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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:**

POLAND

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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 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 Poland, 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).
4. The following team of nominated experts from the roster of experts performed the review: Lead Reviewer – Chris Dore (UK), Generalist – Jean-Pierre Chang (France), Energy – Stephan Poupa (Austria), Mobile – Michael Kotzulla (Germany), Industrial Processes – Kees Peek (Netherlands), Solvents – David Kuntze (Germany), Agriculture & Nature – Hakam Al-Hanbali (Sweden), Waste – Celine Gueguen (France)
5. The review was coordinated by Chris Dore 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

6. Within the 2009 submission, Poland only reported emissions for 2007 and 2006. Previous years, and so, base years for its Protocols, were not recalculated and submitted in 2009. Pollutants under its Protocols as well as CO, TSP, PM₁₀ and PM_{2.5} are provided for the two reported years. Poland informed the ERT that very limited funding was provided for the last year, but that the inventory team will make an effort to prepare full time series inventory tables for the next submission.

7. Poland submitted an IIR report according to the previous IIR reporting structure. The IIR can be improved generally, and in particular by including more detailed information. Poland informed the ERT that it plans to implement the new guidelines on the IIR structure in time for the next submission. The ERT welcome this improvement, and encourage Poland to provide a more detailed IIR report and to use the most up to date recommended structure of the IIR. Following the review, Poland provided some background to their inventory reports. The ERT understand that information is currently provided in more than one inventory report, and agree with Poland in that merging these to produce one IIR is the most sensible way forward.

8. The CLRTAP inventory submitted by Poland needs improvements in a number of areas. In particular, much more detail is required in the IIR to explain the calculation methods, and the data used. The inventory would benefit from more developed calculations in a number of areas (both in terms of using more sophisticated methodologies, as well as improved EFs). The ERT would also like to encourage Poland to include a recalculation of the time series, an uncertainty assessment, and to pay particular attention to improving time series consistency.

KEY CATEGORIES

9. Poland has compiled and presented in its IIR a tier 1 Key Category Analysis (KCA) in terms of level. The ERT recommends that Poland also implement a KCA in terms of trend (if not already done) and report this in the IIR. The KCA is generally the same for the Country and the CEIP analysis (although there are a few cases associated with the use of different of NFR levels).

QUALITY

Transparency

10. The IIR report needs to be more detailed concerning methodological issues, and these should be presented as NFR sector chapters instead of globally and according to pollutant. The ERT encourages Poland, when implementing the new IIR structure for the next inventory, to further detail methodological issues within the different sector chapters. Comments on

individual NFR categories are included in later sections of this report, but the ERT found it difficult to gain a full understanding of the methodologies used by Poland because there was not sufficient explanation in the IIR. For example, the IIR had no section on Industrial Processes.

11. Poland did not use zero-value in the reporting tables, but notation keys. The ERT commends Poland for this.

12. Information explaining the used notation key IE (Included Elsewhere) is not provided in NFR tables IV 1F nor in IIR. Information was provided to the ERT during the review, and the ERT encourages Poland to report this information in the IIR and NFR tables for better transparency of the inventory.

Completeness

13. Poland's inventory (for the pollutants reviewed) includes notation keys "NE" (Not Estimated) in NRF tables (an average of 10 "NE" per pollutant in 2007). An explanation for the use of the "Not Estimated" sources is not reported in the NFR tables (tables IV 1F) nor in IIR section on completeness issues. There are a number of completeness issues, in particular with the Industrial Processes and Solvent sectors.

14. During the review Poland provided some explanations regarding the "NE" entries, and the ERT strongly encourages Poland to provide explanations in the IIR for using this notation key. In addition, the ERT recommends that Poland includes plans to address these sources in the IIR- either by obtaining data to allow an emission estimate to be made, or by reporting the emissions as not occurring.

Consistency, including recalculations and time-series

15. Poland did not recalculate and resubmit years before 2006. For national level totals, recalculations for 2006 are generally not important (less than 10%) except for Pb and Hg. The ERT strongly encourages Poland to recalculate previous years (to ensure time series consistency) and to explain the reasons for the recalculations in the IIR in time for the next submission. This is important to ensure time series consistency, which has been flagged as an issue in several sectors (described in later sections of this report). Poland informed the ERT of their plans to do this, and the ERT commend Poland on their efforts to make these improvements. Following the review, Poland informed the ERT that emission estimates for 1990–1999 have been calculated on a different basis to more recent years, and the limited data makes recalculation more difficult. The ERT understand that it may take several inventory cycles before estimates for all years can be recalculated, and commend Poland on tackling this improvement.

