

**UNITED
NATIONS**



**Economic and Social
Council**

Distr.
GENERAL

CEIP/S3.RR/2009/LT
21/08/2009

ENGLISH ONLY

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

LITHUANIA

CONTENT

INTRODUCTION	3
PART A: KEY REVIEW FINDINGS	4
Inventory submission	4
Key categories	4
Quality	4
Transparency	4
Completeness	5
Consistency, including recalculations and time-series	5
Comparability	5
CLRTAP/NECD comparability	6
Accuracy and uncertainties	6
Verification and quality assurance/quality control approaches	6
Follow-up to previous reviews	6
Areas for improvements identified by Lithuania	6
PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY	7
Cross cutting improvements identified by the ERT	7
Sector specific recommendations for improvements identified by ERT	8
Energy	8
Mobile Sources	11
Industrial Processes	15
Solvents	18
Agriculture	21
Waste	23
List of additional materials provided by the Country during the Review	25

INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention are given by the UNECE document ‘Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols’ ⁽¹⁾ – hereafter referred to as the ‘Methods and Procedures’ document.
2. This annual review has concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} with optional review of Cd, Pb and Hg for the time series years 1990–2007 reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP).
3. This report covers the stage 3 centralised review of the UNECE LRTAP Convention and EU NEC Directive inventories of Lithuania, coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 22nd June 2009 to 25th June 2009 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: Lead Reviewer – Justin Goodwin (EC) generalist – Kevin Hausmann (Germany), Energy – Laetitia Serveau (France), Mobile – Morten Winther (Denmark), Industry and Waste – Hans Wradhe (Sweden) and Leif Hoffman (Denmark), Solvents – Nadine Allemand (France), Agriculture + Nature – Jim Webb (UK)
4. The review was coordinated by Justin Goodwin and 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

INVENTORY SUBMISSION

5. In its 2009 submission, Lithuania reported 2007 data only. Earlier years were analysed using former submissions and considered for this review. Lithuania reported 2005 gridded emissions for Gothenburg protocol pollutants. Lithuania also provided an informative inventory report (IIR).

6. The ERT commends Lithuania for its efforts in compiling and reporting its emissions inventory in the NFR08 format. However, both Lithuania's IIR and data submission are incomplete. Most importantly, the ERT noted the lack of complete and consistent time series and the absence of quality assurance/quality control (QA/QC) procedures. This made it difficult for the ERT to fully assess the inventory's accuracy. The ERT put detailed recommendations in part B of this report.

KEY CATEGORIES

7. Lithuania presents a “tier 1” key category analysis (KCA) based on level assessment in its IIR. The ERT encourages Lithuania to use its time series data to also perform a tier 1 trend assessment.

8. The Lithuanian KCA matches the analysis performed by the CEIP and is used for the prioritisation of inventory improvement. The ERT recommends that Lithuania outlines planned improvements in a specific section of its IIR in more detail linking them to the KCA (see also below). The ERT also encourages Lithuania to correctly sort the source categories of the KCA in its IIR, thus facilitating easy reference and comparison.

QUALITY

Transparency

9. The ERT recognises the level of effort undertaken by Lithuania in providing an inventory with a significant level of detail to undertake a detailed review. However, Lithuania's IIR lacks sufficient detail for a considerable number of sources, making it difficult for the ERT to fully assess the inventory accuracy. In particular, estimates for Energy, Solvents, Industrial processes and Waste are lacking detail about assumptions underpinning the application of emission factors. Part B of this review report provides further details. The ERT encourages Lithuania to work on the IIR to provide more in-depth description of these sectors.

10. Lithuania's data submission uses “IE” (and other notation keys) for a number of source categories and pollutants (e.g. 1A3a Aviation, 1A5 Other). The IIR does not provide detailed explanations for where “IE” emissions are included. The ERT encourages Lithuania to try to provide the required split in the NFR tables using available statistics or proxy data and to

describe these methods in its IIR. Where this cannot be done through lack of data the ERT encourages Lithuania to document, in its IIR, where categories indicated with “IE” are included and to provide a plan for producing the required NFR split for key categories in the future.

11. Lithuania's IIR does not include any information on QA/QC arrangements or procedures. The ERT encourages Lithuania to develop its QA/QC procedures further and to present an overview of the existing and newly developed QA/QC measures in the IIR.

12. For the energy sector, the ERT recommends that Lithuania lists in its IIR all NFR codes noted “IE” and explain that these choices are due to the aggregated statistics of activity provided by the Statistics of Lithuania.

Completeness

13. The ERT acknowledges the effort to which Lithuania has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed. However, the ERT noted some sources reported as “NE” in the data submission. The ERT considers these sources to have little influence on the national total but encourages Lithuania to provide a rationale for excluding sources and/or descriptions of plans to estimate these sources/pollutants in the IIR.

