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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:

ESTONIA

CONTENT

INTRODUCTION

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

2. This annual review, has concentrated on SO_2, NO_x, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time-series years 1990 – 2009 reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.

3. This report covers the stage 3 centralised reviews of the UNECE LRTAP Convention and the EU NEC Directive inventories of Estonia coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 27th June 2011 to 30th June 2011 in Copenhagen Denmark and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: Generalist –John van Aardenne (EEA), Energy –. Emilia Hanley (Ireland), Transport – Michael Kotzulla (Germany), Industry –Valentina Idrissova (Kazachstan), Solvents –Nadine Allemand (France), Agriculture and Nature – Jim Webb (UK), Waste – Nebojsa Redzic (Serbia).

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

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

PART A: KEY REVIEW FINDINGS

5. The inventory is in line with the EMEP/EEA Emission Inventory Guidebook (hereafter EMEP/EEA Guidebook) and the UNECE Reporting Guidelines.

6. The ERT commends Estonia for the effort undertaken to present an extensive IIR which facilitated the review of the 2011 inventory submission. The ERT also thanks Estonia for providing timely and informative responses to the questions raised by the ERT during the review.

7. The 2011 submission is found to be complete with respect to the most important sources of emissions. At the sector level some recommendations have been made to improve the inventory.

The ERT commends Estonia for taking into account results of the UNFCCC review to improve the calculation of agricultural emissions.

INVENTORY SUBMISSION

8. In the 2011 submission, Estonia provided national inventories for the years 1990 to 2009 for all of the required pollutants in the NFR09 format for all categories.

9. The inventory submitted by Estonia is of good quality and is generally well documented in the Informative Inventory Report (IIR).

KEY CATEGORIES

10. Estonia has compiled and presented in its IIR a Key Category Analysis following the EMEP/EEA Guidebook both for year 2009 emissions as well as for the emission trend.

QUALITY

Transparency

11. The ERT recognises the level of effort undertaken by Estonia in providing an inventory with a significant level of detail. The IIR provides detailed information which is well presented to facilitate the review process. During the review, any questions issued by the ERT to the Party were addressed quickly and explanations were accurate and extensive indicating a good responsiveness of the Party.

12. In general, EFs and activity data time-series are almost always documented in detail in the IIR, underlying assumptions are presented and references given. The ERT encourages Estonia to compliment the excellent work done on the IIR with some additional descriptions indicated below e.g. under the chapter Solvents and Waste.

13. The ERT encourages Estonia to check and correct the use of notation keys (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimates” and IE where emissions are “Included Elsewhere”) where estimates are not available or necessary, as indicated in the findings within the sectors in Part B.

Completeness

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

15. Estonia’s inventory for the pollutants reviewed is generally complete. At the sector level some recommendations have been made to improve the inventory as described below under the chapters of the various sectors. During the review Estonia agreed to take these into consideration in the next inventory submission.

16. The ERT recommends that Estonia tries to further increase the completeness of the inventory, especially for particle, POPs and heavy metal emissions (transport) and to evaluate the importance of some activities in the solvent sector which have currently not been taken into account.

Consistency, including recalculations and time-series

17. The ERT noted that for almost all pollutants and sectors recalculations have been carried out. For NMVOC, Pb and CO the changes are relatively significant. The revisions on methods and data are described in the IIR and for many source categories the impact on the emissions compared to the 2010 and 2011 reports are indicated. The ERT found the description and evaluation provided in the IIR helpful to make the recalculations transparent.

Comparability

18. The ERT noted that the inventory of Estonia is comparable with those of other reporting parties. The allocation of source categories is according to the EMEP/UNECE reporting Guidelines and the methodology is consistent with the EMEP/EEA Emission Inventory Guidebook, 2009. The ERT encourages Estonia to continue with this approach to national inventory calculation.

19. The ERT noted that the Party’s inventories submitted under the CLRTAP and NECD for the submitted years 1990 - 2009 are fully consistent, and that NFR09 templates were applied in both reporting.

CLRTAP/NECD comparability

20. The ERT noted that the national totals reported by Estonia under the CLRTAP and NECD for the submitted years 1990-2009 are fully consistent. The ERT commends Estonia for this effort.

Accuracy and uncertainties

21. Estonia has not carried out an uncertainty analysis for the UNECE submission. In its IIR, Estonia mentions that uncertainty analyses are part of the sector level improvements identified for future work. The ERT encourages Estonia to perform an uncertainty analysis prior to the preparation of the next submission so

that the outcome of the uncertainty analysis can provide support for the sectors with highest uncertainties.

Verification and quality assurance/quality control approaches

22. Estonia has elaborated and implemented a quality assurance/quality control (QA/QC) plan. The ERT noted that QA/QC activities are not applied consistently between all sectors. For data reported by the plants, QA/QC procedures were already applied during data collection and processing, but for many sectors QA/QC work is scheduled to take place after the finalization of the NFR report. The ERT encourages Estonia to integrate QA/QC procedures in all aspects of the inventory preparation according to the EMEP/EEA Guidebook, not only when the inventory is being finalized.

FOLLOW-UP TO PREVIOUS REVIEWS

23. Estonia provided detailed responses to the questions identified in the Stage 2 Review on outliers of implied emissions factors, trends and recalculation. Due to the quality of the IIR and Estonia's responsiveness the ERT was able to review the inventory in detail and provide a number of recommendations.

AREAS FOR IMPROVEMENTS IDENTIFIED BY ESTONIA

24. Estonia indicated that it envisages to carry out further improvements particularly on the following items:

a. to provide uncertainty analyses for all key sources;
b. to check the activities data and emission factors in energy industries to address the discrepancy of data on fuel consumption from the Statistical energy balance and the reports of enterprises;
c. to check data from facilities in the solvent use sector for the years 1990-2005.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

Cross-cutting improvements identified by the ERT

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

(a) to further increase the completeness of the inventory , especially for particle, POPs and heavy metal emissions in the transport sector;

(b) to evaluate the importance of activities in the solvent sector currently not taken into account;

(c) to perform an uncertainty analysis prior to the preparation of the inventory so that the outcome of the uncertainty analysis can feed into the inventory preparation in sectors with highest uncertainties;

(d) to use the appropriate notation keys (such as NO (Not Occurring), NE (Not Estimated) and IE (Included Elsewhere) where estimates are not available or necessary;

(e) to integrate QA/QC procedures in all aspects of the inventory preparation according to the EMEP/EEA Guidebook, not only when the inventory is finalized.

