources, the ERT encourages Slovenia to revise the notation keys for reporting. Currently the notation key 'NE' is not used. The ERT recognises that the use of 'NE' should be limited, however, the high frequency of 'NO' (not occurring) and 'NA' (not applicable) might suggest that there are some emissions missing in the inventory. Therefore, the ERT recommends to revise the notation keys and, in addition, to include information on sources not occurring in the country in the IIR. For clarification: if a source does occur in the country, but emissions are not estimated, 'NE' (Not Estimated) should be used instead of 'NO' (Not Occurring) (for the definitions of the notation keys please refer to the Revised Guidelines on emission reporting, III-12).

16. Slovenia uses only 'IE' (Include Elsewhere) for non-road mobile machinery and national navigation. Explanations as to where emissions are included and why the emissions could not be reported under the specific NFR sector are given in a transparent way. Nevertheless, the ERT encourages Slovenia to develop a method for splitting emissions from road transport and off road sources.

17. The IIR provides a comprehensive description of QA/QC. Also, for every sector qualitative information is provided on the recalculations made and planned improvements are well documented.

18. Slovenia provides projections for both 'WM' and 'WAM' scenarios in the NFR tables. However, the data for the most recent year in the projection tables are inconsistent with the data presented in the emission inventory table. To improve transparency the ERT suggests reporting the projections corresponding to the most recent submission.

19. The ERT encourages Slovenia to compliment the excellent work done on the inventory and the IIR with some additional descriptions indicated below.

Completeness

20. The ERT acknowledges the effort to which Slovenia has gone to provide estimates of emissions for almost all sub-sectors.

21. Slovenia has reported emissions for most pollutants in NFR14 and the complete time series. The ERT encourages Slovenia to report emissions from BC, As, Cr, Cu, Ni, Se and Zn

for the complete time series. PM₁₀, PM_{2.5} and TSP emissions have been reported from 2000 onwards. The ERT encourages Slovenia to report emissions from 1990 onwards for all pollutants. During the review, Slovenia indicated that it plans to include emissions from additional heavy metals and black carbon within the next two or three years.

22. Slovenia submitted the full time series of emissions and activity data from 1990 onwards and the inventory for the reviewed pollutants is generally complete. However, completeness was difficult to fully assess because some sectors are not mentioned in the IIR and there is a high use of 'NA' and 'NO', which might indicate that there are missing sources/pollutant emissions. The ERT recommends that Slovenia adds more information as to why some sources are currently not reported (e.g. lack of activity data, source does not exist in Slovenia) and whether there are plans to report them in the future.

Consistency, including recalculations and time-series

23. Slovenia has recalculated the complete time series and has provided qualitative information on the recalculations made in each sector chapter of the IIR. The ERT recommends that Slovenia also includes quantitative information on the recalculations made per sector as well as the impact on the national totals and trends in the time series.

24. Explanations for emission trends, fluctuations, dips and jumps are provided for all main pollutants with detailed information on the share of sources contributing to the total emissions. The ERT commends Slovenia for this.

Comparability

25. The ERT notes that the inventory of Slovenia is comparable with those of other reporting parties. The allocation of source categories follows that of the EMEP/UNECE reporting Guidelines. The ERT encourages Slovenia to continue with this approach as part of the national inventory calculation.

CLRTAP/NECD comparability

26. The ERT noted that there are some differences between the estimates provided by Slovenia under LRTAP and NECD. Slovenia responded that this was due to recalculations as a result of mistakes found, new data obtained and inclusion of new sources in the later LRTAP submission.

Accuracy and uncertainties

27. Slovenia did not undertake an uncertainty analysis as part of the 2015 submission. The ERT encourages Slovenia to provide quantitative uncertainty estimates of the emission estimates, especially for key sources, in their next submission. Slovenia responded during the review week that they planned to perform an uncertainty analysis within the next submission or in 2017.

Verification and quality assurance/quality control approaches

28. The quality control and quality assurance (QA/QC) procedures carried out by Slovenia are very well documented. The IIR covers the institutional arrangements in a good level of detail, the inventory preparation process and the QA/QC. Slovenia has implemented an automated QA/QC plan in accordance with the EMEP/EEA Guidebook embedded in their new inventory system (ISEE). This includes general QA/QC procedures (Tier 1) applied to the

whole inventory at all times and elements of sector specific procedures (Tier 2). The Party has also defined roles and responsibilities for inventory compilation, improvement and QA/QC.

29. The ERT commends Slovenia for its general quality assurance/quality control (QA/QC) activities. However, sector specific checks are not documented in the IIR. The ERT encourages Slovenia to provide information on sector specific QA/QC procedures in future submissions.

FOLLOW-UP TO PREVIOUS REVIEWS

30. The current Stage 3 review has used outputs from the Stage 1 and Stage 2 review processes. ERT invites Slovenia to also refer to these previous reviews when examining this review report and when updating its improvement plans.

31. The ERT commends Slovenia for the improvement of its inventory by implementing almost all recommendations made in the previous Stage 3 report:

32. Listing improvements planned in the IIR.

33. Reporting data sources and references for all emission factors and activity data by pollutant and source in the individual sector chapters.

34. Give explanations regarding the use of 'IE' (Included Elsewhere).

35. Providing more detail on the description of time series trends, and drivers for trends as well as contributions from key sources to the national totals.

36. Providing further information on the methodologies used for compiling emissions projections.

AREAS FOR IMPROVEMENTS IDENTIFIED BY SLOVENIA

37. The IIR identifies several areas for improvement per sector. These include:

- (a) Update methodologies and emission factors according to the 2013 EMEP/EEA Inventory Guidebook for several NFR categories in the Energy, Non Road Transport and Waste sectors.
- (b) Examination of EF and NCV used in 1A1a.
- (c) Estimate of emissions from fuel use by the military for the 1986-2007 period.
- (d) Thorough examination of other EF (other than for NMVOC and PM) for wood burning.
- (e) Try to obtain country-specific EF for 1B1a.
- (f) New estimates for manure management systems in cattle and pig production for 2007-2014.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