16. From the Stage 2 review results on the S&A time series analysis, CO national total emissions in 1993 are about 70% higher than 1994 emissions. Following the review, Poland informed ERT that this change was due to coal use in the domestic sector, but that recalculations would be undertaken, which will decrease the CO emissions from 1993 and earlier years.

Comparability

17. With the exception of activity data, Poland has implemented the new NFR 2008 format, even though this was required within a very short timescale (Decision of Dec. 2008). Poland informed the ERT that it plans to include activity data within the next submission, and the ERT welcome the efforts of Poland to make this improvement.

CLRTAP/NECD comparability

18. From the LRTAP versus NECD comparison in the S&A, some important differences are evident, which depend on the year and pollutant (e.g. for NMVOC between +34% to -50%). Poland informed the ERT that some recalculations were made between the submission dates for the NECD and the LTRAP. The ERT understands the difficulties associated with this issue, but nevertheless encourages Poland to report NECD and LTRAP data which is as consistent as possible. Where there are inconsistencies between the two datasets, the ERT strongly encourages Poland to include explanations in the IIR to improve transparency, and indicate whether these are associated with e.g. improvements or correction of errors.

Accuracy and uncertainties

19. Quantitative estimates of uncertainties are not yet calculated by Poland. Poland informed the ERT that it plans to undertake this in time for the next inventory. The ERT encourages Poland to make this improvement and to use the results from the uncertainty assessment as a tool to prioritise improvements for key categories.

Verification and quality assurance/quality control approaches

20. Information on QA/QC is not included in the IIR, but in a separate document provided to the ERT during the review. Poland informed the ERT of its plan to update the QA/QC plan according to the new EMEP/EEA Guidebook. The ERT recommends that Poland implement sector specific QA/QC routines as well as general procedures, and that text detailing the QA/QC plan is included in the IIR.

FOLLOW-UP TO PREVIOUS REVIEWS

21. The inventory submission for 2009 of Poland (NFR tables and IIR) and Poland's responses to ERT questions enabled the ERT to implement the stage 3 review and to provide a number of detailed recommendations. The ERT understand the level of effort required by Poland to answer questions during the review process, and would like to thank Poland for their good efforts.

AREAS FOR IMPROVEMENTS IDENTIFIED BY POLAND

22. The IIR does not include information on planned improvements. The ERT encourages Poland to report an improvement plan in future IIRs.

23. During the review, Poland informed the ERT that there were areas for improvement in the inventory which related to the review questions. The ERT noted the willingness of Poland to take into account the conclusions and recommendations from the review in their next improvement plan.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO POLAND

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

24. The ERT identified the following cross-cutting issues for improvement:
- (a) Inclusion of text explaining the QA/QC plan for the LRTAP national inventory in the IIR. This should include both general, and sector specific QA/QC procedures and checks.
 - (b) Within the NFR format tables (table IV 1F) and the IIR, full explanations of the use of notation keys (IE, NE, etc.). The IIR should also include improvements relating to the use of “NE”.
 - (c) Implementation of the new recommended structure for the IIR.
 - (d) More comprehensive explanations, and more detailed information to be included throughout the IIR. In particular: more detailed descriptions of methodologies, EFs and activity data (with references) and the inclusion of a chapter on Industrial Processes. In addition, information on all significant recalculations and the impacts of these recalculations on national totals and trends, and information on planned improvements.
 - (e) Implementation of a Key Category Analysis for trends.
 - (f) Recalculation and resubmission of a full time series as appropriate. In particular this should include the reference years of Protocols. The ERT recognise that this may take several inventory cycles.
 - (g) Submission of activity data, as indicated in the new NFR tables.
 - (h) Implementation of an uncertainty assessment, and use of the results as a relevant tool to prioritise improvements for key categories.
 - (i) To continue to incorporate high quality facility level data into the national estimates and to generate country specific emission factors (as is being done for large power plants and industrial facilities, and PM in the Industrial Processes sector).
25. 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 ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990–2007		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
1.A.1	Energy industries	x		x
1.A.2	Manufacturing industries and construction	x		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.