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

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO_x, NO_x, NMVOC, NH_3, CO, HMs, POPs		
Years		1990 – 2009 + (Protocol Years)		
NFRCode	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.1.a	public electricity and heat production	x		x
1.A.1.b	petroleum refining	x		x
1.A.1.c	Manufacture of solid fuels and other energy industries	x		x
1.A.2.a	iron and steel	x		x
1.A.2.b	non-ferrous metals	x		x
1.A.2.c	chemicals	In 1A2fi	IE	
1.A.2.d	pulp, paper and print	In 1A2fi	IE	
1.A.2.e	food processing, beverages and tobacco	In 1A2fi	IE	
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	x		x
1.A.4.a.i	commercial / institutional: stationary	x		x
1.A.4.b.i	residential plants	x		x
1.A.5.a	other, stationary (including military)	In 1A4ai	IE	
1.B.1.a	coal mining and handling	x		x
1.B.1.b	solid fuel transformation	In 1B1a	IE	
1.B.1.c	other fugitive emissions from solid fuels)		NO	
1 B 2 a i	Exploration, production, transport		NA	
1 B 2 a iv	Refining / storage	x		x
1 B 2 a v	Distribution of oil products	x		x
1 B 2 b	Natural gas	x		x
1 B 2 c	Venting and flaring	x		x
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2		NA	
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.				

27. General recommendations on cross-cutting issues: The energy sector inventory is presented in a transparent and comprehensive manner for the Energy sector. During the review, any questions issued by the ERT to the Party were addressed quickly and explanations were accurate and extensive indicating responsiveness of the Party. The ERT commends this and encourages Estonia to continue improving their inventory wherever necessary, particularly by including more source documents supporting the rationale behind their reported emissions. Especially for details in the QA/QC system, energy balance sheets, as well as for emission factors used for calculating the emissions for each NFR subcategory and each pollutant.

Transparency:

28. The ERT recognises the level of effort undertaken by Estonia in providing a well presented inventory with a significant level of detail for the Energy Stationary sector.

29. Estonia did neither include an energy balance sheet in their last submission nor any information on the emission factors used for calculating their energy emissions but the Party agreed with the ERT that this type of source information would improve the transparency of their inventory in the future.

30. The ERT observed a few reported IEs for certain sub-sectors (with clear reference to the sectors where they were included) and a number of reported zero-values in the NFR (for details see sub-sector specific recommendations below). In general, it is recommended to replace zero-value cells with appropriate notation keys where relevant and also to split the sub-sector estimates further to avoid using the notation key IE where possible. In cases where the zero emissions are related to emissions below 0.000 kilo tons this should be explained in the IIR.

Completeness:

31. The ERT considers the Energy Stationary sector to be generally complete. The ERT commends Estonia for the fact that no NE notation keys were used in the Energy sector.

32. In the 2011 submission, Estonia provided national inventories with full time-series for the years 1990 to 2009 for all of the required pollutants in the NFR09 format for the Energy sector categories.

Consistency including recalculation and time-series:

33. The ERT noted that recalculations in the Energy Stationary sector have been applied consistently through the entire time-series and all methods in the sector appear to be in line with the EMEP/EEA Guidebook and the UNECE Reporting Guidelines.

34. The Party did not include any information on the fluctuation or abnormal levels of IEF and subsequent fluctuation in pollutant emissions in their energy emission time-series. During the review week, however, Estonia provided detailed and satisfactory clarification of all decreases and increases that were addressed by the ERT and agreed that it would improve the quality of future IIRs to include this additional information in their future IIR.

Comparability:

35. The ERT noted that the Estonian Energy sector inventories submitted under the CLRTAP and NECD for the years 1990 - 2009 are fully consistent, and that NFR09 templates were applied in both reportings. The ERT considers the Estonian Energy sector inventory to be comparable with those of other reporting parties due to the inclusion of all relevant sources and the use of methodologies provided in the EMEP/EEA Guidebook. The ERT encourages Estonia to continue with this approach in their Energy sector inventory calculation.

Accuracy and uncertainties:

36. Estonia did not provide an uncertainty assessment for the Energy sector. During the review week, however, the Party indicated to include it in the next submission.

37. Estonia reported general QA/QC procedures implemented in the latest inventory and when asked by the ERT to provide more details on their QA/QC process, the Party promptly provided more comprehensive and accurate description and agreed to include this in the IIR to further enhance the transparency of the IIR.

Improvement:

38. Estonia provided a list on some planned sectoral improvements but did not elaborate on these in more detail in the IIR. The ERT encourages the Party to include more specific and detailed information on planned improvements in the Energy sector as well as the status of each improvement and/or time frame anticipated for implementation of each improvement.

Sub-Sector Specific Recommendations.

Category issue 1: Inconsistencies in key source time-series

44. The ERT noted some fluctuations or abnormal levels of Implied Emission Factors (IEF) in time-series for specific key sub-sectors of various pollutants and brought these to the attention of the Party. During the review Estonia provided some explanations for these and indicated to carry out more analyses to correct the inconsistencies between the years for the future submissions, where relevant, or to provide justifications for the fluctuations in the IIR. Sectors: 1.A.1.a: public electricity and heat production; 1.A.2.f.i: Stationary Combustion in Manufacturing Industries and Construction: Other; 1.A.4.b.i: residential plants; 1.B.2.a.v: Distribution of oil products for various pollutants.

Category issue 2: Sector 1.A.1.a: public electricity and heat production

39. –The ERT found a significant IEF fluctuation in the reported HCB emissions for 1990 - 2009 and a gap (no reported emissions) for the year 2004.

40. The ERT recommends that Estonia verifies and recalculates POP emissions for the next submission by including calculations for 2004.

Category issue 3: Sector 1.A.1.a: public electricity and heat production

41. The ERT found that the implied emission factor for PCB emissions is relatively high compared to other Parties` findings for 1990 - 2009. The Party explained that they are using emission factors for calculating PCB emissions derived from the„"Technical Paper to the OSPARCOM-HELCOM-UNECE Emission Inventory of HM and POPs“(TNO 1995), where EFs are available for wood (0,46 mg/GJ) and wood waste (0,19 mg/GJ, coal (0,13 mg/GJ), liquid fuels (0.09 mg/GJ) and for oil shale (0,41 mg/GJ), as these were regarded to be more representative for the country-specific conditions than the EMEP/EEA Guidebook values. Estonia also indicated that additional measurements are needed for verification of the EFs. The ERT encourages Estonia to carry out further studies to verify the use of emission factors.

Category issue 4: Sector 1.A.1.a: public electricity and heat production

42. The ERT found quite significant IEF fluctuations for PCDD/F emissions between 2003 and 2009 compared to the rest of the 1990 – 2009 trend. The Party stated that the significant IEF fluctuation in 2003-2009 was due to the fluctuation of emissions from oil shale power plants because of three different EFs being available for oil shale, depending on the boiler type (2.95 to 400 g I-TEQ/t). In the last year the share of oil shale combusted in boilers with higher EF has increased significantly. The EFs were obtained from a national dioxin project.

Category issue 5: Sector 1.A.1.a: public electricity and heat production

43. The ERT noted that there is a significant increase of the IEF for PM_{10} and $PM_{2.5}$ emissions in 2007 when compared to the generally consistently decreasing 1990 – 2009 time-series.