38. The ERT has identified the following cross-cutting issues for improvement:
- (a) The ERT encourages reporting emissions of BC, As, Cr, Cu, Ni, Se and Zn, PM₁₀, PM_{2.5} and TSP for the complete time series.
 - (b) In order to enhance transparency and completeness, the ERT recommends that Slovenia revises the notation keys and additionally includes information on sources not occurring in the country in the IIR (see also paras 15 and 22).
 - (c) The ERT recommends that Slovenia includes a quantitative examination of the recalculations made by sector, as well as the impact on the national totals and trends in the time series.
 - (d) The ERT recommends that Slovenia provides qualitative uncertainty estimates.
 - (e) The ERT encourages Slovenia to provide information on sector-specific QA/QC procedures in future submissions.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

| Pollutants Reviewed | | SO ₂ , NO _x , NMVOC, CO, TSP, PM ₁₀ , PM _{2.5} , Hg, Cd, Dioxin, PAH, HCB | | |
|---------------------|--|---|--------------|-------------------------|
| Years | | 1990 – 2013 | | |
| NFRCode | CRF_NFRName | Reviewed | Not Reviewed | Recommendation Provided |
| 1A1a | Public electricity and heat production | X | | X |
| 1A1b | Petroleum refining | | NO | X |
| 1A1c | Manufacture of solid fuels and other energy industries | X | | X |
| 1A2a | Iron and steel | X | | X |
| 1A2b | Non-ferrous metals | X | | X |
| 1A2c | Chemicals | X | | X |
| 1A2d | Pulp, Paper and Print | X | | X |
| 1A2e | Food processing, beverages and tobacco | X | | X |
| 1A2f | Stationary combustion in manufacturing industries and construction: Non-metallic minerals | X | | X |
| 1A2gviii | Stationary combustion in manufacturing industries and construction: Other (please specify in the IIR) | X | | X |
| 1A3ei | Pipeline transport | X | | X |
| 1A3eii | Other (please specify in the IIR) | | NO | X |
| 1A4ai | Commercial/institutional: Stationary | X | | X |
| 1A4bi | Residential: Stationary | X | | X |
| 1A4ci | Agriculture/Forestry/Fishing: Stationary | | NO | X |
| 1A5a | Other stationary (including military) | | NO | X |
| 1B1a | Fugitive emission from solid fuels: Coal mining and handling | X | | X |
| 1B1b | Fugitive emission from solid fuels: Solid fuel transformation | | NO | X |
| 1B1c | Other fugitive emissions from solid fuels | | NO | X |
| 1B2ai | Fugitive emissions oil: Exploration, production, transport | | NO | X |
| 1B2aiv | Fugitive emissions oil: Refining / storage | | NO | X |
| 1B2av | Distribution of oil products | X | | X |
| 1B2b | Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other) | | NO | X |
| 1B2c | Venting and flaring (oil, gas, combined oil and gas) | | NO | X |
| 1B2d | Other fugitive emissions from energy production | | NO | 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:

39. Data sources for stationary energy are well described in the IIR of Slovenia; references for emission factors and Net Calorific Values (NCVs) are also well presented in the IIR. To improve transparency Slovenia added activity data of sub-sectors in the IIR. Slovenia also provides good methodology explanations in the IIR.

40. The ERT notices that in the NFR table for the sectors 1A3eii, 1A4ci, 1A5a, 1B1b, 1B1c, 1B2ai, 1B2aiv, 1B2b, 1B2c and 1B2d the Notation Key 'NO' (Not Occurring) is used. The sectors are not mentioned in the IIR and it is not clear whether these sectors are indeed 'NO' or maybe 'IE' (Included Elsewhere). The ERT asked the Party for additional information. During the review week Slovenia provided the following response: *1A1b: 'Petroleum refining notation: In 2003 the only petroleum refinery was closed and no emissions have occurred from this category since 2004. Notation key NO is accurate. There is a mistake in the explanation in the IIR. We will correct it in the IIR 2016; 1A3eii: Other: Emissions are reported under 1A2gvi Mobile Combustion in manufacturing industries and construction. No other emissions occur. 1A4ci: Agriculture/Forestry/Fishing: Stationary: Emissions are included in 1A4bi Residential: Stationary. Notation key IE should be applied; 1A5a: Other stationary (including military) Emissions are included in 1A4ai, Commercial/institutional: Stationary. Notation key IE should be applied; 1B1b: Fugitive emission from solid fuels: Solid fuel transformation. There are no emissions from that source in Slovenia. Notation key NO is accurate; 1B1c: Other fugitive emissions from solid fuels. There are no emissions from that source in Slovenia. Notation key NO is accurate; 1B2ai: Fugitive emissions oil: Exploration, production, transport. Notation key NO is accurate since 2003. We will check and calculate potential emissions for the period before 2003; 1B2aiv: Fugitive emissions oil: Refining / storage. Notation key NO is accurate since 2003. We will check and calculate potential emission for period before 2003; 1B2b: Fugitive emissions from natural gas (exploration, production, processing, transmission, storage, distribution and other). We will check methodology and calculate potential emissions for next annual submissions. Notation key NE should be applied; 1B2c: Venting and flaring (oil, gas, combined oil and gas). We will check methodology and calculate potential emissions for next annual submissions. Notation key NE should be applied; 1B2d: Other fugitive emissions from energy production. There are no emissions from that source in Slovenia. Notation key NO is accurate'*. The ERT thanks the Party for the reply and encourages Slovenia to use the correct notation keys in the next submission

41. The ERT noticed that Slovenia did not use country specific emission factors for the Key Categories but Emission Factors (EFs) from the 2009 EMEP/EEA Guidebook. The ERT has also noted that Slovenia plans to improve this in the next submission(s). During the review week the Party responded that they were planning to thoroughly examine all emission factors used, and that they would pay special attention to key sources. The ERT encourages Slovenia to do so.

42. In case emissions are not occurring in an NFR sector, all pollutants in the sector should have the notation key 'NO'. For example, NH₃, BC, and the additional heavy metals in 1A1b should be 'NO' instead of 'NA'. During the review week the Party responded that their understanding was that 'NR' (not relevant) had precedence over 'NO'. Slovenia is ready to follow the logic of other rapporteurs and to correct the notation keys in the next annual

submission. The Party also mentioned that 'NA' for NH₃ in 1A1b for the year 2013 was a mistake, and that 'NO' had been used for other years. They will check all sources and correct the Notation Keys. The ERT encourages the Party to check the proper use of notation keys and to update the NFR table accordingly.