General recommendations on cross cutting issues

26. **Completeness:** The ERT consider the Energy sector to be complete and comprehensive, but without any methodology descriptions.

27. **Transparency:** Poland does not use any zero-values in the reporting tables. Some “IE” notation keys are used but no description is provided in the IIR and the reporting tables. Information about IE notation keys has been provided during the review, which explains where the relevant emissions are included. The ERT recommends that this information should be included in the IIR and the reporting tables for future submissions.

28. Poland has provided a detailed but not very transparent emissions inventory. Estimates are provided at a detailed level for all energy sectors. However Poland’s methodology and emission factors in the IIR are considered by the ERT to be not well described for the Energy Sector. The ERT strongly encourage Poland to include a general methodological description in the IIR, to explain what data is used, and the methodologies for making emission estimates.

29. **Uncertainty:** The ERT encourages Poland to undertake uncertainty analysis for the Energy Sector in order to help support the inventory improvement process and to provide an indication of the reliability of the inventory data.

30. **QA/QC procedures:** The Party has some basic QA/QC checks: initial check of activity data, recalculations and outliers check. The ERT encourages Poland to implement and report sector specific QA/QC procedures for the Energy sector.

31. **Recalculations:** Poland has recalculated its inventory for some sectors in the year 2006. However, the IIR does not include all of the necessary explanations. The ERT encourages Poland to provide more detailed explanation of recalculations in the IIR, including the reasons for the recalculation, the impact on the sector and implication on trends for the Energy sector.

32. **Improvement:** The ERT commends Poland for its improvement in the PM inventory. The ERT encourages Poland to include an improvement plan in the IIR, so that the most important improvements can be prioritised.

Sub-sector specific recommendations

1.A.1.a Public electricity and heat production – NO_x, SO_x

33. The ERT found that NO_x emissions 2006–2007 are about 15% higher than for previous years. SO_x emissions 2006–2007 are about 20% higher than for previous years. Poland responded that recalculations (caused by a change in methodology) were made for the years from 2005 on and provided some explanations. The ERT encourages Poland to report changes in methodology in the IIR and to improve time series consistency.

1.A.2.a Iron and steel – sinter and pelletizing plants – NO_x

34. The ERT identified that according to Poland's "UNECE report 2006", 95 PJ of unspecified fuel is used for sinter and pelletizing plants and that the emission factor used for NO_x of 0.3 kg/TJ is very low. Poland responded that mainly coke is used for sinter plants and that it would investigate the reference of this emission factor. The ERT recommends that Poland include a more comprehensive chapter about emissions from the iron and steel industry in the IIR.

1.A.2.d Pulp, paper and print – NO_x

35. The ERT identified rather low NO_x emissions from pulp and paper production. The party responded that the current methodology needs to be verified or changed. The ERT encourages Poland to review estimates from this source, and recommends that Poland include sector specific QA/QC procedures in its IIR.

1.A.2.fi Cement industry – NO_x

36. The ERT identified a rather high NO_x emission factor of 2380 kg NO_x/TJ for this source. The Party responded that the current methodology needs to be verified or changed. The ERT encourages Poland to review estimates from this source, and recommends that Poland include sector specific QA/QC procedures in its IIR.

1.A.4.b.i Residential

37. The ERT noted that category 1.A.4.b is a key source for many pollutants and that according to Poland's "UNECE report 2006" a tier 1 method has been used. The ERT recommends that Poland should use higher tier methods for key source estimations, and that these should be a priority for improvements.

Mobile sources

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , CO, TSP, PM ₁₀ & PM _{2.5}		
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.2.f i	1.A.2.f ii
1.A.3	Transport	x	1.A.3.c	1.A.3.a, b vi & vii, 1.A.3.d ii, 1.A.3.e
1.A.4	Commercial, residential, agriculture & forestry mobile sources	x	1.A.4.a ii, bii	1.A.4c ii, iii
1.A.5	Other mobile sources	x		1.A.5.b
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

38. **Completeness:** The ERT consider the Transport sector and the other sectors including mobile sources to be of good completeness, although there are some gaps which need to be filled. Similarly, in the IIR, the levels of detail in the methodology descriptions, explanation of notation keys and recalculations as well as QA/QC need improvement.