14. Lithuania reports some emissions as zero (0) in its data submission (e.g. for some heavy metals in transport). The ERT recommends the use of notation key (NO) instead of zeros.

Consistency, including recalculations and time-series

15. Lithuania has not submitted previous inventory years in its 2009 submission (only 2007). Therefore the data held by the UNECE for earlier years are not consistent with methodologies used for the latest submission. This will result in the inventory being inconsistent across the time series with earlier years' estimates and not benefiting from the research and revisions done to emission factors and assumptions for the latest inventory. The ERT encourages Lithuania to calculate and submit data for all years of the time series so that all years have consistent methods, data and assumptions.

Comparability

16. Due to the absence of complete and consistent time series and the lack of transparency in the methods used in some sectors, it was difficult for the ERT to assess the comparability of the inventory. The ERT encourages Lithuania to take the ERT's recommendations – as laid out in part B of this document – into account, thus ensuring the submission of comparable inventories in the future.

CLRTAP/NECD comparability

17. The ERT identified some differences between the CLRTAP and NECD inventories for Energy, Mobile, IP and Agriculture with no explanation in the IIR or response to the Review. The ERT encourages Lithuania to ensure that the CLRTAP and NECD inventories are consistent and that any necessary (e.g. different geographical scopes) differences are documented in the IIR.

Accuracy and uncertainties

18. Lithuania did not provide any information on uncertainties in their IIR. During the review, in responses to questions for the Energy Sector, Lithuania outlined a number of improvements for uncertainty assessment of emission factors.. The ERT encourages Lithuania to undertake some initial uncertainty assessments while improving its inventory over the next few years.

Verification and quality assurance/quality control approaches

19. Lithuania's IIR does not include any information on QA/QC arrangements or procedures. During the review, in responses to questions for the Energy Sector, Lithuania outlined a number of (QA/QC) activities. The ERT encourages Lithuania to continue to develop its QAQC as planned and to present an overview on its QA/QC measures in the IIR.

FOLLOW-UP TO PREVIOUS REVIEWS

20. Lithuania did not provide responses to all findings of the 2008 stage 2 review as performed by the CEIP. The ERT encourages Lithuania to cooperate with the CEIP in order to solve the pending issues as well as the outcome of the current 2009 stage 2 review.

AREAS FOR IMPROVEMENTS IDENTIFIED BY LITHUANIA

21. Lithuania does not provide information on any specific improvements planned in its IIR. The ERT encourages Lithuania to list, in its future IIRs, specific improvements planned and outline other improvements needed to improve the quality of the inventory.

22. The ERT sets out a number of specific recommendations in part B of this report. These are detailed in both their cross-cutting and their sector-specific nature as shown below.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

23. The ERT encourages Lithuania to report complete and consistent time series in the NFR08 format with covering descriptions of methods and time trends in its IIR.
24. For improved transparency, the ERT encourages Lithuania to extend the description of its methods, assumptions and data sources for emission estimation given in the IIR for all Sectors, provide data at the required NFR level of detail (at least for Key Categories) reducing the use of “IE” and provide documentation of the “IE” use in its reporting tables.
25. The ERT encourages Lithuania to present an overview on its QA/QC measures in the IIR.
26. The ERT encourages Lithuania to structure the IIR according to the template provided in the EMEP guidelines for reporting (Annex 6) to improve the transparency of the inventory.
27. The ERT recommends that Lithuania should work with the CEIP on addressing the questions from the stage 2 reviews.
28. The ERT encourages Lithuania to check for the use the appropriate notation keys in its submission.
29. The ERT encourages Lithuania to assess and report on the uncertainty of the emission estimation and to incorporate the uncertainty assessment in its improvement planning procedures.
30. In its response to the review, Lithuania indicated that it will take into account the recommendations and make efforts to improve the quality of national emission inventory in reporting its national emissions inventory report in 2009, including updated information in new NFR format, the main pollutants emission trend assessment, and "IE" explanations.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

Energy

Review scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, CO, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		2002–2007		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
1.A.1	Energy industries	x		*
1.A.2	Manufacturing industries and construction	x		*
1.A.4	Commercial, residential, agriculture & forestry	x		x
1.A.5	Other	x		*
1.B.1	Fugitive emissions from solid fuels	x		*
1.B.2	Fugitive emissions from oil and natural gas	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.				

* Lithuania is encouraged to improve the description of methods, data sources and assumptions for all categories reported. The lack of transparency in the report meant that the ERT were unable to fully assess the accuracy or appropriateness of the methods.