Completeness:

43. The ERT considers the Energy sector to be in general complete and comprehensive with a good level of detail in the methodology descriptions.

44. Emissions for 1A are generally complete and NE has been applied only for some heavy metals. The IIR provides good information on the sources of fuel used, the emission factors and the NCVs. However, in order to improve completeness, the ERT recommends that Slovenia adds activity tables with information about all reported sources.

45. The ERT commends the Party for including useful information about all the data used in Chapter 1B, and, by doing so, improved the completeness of the IIR.

Consistency including recalculation and time series:

46. The ERT recommends that the Party includes descriptions of recalculations (if applicable) for all Energy sectors.

47. The ERT welcomes the information about recalculations provided in the energy sector of the IIR. To further improve the completeness and the transparency of the recalculations, the ERT encourages the Party to add more details and explanations to the description of the recalculations; i.e. to describe the rationale and the impact on the sector, including the implications for trends in the energy sector in the IIR.

48. The ERT noticed that the Party has not reported PM_{2.5}, PM₁₀ and TSP before 2000. The ERT encourages reporting TSP for the whole time series, in accordance with the Guidelines. Moreover, because of the need for environmental assessment, the ERT encourages Slovenia to also provide time series for PM_{2.5} and PM₁₀.

Comparability:

49. The ERT noticed some small differences between NECD and CLRTAP tables, in the sectors 1A2f and 1A2gviii. Both submissions should present the same amount of emissions; therefore the ERT encourages the Party to verify the consistency of the reports, and to correct them where needed.

Accuracy and uncertainties:

50. The ERT commends Slovenia for providing extensive information on general QA/QC procedures in its IIR. The ERT recommends that Slovenia provides information on the QA/QC procedures specific to the Energy sector.

Improvement:

51. The ERT commends Slovenia for including planned improvements per sector and for summarizing them all in a separate chapter.

52. The ERT noted that Slovenia's planned improvements included an upgrade of the methodology and emission factors to the 2013 EMEP/EEA Emission Inventory Guidebook, and commends the Party on that.

53. The ERT noticed that Slovenia's planned improvements included an effort to try and obtain country specific emission factors for NMVOC in sector 1B1a. The ERT encourages the Party to obtain country specific emission factors also for other key categories in order to upgrade their methodologies to Tier 2 or 3.

54. The ERT noticed that the planned improvements in the IIR 2015 are very similar to those of the IIR 2014. The ERT encourages the Party to work on improvements as planned.

55. The ERT noticed that there are no improvements planned in the IIR 2015 for sector 1A2d. The ERT encourages the Party to investigate whether there are no improvements needed for this sector, or include them in the list.

Sub-sector Specific Recommendations.

Category issue 1: 1A1a - TSP

56. The ERT noticed that for the sector 1A1a the emission totals for TSP (particular matter) show a significant drop in 2006, before rising and dropping again. This is neither mentioned, nor explained in the IIR report. During the review week Slovenia responded that the drop in TSP emissions in 2006 was due to lower emission factors for domestic lignite coal and domestic brown coal compared to previous years (IIR 2015, page 47, tables 3.1.1.3 and 3.1.1.4). The ERT thanks the Party for the response and encourages Slovenia to include the clarification in the next submission, but also to include a reason for the significant drop in emission factors.

Category issue 2: TSP, PM₁₀, PM_{2.5}, PAH

57. The ERT noticed that in chapter 2.6 on emission trends the graphs for particular matter and PAH show an increase for the year 2011. This is not explained in the text, but is probably caused by an increase in wood consumption in small combustion. During the review week Slovenia responded that the main reason for higher emissions in 2011 *is the higher use of wood biomass in the residential sector although an increasing use of biomass has been observed since 2008. This trend is probably a result of the economic crisis and a high price of petroleum products as well as state measures to promote renewable energy sources. While some households had replaced more expensive fuels (LPG and oil) with much cheaper wood biomass as early as 2009, the others needed more time and financial resources to install new wood biomass boilers. In 2009 the Eco Fund started to finance the installation of devices for heat generation from renewable sources in accordance with the Decree on Energy Savings at End-Users. The main purpose of this act was namely the promotion of biomass in order to achieve the Kyoto protocol target. In the period 2009–2012 the Eco fund awarded EUR 21 million in grants to citizens for this purpose and the increase of biomass used in 2011 could be explained with this measure.* The ERT thanks the Party for the response and encourages Slovenia to include the clarification in the next submission.

TRANSPORT

Review Scope

| Pollutants Reviewed | | SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} , CO, HMs, POPs, activity data | | |
|---------------------|---|---|--------------|-------------------------|
| Years | | 1990 – 2009 | | |
| NFR Code | CRF_NFRName | 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 | | NO | |
| 1A3dii | National navigation (shipping) | x | | |
| 1A4aii | Commercial/institutional: Mobile | | IE | |
| 1A4bii | Residential: Household and gardening (mobile) | x | | |
| 1A4cii | Agriculture/Forestry/Fishing: Off-road vehicles and other machinery | x | | |
| 1A4ciii | Agriculture/Forestry/Fishing: National fishing | | IE | x |
| 1A5b | Other, Mobile (including military, land based and recreational boats) | x | | |
| 1A3di(i) | International maritime navigation | x | | |
| 1A3 | Transport (fuel used) | x | | |

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues.

Transparency:

58. Slovenia has provided a detailed and transparent emissions inventory on transport. The calculation method and emission factors are considered, by the ERT, to be transparent and well described in the IIR.

Completeness:

59. The ERT considers the Transport sector to be almost complete and comprehensive with good levels of detail in the methodology descriptions for most pollutants. Emissions of lead and cadmium have been included since the last Stage 3 review in 2011 and this is welcomed. The ERT welcomes Slovenia's intention to estimate emissions of additional heavy metals and black carbon in the next few years.

60. Emissions arising from aviation international cruise and aviation domestic cruise are reported as 'NO' in the NFR tables. Slovenia provided the reasons for this during the review week. It is thought that the emissions arising from domestic aviation cruise are currently not included in the inventory. Emissions from this sector have however been reported as a memo item and are therefore excluded from the emission totals.

Consistency including recalculation and time series:

61. No consistency issues were identified for the transport sector. Trends in emissions are well described for the road transport sector. The ERT recommends that Slovenia includes similar descriptions of trends for the other transport sectors as well.