39. **Transparency and Completeness:** Poland provided a detailed and for most parts transparent emissions inventory. Estimates are provided at the most detailed level for sectors including mobile sources. However, the descriptions of the methodologies used need to be improved in terms of transparency. The ERT encourages Poland to include more details in the IIR including: methodologies and EFs used for mobile sources (with references), and recalculations.

40. The ERT commends the Party for providing the information in the NFR tables which explain the allocation of emissions reported as 'IE' (included elsewhere) for the mobile sources.

41. **Uncertainty:** Poland has not yet estimated uncertainties. The ERT therefore encourages Poland to improve this important part of the inventory.

42. **QA/QC procedures:** The ERT welcomes Poland's efforts to implement a QA/QC system based on the system already in use for UNFCCC greenhouse gas reporting.

43. **Recalculations:** There is almost no information to be found in the IIR about recalculations carried out by the Party. The ERT encourages Poland to provide such information in the next IIR, including information for each sub-sector, as well as a separate, more detailed chapter on this issue. During the review, Poland indicated their willingness to provide more detailed information about recalculations in future IIRs, and the ERT warmly welcome this planned improvement.

Sub-Sector Specific Recommendations**1.A.2.f ii Mobile combustion in manufacturing industries and construction – consistency**

44. The ERT noted that there are data reported for the main pollutants, but that for example heavy metals are reported as included elsewhere (IE, here: under 1.A.2.f i). The ERT warmly welcomes the party's willingness to report emissions for all pollutants in sub-sector 1.A.2.f ii in future submissions, thereby removing the need for reporting "IE". The ERT, in addition, acknowledges the subsequent provision of the heavy metal emissions data for this sub-sector and again wants to encourage Poland to reduce the use of 'IE' in future submissions.

1.A.2.f ii, 1.A.3.b (all sub-sectors) – recalculations

45. The ERT noted that there seem to have been at least some recalculations within the 2006 data leading to some differences between data reported under NECD and CLRTAP. No information is included in the IIR, but the Party explained that this arose from recalculations applied to the CLRTAP dataset, after submission of the NECD dataset. The ERT note that this is an issue with other Parties as well. However, the ERT encourage Poland to report consistent NECD and CLRTAP data as far as is possible. The ERT also strongly encourage Poland to include explanations of these types of recalculations and changes in their IIR.

1.A.3.b v – NMVOC

46. During the centralized review, the ERT noted that Poland does not report non-exhaust NMVOC emissions from this sub-sector. The ERT recommends that Poland investigate this issue and use default EFs if there aren't any country specific EFs available. Poland indicated their willingness to address this in future submissions. The ERT commends the party's understanding, and encourages the party to fill the existing data gap.

1.A.3.b vi Road transport, automobile tyre and brake wear & vii Road transport, automobile road abrasion – non-exhaust heavy metal emissions

47. The ERT recommends that the Party investigate whether emission estimates can be made for heavy metal emissions from tyre and brake wear (and road abrasion).

1.A.3.c Railways – allocation of HM emissions

48. During the review, the ERT noted that for sub-sector 1.A.3.b vii 'IE' has been reported for particle emissions, and recommended providing separate data for particle emissions. Poland indicated their intention to investigate this complex but nevertheless important issue. The ERT commends the party for its willingness to consider improvements in this part of their inventory.

1.A.3.e Other – allocation of emissions

49. The ERT noted that emissions from this sector have been reported as ‘included elsewhere’ in sector ‘1.A.1.c – Manufacture of Solid Fuels and Other Energy Industries’. The ERT welcomes the explanations given in the NFR tables about where emissions are included but nevertheless wants to encourage the party to collect data on a level which would allow improved disaggregation.

1.A.3.d ii National navigation – allocation heavy metal emission

50. The ERT realized that heavy metal emissions from this sub-sector are reported as ‘included elsewhere’ in sector ‘1.A.1.c – Manufacture of Solid Fuels and Other Energy Industries’ whereas emissions of main pollutants and particles are reported within the sub-sector itself. The ERT therefore encourages the development of methodologies which would allow data for this sub-sector to be made separately.

1.A.4.c ii Off-road vehicles and other machinery & iii National fishing – allocation heavy metal emission

51. For these sub-sectors, the party provides emission data for main pollutants and particles. But, in contrast, heavy metal emissions have been totally included in 1.A.2.f i. The ERT encourages the party to develop methodologies which would allow data for these sub-sectors to be estimated separately, and allocated to the appropriate NFR category.