44. Estonia explained that an additional analysis needs to be carried out by the Party to study the reason for this. The ERT recommends Estonia to verify these emissions for the next submission.

Category issue 6: Sector 1.A.1.a: public electricity and heat production

45. The ERT found that the IEF in the mercury time-series is higher for the years1990-1993 of the trend, and has a sudden increase between 2002 – 2004 compared to the rest of the time-series. The Party confirmed that they have checked the calculations of IEF and that they are correct. The analysis table (sheet "POPs_1A1a") was included in the Party's response. The ERT recommends Estonia to include the analysis and possible corrections ino the next submission.

Category issue 7: 1.A.2.f.i: Stationary Combustion in Manufacturing Industries and Construction: Other

46. The ERT found a significant IEF fluctuation in the reported TSP emission trend and discovered that the IEF is also high compared to other Parties` findings between 1990 and 1996. Estonia explained that the TSP emissions from one plant (the Kunda cement factory) were high in that period. It used to be a big problem for Kunda town citizens in those days but that more effective abatement techniques were applied in the factory since1995. Therefore, after that no more issues with TSP emissions have occurred. The ERT thanks Estonia for providing this clarification and also encourages Estonia to add this explanation in their IIR.

Category issue 7: 1.A.4.b.i: residential plants

47. The ERT found a sifnificat increase of the IEF for the following emissions in 2007: NO_x, NMVOC, $PM_{10,}$ $PM_{2.5}$, TSP, CO, PCDD/F; B(a)p, B(b)f, B(k)f, I(123)p (i.e.PAH-4); HCB, SO_x, NH_3, PCBs and heavy metals. The Party admitted an error in their activity data due to an allocation of data in a wrong row. The ERT received the correct data estimates during the review. The ERT thanks Estonia for this information and recommends Estonia to correct the values in the next submission.

Category issue 7: 1.B.2.a.v: Distribution of oil products

48. The ERT found a sudden increase in the NNVOC IEF between the years 2000 – 2004.The Party explained this fact with a high share of NMVOC emission from an Estonian terminal during those years. Only activity data for gasoline distribution are provided in the NFR table, activity data for fuels in terminals are missing because data were only available from 2006 onwards. The emission factor calculated by using emission and activity data for gasoline distribution only is correct (tables 3.79 and 3.82 of IIR). A data analysis sheet ("1B2av_NMVOC") was included in the Party's response. The ERT welcomed all the detailed explanations supplied by the Party during the review week. The ERT encourages Estonia to correct the errors explained above and to investigate further all the current emission fluctuations. If necessary, EFs should be adjusted and recalculations made for the above mentioned pollutants in the Energy sub-sectors. In the meantime, the ERT recommends Estonia to include a table including fluctuations in sub-sectors and pollutants as well as explaining any abnormal values to increase the transparency of the report and to make future review work more efficient. All the improvements would be a great addition to an already very well elaborated inventory.

Category issue 8: Zero-values

49. Estonia has reported the following zero (0) values instead of notation keys in the NFR tables:

Energy Sub-sectors:	**Pollutants:**
1A1a	NH_3 and Se
1A1b	All but NO_x, NMVOC and CO
1A1c	Se
1A2a	NH_3, Cd, Hg, Se, HCB
1A2b	NH_3, Cd, Hg, Ni
1A2fi	Se
1A4ai	NH_3 and Se
1B1a	All 9 heavy metals
1B2c	NH_3, $PM1_0$ and $PM_{2.5}$

50. The ERT encourages Estonia to replace all the above estimates in the Energy Stationary sub-sectors reported as zero (0) values in the NFR tables with the proper notation keys (i.e. NO where emissions are "Not Occurring", NA where emissions are "Not Applicable" and IE where emissions are "Included Elsewhere") in cases where relevant, or to provide a justification for reporting zero-values (e.g. if the actual emission is below 0.000 kilo tons).

TRANSPORT

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, TSP, PM_{10} & $PM_{2.5}$, (HM & POPs)		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.3.a.i.(i)	international aviation (LTO)	x		
1.A.3.a.i.(ii)	international aviation (cruise)	x		
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)	x		
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)	x		
1.A.3.b.i	road transport, passenger cars	x		
1.A.3.b.ii	road transport, light duty vehicles	x		
1.A.3.b.iii	road transport, heavy duty vehicles	x		
1.A.3.b.iv	road transport, mopeds & motorcycles	x		
1.A.3.b.v	road transport, gasoline evaporation	x		
1.A.3.b.vi	road transport, automobile tyre and brake wear	x		
1.A.3.b.vii	road transport, automobile road abrasion	x		
1.A.3.c	railways	x		
1.A.3.d.i (ii)	international inland navigation		x	
1.A.3.d.ii	national navigation	x		
1.A.4.a.ii	commercial/institutional (mobile)	x		
1.A.4.b.ii	household and gardening (mobile)	x		
1.A.4.c	agriculture / forestry / fishing	x		
1.A.4.c.ii	off-road vehicles and other machinery	x		
1.A.4.c.iii	national fishing			x
1.A.5.b	other, mobile (including military, land based and recreational boats)	x		
1 A 3 d i (i)	International maritime navigation			x
1 A 3	Transport (fuel used)			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:

51. Estonia has provided a detailed and largely transparent transport sector emissions inventory. Most estimates are provided at the requested level of detail for the transport sector and all other mobile sources. The descriptions of methodology and emission factors provided in the IIR are transparent and well described particularly for aviation and road transport. Nonetheless, the ERT encourages Estonia to complete the description with further details including explanations for the use of the notation key “IE”.

52. Estonia uses zero-values in a number of areas in the reporting tables. The ERT encourages the Party to provide an explanation for these values in the IIR, or in cases where estimates are not available, to use appropriate notation keys (e.g. NO where emissions are “Not Occurring”, NE where emissions are “Not Estimated” and IE where emissions are “Included Elsewhere”).

53. In the NFR tables, emissions from several source categories are reported as IE without providing explanatory information .Even though this information is provided in the IIR, the reasons for not being able to report these emissions separately are not explained. The ERT encourages the Party to provide this information in both the NFR and the IIR including explaining the reasons, as well as information on possible plans to improve the inventory to allow the sources to be reported separately.

Completeness:

54. The ERT considers the Transport sector to be rather complete and comprehensive with sufficient detail on methodology applied. Nonetheless, there are some data gaps regarding PM as well as for heavy metal emissions and POPs. The ERT encourages the Party to put further efforts into closing these gaps and to improve its inventory's completeness.

Consistency including recalculation and time-series:

55. Estonia has recalculated the Transport sector emissions for almost all subcategories and provided the related information in the IIR.

56. The ERT also commends Estonia for providing information on the absolute changes in emission values in the IIR. Nevertheless, the ERT wants to encourage the Party to include information on relative changes and, if possible, to provide both the time-series from the last and the current submission.