62. Slovenia has recalculated emissions for diesel machinery in agriculture and forestry using new emission factors and new information on the fleet profile and this is welcomed. No other recalculations were undertaken.

Comparability:

63. The COPERT 4 v9 software has been used for calculating emissions from road transport and therefore the estimates are comparable with other inventories. For other sectors, in the majority of cases the 2009 EMEP/EEA Emission Inventory Guidebook has been followed. It is recommended that the 2013 EMEP / EEA Guidebook is used for future submissions and amendments made accordingly.

Accuracy and uncertainties:

64. Based on the reported information, there seem to be no significant over- or underestimates of emissions for any of the pollutants.

65. No uncertainty analysis has been made alongside the 2015 submission. The ERT encourages Slovenia to provide this information in future years.

66. Slovenia has performed QA/QC activities, which are well described in the IIR. The ERT welcomes the development and implementation of a QA/QC plan and the designation of a QA/QC Manager.

Improvement:

67. The ERT welcomes Slovenia's intention to apply the 2013 EMEP / EEA Guidebook to many sectors and to include calculations of other heavy metals in future inventories.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.3.d.ii National navigation (shipping): All Pollutants

68. The IIR states that emissions from this sector are included in the road transport sector (1A3b). The ERT recommends that Slovenia treats emissions from national navigation separately, if possible, and follows the Tier 1 approach as described in the Guidebook.

Category issue 2: 1.A.3.a.i(i) International Aviation LTO (civil) and 1.A.3.a.ii(i) Domestic Aviation LTO (civil): All Pollutants

69. The NFR tables provide higher emissions from Domestic Aviation LTO than from International Aviation LTO over all reported years. The ERT team thinks this may be incorrect as the IIR states that there are only a couple of small domestic airports used for sport or tourist activities (Section 3.3.3.2). The ERT encourages Slovenia to check the data and make amendments in future inventories, if appropriate.

Category issue 3: 1.A.3.a.i(ii) International aviation cruise and 1A3aii(ii) Domestic aviation (cruise): All Pollutants

70. The notation key 'NO' is provided for Domestic Aviation (cruise). During the review week Slovenia provided information on the reason why this key was used: there are no domestic flights in the country. However, the reason provided remains unclear. Emission estimates are provided for Domestic Aviation LTO (1A3aii(i)), which infers that there are domestic flights in the country and therefore there should be associated domestic cruise emissions. Despite it being a "memo" item, it is recommended that Slovenia estimates emissions from Domestic Aviation (cruise) in future inventories.

71. The notation key 'NO' is provided for International Aviation (cruise). Slovenia provided information on the reason for this during the review week: all emissions arising from International aviation were included in International aviation LTO (1A3ai(i)) and therefore the notation key 'IE' should have been used. The ERT encourages Slovenia to estimate emissions separately for LTO and cruise emissions.

INDUSTRIAL PROCESSES

Review Scope

| Pollutants Reviewed | | SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} | | |
|---------------------|---|---|--------------|-------------------------|
| Years | | 1990 – 2013 + (Protocol Years) | | |
| NFR Code | CRF_NFRName | Reviewed | Not Reviewed | Recommendation Provided |
| 2A1 | Cement production | X | | X |
| 2A2 | Lime production | X | | |
| 2A3 | Glass production | X | | |
| 2A5a | Quarrying and mining of minerals other than coal | X | | |
| 2A5b | Construction and demolition | X | | X |
| 2A5c | Storage, handling and transport of mineral products | X | | X |
| 2A6 | Other mineral products (please specify in the IIR) | X | | |
| 2B1 | Ammonia production | X | | |
| 2B2 | Nitric acid production | X | | |
| 2B3 | Adipic acid production | X | | |
| 2B5 | Carbide production | X | | X |
| 2B6 | Titanium dioxide production | X | | |
| 2B7 | Soda ash production | X | | |
| 2B10a | Chemical industry: Other (please specify in the IIR) | X | | X |
| 2B10b | Storage, handling and transport of chemical products (please specify in the IIR) | X | | |
| 2C1 | Iron and steel production | X | | X |
| 2C2 | Ferroalloys production | X | | |
| 2C3 | Aluminium production | X | | |
| 2C4 | Magnesium production | X | | |
| 2C5 | Lead production | X | | |
| 2C6 | Zinc production | X | | |
| 2C7a | Copper production | X | | |
| 2C7b | Nickel production | X | | |
| 2C7c | Other metal production (please specify in the IIR) | X | | |
| 2C7d | Storage, handling and transport of metal products (please specify in the IIR) | X | | |
| 2H1 | Pulp and paper industry | X | | |
| 2H2 | Food and beverages industry | X | | |
| 2H3 | Other industrial processes (please specify in the IIR) | X | | |
| 2I | Wood processing | X | | |
| 2J | Production of POPs | X | | |
| 2K | Consumption of POPs and heavy metals (e.g. electrical and scientific equipment) | X | | |
| 2L | Other production, consumption, storage, transportation or handling of bulk products (please specify in the IIR) | X | | |

General recommendations on cross-cutting issues

Transparency:

72. The IIR is overall transparent. Slovenia has delivered an IIR with a chapter for industrial processes and with chapters for each subsector where the methods and the data sources are described. Still there is room for improvement.

73. ERT recommends providing more detailed information about REMIS in the IIR and why the data has been used from 2013 onwards and not before. The ERT recommends specifying the fact in all chapters where REMIS data is used and to add the info that REMIS data are plant-specific measurements.

Completeness:

74. The Slovenian report is overall complete, with minor gaps. ERT encourages Slovenia to add the missing emissions from TSP and PM for Construction and Demolition, for Storage, Handling and Transport of Mineral products and for Calcium carbide production, furthermore to add the emissions of NO_x, SO₂, NMVOC, NH₃ and CO from iron and steel production.

Consistency including recalculation and time series:

75. Slovenia quotes the old 2009 EMEP/EEA Guidebook in several subsectors. ERT recommends using the latest 2013 EMEP/EEA Guidebook. ERT recommends that the Party plans to do this in the next submission.

Improvement:

76. There are no sector specific planned improvements reported in the IIR.

Sub-sector Specific Recommendations..