1.A.5.b – Other, mobile - allocation and completeness

52. According to the IIR and the submission data, all activities within this sub-category are included under 1.A.3.b and therefore reported as included elsewhere (IE). The ERT warmly encouraged the party to provide separate data for mobile military sources if possible. By doing so, the party should also try to include military aircraft which seems not to have been considered in the current version of the inventory. Poland indicated that it would investigate this, and the ERT gratefully received Poland’s willingness to improve the completeness of this sector.

Industrial ProcessesReview scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990–2007 + (Protocol Years)		
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			
2.A.4	soda ash production and use			
2.A.5	asphalt roofing	X		X
2.A.6	road paving with asphalt	X		X
2.A.7	other including non fuel mining & construction			
2.A.7.a	other including non fuel mining & construction			
2.A.7.b	Construction and demolition			
2.A.7.c	Storage, handling and transport of mineral products			
2.B.1	Ammonia production			
2.B.2	nitric acid production			
2.B.3	adipic acid production			
2.B.4	carbide production			
2.B.5	other	X		X
2.C.1	iron and steel production	X		X
2.C.2	ferroalloys production			
2.C.3	aluminium production			
2.C.4	sf6 used in aluminium and magnesium foundries			
2.C.5	other (please specify)			
2.D.1	pulp and paper	X		X
2.D.2	food and drink	X		X
2.D.3	Wood processing			

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

53. **Completeness:** The ERT considered the detail level for the Industrial Processes sector in Poland's submission to be insufficient. The ERT strongly recommends that Poland include an Industrial Processes chapter with the necessary level of detail in the IIR for the next submission. This should include an explanation of methodologies, the EFs and activity data used, and the references for these EFs and activity data.

54. **QA/QC procedures:** The ERT encourages Poland to include sector specific QA/QC paragraphs in the next submission. This would provide much more transparency.

55. **Recalculations:** The ERT noted Poland has carried out new PM emission estimates based on improved and extended methodology for the years 2000–2007. The ERT compliments Poland on this.

56. **Uncertainty:** The ERT encourages Poland to include uncertainty analysis in the Industrial Processes chapter. This will help to support the continuous improvement process, and to provide an indication of the reliability of the inventory data.

57. **Transparency:** Although there is an insufficient level of detail, the current IIR of Poland is generally transparent and well organised. The ERT were also pleased to note that Poland used some country-specific Emission Factors for PM. The ERT asked which sources the Polish specific PM emission factors were used with, and Poland provided the ERT with an overview of all sources of PM emission factors (including references). The ERT encourages Poland to continue with this approach in the future.

58. **Improvement:** The ERT noted Poland's plan to complete the recalculation of the PM emissions for the whole period (1990-1999) in the near future. The ERT encourages Poland to implement this improvement.

*Sector specific recommendations***All of the Industrial Processes Sector**

59. There was an insufficient level of detail in Poland's submission, and therefore a lot of information on methodologies and data is missing from the Polish IIR. The most important missing subjects are:

- the explanations of major changes in the emission trends;
- when country specific emission factors are used and default emission factors;
- the description of notation keys.

60. The ERT strongly recommends that Poland includes a separate Industrial Processes sector in their IIR, with at least the above mentioned missing subjects in the next submission.

Solvents

Review scope

Pollutants reviewed		NMVOC, CO, NO _x , Pb, SO _x , TSP, PM ₁₀ and PM _{2.5}		
Years		1990–2007		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
3.A.1	Decorative coating application	3A1		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

61. **Completeness:** The ERT consider the solvent sector to be understandable. But, Poland does not report any emissions before 2001. The ERT encourages Poland to close the gaps in the reporting of emissions for the time between 1990–2000 and in some cases for years up to 2006.

62. **QA/QC procedures:** The ERT encourages Poland to implement sector specific QA/QC procedures and to describe these in the IIR.

63. **Recalculations:** No recalculations are stated in the IIR. The ERT understands that Poland does undertake recalculations, and encourages Poland to report these recalculations in the IIR as part of the next submission.