General recommendations on cross cutting issues

31. **Completeness:** Sources which are not estimated (NE) have not been clearly identified in Lithuania's IIR. The ERT encourages Lithuania to document in its IIR the sources that emissions may occur but emissions have not been estimated.

32. For the energy sector and for the year 2007, two NFR codes are identified with the notation key "NO": 1A2a and 1A2b. Lithuania explains in its answer that it does not have iron and steel production plants or non-ferrous metal production plants.

33. The ERT recommends that Lithuania lists in its IIR all NFR codes identified with "NO" and explain in its IIR that for these codes no installation exists in Lithuania.

34. **Transparency:** The ERT encourages Lithuania to indicate in its IIR for each national energy sector classification the list of sub-sectors which are included in the inventory and those that are included elsewhere (IE) and where they are included.

35. The ERT commends Lithuania for its clear identification of references and emission factors per fuel and clear correspondence between NFR sectors and national energy sector classification given in the Lithuanian IIR. However, The ERT encourages Lithuania to provide

further explanation of the type of approaches used (area approach, point sources approach or a combination of both approaches data used), the type of activity data used and their references/sources (for example: the fuel consumption per installation), and the emission factors per pollutant, per sub-sector, per year studied in its IIRs to improve transparency and enable the validity of the methods to be assessed by the ERT.

36. The ERT encourages Lithuania to explain in its IIR details of the energy balance and give a scheme which shows the evolution of fuel consumption per fuel and per year. This part is important to understand the emission trends in the energy sector.

37. The ERT encourages Lithuania to provide, in future IIRs, a more detailed description of the time series (1990 – latest year) particularly for the trend in emissions of SO₂, NO_x and PM from the Energy sector.

38. The ERT encourages Lithuania to use the NAPFUE codes rather than the name of fuel in future IIRs.

39. **Uncertainty:** No uncertainty analysis is indicated in the IIR for the Energy Sector. The ERT encourages Lithuania to undertake uncertainty analysis for the Energy Sector in order to provide an indication about the reliability of the inventory data.

40. **Comparability and consistency:** Some differences are observed for NO_x in 1A2f and SO₂ in 1A2e between the NEC submission and the LRTAP submission for the energy sector. Lithuania acknowledged that these differences were due to errors and will correct them for the next submission. The ERT encourages Lithuania to indicate in its IIR any differences between NEC and CLRTAP emissions and to work towards ensuring that these inventories use consistent data methods and assumptions.

41. **QA/QC procedures:** The ERT notes that no specific QA/QC procedures have been developed for the energy sector. The ERT encourages Lithuania to explain in its IIR the QA/QC procedure and verification and to develop procedures for the energy sector.

42. **Recalculations:** No details of recalculations have been provided by Lithuania. The ERT encourages Lithuania to give a more detailed explanation of the recalculations, including the impact on the energy sector.

43. **Improvement:** The Lithuanian IIR does not describe any improvements planned or identified. Lithuania indicated in their response to the review that no improvements in the energy sector (without mobile source) have been made since the last submission but that Lithuania was planning to estimate emissions for the NFR code 1A4ciii (national fishing). The ERT encourages Lithuania to include explanations of any future improvements and to list other planned or identified improvements in future IIRs.

Sub-sector specific recommendations

44. The IIR does not describe many of the emission estimates in a sufficient way for the ERT to be able to determine the validity of the underlying data or methods. The ERT encourages Lithuania to provide more detailed descriptions of the methods, data sources and assumptions used in making its estimates in future IIRs. The following Categories have some suggestions for improvement by the ERT. However, the ERT recommends that all category descriptions should be reviewed and developed in order to provide the appropriate transparency.

1 Energy

45. The comparison with the other countries shows that the fuel sulphur content indicated in the IIR seems to be higher than other countries. Lithuania's answer to this question is that fuel sulphur contents are calculated yearly and that some specific regulation about fuel content is applied. The ERT notes that in Lithuania's response the EU Directive 99/32 the sulphur content is not indicated. This directive plans that by 1st January 2008 the sulphur content for residual fuel should be about 0.1% compared to the value for the year 2007 of about 2.2%. The ERT is surprised that Lithuania has not reflected on any transition to this low level for the sulphur content of residual fuel in its inventory. The ERT encourages Lithuania to verify if the national legislation takes into account this directive and to verify the emission factors used for the year 2007 (for residual fuel).

1 Energy – Particulates

46. The ERT noted that in annex 1 in the IIR, the emission factor for PM for a fuel is often the same for the different category. For example, for the fuel wood, power plants have the same TSP emission factor as households. The ERT encourages Lithuania to review these emission factors and to take into account characteristics of different levels of abatement equipment used for different categories.