Comparability:

57. The ERT considers the description of methodologies, the EFs and the underlying AD to be comprehensive and transparent. Nonetheless, comparability could be improved by reporting all sub-sectors separately.

Accuracy and uncertainties:

58. The ERT encourages Estonia to carry out an uncertainty analysis for the Transport Sector and to use it to indicate where improvements are needed and for the reliability of the data

59. In the IIR Estonia indicates that in the transport sector calculations common statistical quality checking related to assessment of trends has been carried out .

Improvement:

60. Information on planned improvements following the UNFCCC NIR outline is provided in the IIRt. The ERT commends this approach, nonetheless encourages the Party to also include information on the timeline of the improvements to be made

Sub-Sector Specific Recommendations

Category issue 1: 1.A.3 – PM emissions

61. As Estonia does not report PM emissions before 2000 the ERT asked the Party whether there are plans to provide data from the year 1995 onwards in future submissions. During the review Estonia informed the ERT that though these emissions could be calculated in the COPERT model from 1990 to1999 as well, the

Party only reports PM emissions from 2000 onward based on TFEIP/UNECE Guidelines for estimating and reporting Emission data under CLRTAP. Because PM2.5 and PM10 are not included in the inventory for all other sources, the sum of these emissions would not be representative for the total emissions if only 1A3 emissions were included.

Category issue 2: 1.A.3 and mobile sources in 1A4 and 1A5

62. In the NFR table "Additional Info" no information is provided on where emissions from sub-sectors reported with "IE" are included. This information is provided in the IIR only but without explaining the reasons. The ERT therefore asked the Party to include all necessary information in the future submissions. The ERT also asked the Party on its plans to prepare the estimates at the level of the sub-sectors for future submissions. During the review, Estonia informed the ERT the IIR will be improved for the next submission by also including the "Additional Info" with all the information available regarding emission calculations. The ERT commends this plan to improve the transparency of the inventory.

Category issue 3: 1.A.3.b Road Transport - Lead

63. The ERT noted that despite leaded gasoline has been prohibited in Estonia since 2000 and lead emissions from NFR 1A3biii ceased in the same year, lead emissions from 1A3bi are still reported for the years after 2000. The Party stated that this is e i) due to the very low lead content still remaining in the unleaded gasoline which is ii) used mostly in 1A3bi whereas in 1A3biii hardly any gasoline has been used in the recent years.

Category issue 3: 1.A.3.b Road transport - NO_x, SO_2, NH_3, NMVOC, CO

64. The ERT noted small decreases in the emission values for 1998 for all pollutants. During the review, the Party stated that the reason of the decrease of emissions in 1998 was the decline in gasoline fuel consumption which fell by 27%. Therefore, even though the diesel consumption increased slightly an emission decrease can be observed.. The significant decrease lasted for only one year due to the prevailing rather unstable economic environment influencing also fuel consumption decisions. Estonia indicated to further investigate the issue in cooperation with other governmental agencies. The ERT encourages Estonia to provide further information on the background of emission trends in the IIR.

Category issue 4: 1.A.3.b.iv Road transport – Mopeds & Motorcycles

65. The ERT noted that the emission trends for mopeds and motorcycles decline rapidly after 1993 (by more than 90%) for all pollutants. During the review Estonia explained to the ERT that this extreme decline started from 1992 as a result of the economy crisis after Estonia regained its national independence. Due to new technical requirements put into law after 1993, the number of mopeds decreased very sharply from more than 100.000 vehicles registered before the Estonian independence to only 2,200 in 1994. The ERT encourages Estonia to provide further information on the background of emission trends in the IIR.

66. The ERT noted that the SO_2 emission trend did not only decline significantly, but that even no emissions were reported after 2000. During the review Estonia informed the ERT that for this very small sub-sector, a zero value was used for export calculation in the COPERT model, because significant decrease of sulphur concentration was measured. Yet, Estonia agreed that no matter how small these emissions are, the correct value should be provided. Estonia will make efforts to submit these numbers in following submissions.

Category issue 5: 1.A.3.b Road transport - TSP

67. In its IIR Estonia states that it is aware that TSP emissions occur in the sub-sectors of 1A3bvi and vii but that it was not possible to report these due to the lack of an EF in the COPERT model used for the calculation. Estonia is planning to estimate these emissions for the future submissions. The ERT warmly welcomes this plan, encouraging the Party to also check other pollutants not yet reported. During the review Estonia also informed the ERT that there should be TSP emissions in the NFR tables but that there seems to have occurred an error within the COPERT version 8.0, stating that data will be corrected as soon as possible. The ERT recommends Estonia to try to complete the inventory e.g. by consulting inventories from other countries.

Category issue 6: 1.A.3.b Road transport - Hg, As, PCDD/F, PAH, HCB, PCBs

68. In the IIR Estonia states that emissions occur in the sub-sectors of 1A3b but that these have not been reported due to the lack of an EF in the COPERT model used for the calculation. During the review Estonia informed the ERT that solving these issues will depend on the development of the COPERT model, but as this kind of EF data is hard to obtain and as there are no emission factors available for these pollutants in the EMEP/EEA Guidebook 2009 this will take some further efforts. The ERT recommends Estonia to try to complete the inventory e.g. by consulting inventories from other countries.

Category issue 7: 1.A.3.c Railways - SO_2

69. The ERT noted that the generally declining emission trend for SO2 from 1A3c shows a one-year decrease in 2001 which is caused by a significant reduction in the sulphur concentration permitted in diesel oil in the same year. Increase in SO2 emissions in the following years after 2001 is caused by a shift from diesel oil (low sulphur content) to light fuel oil (much higher sulphur content) in 2002. During the review Estonia informed the ERT that the reason of the rise of NOx emission in 1993 was due to the rapid increase in fuel consumption based on the energy balance produced by Statistics Estonia. Regarding the sudden increase of AD in 1993 the Party agreed that this issue should be further discussed with Statistics Estonia. The ERT encourages the Party to further explain this special circumstances in the future IIRs.