Category issue 1: 2A1 Cement production

77. Slovenia reports in the IIR that for the period 1986–1998 the activity data used for emission calculation are data on the annual production of clinker obtained from the Statistical Office of the Republic of Slovenia and that these data were obtained directly from the cement production plants. It is not clearly recognizable that from 1999 the plant specific data are used. The ERT encourages Slovenia to improve transparency when providing this information in the next submission.

78. Slovenia uses the REMIS data from 2013 onwards. As this is a method change, the ERT encourages Slovenia for consistency reasons to find a solution to prove that the change of method over the time series has no influence on the quality of the emissions data over the whole time period.

Category issue 2: 2. A.5.b Construction and Demolition

79. 14. The ERT found that Slovenia does not report emissions from TSP and PM, although there are default EFs for these in the 2013 EMEP/EEA Guidebook. Slovenia informed the ERT that no activity data were available. The ERT recommends identifying new

data for the activity data for this subsector until the next submission or to find another solution to fill this gap.

Category issue 3: 2. A.5.c Storage, Handling and Transport of Mineral products

80. The ERT noted that no emissions of PM and TSP are reported and the wrong Notation key 'NO' is used. Slovenia responded that all emissions were reported in other NFRs in the mineral industry. The ERT recommends to implement the Notation key 'IE' in this subcategory and to include the information where these emissions are reported in the IIR for more transparency.

Category issue 3: 2. B.5 Calcium carbide production

81. The ERT noted that Slovenia does not report TSP and PM emissions from calcium carbide production. On request, Slovenia informed that calcium carbide was produced until 2007. The ERT recommends calculating the emissions of TSP and PM from 1990 to 2007 based on the default EFs from the 2013 EMEP/EEA Guidebook and reports these emissions in the next submission.

Category issue 3: 2. B.10.a Chemical industry - other

82. The ERT noted that Slovenia does not report the different branches in this subcategory, which are summarized here. During the review Slovenia sent the following list: Synthetic fiber production, formaldehyde processing, chlorine production, detergent production, korund production, melamin production, silicate and zeolyte production. The ERT encourages Slovenia to add this information in the next IIR for more transparency.

Category issue 4: 2. C.1 Iron and Steel production

83. Slovenia reports in the IIR: "We assumed that energy source in this type of industry refers only to electricity and that emissions from coke and other material are all process emissions. The consequence is that the coke consumption for the years 1986 – 1987 has been allocated to the energy sector, whereas for the period 1988 – 2009 all coke consumption has been included in the industrial processes sector." However, the ERT found that for all four NECD pollutants (NO_x, SO₂, NH₃, NMVOC) and also for CO the Party reports NA. Slovenia responded that the emissions were not reported and that the use of 'NA' was incorrect. As for iron and steel production EFs are available in 2013 EMEP/EEA Guidebook, and the ERT recommends that Slovenia calculates the missing emissions in the next annual submission.

SOLVENTS

Review Scope

| Pollutants Reviewed | | NMVOC | | |
|---------------------|---|--------------------------------|--------------|-------------------------|
| Years | | 1990 – 2013 + (Protocol Years) | | |
| NFR Code | CRF_NFRName | 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) | NO | NO | |

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:

84. The Solvents and Other Product Use sector inventory of Slovenia is not completely transparent. In the previous Stage 3 Review Report (from 2011) the ERT encouraged Slovenia to fill in the worksheet entitled “Additional info” of the CLRTAP template for next year’s submission, where the use of notation keys ‘NE’ and ‘IE’ is explained. The ERT notes that the explanations for the use of the notation keys ‘NE’ and ‘IE’ are still missing. After consulting the Party, it provided the ERT with an overview containing explanations regarding the use of the notation keys ‘NE’ and ‘IE’. The ERT recommends that Slovenia includes an overview with explanations for the use of the notation keys ‘NE’ and ‘IE’ in the next submission.

85. The ERT notes that the industrial NFR sectors 2H1, 2H2, 2I and 2K have been included in Paragraph 4.4, Other solvent and product use. After consulting, the Party replied that *the 2H1, 2H2, 2I and 2K sectors had been included in Paragraph 4.4, Other solvent and product use according to NFR structure in 2013 EMEP/EEA Guidebook. Reallocations of emissions compared to previous years were performed due to a change in Nomenclature for the Reporting Structure. Emissions from industrial processes and solvent and product use are considered as a whole and reported in one chapter.*

86. The ERT replied that according to the 2013 EMEP/EEA Guidebook the Party is quite right. However, it would be much more logical to divide this chapter into the following sections consistently with NFR14 categories:

- 2A Mineral products
- 2B Chemical industry
- 2C Metal production
- 2D Product and Solvent use
- 2G Other product use
- 2H Other Production industry
- 2I Wood processing
- 2J Production of POPs
- 2K Consumption of POPs and heavy metals
- 2L Other production, consumption, storage, transportation or handling of bulk products

Following this the Party replied that the National inventory should be prepared in accordance with the revised guidelines for reporting emissions and projections data under the Convention on Long Range Transboundary Air Pollution (ECE/EB.AIR.125). One of the main structural changes in the latest version of the 2013 EMEP/EEA Guidebook was the merging of two NFR sectors ("2. Industrial process" and "3. Product use") into one NFR sector "2. Industrial processes and product use". The sector "2. Industrial processes and product use" can be divided to four groups of comparable rank: 2.A Mineral products, 2.B Chemical industry, 2.C Metal production, and 2.D-2.L "Other solvent and product use".

87. Slovenia agrees that the ERT proposal could be logical, but on the other hand could also lead to confusion due to inconsistent terminology. If ERT's recommendation were a general recommendation for all Parties Slovenia would be ready to follow it.

88. The ERT thanks Slovenia for their replies and for thinking along and strongly recommends EMEP/EEA to change the structure of the "Industrial processes and solvent and product use" chapter as soon as possible in the EMEP/EEA Guidebook.

89. The ERT also notes that there is no information on the Tier methods used. The ERT recommends that Slovenia includes information on which Tier methods have been used, at least for the key sources, in the next submission.

90. The ERT also notes that Slovenia does not always use the appropriate notation keys in the NFR tables for a number of source categories of the Solvents and Other Products sector. For more detailed information see the relevant sector section.

91. Furthermore the ERT notes that an overview of trends in emissions are missing. The ERT recommends that Slovenia adds an overview of trends in emissions, at least for the key sources, to its next submission.