1A2a and 1A2b Stationary Combustion in Manufacturing Industries and Construction

47. The ERT noted that Lithuania used the notation key "NA" for the NFR codes 1A2a and 1A2b for POP and "NO" for the other pollutants used. The ERT encourages Lithuania to be consistent in its use of notation keys and to use NO for categories which exist but where no emissions occur.

1A4bi Residential: Stationary plants

48. The ERT questioned the absence of data and emissions for wood consumption from 1A4bi Residential: Stationary plants. In its response to the ERT Lithuania indicated that in 2007, 18046000 GJ of biomass were consumed, that the estimates are included in the inventory and that there were errors in the submitted tables of data. The ERT encourages Lithuania to check whether the inventory includes these estimates and provide corrected data tables for future submissions.

Mobile Sources

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, CO, NH ₃ , PM ₁₀ & PM _{2.5} , Cd, Hg, Pb		
Years		1990–2007 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
1.A.2	Manufacturing industries and construction mobile sources	x		
1.A.3		x		X
1.A.4	Commercial, residential, agriculture & forestry mobile sources	x		x
1.A.5	Other mobile sources	x		x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting issues

49. **Completeness:** The ERT has found some sectors and pollutants where emission estimates are missing including:

- for all mobile sources for the years before 2002 for CO, NMVOC, NO_x, NH₃, SO_x, TSP and Pb
- for years before 2004 for PM10 and PM2.5.
- for Hg emission estimates, except 1A3d ii (national navigation) for which 2004-2007 estimates exist.
- 1A4a ii (Commercial and institutional mobile) and 1A4b ii (Household and gardening mobile) no emission estimates have been calculated (see under sub sector specific recommendations).
- 1A2f ii (manufacturing industries and construction mobile) only 2007 emission estimates have been calculated.
- 1A3a ii (i, domestic aviation cruise) 2004-2006 emission estimates are calculated, although the IE notation key is shown for the year 2007.
- For the sub sectors 1A3b vi and vii (tyre and brake wear; road abrasion), TSP estimates are only given for 2004-2007.

The ERT acknowledge Lithuania's intentions to improve this part of the inventory in the future, as explained in the reply to ERT's initial review questions. The ERT recommends that the Party complete and maintain a consistent time series of emissions.

50. **Transparency:** For sub sectors other than road transport using diesel and gasoline, emission factor information for SO₂ is missing in Table 2-24. In order to improve the transparency of the inventory for other mobile sources, the ERT encourages Lithuania to show fuel activity data provided by the national Energy Balance to underpin the emission calculations, and to provide more details of the emission factors actually used in the inventory for the different mobile sub sectors in the next IIR (for road transport see sub sector specific recommendations).

51. **Uncertainty:** Lithuania has not provided uncertainty estimates for mobile sources. The ERT encourage Lithuania to make sub sectoral uncertainty estimates for all mobile sources.

52. **QA/QC procedures:** There are no QA/QC procedures for the mobile source estimates described by Lithuania in the IIR. The ERT encourages Lithuania to include details of QA/QC procedures/checks used for the mobile sector.

53. **Recalculations:** Lithuania has made no recalculations in the inventory for mobile sources. The ERT encourages Lithuania to report on recalculations or areas where there need to be recalculations in its IIR.

54. **Improvement:** The ERT finds that there are no planned improvements specified in the IIR. The ERT encourages Lithuania to list planned and desired improvements in its IIR to help to provide transparency on future improvements and to support improvement prioritisation.

Sub-sector specific recommendations

The ERT acknowledge the detailed level of the inventory for civil aviation and road transport emissions in Lithuania, and the Party's intention to improve certain parts of the inventory in the future. The ERT gives the following sub sector-specific recommendations.

1.A.3.a Civil aviation

55. For the sub sectors 1A3a ii (i/ii, domestic aviation LTO/cruise) the IE notation key is given. The ERT acknowledge Lithuania's intentions to improve this part of the inventory in the future, as explained in the reply to ERT's initial review questions. The ERT encourage Lithuania to work towards making separate emission estimates for this sector as well.

56. In the IIR report for aviation a short description is given of how the LTO emissions are estimated. The ERT recommends that Lithuania describe in the next IIR how cruise emissions are estimated.

57. In Table 2-24, SO₂ emission factor information is given for aviation gasoline. The ERT suspects that jet fuel is really meant in this case. The ERT encourages Lithuania to list the SO₂ emission factor for jet fuel in Table 2.24 in the next IIR.

1.A.3.b Road transport

58. From the vehicle categories listed in the IIR emission factor tables, the ERT assumes that the COPERT IV model version is used to calculate the road transport emissions in Lithuania. In the response to ERT's initial review questions, Lithuania explains that emission estimates for the years before 2007 are made using the COPERT III version. In order to improve consistency, Lithuania is encouraged to recalculate the emissions for road transport for the years prior to 2007 using COPERT IV.