64. The ERT identified differences in emission reporting between NECD and CLRTAP. Poland explained that this was caused by late calculations for 2006 emissions which were included in the LRTAP dataset, but not the NECD dataset. Whilst the ERT is pleased to see inventory developments, it encourages Poland to optimize the process of reporting, so that the same emissions can be reported in NECD and CLRTAP.

65. **Uncertainty:** The ERT encourages the Party to undertake uncertainty analysis for the solvent sector. This will help with the process of inventory development and will provide an indication of the reliability of the inventory data.

66. **Transparency:** Poland did not include an index in the IIR, and the ERT encourages Poland to add an index for improved transparency. Furthermore, the ERT encourages Poland to describe in the IIR the revision of the emissions over the time series and also the reasons for the revisions. This is especially relevant for the existing time series, where there is a jump in the data from 2005 to 2006. These jumps will need to be explained or corrected. The ERT also recommends that the emission factors be included in the IIR, and information added to explain whether these are default or country specific EFs. The ERT recommends that Poland reports recalculations in the IIR, by giving the reasons for each of the major recalculations.

67. **Improvement:** The ERT encourages Poland to make emission estimates for 1990-2000, and to include information on the EFs and the recalculations in the IIR in the next submission.

Sector Specific Recommendations

3.A. Paints and Coatings – NMVOC

68. The ERT encourages Poland to describe in the IIR why there is a steep decrease of emissions of NMVOC in 3A3 between the years 2005 and 2006. Following the review, Poland provided information on the use of different paints for 2005 – 2007. The use of “conventional solvent paints” explains the trend with time.

3.B. Dry Cleaning and Degreasing – NMVOC

69. The ERT recommends that a description of the revision of the emissions of NMVOC in 3B1 be included in the IIR. This would explain the increase in emissions from 2001 to 2004, and the low emissions of 2006 compared with 2005 and 2007. Following the review, Poland provided information which explains the growth from 2001 to 2004.

3.C. Chemical Products, Manufacture & Processing – NMVOC

70. In the time series of 3.C there is a steep increase of the emissions of NMVOC. The ERT encourages Poland to explain in the IIR why this occurs. Following the review, Poland provided activity information which explained the trend across 2005 to 2007.

71. The ERT encourages Poland to check if there are emissions in Poland of CO, NO_x, Pb and SO_x from 3C, and if it is possible to develop an emission factor and to then report these emissions. If no emissions occur in Poland, the relevant notation key should be used.

3.D. Other products containing HMs and POPs - NMVOC

72. The ERT encourages Poland to explain in the IIR the changes in emissions between 2005 and 2006 of NMVOC in 3D3. Following the review, Poland provided activity information which explained the trend across 2005 to 2007.

73. The ERT encourages Poland to check if there are emissions in Poland of TSP, PM₁₀ and PM_{2,5} from 3.D. If there are emissions, the party is encouraged to develop an EF and to report calculated emissions. If there are no emissions, then the relevant notation key should be used.

Agriculture

Review scope

Pollutants reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		2001–2007 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
4.B	Manure Management	NH ₃ , PM ₁₀ , PM _{2.5}		x
4.D1	Direct Soil Emissions	NH ₃ , NO _x , PM ₁₀ , PM _{2.5}		x
4.F	Field burning of agricultural wastes	NMVOC, CO, PM ₁₀ , PM _{2.5} , PAH		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

74. Completeness: The agriculture inventory of Poland covers the most important sources of emissions with the exception of estimates of emissions of NH₃ from 4.B7 (Mules and Asses), emissions of PM from 4.B.3 (Sheep), 4.B.4 (Goats), 4.B.9c (Turkeys), 4.D.2a (Farm-level agricultural operations ...), 4.D.2b (Off-farm storage, handling ...), emission of NO_x from 4.D.1a (Synthetic N-fertilizers) and emission of PAH from 4.F (Field burning of agricultural wastes). These sources are all reported as not estimated “NE”. Emissions from 4.G are reported as “NA”. The ERT identified a need for further improvement of completeness of the inventory estimates.

75. Transparency: In a response to questions raised by the ERT during the review week, Poland provided answers and additional documentation on activity data, and clearer information regarding methodologies. The ERT strongly recommends that Poland provide more detailed information on activity data and methodologies in the IIR of its next annual inventory submission.