Category issue 8: 1.A.3.d.ii National Navigation – NO_x, NMVOC, NH_3, SO_2, CO

The Stage 2 review for Estonia showed a significant increase in the emissions from this sector. According to the IIR, a relatively large amount of light fuel oil was consumed in 1993 compared to the years before and after. The ERT asked the Party to provide further details on the issue in the future IIRs.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, CO, NH_3, TSP, PM_{10} & $PM_{2.5}$		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2.A.1	cement production	X		X
2.A.2	lime production	X		X
2.A.3	limestone and dolomite use	X		
2.A.4	soda ash production and use	X		
2.A.5	asphalt roofing	X		
2.A.6	road paving with asphalt	X		
2.A.7.a	Quarrying and mining of minerals othe than coal	X		
2.A.7.b	Construction and demolition	X		
2.A.7.c	Storage, handling and transport of mineral products	X		
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)	X		
2.Bb.1	ammonia production	X		
2.B.2	nitric acid production	X		
2.B.3	adipic acid production	X		
2.B.4	carbide production	X		
2.B.5.a	Other chemical industry (Please specif the sources included/excluded in the notes column to the right)	X		
2.B.5.b	Storage, handling and transport of chemical products (Please specify the sources included/excluded in the notes column to the right)	X		
2.C.1	iron and steel production	X		
2.C.2	ferroalloys production	X		
2.C.3	aluminium production	X		
2.C.5.a	Copper Production	X		
2.C.5.b	Lead Production	X		
2.C.5.c	Nickel Production	X		
2.C.5.d	Zinc Production	X		
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes column to the right)	X		
2.C.5.f	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)	X		
2.D.1	pulp and paper	X		
2.D.2	food and drink	X		
2.D.3	Wood processing	X		
2.E	production of POPs	X		
2.F	consumption of HM and POPs (e,g. Electrical and scientific equipment)	X		

2.G	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)	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:

70. The ERT noted that the Industrial Processes sector in the Estonian IIR is generally well presented and includes almost all necessary information providing a high level of transparency. Activity data and emission factors are transparently presented and justified in the IIR, and the emissions trends are explained in the IIR.

71. Many Tier 3 emission estimates are presented in the IIR and these are mostly measured emissions. In the IIR it is explained that some operators may also estimate emissions using national approved methodologies (e.g. mass balance approach). The ERT encourages Estonia to provide more detailed explanations on these Tier 3 methodologies.

72. Although the use of notation keys is explained in the IIR, the ERT noted that Estonia reported zero (0) emissions for some pollutants in some categories (e.g. PM emissions for ammonia production (2B1), Pb, Hg and Cd emissions from Iron and steel production (2C1)). The ERT recommends Estonia to explain the magnitude of these emissions or use appropriate notation keys when reporting these emissions.

Completeness:

73. The ERT commends Estonia for providing a complete inventory for the Industrial Processes sector.

Consistency including recalculation and time-series:

74. Due to changes in methodologies and introduction of new emission factors, the ERT noted that Estonia recalculated NMVOC emissions for the food and drink activities for 1990-2008 resulting in an increase of emissions in 2008 by 39.3%.

75. Additionally, NMVOC emissions from road paving with asphalt for 1990-2009 and PM emissions from constructions and demolition for 2000-2009 were estimated for the first time.

76. The effect of the recalculations for NMVOC emissions is briefly described in the IIR. The ERT encourages Estonia also to provide an impact analysis for all pollutants and sectors.

Comparability

77. The ERT notes that the Estonian inventory is based on the 2009 EMEP/EEA Guidebook and is comparable with those of other reporting Parties. The allocation of

source categories follows the EMEP/UNECE Reporting Guidelines and NFR categories. The ERT commends Estonia for this, and encourages Estonia to continue with this approach for national inventory calculation.

Accuracy and uncertainties:

78. The ERT encourages Estonia to undertake sector specific quantitative uncertainty analyses for the industrial processes in order to support the improvement process and to provide an indication of the reliability of the inventory data.

79. The ERT noted that a QA/QC plan is under development nia. For industrial processes a common statistical quality checking only related to the assessment of emission trends has been carried out. Tier 3 estimates (data from operators) have been checked by local environment departments and also by the EEIC.

80. In the inventory preparation chart provided in the IIR, the QA/QC procedures are carried out after the NRF is prepared. That approach may lead to the poor quality of data used to estimate emissions. The ERT encourages Estonia to implement QA/QC procedures at every step of data collection from operators and statistics, together with the uncertainty levels.

Improvement:

81. The Estonian IIR includes only limited information on sector specific improvement plans.

82. The ERT noted that the planned improvements include reallocation of emissions from NFR 2A7d and 2G for wood and furniture industries to 2D3 wood processing. An uncertainty analysis is planned for the next submission. The ERT commends Estonia for the planned improvements. The ERT encourages Estonia to use the uncertainty assessment to indicate priorities for improvement, even if other sectors are considered of higher priority than the industry sector.

Sector Specific Recommendations

Category issue 1: 2A1 Cement production, 2A2 Lime production

83. The ERT noted that Estonia reported almost all emissions, except PM, from cement and lime production, as IE (under NFR 1.A.2.f.i). The IIR provides all the AD and EFs used to estimate emissions including dioxins and HMs. The ERT encourages Estonia to consider the possibility to separately report energy and IP emissions to improve transparency.

SOLVENTS

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
3.A.1	Decorative coating application	**x**		**x**
3.A.2	Industrial coating application	**x**		**x**
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)	**x**		**x**
3.B.1	Degreasing	**x**		**x**
3.B.2	Dry cleaning	**x**		**x**
3.C	Chemical products,	x		x
3.D.1	Printing	**x**		**x**
3.D.2	Domestic solvent use including fungicides	x		x
3.D.3	Other product use	x		x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross-cutting issues

Transparency:

84. For the Solvent use sector, the IIR is generally transparent and well-presented and organised. However, the ERT recommends adding some details as described below. The ERT encourages Estonia to provide information on the trends of the activity levels. This is relevant particularly where activities have a rapid evolution from year to year or when no emission data are provided. The explanations provided to the ERT during the review could be incorporated in the IIR.

85. The current emission inventory is accurate but the impact of possibly missing activities cannot be estimated at this point.

86. The notation key NA is used for NFR 3A3 in the reporting template for NECD and CLRTAP. The ERT recommends Estonia to verify the use of this notation key as according to the IIR (page 130), the use of IE might be more appropriate.

Completeness:

87. The ERT considers the solvent sector to be almost complete. However, some additional activities listed below are missing. The ERT encourages Estonia to explain if these activities exist and encourages Estonia to estimate NMVOC emissions from the existing activities using a methodology adapted to their potential emissions and using the methodologies in the EMEP/EEA Guidebook. These activities are :

NFR 3C: SNAP 060301 Polyester processing

SNAP 060302 PVC processing
SNAP 060306 Pharmaceutical product manufacturing
SNAP 060310 Asphalt blowing
SNAP 060311 Adhesive tape manufacturing

NFR 3D: 060401 glass wool enduction

Consistency including recalculation and time-series:

88. Estonia has carried out recalculations in the time-series but no information is provided on the possible impacts of the recalculations to the emissions.

89. The emission inventory is consistent from year to year.

Comparability:

90. The methods used in the inventory are consistent with the EMEP/EEA Guidebook.

Accuracy and uncertainties:

91. No uncertainty analysis is presented for NMVOC emissions for the solvent use sector. The ERT recommends Estonia to carry out an uncertainty analysis, which can be helpful for improvement plans of the emission inventory and for prioritisation of work.