59. It is not clear from the IIR what the aggregation levels are of fleet and mileage data being provided by Regitra and the Institute of Transport, respectively. It is recommended that Lithuania provide more details of the fleet and mileage data which is used as input data. Lithuania is also encouraged to explain in more detail how fleet and mileage figures have been disaggregated into the COPERT categories in the inventory.

60. The ERT finds that errors appear in the IIR Table 2-12 for heavy duty trucks under rural and highway driving conditions. The errors are most probably due to row shift. Lithuania is encouraged to correct these errors in the next IIR.

1.A.4.a ii Commercial and institutional mobile

61. According to Lithuania's response to ERT's initial review questions, the emissions for 1A4a ii (commercial and institutional mobile) are included under 1A4. However, in the Party's NFR report the NE code key is given. The ERT encourages Lithuania to change this code to IE, and explain the specific sub sector under which the emissions of 1A4a ii are included in the next IIR. Also, the ERT encourages Lithuania to collect activity data for the sector 1A4a ii and make separate emission estimates for this sector.

1.A.4.b ii Household and gardening mobile

62. According to Lithuania's response to ERT's initial review questions, no separate activity data exist for 1A4b ii (household and gardening mobile), and instead, the emissions are included under 1A4. However, in the Party's NFR report the NE code key is given. The ERT encourages Lithuania to change this code to IE, and explain where the emissions of 1A4b ii are included in the next IIR. Also, the ERT encourages Lithuania to collect activity data for the sector 1A4b ii and make separate emission estimates for this sector.

1.A.4.c iii National fishing

63. For the sub sector 1A4c iii (National fishing), the IE notation key is given. The ERT encourages Lithuania to explain where these emissions are included in the next IIR. Further, the ERT encourages Lithuania to work towards making separate emission estimates for this sector.

1.A.5.b Other

64. For the sub sector 1A5b (Other) sector, the IE notation key is given. The ERT encourages Lithuania to explain where these emissions are included in the next IIR. Further, the ERT encourages Lithuania to work towards making separate emission estimates for this sector.

Industrial Processes

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , TSP, PM ₁₀ , PM _{2.5} , and HM		
Years		2002–2007		
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	Other including non fuel mining & construction (please specify in a covering note)		x	*
2.B.2	Nitric acid production	x		x
2.B.3	Adipic acid production		x	*
2.B.4	Carbide production		x	*
2.B.5	Other (please specify in a covering note)	x		x
2.C.1	Iron and steel production		x	*
2.C.2	Ferroalloys production		x	*
2.C.3	Aluminium production		x	*
2.C.4	SF ₆ used in aluminium and magnesium foundries		x	*
2.C.5	Other (please specify)			*
2.D.1	Pulp and paper		x	x
2.D.2	Food and drink	x		*
2.D.3	Wood processing		x	x
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

* Lithuania is encouraged to improve the description of methods, data sources and assumptions for all categories reported. The lack of transparency in the report meant that the ERT were unable to fully assess the accuracy or appropriateness of the methods.

General recommendations on cross cutting issues

65. **Completeness:** The ERT noticed that the time series for some sectors and some pollutants are not complete. Lithuania is encouraged to complete the time series and to include PM10 and PM2.5. Lithuania is encouraged to complete the time series and to include the sectors Pulp and paper and Wood processing in the next inventories.

66. Some of the time series are not complete for the years 2002–2007 and Lithuania provides no data for IP before 2002. The ERT encourage Lithuania to complete the time series and provide data for all years between 1990 and the latest inventory year.

67. **QA/QC procedures:** The ERT notices that no sector specific QA/QC has been described. The Party is encouraged to present a plan for the development and implementation of a QA/QC system.

68. **Recalculations:** Lithuania has not reported recalculations in the inventory for Industrial Process sources and has not provided any documentation about recalculations in the IIR. The ERT encourages Lithuania to report on recalculations or areas where there need to be recalculations in future IIRs.

69. **Uncertainty:** The ERT noticed that no uncertainty estimates are presented in the IIR. The Party is encouraged to present a plan for inclusion of uncertainty estimates in the IIR.

70. **Transparency:** The methodology is described very briefly and does not allow an in-depth evaluation of methods, assumptions and data sources by the ERT. The ERT encourage Lithuania to implement the recommended structure for Informative Inventory Reports (IIR) and to provide more detailed descriptions of the methods, assumptions and data sources including details of activity data and emission factors.

71. **Improvement:** The ERT finds there are no planned improvements specified in the IIR. The ERT encourages Lithuania to list planned and desired improvements in its IIR to help to provide transparency on future improvements and to support improvement prioritisation.