76. Improvements: Poland has undertaken a level assessment for the main pollutants (NH₃, NMVOC and PM) for emission sources for the Agriculture sector. Only a short description of uncertainties, recalculations and planned improvements has been presented for the whole sector. The ERT recommends that Poland undertake and give detailed information on recalculations in the IIR and NFR tables in its annual submission.

77. QA/QC: Poland has undertaken QA/QC procedures in order to ensure a high quality of its IIR by implementing parallel procedures applied for the Polish annual greenhouse gas inventory. Poland indicated in its greenhouse emissions inventory submission that no changes in the QA/QC plan have been made since 2008. The ERT recommends that Poland report detailed information regarding QA/QC procedures in their IIR, and make further efforts to update these procedures in their annual inventory submission.

78. Recalculations: The ERT noted that Poland has undertaken recalculations (2001–2006) of emissions of NH₃, NMVOC and PM for its Agriculture emission inventory. The ERT encourages Poland to continue this procedure and include more pollutants in future IIR submissions.

Sector specific recommendations

4.B Manure management:- NH₃ and PM

79. Poland uses a country-specific EF for the estimation of NH₃ emissions from 4.B.8 (Swine) which is higher by 35% compared to the default value given by EMEP/CORNIAR. The ERT recommends that Poland provide detailed information on derivation of their country-specific EFs in future submissions.

80. In a response to the ERT during the review week, Poland indicated that they do not differentiate between different categories of pigs (4.B.8) based on animal weight in their inventory. One EF for NH₃ emission is used for fattening pigs of 20–110 kg [Pietrzak 2006; table 8]. The ERT encourages Poland to take into account the different categories of 4.B.8 for the estimation of NH₃ emissions in future inventory submissions.

81. The ERT noted that Poland did not estimate NH₃ and PM emissions from 4.B.7 (Mules and asses). Poland responded to the ERT during the review week that official statistics of population of these animals are unavailable. The ERT encourages Poland to make further efforts to include emissions from this category in its future inventory submission.

82. Poland does not estimate emissions of PM from 4.B.3 (Sheep), 4.B.4 (Goats), and 4.B.9c (Turkeys), all of which are reported as “NE”. Although emissions from these categories are expected to be small, the ERT suggests that these animals should be accounted for in the inventory. The ERT recommends that Poland estimate emission of PM in its next submission, and report the methodology in the IIR.

4.D.1 Agricultural Soils:- NH₃, NO_x, and PM

83. In response to questions made during the review process, Poland provided information on the methodologies used for the calculation of emissions factors of NH₃ emission from 4.D.1a (N-fertilizers). The ERT recommends that Poland provide more detailed information on the data and methodologies in the IIR of its next annual inventory submission.

84. Poland reported emissions of NO_x from 4.D.1a (Synthetic N-fertilizers), emissions of PM from 4.D.2a (Farm-level agricultural operations ...) and 4.D.2b (Off-farm storage, handling ...) as not estimated “NE”. The ERT recommends that Poland make further efforts to complete and include emissions of these pollutants in future submissions.

4.F. Field Burning of Agricultural Wastes:- PAH

85. The ERT noted that Poland reported emissions from 4.F (Field Burning of Agricultural Wastes) of PAH as not estimated “NE”. The ERT recommends that Poland makes efforts to complete and include emissions of these pollutants and others (e.g., NMVOC, PM) in its future IIR submissions.

Natural emissions

Review scope

Pollutants reviewed		NMVOC		
Years		2001–2007 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not reviewed	Recommendation provided
7A	7 A OTHER (included in National Total for Entire Territory)	NMVOC		x
7B	7 B Other not included in National Total of the entire Territory (Please specify in your IIR)	NMVOC		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.				

Sector specific recommendations

86. NFR Allocation: The ERT notes that Poland included a large NMVOC emission in NFR 7A “Other, Included in National Total” for 2000 to 2006. The ERT assume that these emissions arise from natural sources (forestry) which should not be included in the national total, and therefore should be reported under NFR 7B “Other, Not Included in National Total”. Emission estimates for 2007 are correctly reported in NFR 7B. The ERT strongly recommend that for 2000-2006 the emissions reported under 7A be moved to 7B. The ERT also wish to point out to Poland that these are the types of problems and inconsistencies which arise if the entire time series is not recalculated each year.