92. The ERT notes that most reported emission estimates of the solvents sector are based on plant specific data which are based on measurements and mass balances of used solvents (solvent management plans). The ERT commends Slovenia for using plant specific data (high tier approach) for estimating emissions.

Completeness:

93. In the previous Stage 3 Review Report (from 2011) the ERT recommended that Slovenia should improve the completeness of its reporting on the solvents sector by including 'NO' (not estimated) emissions in next year's submission. The ERT notes that Slovenia has

reported most of these missing emissions in its current submission and commends the Party for this. Only for 2D3e and 2D3f there are still no emissions reported for the period 1990-2004. Instead, the notation key 'NO' has been reported. The ERT strongly recommends that Slovenia includes these missing emissions in the next submission

94. In the previous Stage 3 Review Report (from 2011) ERT also encouraged Slovenia to provide comprehensive activity data with a good level of detail as well as methodology descriptions in the next IIR. The ERT notes that methodology descriptions are included in this submission and commends Slovenia for this. Furthermore, the ERT notes that in this submission there are still no activity data, neither in the NFR tables nor in the IIR. Following a consultation, the Party provided the ERT with an overview of activity data of NFR 2D3b, NFR 2D3c and some subsectors of NFR 2D3g. Emissions from all other activities are not calculated from AD and EFs, but obtained from the REMIS – HOS data base. The ERT strongly recommends that Slovenia includes this information in the next submission.

Consistency including recalculation and time series:

95. The ERT notes that Slovenia has not performed recalculations for any of the source categories within the Solvents and Other Product Use sector. The ERT found no discrepancies between the 2012 and 2013 emissions time series for the various emission sources.

96. In the previous Stage 3 Review Report (from 2011) the ERT recommended that Slovenia should improve the consistency of its reporting by using the emission factors of the most recent EMEP/EEA Guidebook. The ERT finds that Slovenia still does not always use the Emission Factors of the most recent 2013 EMEP/EEA Guidebook for calculating emissions. The ERT recommends Slovenia to use emission factors from the latest EMEP/EEA Guidebook in the next submission.

Comparability:

97. Slovenia has provided its emissions inventory in accordance with the reporting requirements and submitted it in the requested NFR format.

98. Furthermore, the ERT notes that there are no real differences between the CLRTAP and NECD emissions in the Solvents and Other Product Use sector. There are only two cells exchanged. The ERT recommends that Slovenia corrects this mistake in the next submission.

Accuracy and uncertainties:

99. In the previous Stage 3 Review Report (from 2011) the ERT encouraged Slovenia to undertake an uncertainty analysis and to implement sector specific OA/QC procedures for the solvent sector. The ERT notes that still no uncertainty analysis has been undertaken and no specific QC procedures have been carried out for the Solvent sector. For the next annual submission, Slovenia will try to estimate uncertainty and include source specific QA/QC plan for crucial sectors. The ERT encourages Slovenia to implement an uncertainty analysis and to carry out specific QC procedures for the Solvent sector in the next submission.

100. The ERT notes that Tier 1 has been used to calculate the emissions from key source 2D3a. After being consulted, the Party replied that there are no statistical data on the consumption of products which contain solvents available in Slovenia. Therefore a simple method (Tier 1) is the only possibility to calculate NMVOC from this sector at this moment. In

spite of that, the ERT encourages the Party to change from the Tier 1 to the Tier 2 approach in future for all key sources.

Improvement:

101. The ERT notes that no improvements are planned for the Solvents and Other Product sector. The ERT encourages Slovenia to list planned and desired sector-specific improvements in its IIR to help provide transparency for future improvements and to support improvement prioritization.

Sub-sector Specific Recommendations.

Category issue 1: 2G - NMVOC

102. The ERT finds that the used notation keys in the NFR tables are 'NO' and 'NR'. After being consulted the Party responded that they used 'NR' (not relevant) for black carbon and the additional heavy metals since reporting of these pollutants is not mandatory, and "NO" (not occurring) for all other pollutants since the NFR sector 2G does not occur in Slovenia. Because NFR sector 2G does not occur in Slovenia, the ERT encourages the Party to use the notation key 'NO' for all pollutants.

AGRICULTURE

Review Scope:

| Pollutants Reviewed | | NO _x , NMVOC, NH ₃ , PM ₁₀ , PM _{2.5} , NMVOCs and HCB | | |
|---------------------|---|--|--------------|-------------------------|
| Years | | 1990 – 2013 + (Protocol Years) | | |
| NFR Code | CRF_NFRName | Reviewed | Not Reviewed | Recommendation Provided |
| 3B1a | Dairy cattle | x | | |
| 3B1b | Non-dairy cattle | x | | |
| 3B2 | Sheep | x | | x |
| 3B3 | Swine | x | | |
| 3B4a | Buffalo | x | | |
| 3B4d | Goats | x | | x |
| 3B4e | Horses | x | | |
| 3B4f | Mules and asses | x | | |
| 3B4gi | Laying hens | x | | |
| 3B4gii | Broilers | x | | |
| 3B4giii | Turkeys | x | | |
| 3B4giv | Other poultry | x | | |
| 3B4h | Other animals (please specify in IIR) | 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 | | |
| 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 | | x |
| 3F | Field burning of agricultural residues | x | | x |
| 3I | Agriculture other (please specify in the IIR) | x | | x |
| 11A | Volcanoes | x | | |
| 11B | Forest fires | x | | |

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues

103. The emission inventory of the Agriculture sector includes emission of NO_x, NMVOC, NH₃, PM and TSP from 3B Manure management and 3D Inorganic N-fertilizers. Emissions from 3Df Use of pesticides, 3F Field burning of agricultural residues and 3I Agriculture other are reported as 'NO' (not occurring).

104. The agriculture emission inventory of Slovenia is nearly complete in terms of categories, coverage and years and most of the categories have been reported with sufficient transparency.

105. The ERT commends Slovenia for implementing most of the recommendations made in the previous review to improve its emission reporting. However, trend analysis can be further improved by adding detailed information to explain the jumps and dips in the NH₃ emissions. The ERT recommends that Slovenia includes such information in its annual submission to improve transparency.

106. The ERT also recommends that Slovenia harmonizes reporting emissions under the NEC Directive and the CLRTAP in order to reduce the discrepancy of the reported emission data.