Sector Specific Recommendations

72. The IIR does not describe many of the emission estimates in a sufficient way for the ERT to be able to determine the validity of the underlying data or methods. The ERT encourages Lithuania to provide more detailed descriptions of the methods, data sources and assumptions used in making its estimates in future IIRs. The following Categories have some suggestions for improvement by the ERT. However, the ERT recommends that all category descriptions should be reviewed and developed in order to provide the appropriate transparency.

2A1 Cement production

73. The ERT noticed that the time series for CO, Hg, NO_x, Pb, and SO₂ are not complete. The Party is encouraged to complete the time series and to improve the description of methods, assumptions and data sources for this category.

2A2 Lime production

74. The ERT noticed that the time series for CO, NO_x, and TSP are not complete. The Party is encouraged to complete the time series and to improve the description of methods, assumptions and data sources for this category.

2B Chemical industry

75. The ERT noticed that the time series for CO are not complete. The Party is encouraged to complete the time series and to improve the description of methods, assumptions and data sources for this category.

2D Other production

76. Lithuania indicated that due to confidentiality problems the sectors Pulp and paper as well as Wood processing were not reported. The ERT encourages the Party to try to include these sectors separately or on an aggregated level together with another category in future submissions.

Solvents

Review scope

Pollutants Reviewed		NMVOC		
Years		1990–2006 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
3.A.1	Decorative coating application	Under 3A3		x
3.A.2	Industrial coating application	3A2		x
3.A.3	Other coating application (please specify the sources included/excluded in the notes column to the right)	3A3		x
3.B.1	Degreasing	3B1		x
3.B.2	Dry cleaning	3B2		x
3.C	Chemical products, manufacture & processing	3C		x
3.D.1	Printing	3D1		x
3.D.2	Domestic solvent use including fungicides	3D2		x
3.D.3	Other product use	3D3		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

77. **Completeness:** The ERT does not consider the solvent sector to be complete and the emissions for the sector may be underestimated. Only two activities under 3D2 and 3D3 are considered. The ERT encourages Lithuania to assess any potentially missing sources under SNAP 060301 to 060314 in NFR 3C including polyester processing, rubber processing, and asphalt blowing and SNAP 060401 and 060412 in NFR 3D including printing activities, production of pharmaceutical products.

78. The ERT recommends that Lithuania set up a progress plan to improve the completeness of the emission inventory and prioritise the activities to be taken into account.

79. **QA/QC procedures:** According to information provided, QA/QC procedures are not set up for the Solvents sector. The ERT encourages Lithuania to implement sector specific QA/QC procedures for the next submission and to report on these in its IIR.

80. **Recalculations:** Lithuania has made no recalculations in the inventory for Solvents sources. The ERT encourages Lithuania to report on recalculations or areas where there need to be recalculations in its IIR.

81. **Uncertainty:** The ERT encourages Lithuania to undertake uncertainty analysis for the solvent sector in order to help support the improvement process and to provide an indication of the reliability of the inventory data.

82. **Transparency:** The ERT commends Lithuania for providing details of emission factors in its IIR. However, the ERT encourages Lithuania to improve the description of methods, assumptions and data sources in its IIR including providing some background to the developed country specific emission factors and the rationale for using them..

83. **Improvement:** The ERT finds that there are no planned improvements specified in the IIR. The ERT supports Lithuania's plans (identified during the review week) to take into account the implementation of Council Directive 1999/13/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations. The ERT encourages Lithuania to list planned and desired improvements in its IIR to help to provide transparency on future improvements and to support improvement prioritisation.

Sector specific recommendations

3A1: Building and construction applications and domestic uses NMVOC

84. During the review week Lithuania indicated that emissions for 3A1 are included with 3A3. The ERT encourages Lithuania to consider domestic uses of paints and paints for building and construction under NFR 3A1 and not under NFR 3A3.

85. For the uses of paints for building and construction applications and domestic uses (taking into account the SNAP 060103 and SNAP 060104 respectively), the ERT encourages Lithuania to take into account the different types of paints used (solvent borne and water borne paints) and to try to obtain each year the consumption of each of these paints through, for example, the association of Lithuanian paint manufacturers. Through this methodology it is possible to have a picture of the progress made with the reduction of emissions of NMVOC. Lithuania is also encouraged, by the ERT, to take into account the impact of the EU Directive of 21 April 2004 [2004/42/EC] related to the use of paints for building applications and car repairing which sets up a maximum solvent content for products in the EU Member states.

3A2: Industrial applications NMVOC

86. For uses of paints in industrial applications, the ERT encourages Lithuania to take into account the different types of paints used (such as solvent borne, water borne paints and powders) and to try to obtain each year the consumption of each of these paints through, for example, the association of Lithuanian paint manufacturers. Through this methodology it is possible to have a picture of the progress made with the reduction of emissions of NMVOC. Lithuania is also encouraged to take into account the impact of the EU Directive 1999/13 related to the use of solvents in certain activities which sets up ELVs for stack emissions and fugitive emissions in the EU Member states.