92. According to the IIR QA/QC and verification are carried out for each NFR activity covered under NFR3.

Improvement:

93. The ERT takes note of the improvements scheduled by Estonia and encourages Estonia to continue this process, particularly to take into account the recommendations in the following chapters addressed by the ERT sector by sector.,

Sector Specific Recommendations

Category issue 1: 3A1 Decorative coating applications – NMVOC

94. Sector 3A1 is a key source of NMVOC emissions. The ERT encourages Estonia to develop a methodology to enable to distinguish water borne and solvent borne paints as, due to the European regulation (Directive 2004/42/EC on the solvent content of products) set up in Estonia, their uses fluctuate from year to year. The characteristics of solvent borne paints could also be evaluated each year with paint experts to determine their average solvent concentration. Useful sources of information can be the European Federation of paint producers, the Estonian Federation of paint producers, paint manufacturing experts and paint users.

95. The IIR provides transparent information on methodologies used. Year-to-year trends in emissions are not explained even though there are significant increases in the emissions. The ERT recommends Estonia to provide information in

the IIR to enable understanding of those trends. The information provided to reply to questions of the ERT could be incorporated into the IIR.

Category issue 1: 3A2 industrial coating applications – NMVOC

96. Both a bottom-up and a top-down approach are used by Estonia to estimate NMVOC emissions from industrial coating applications. The OSIS data base is used to estimate plant specific emissions from 2006 to 2009. As the thresholds for reporting emissions are low the information in the OSIS data base can be considered quite complete. The ERT encourages Estonia to better explain the methodology used, taking advantage of the answers provided to the ERT questions during the review.

97. The ERT encourages Estonia to provide information on the consumption of paints covered by the OSIS questionnaire and the remaining consumption which is not covered by the questionnaire.

98. The ERT encourages Estonia to continue with its improvement plan to better estimate emissions for the period 1990 – 2000.

Category issue 1: 3A3 i Other coating applications – NMVOC

99. Estonia uses the notation key NA in the reporting template for NECD and CLRTAP. According to explanation provided in the IIR, the notation key IE should be used. The ERT encourages Estonia to verify this issue.

Category issue 2: 3B1. Degreasing – NMVOC

100. Sector 3B1 is a key source of NMVOC emissions. Both a bottom-up and a top-down approach are used by Estonia to estimate NMVOC from vapour cleaning and cold cleaning. The OSIS data base is used to estimate plant specific emissions for vapour cleaning and an emission factor based on population is used for cold cleaning. The ERT encourages Estonia to improve the explanation on methodologies applied in the IIR taking advantage of the answers provided to the ERT questions during the review.

101. The ERT encourages Estonia to exclude the possible risk of double counting of NMVOC emissions in this sector. Cold cleaning is carried out both in industrial plants and non-industrial plants. In Estonia, part of cold cleaning is carried out in industries. However, cold cleaning carried out by the general public could be already covered by the emission factor used for the SNAP activity 060408 domestic uses of solvents. There is also a risk of overestimating NMVOC emissions with an emission factor based on the population. The use of an emission factor expressed per inhabitant does not enable Estonia to know if solvent use and emissions decrease in this activity due to the implementation of the EU directive 1999/13.

102. A source of information for the chlorinated solvent sales is the European federation ESCA (European Chlorinated Solvent Association) as well as the Estonian Chemical Industry Association.

Category issue 2: 3B2. Dry cleaning – NMVOC

103. The ERT takes note that emissions are estimated on basis of perchloroethylene uses. If possible, the emission factor used for the past situation

(1990 to 2000) could be improved by taking into account the evolution of the number of open and closed circuit machines over time.

104. Information on trends observed both in activity data and emissions do not exist in the IIR. The ERT encourages Estonia to provide information explaining the observed trends.

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

105. The activity levels and emissions from the activities covered by this NFR are retrieved from the OSIS database from 2006 to 2009. The ERT encourages Estonia to check if the OSIS data base is complete for those sectors. This can be done by comparing the activity levels reported in the OSIS database with general statistics. The ERT encourages Estonia to check if the following activities which currently are missing from the report, exist in Estonia, and to develop methodologies in line with the EMEP/EEA Guidebook to estimate the emissions where they are existing:

SNAP 060301 Polyester processing
SNAP 060302 PVC processing
SNAP 060306 Pharmaceutical product manufacturing
SNAP 060310 Asphalt blowing
SNAP 060311 Adhesive tape manufacturing

106. The ERT takes note of the improvement process scheduled by Estonia to provide activity levels from 1990 to 2006 as well as to estimate emissions from activities currently missing and encourages Estonia to continue this process.

Category issue 3: 3.D1. Printing activities – NMVOC

107. Both a bottom-up and a top-down approach are applied by Estonia to estimate NMVOC from printing activities. The OSIS data base is used to estimate plant specific emissions from 2006 to 2009. As the thresholds for reporting emissions are low the information covered by the OSIS data base can be considered rather complete. However, the ERT encourages Estonia to improve the description of the methodology by taking advantage of answers provided to the ERT questions during the review.

108. The ERT encourages Estonia to provide information on the consumption of ink or emissions from plants covered by the OSIS questionnaire and on the remaining consumption not covered by OSIS. The results of the questionnaire demonstrate that the questionnaire content gets more and more complete and representative over the years.

109. The ERT encourages Estonia to try to improve the estimation of emissions for the period 1990 – 2000. The emission factors used are constant over the time though they probably should be higher for the past.

Category issue 3: 3.D2. Domestic uses of solvent – NMVOC

110. This activity is a key source. The ERT encourages Estonia to verify if the emission factor used for the calculation is representative for Estonia. It is a complex

task but one source of information could be this report by Norway http://www.ssb.no/english/subjects/01/04/10/doc_201020_en/doc_201020_en.pdf.

Category issue 3: 3.D3. Other product uses – NMVOC

111. The ERT encourages Estonia to verify if mineral and glass wool induction activities are existing in Estonia and to set up a methodology to estimate NMVOC emissions for existing sources.

112. The ERT encourages Estonia to provide information on the consumption of glues or emissions from plants covered by the OSIS questionnaire and on the remaining consumption not covered by OSIS. The results of the questionnaire demonstrate that the questionnaire content gets more and more complete and representative over the years.

113. The ERT notes that Estonia is aware of some inconsistencies in the time series and encourages the Party to try to solve those inconsistencies.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2009		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
4 B 1 a	Cattle dairy	NH_3, $PM_{2.5}$, PM_{10},TSP and NMVOC		
4 B 1 b	Cattle non-dairy	NH_3, $PM_{2.5}$, PM_{10},TSP and NMVOC		
4 B 2	Buffalo			
4 B 3	Sheep	NH_3 and NMVOC		
4 B 4	Goats			
4 B 6	Horses	NH_3, $PM_{2.5}$, PM_{10} and NMVOC		
4 B 7	Mules and asses			
4 B 8	Swine	NH_3, $PM_{2.5}$, PM_{10},TSP and NMVOC		
4 B 9 a	Laying hens	NH_3, $PM_{2.5}$, PM_{10},TSP and NMVOC		
4 B 9 b	Broilers	NH_3, $PM_{2.5}$, $PM1_0$,TSP and NMVOC		
4 B 9 c	Turkeys			
4 B 9 d	Other poultry	NH_3, $PM_{2.5}$, PM_{10},TSP and NMVOC		
4 B 13	4 B 13 Other			
4 D 1 a	Synthetic N-fertilizers	NH_3, $PM_{2.5}$, PM_{10} and NMVOC		
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products			
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products			
4 D 2 c	N-excretion on pasture range and paddock unspecified (Please specify the sources included/excluded in the notes column to the right)			
4 F	Field burning of agricultural wastes			
4 G	Agriculture other(c)			
11 A	(11 08 Volcanoes)			
11 B	Forest fires			
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which have and which have not in the respective columns.				