Transparency:

107. The Agriculture sector chapter in the IIR is generally transparent as the Party's methodology, emission factors and assumptions for estimating emissions are described. The ERT noted that some items can be further improved, such as adding more information about the emission trend of NH₃. The ERT encourages Slovenia to continue its effort to enhance transparency by including more detailed information on the Agriculture sector.

108. The ERT also noted that no explanations were provided in the IIR on the rationale for the use of the notation keys 'NO' to report emission from 3Df Use of pesticides, 3F Field burning of agricultural residues and 3I Agriculture other. The ERT recommends that Slovenia addresses the emissions from these categories in future submissions to enhance the transparency of the emission inventory of agriculture.

Completeness:

109. The emission inventory of the Agriculture sector covers the most important sources of emissions with the exception of estimates of PM from 3B2 sheep and 3B4d goats, and emission of hexachlorobenzene (HCB) from 3Df Use of pesticides. The ERT commends Slovenia for its continuous efforts to complete its emission inventory for the Agriculture sector.

110. The 2013 EMEP/EAA Guidebook provides methodologies for estimating emissions of PM from various categories in agriculture. The ERT recommends that Slovenia estimates emissions of PM from 3B2 sheep and 3B4d goats in order to enhance the completeness of the emission inventory in future submissions. The ERT also encourages the Party to estimate emission of HCB from the use of pesticides when reliable activity data is available.

Consistency including recalculation and time series:

111. The ERT did not identify any issues concerning consistency for the Agriculture sector. Slovenia undertook a recalculation of its emission inventory which includes:

- Error due to double counting of NH₃ emissions of grazed sheep was eliminated since last submission.
- New data on urea consumption have been introduced since last submission.

- Emissions of NH₃ from 3Da2b Sewage sludge applied to soils have been calculated and included into national inventory for the period 1986 – 2013 for the first time.

112. The ERT commends Slovenia for the consistency of the time series and the recalculation made for the Agriculture emission inventory. The ERT encourages Slovenia to continue enhancing the quality of its emission estimates and the consistency of the agriculture sector, so that national circumstances can be reflected in future submissions.

Comparability:

113. Slovenia indicated in its IIR that for emissions of NO_x, NH₃ and NMVOC from manure management, the Tier 2 methodology in the 2013 EMEP/EEA emission inventory Guidebook was used to assess the emissions of NH₃ and nitric oxide. The ERT commends the Party for the detailed description of the methodologies used for estimating pollutant emissions from the Agriculture sector.

114. The ERT noted that the national total of NH₃ emission for 2013, reported under LRTAP differs from that reported under NECD. The ERT recommends that Slovenia harmonizes the reporting of emissions between LRTAP and NECD or explains the reason for the discrepancies of the reported emission data in next submission.

Accuracy and uncertainties:

115. The ERT considers Slovenia's emissions inventory of the Agriculture sector to be of an adequate accuracy.

116. Slovenia stated in its IIR that a QA/QC will be implemented at the end of 2013. The ERT commends Slovenia for undertaking such an approach and encourages the Party to make an uncertainty analysis for the Agriculture sector in order to provide an indication of the reliability of the inventory data in the next submission.

Improvement:

117. Slovenia indicated in its IIR that it will undertake some improvements as new estimates for manure management systems for cattle and pig production will be provided for the period 2007-2014.

118. The ERT commends Slovenia for its plan to undertake such improvements and also encourages the Party to make other necessary improvements for the whole sector.

Sub-sector Specific Recommendations.

Category issue 1: 3Da1 Agricultural soils: AD

119. The ERT noted that the IIR does not contain detailed information on the inorganic fertilizers used. The ERT encourages Slovenia to provide detailed information on the breakdown of inorganic fertilizer use into the relevant compounds in future submissions in order to ensure the transparency of the emission inventory of the Agriculture sector.

Category issue 2: 3Da1 Inorganic N-fertilizers: NH₃

120. The ERT noted that there is a jump of NH₃ emission between 1991 and 1992. This period shows an increase in emissions by about 65 % (from 1727 Mg in 1991 to 2847 Mg in 1992). A similar increase of the activity data was observed. The ERT put a question on this issue to the Party. The Party responded during the review week that the reasons for the sharp increase in sales of mineral fertilizers in 1992 might be:

- *Poor economic situation and war for independence in 1991 which caused considerably lower sales of mineral fertilizers than during the previous years, independence and improved economic situation in 1992,*
- *High inflation in 1992 which stimulated farmers to renew stocks of mineral fertilizers (a well-established practice from the times of high inflation in Yugoslavia was to invest in material resources),*
- *Main supplier of mineral fertilizers in Slovenia was (and it still is) a company from Croatia. The fear that due to the political situation in Croatia there would be a disturbance in mineral fertilizers supply forced farmers to increase their stocks of mineral fertilizers”.*

121. The ERT thanks Slovenia for their speedy response to this question. The ERT recommends that Slovenia includes this information in the IIR in the next submission in order to enhance the quality of the trend analysis and ensure the transparency of the Agriculture sector.

Category issue 3: 3Da2a Animal manure applied to soils: NH₃

122. The ERT noted that Slovenia used the notation key ‘NA’ (not applicable) to report NH₃ emission from 3Da2a (Animal manure applied to soils), but the emissions are reported under 3B manure management as indicated in the IIR. When asked about this by the ERT during the review week, Slovenia said that it would correct this error and use the appropriate notation key, ‘IE’ (Included Elsewhere), to report emission from this activity. The ERT recommends that Slovenia uses the notation keys as indicated in the 2013 EMEP/EEA emission inventory Guidebook.

Category issue 4: 3Df Use of pesticides: HCB

123. The ERT noted that Slovenia reported the emissions of HCB from the use of pesticides as ‘NO’ (not occurring) in the NFR tables. The use of pesticides in Slovenia is documented in the National Action program to achieve sustainable use of plant protection products for the period 2012-2022. The ERT asked the Party about this. Slovenia responded during the review week that: *“the data available in the National Action program cannot be used for HCB emission calculation since the table (AD) does not specify the amount of individual pesticides, but only groups and sub-groups of plant protection products”*. The Party also added *“that the reason for not estimating HCB emissions from use of pesticides is a legislative ban on the use of HCB in plant protection products in Slovenia and HCB has not been applied as fungicide in Slovenia”*. The ERT reminds Slovenia that the use of particular pesticides in agriculture can be a source of POPs emission due to traces of HCB in some pesticides as a contaminant. The ERT encourages Slovenia to consider reporting HCB emission when detailed data on pesticides is available.