87. The ERT encourages Lithuania to extend its collection of national statistical data and to set up methodologies to utilize the data from regulatory reporting under E-PRTR and IPPC to improve the accuracy of the inventory and to take into account abatement technologies and different applications.

3B: Degreasing – NMVOC

88. The ERT encourages Lithuania to implement a more detailed methodology based at least on solvent consumption data. Chlorinated solvents are mainly used in degreasing applications and the balance between solvent inputs and outputs should be known due to EU legislation controlling them.

3B2: Dry cleaning – NMVOC

89. Lithuania does not provide estimates of emissions from dry cleaning. The ERT encourages Lithuania to set up a methodology to estimate the emissions from this sector and to report on emissions in future submissions.

3C: Chemical products, manufacture & processing – NMVOC

90. The ERT encourages Lithuania to check again the presence of some activities in Lithuania. These activities are, for example, polyester processing, polystyrene processing, rubber processing, and asphalt blowing. The ERT acknowledges that although NMVOC emissions may be low, these activities should be taken into account in the inventory.

3D2 and 3D3: Chemical products, manufacture & processing – NMVOC

91. The ERT encourages Lithuania to check again the presence of some activities in Lithuania. These activities are, for example, pharmaceutical product manufacturing, fat edible oil production. The ERT acknowledges that although NMVOC emissions may be low, these activities should be taken into account in the inventory.

3D1: Printing activities – NMVOC

92. For NFR 3D1, printing activities, no emissions are reported. Lithuania is encouraged to consider the development of a methodology for at least: rotogravure, flexography and heat set offset, using the new version of the EEA/EMEP Guidebook to address this sector which is considered a large emitter in most countries.

3D3: Glue and adhesive applications – NMVOC

93. The EF for glue and adhesive applications is constant across the time series and expressed in mass of VOC per inhabitants. The ERT encourages Lithuania to set up a methodology to take into account the different types of glues: (solvent based, water based and solvent free) and to report on emissions for these categories in future submissions.

Agriculture

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990–2006 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
4.B	Manure management	NH ₃		X
4.D1	Direct soil emissions	NH ₃		X
4.F	Field burning of agricultural wastes			
5E	Other			
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

94. **Completeness:** Lithuania does not report NH₃ emissions for broilers or other poultry, even though animal numbers are given in the IIR. All poultry emissions now appear to be reported under 4B 9a layers. The ERT also encourages Lithuania to estimate emissions of broilers and other poultry and to separate NH₃ emissions among poultry sub-categories in 4B 9.

95. Lithuania currently does not provide estimates of emissions of NO_x and PM from 4B and 4D. The ERT also encourages Lithuania to calculate PM and NO_x emissions from 4B and 4D.

96. **QA/QC procedures:** The Party has not reported any QA/QC procedures for the agriculture sector. The ERT encourages Lithuania to implement and report in its IIR on sector specific QA/QC procedures for the agriculture sector.

97. **Recalculations:** Lithuania has made no recalculations in the inventory for agricultural sources. The ERT encourages Lithuania to carry out recalculations where needed and report on them in its IIR.

98. **Uncertainty:** The ERT did not find any details of uncertainty analysis in Lithuania's IIR. The ERT encourages Lithuania to undertake **uncertainty** analysis for the agriculture sector (particularly for emissions reported under 4B and 4D) in order to help support the improvement process and to provide an indication of the reliability of the inventory data.

99. **Transparency:** The IIR provided by Lithuania is generally transparent and well presented/organised although some additional detail should be added as recommended below. The ERT encourages Lithuania to provide more detail in the IIR including: activity data (e.g. livestock numbers) emission factors, methodologies and assumptions for estimates for the years 1990–2006. In addition, it would be useful to include in the IIR information regarding aspects of livestock husbandry and manure management that have a significant impact on NH₃ emissions such as the ratio of the housing to grazing period and whether manure is handled as liquid slurry or as solid manure.

100. **Improvement:** The ERT finds that there are no planned improvements specified in the IIR. The ERT encourages Lithuania to list planned and desired improvements in its IIR to help to provide transparency on future improvements and to support improvement prioritisation.

Sector specific recommendations

4B: Manure management – NH₃

101. In examining the time series the ERT noted that for Dairy cows (4B 1a), there was a big decrease, *c.* 10%, in NH₃ emissions between 2005 and 2006. During the course of the review Lithuania was unable to provide a detailed response and the ERT were still unclear about the reasons for this trend. The ERT encourages Lithuania to provide clarification on the relationship between the trends for NH₃ emissions and the numbers of cattle in future IIRs.