General recommendations on cross cutting issues

Transparency:

114. The estimates are reported transparently.

115. Emissions have been calculated for manure management based on the Tier 1 method provided in the EMEP/CORINAIR Guidebook. The Party calculated TSP emission factors in proportion to those of PM_{10} and TSP in the old Guidebook (new PM_{10} EF*100% / the proportion of an old PM_{10} EF of old TSP EF), although since there are no default emission factors for TSP in renewed Guidebook,

116. Activity data on livestock numbers and N fertilizer use is provided in the IIR.

117. The use of notation keys and allocation of emissions reported as IE are explained in the IIR.

Completeness:

118. In respect to the most important sources of emissions the inventory is complete. However, Estonia did not report emissions of NO_x from NFR 4D (Agricultural soils) although a default EF is provided in the EMEP/EEA Guidebook. This is a minor source but since NMVOC emissions are reported, the NO_x emissions can be estimated or could be stated as insignificant. The Party replied to consider this comment will be taken into account in the next submission. The notation key NE is used regarding emissions from NFR 4F. Table 1.2 in the IIR indicates that emissions from this source will be calculated for the next submission. The ERT encourages Estonia to include these emissions in the inventory.

Consistency including recalculation and time-series:

119. According to the IIR, recalculations were carried out using the methodologies provided in the 2009 version of the EMEP/EEA Guidebook. Detailed results are provided in Section 10 of the IIR.

120. There is an increase in NH_3 emissions in 2008 which appears to be due to an increase of emissions from N fertilizers in that year which is related to a 25% increase of N fertilizer use in 2008 compared to 2007 and 2009. Such a sharp increase in N fertilizer use was reported for many countries in 2008 and the reported trends in emissions appear consistent with reports of livestock numbers and N fertilizer use.

Comparability:

121. The Party's agricultural emissions were estimated using the emission factors provided in the EMEP/EEA Guidebook. No over or underestimates were identified in the estimates by the Party.

Accuracy and uncertainties:

122. There is no uncertainty analysis for the sector. A quantitative uncertainty assessment is foreseen for the next submissions. The ERT encourages Estonia to carry out the uncertainty analysis.

123. Together with the estimates for the other sectors a statistical quality checking related to assessment of trends has been carried out for the agriculture sector.

Improvement:

124. Planned source-specific improvements noted in section 6.5 of the IIR are aimed to improve data quality by introducing Tier 2 or Tier 3 methods for emission estimates based on activity data and emission factors and to provide an uncertainty analysis. The ERT encourages Estonia to continue improving the inventory.

Sector specific recommendations

Category issue 1: NFR 4D – Agricultural soils –NO_x

125. According to the IIR, page 170, paragraph 6.3.1 Source category description, the second sentence states that 'the share of agricultural soils into total NH_3 emissions in 2009 was 0.26%, so this sector does not contribute to the total NH_3 emission'. The ERT suggests that this sentence should state, 'the share of agricultural soils into total NO_x emissions in 2009 was 0.26%, so this sector does not contribute to the total NO_x emission'. This modification is based on the page 162 statement which stipulates that fertilizers account for 25% of NH_3 emissions and that inspection of the numbers reported suggests a much larger contribution than <1% to total NH_3 emissions.

126. No uncertainty analysis is provided in section 6.5 but foreseen as a improvement. For section 6.5. it is reported that a common statistical quality check related to assessment of trends has been carried out. However, in the Agriculture section of the IIR no review process is mentioned. During the review, the Party agreed to the comments made by the ERT and submitted the corrected sentence as: 'The share of agricultural soils into total NH_3 emissions in 2009 was 23.3%'. The Party pointed out that the 25% cited on page 163 (not on page 162) is the share from agriculture sector NH_3 emissions in 2009, not the share from total ammonia emissions.

WASTE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2006 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
6.A	solid waste disposal on land	x		x
6.B	waste-water handling	x		x
6 C a	6 C a Clinical waste incineration (d)	x		x
6 C b	Industrial waste incineration (d)		x	x
6 C c	Municipal waste incineration (d)	x		x
6 C d	Cremation	x		x
6 C e	Small scale waste burning	x		x
6.D	other waste (e)	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:

127. The description of the methodology in the IIR is clear and understandable.

128. The activity data used in the calculations originate from the Estonian Waste Data Management System. Emission data used in the inventory in all NFR waste sectors are based on plant specific data reported by plant operators.

129. In IIR Chapter 8.1.1 Sources category description, in Table 8.1. Estonia provides information on the number of emission sources for the Waste sector.

130. Emissions of PCDD/PCDF from clinical and industrial waste incineration are calculated on basis of facility data emissions. However, the activity data to support these statements and calculations are not provided except for hospital waste incineration. No information about the emissions factors used is provided in the IIR.

131. The documentation of the Waste sector inventory in the IIR is limited to 1.5 pages.

132. The ERT encourages Estonia to continue developing the waste sector inventory with elaborated information on all necessary activity data, used emission factors and methodologies.

133. Estonia has used the notation key IE for the number of estimates in the waste sector and there is no information in the IIR for the allocation of these emissions. The ERT recommends Estonia to improve the explanations for the notation key “IE” in the sub-category.

Completeness:

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

135. Notation keys have been used in some of the sub-categories, such as NO in 6 Cc. From the NFR the ERT noted that in some sub-categories data became available corresponding to the development of the national waste management system after Estonia became a EU Member State. In the IIR no activity data are provided which could support these calculations.

136. The notation key NE was used for category 6D Other waste, but only for 2007. For the other years before 2007 the cells are left blank. Even though emission values for NMVOC and NH_3 for 2008 and 2009 are provided the origin of these emissions remains unexplained in the IIR.

Consistency including recalculation and time-series

137. Estonia failed to provide any information on recalculations in the 2011 submission for this sector.

138. Due to the development of the National Waste Management data system, the ERT encourages Estonia to include recalculations for the previous period in the future IIRs.

139. 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 several zero (0) value, and varying notation keys between the years reported. No further explanation is provided in the IIR. The ERT encourages Estonia to examine the use of notation keys and to provide explanations for their application in the IIR.