Category issue 5: 3B2 Sheep and 3B4d Goats: PM₁₀ and PM_{2.5}

124. The ERT noted that the emissions of PM₁₀ and PM_{2.5} from sheep and goats are reported using the notation key 'NA' while activity data for these animal groups was provided in the NFR tables. The 2013 EMEP/EAA Guidebook provides methodologies for estimating emissions of PM from numerous categories of the Agriculture sector. The ERT recommends that Slovenia estimates emissions of PM from sheep and goats in order to enhance the completeness of the emission inventory in future submissions.

WASTE

Review Scope:

| Pollutants Reviewed | | SO ₂ , NO _x , NMVOC, NH ₃ , PM, heavy metals and POP's | | |
|---------------------|--|---|--------------|-------------------------|
| Years | | 1990 – 2013 + (Protocol Years) | | |
| NFR Code | CRF_NFRName | 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 | |
| 5D1 | Domestic wastewater handling | X | | X |
| 5D2 | Industrial wastewater handling | X | | |
| 5D3 | Other wastewater handling | | X | |
| 5E | Other waste (please specify in IIR) | | X | |

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues

Transparency:

125. Slovenia has made incorrect use of notation keys for several emission years, several sources and for several pollutants. The use of the notation key 'NO', for instance, is not possible in combination with other notation keys (i.e. the source/process does not exist in the country). The ERT recommends Slovenia to check future submissions on the proper use of notation keys.

Completeness:

126. The ERT notes that Slovenia does not report PM emissions for the time series 1990-1999. In the 2011 review the ERT recommended that Slovenia should assess the possibilities for this and to calculate and report emissions for the time series 1990-1999. In the IIR there is no explanation regarding this subject. The ERT encourages Slovenia to include the PM emissions for the time series 1990-1999 in future submissions.

127. Slovenia uses 'NR' as notation key for BC emissions. Although this is the right notation key for this voluntary pollutant, the ERT has noted that in several countries information is now available that describes the fraction of BC in PM₁₀ for several processes. The ERT encourages Slovenia to gather the necessary information and to investigate the possibility of including this information in the Slovenian inventory.

Accuracy and uncertainties:

128. Following the encouragement made by the ERT in the 2011 review, Slovenia now describes the QA/QC in the IIR. The ERT notes that no source specific QA/QC procedures are described. The ERT encourages Slovenia to also implement source specific QA/QC procedures.

129. Slovenia does not provide an uncertainty analysis in the IIR. The ERT reiterates the recommendation from the 2011 review to include an uncertainty analyses in the IIR in future submissions.

Improvement:

130. The ERT commends Slovenia for the follow up on most of the recommendations from the 2011 review and encourages Slovenia to proceed with this.

Sub-sector Specific Recommendations.

Category issue 1: 5A Solid waste disposal on land – Activity data

131. Slovenia followed up on the recommendation from the 2011 review to estimate NMVOC and PM according to the Tier 1 method of the Guidebook. Asked for an explanation regarding the differences in reported amounts of deposited waste in the IIR and those reported by Eurostat, Slovenia replied that in the calculation (and IIR) only the biodegradable part of the waste was reported, as also described under "Activity data" (p 178) in the IIR. The ERT notes furthermore, that Guidebook EFs used by Slovenia are based on the total amount of waste deposited. Using only the degradable amount of deposited waste in the calculation leads to an underestimation of the emission of pollutants. The ERT recommends that Slovenia uses the total amount of waste deposited as activity data in the calculations.

Category issue 2: 5B1 Composting – Activity data

132. Slovenia reports no emissions prior to 2002 and uses the notation key 'NO' (not occurring). The ERT notes that the Eurostat database reports amounts of composted waste as of 1995. On request, Slovenia explained that the Eurostat data are estimates based on three surveys that were all conducted differently and that were non-comparable and hence 'NE' would be a more appropriate notation key. The ERT notes that the Eurostat database does not contain any information about these data being estimated and the surveys seem to indicate that there was, in fact, composting activity in that period. The ERT recommends to use the notation key 'NE' and encourages Slovenia to extrapolate the activity data in future submissions.

Category issue 3: 5C1 Waste incineration – All sources and all pollutants

133. The ERT notes that the EFs used originate from the 2009 EMEP/EEA Guidebook and that Slovenia in the IIR states its intention to use the methodology and EFs from the 2013 EMEP/EEA Guidebook to further improve its submissions. Furthermore, the ERT notes that the 2013 EMEP/EEA Guidebook assumes that abatement technology is in operation. The ERT notes also that Slovenia explained that incineration of waste also occurs in the cement industry. To avoid an underestimation of emissions, the ERT recommends Slovenia, before using the 2013 EMEP/EEA Guidebook EFs, to investigate the suitability of these EF's with regard to the applied abatement technology.

Category issue 4: 5C1a Municipal waste incineration – NH₃ and Indeno (1,2,3-cd) pyrene

134. The ERT notes that Slovenia uses the notation key 'NA' while activity data and EFs (2013 EMEP/EEA Guidebook) are available. Slovenia explained that this was done unintentionally and would be corrected in the next submission.

Category issue 5: 5C1bii Hazardous waste incineration – All Pollutants

135. Slovenia reports the required pollutants with the notation key 'NO' in the NFR tables. On request Slovenia explained that this will be corrected to 'IE' (Included Elsewhere) in the next submission, as this source is included in 5C1bi.

Category issue 6: 5D1 Domestic waste water handling – NMVOC

136. In the 2011 review, the ERT recommended to include the NMVOC emissions from wastewater handling in the report. The ERT notes that Slovenia reports 'NA' for NMVOC from domestic wastewater handling. However, no activity data on municipal wastewater treatment is reported in the IIR. There is a reference made to the database of the Slovenian Environment Agency for the activity data from this process. The ERT notes that as such, activity data and an emission factor (2013 EMEP/EEA Guidebook) are available. The ERT reiterates the recommendation from the 2011 review to include the NMVOC emission from municipal wastewater treatment plants in the inventory and to report these in future submissions.

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

1. Slovenia_waste_question 2_Review_2015.xlsx