102. In examining the time series, the ERT noted that for Pigs (4B 8), there was a big increase in the NH₃ emission estimate, *c.* 10%, from 2005 to 2006, after a decrease from 2004 to 2005. During the course of the review Lithuania was unable to provide a detailed response and the ERT were still unclear about the reasons for the trends. The ERT encourages Lithuania to provide clarification on the relationship between the trends NH₃ emissions and the numbers of pigs in future IIRs.

103. Lithuania currently uses a simple tier 1 approach for estimating emissions from manure management. As Manure Management is a Key Category, the ERT recommend that for the calculation of NH₃ emissions Lithuania adopt the Tier 2 approach described in the revised EMEP/CORINAIR guidebook.

104. Lithuania is encouraged by the ERT to provide more detailed information in its next IIR submission on the data used for calculations and the inclusion of activity data for 4B Manure Management.

4D1: Agricultural soils – NH₃

105. In examining the time series, the ERT noted that there was a decrease, *c.* 20% of the previous NH₃ emission estimate, of fertilizer emissions from 2002 to 2003. During the course of the review Lithuania was unable to provide a detailed response and the ERT were still unclear about the reasons for this trend. The ERT encourages Lithuania to provide clarification on the relationship between the trends for NH₃ emissions and fertilizer consumption in future IIRs.

Waste

Review scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , TSP, PM ₁₀ & PM _{2.5} , HM		
Years		2002–2007		
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	Waste incineration		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 codes have been reviewed and which have not in the respective columns.

General recommendations on cross cutting issues

106. **Completeness:** Lithuania is encouraged to investigate the significance of Solid waste disposal on land and Waste-water handling in order to improve the completeness of the inventory. In response to enquiries from the ERT Lithuania has indicated that waste incineration with energy recovery is included in category 1 (Energy). The ERT encourages Lithuania to investigate if other kinds of waste management (e.g. waste incineration; non energy generation) exist and need to be included in the inventory and to indicate this in its IIR.

107. **QA/QC procedures:** The ERT notices that no sector specific QA/QC has been described. The Party is encouraged to present a plan for the development and implementation of a QA/QC system.

108. **Recalculations:** Lithuania has made no recalculations in the inventory for Industrial Process sources. The ERT encourages Lithuania to report on recalculations or areas where there need to be recalculations in its IIR.

109. **Uncertainty:** The ERT noticed that no uncertainty estimates are presented in the IIR. The Party is encouraged to present a plan for inclusion of uncertainty estimates in the IIR.

110. **Transparency:** In response to enquiries from the ERT Lithuania has indicated that waste incineration with energy recovery is included in category 1 (Energy). The ERT encourages Lithuania to improve the use of notation keys in order to improve the transparency.

111. The methodology is described very briefly and does not allow an in-depth evaluation of methods, assumptions and data sources by the ERT. The ERT encourages Lithuania to implement the recommended structure for Informative Inventory Report (IIR) and to provide more detailed description of the methods, assumptions and data sources including details of activity data and emission factors.

112. **Improvement:** The ERT finds that there are no planned improvements specified in the IIR. The ERT encourages Lithuania to list planned and desired improvements in its IIR to help to provide transparency on future improvements and to support improvement prioritisation.

Sector Specific Recommendations

113. Lithuania is encouraged to include Solid waste disposal on land and Waste water handling in the inventory or at least document that these sources are insignificant and can be left out of the inventory.

114. The IIR does not describe many of the emission estimates in a sufficient way for the ERT to be able to determine the validity of the underlying data or methods. The ERT encourages Lithuania to provide more detailed descriptions of the methods, data sources and assumptions used in making its estimates in future IIRs. The ERT recommends that all category descriptions should be reviewed and developed in order to provide the appropriate transparency.

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

1. Lithuania Stage 2 S&A report
2. Lithuania Stage 1 report 2009
3. Lithuania's IIR 2009 : LT-IIR_2007.pdf
4. LT-2007.xls
5. [LT emission inventory data 2007.xls](#)
6. Emissions Data Tool: 2009ReviewData-NoLinks-v9.xls
7. Solvents: responses to questions in “Lithuania-Solvents-23-06-09-PreReview-réponse.doc”
8. Mobile: responses to questions in “Lithuania-Energy-Mobile-11-06-09-PreReview1.doc”
9. Agriculture: responses to questions in “Lt_reply_260609.doc”
10. Energy: responses to questions in “Lithuania-Energy-11-06-09-PreReview1 (2).doc”
11. IP: responses to questions in “Lithuania-IP-11-06-09-PreReview1_reply.doc”
12. Waste: responses to questions in “Lithuania-Waste-16-06-09-PreReview1_reply.doc”