Comparability:

140. Except for the clinical waste incineration, for which Estonia states that the UNEP methodology is used for estimation of dioxin emissions, no information on used methodologies can be found in the IIR. The ERT encourages Estonia to include descriptions of methodologies to enable comparability of the inventory to other countries' inventories.

141. The emissions estimates in the waste sector are not fully comparable to other Parties` estimates in terms of detail and use of categories for the whole time period, which corresponds to the gradual development of the National Waste data management system.

Accuracy:

142. Estonia did neither provide information on the key sources or the Waste sector, nor on the Tier level used for the calculations. In the IIR Estonia stated that emissions from all NFR categories under the Waste sector are based on plant specific data provided by the operators, but information on the EFs used in calculations is missing.

143. According to the IIR Estonia did not carry out a complete QA/QC check for the waste sector. The ERT recommends Estonia to include the waste sector in a systematic QA/QC procedure.

144. Estonia did not provide an uncertainty analysis for the Waste sector. The ERT recommends Estonia to provide an uncertainty analysis for the sector and use the results to support improvements for the preparation of the inventory.

Improvement:

145. In the IIR future improvement of the Waste sector inventory are envisaged via three activities:

- to calculate emissions from landfills and from waste water treatment by using data from the Waste Management System;
- to calculate HCP and PCB emissions from waste incineration;
- to improve the QA/QC procedure.

146. The ERT encourages Estonia to implement these foreseen improvements and to provide recalculated data as well as additional information on activity data and explanations for the methodologies used for estimation in IIR.

Sector-specific recommendations

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

147. Estonia provides only NMVOC emission for this sub-sector. The data are reported by four plant operators. In the IIR it is stated that data calculated by the operators on NMVOC, NH_3, TSP and CO emissions have been reported but that these emissions occurred only in 2008 and 2009. Explanations of the reasons and methodologies used in the calculations have not been provided in the IIR.

148. In the time period 1990 - 2010 NMVOC emissions are reported as zero (0) for many years. The ERT encourages Estonia to provide explanations for the fluctuation of emissions, on the methodologies and the reasons for reporting zero-values, or otherwise use the appropriate notation keys in the IIR.

149. For those cases, where there no site specific data are available or where data are not in accordance with the General Guidance Chapter 6 (Inventory management, improvement and QA/QC) in the EMEP/EEA Guidebook, the ERT encourages Estonia to calculate NH_3 emissions from landfill sites and SO_x and NO_x from open burning at landfill sites. The ERT also encourages Estonia to provide a description for these data in the IIR.

150. The ERT recommends Estonia to use the appropriate notation keys for those cells which are left blank.

Category issue 2: 6.B Wastewater handling

151. For this sector (6B) Estonia reports NMVOC and NH_3 emissions. The inventory includes emissions from 9 waste water treatment plants. In the IIR Estonia states that NO_x, SO_x, NMVOC, NH_3 and CO emissions are calculated only for 2008

and 2009. Information on activity data, the methodology and the EFs used for these calculations is missing.

152. For some years, the emission values are reported as zero (0). The time-series for NMVOC and NH_3 are inconsistent, showing fluctuations in the emission values and also different notation keys during the reporting period 1990-2009 in the NFR tables..

153. The ERT encourages Estonia to provide explanations for the fluctuation of emissions, on the methodologies used and on the zero-values, or otherwise to use the appropriate notation keys. In order to improve transparency, the ERT also encourages Estonia to document the issues that affect the emissions in the IIR and to provide activity data, methodology and EFs used.

Category issue 3: 6.C.a Medical waste incineration

154. In the IIR Estonia stated that one operator reported data on hospital waste incineration, but that there are no activity data. Only PCDD/ PCDF emissions are reported under 6.C.a. as an expert estimation. All other pollutants (NO_x, SO_x, NMVOC, NH_3, TSP, PM_{10}, $PM_{2.5}$, TSP, CO and heavy metals) are reported under the sub-sector 6.C.b. In the IIR, Estonia does not provide information on PM_{10} and $PM_{2.5}$, emissions though these emissions are reported in the NFR tables as IE under the sub-sector 6.C.b. PAH-4 emissions are reported as zero (0) values, however, there is no documentation of these emissions in the IIR.

155. The ERT encourages Estonia to collect activity data for this sub-sector where possible by, e.g. diverting it from industrial waste incineration sub=sector data.

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

156. In the IIR, Estonia provides data reported by 5 plant operators in this sub-sector and includes emissions from flaring in chemical industry, sludge and waste oil incineration. However, no activity data are reported. In the IIR it is stated that emission data for NO_x, SO_x, NMVOC, NH_3, TSP, CO, Cu, PCDD/ F were calculated by operators and the entire data sets for the years 2008 and 2009 are provided. For some pollutants, Estonia provided zero (0) values, without documenting or explaining them in the IIR.

157. The ERT recommends Estonia to collect activity data for this sub-sector, e.g. by deriving them from medical waste incineration sub-sector data.

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

158. There is no municipal waste incineration in Estonia and accordingly no emissions are reported.

Category issue 6: 6.C.d Cremation

159. In the IIR, Estonia provides data for two operators in this sub-sector for NO_x, SO_x, NMVOC, NH_3, TSP and CO, but only for the years 2008 and 2009. No data for heavy metals are provided in the NFR tables. For some pollutants, Estonia provided zero (0) values, but these are not documented in the IIR. The ERT encourages Estonia to calculate heavy metals emissions from this source.

Category issue 4: 6.C.e Small-scale waste burning

160. No emissions from small scale waste burning were reported by Estonia. In the NFR tables for this sub-sector the NA notation key is used or the cells are left blank.

161. The ERT encourages Estonia to indicate if this activity exists and to provide data for existing emissions. Also, the ERT recommends Estonia to use the appropriate notation keys in reporting.

Category issue 5: 6.D Other Waste(s)

162. Estonia provided data for this sub-sector and stated in the IIR that the emissions include data reported by two point sources, one of them being compost production. No explanation for the other facility was provided in the IIR. The ERT encourages Estonia to provide information on the emissions and how they were calculated in the IIR.

7. OTHER

163. Activities from this sector do not occur in Estonia and thus no emissions are reported.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to preliminary questions raised prior to the review:
2. EST General 10-06-2011 answer.docx
   Estonia Energy Stationary 21.06.2011 Q1 to 3 answer.docx-
   ESTONIA Transport+Mobile 09-06-11-Q1.doc
   Estonia-solvents 20-06-11-Q1 answers.docx
   Esto Agriculture 100611 answer.docx
   Esto Agric Quest tem 150611 answers.doc

3. Response to questions raised during the review:
   Estonia Energy Stationary 28.06.2011 Q4 answer.docx
   ESTONIA Transport+Mobile 28-06-11-Q2 answers.doc
   ESTONIA Transport+Mobile 28-06-11-Q2 answers reply 20-06-11.doc

4. Estonia Stage 2 S&A report 2009
5. Estonia Stage 1 report 2009
6. Estonia IIR 2009