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		
6.Ca	Hospital waste incineration	x		x
6.Cb	Hazardous waste incineration	x		x
6.Cc	Municipal waste incineration	x		x
6.Cd	Cremation	x		x
6.Ce	Open 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 codes have been reviewed and which have not in the respective columns.

General recommendations on cross cutting issues

87. **Accuracy:** The ERT recommends that Poland take as reference the most recent version of the EMEP/EEA Guidebook, and stay informed of the new versions and consequently update the applied methodologies.

Transparency

88. During the review process, the ERT noted some editorial mistakes in the tables. The ERT encourages Poland to check the units presented in the various IIR tables for consistency and accuracy.

89. The ERT encourages Poland to report its IIR under the structure proposed in the "Guidelines for reporting" (annexe VI). This will improve transparency of the report.

90. The ERT recommends that Poland describe more precisely the methodology applied to the waste sector. This should include information on activity data time series and assumptions made, all at the sub-sector level.

91. To improve the transparency of the IIR, the ERT encourages Poland to specify the precise references of applied EFs and activity data. This should include the version of the EMEP/EEA Guidebook, and an explanation of the selected EF whenever options are proposed in the Guidebook.

92. **Transparency and Completeness:** The ERT noted some incorrect notation keys (NA for all pollutants from NFR6A, NA for HM even though default EFs are proposed in the EMEP/EEA Guidebook). The ERT encourages Poland to check carefully notation keys specified in the data submission. The new 2009 EMEP/EEA Guidebook provides guidance to help with the choice between NE and NA.

93. **Completeness:** The ERT recommends that Poland takes into account all of the pollutants for which EFs are specified in the current version of the EMEP/EEA Guidebook. Poland indicated during the review that, as there are EFs in the new Guidebook, it will estimate emissions for relevant pollutants in its next submission. The ERT welcomes this improvement.

Sector specific recommendations

6A- Solid waste disposal on land – NMVOC

94. The ERT recommends that Poland estimate other air pollutants emitted from landfills (especially NMVOC) either using 2009 EMEP/CORINAIR Guidebook default NMVOC EFs or using information from landfill gas composition if this is available (from field measurement data or the literature). A pollutant/CH₄ ratio could be used. This would allow emission estimates to be made from the CH₄ emissions estimated under UNFCCC.

6Ca- Hospital waste incineration – all pollutants (except NMVOC)

95. Poland estimates emissions from incineration of hospital waste only for NMVOC although default EFs are proposed in the 2006 and 2009 versions of the EMEP/EEA Guidebook. The ERT recommends that Poland estimate emissions for all of the pollutants which are documented in the most recent version of the EMEP/EEA Guidebook.

6Cb - Hazardous waste incineration – all pollutants (except NMVOC and TSP)

96. Poland estimates emissions from incineration of hazardous waste only for NMVOC and PM&TSP although default EF are proposed in 2006 and 2009 versions of the EMEP/EEA Guidebook. The ERT recommends that Poland estimate emissions for all pollutants which are documented in the most recent version of the EMEP/EEA Guidebook

6Cb- Hazardous waste incineration TSP&PM

97. Incineration of industrial waste appears to be a key category for TSP in Poland. The ERT notes that associated EFs for this are one thousand times higher than for incineration of municipal waste (table 15). This is not consistent with the data proposed in the EMEP/EEA Guidebook (neither in proportion nor in value). The ERT encourages Poland to check the reason for such high TSP emissions, and either provide an explanation in the IIR, or correct the values.

6Cc – Municipal waste incineration – all pollutants

98. Poland allocates emissions from sludge incineration to NFR6c. The ERT recommends that Poland allocate emissions from sludge incineration to the NFR 6Cb sector as it is specified in the 2009 EMEP/EEA Guidebook. Poland has indicated that this allocation will be changed in the next submission, and the ERT thank the Party for their willingness to improve their reporting.

99. To improve the transparency of the IIR, the ERT encourages Poland to explain in the report that incineration of MSW with energy recovery exists within the country, but is considered to be insignificant.

6Cd- Cremation – all pollutants

100. Poland estimates emissions from cremation only for NMVOC although default EFs are proposed in the 2006 and 2009 versions of the EMEP/EEA Guidebook. The ERT recommends that Poland estimate emissions for all of the pollutants documented in the most recent version of the EMEP/EEA Guidebook.

6D- Other waste – dioxins

101. 6D is a very important source of dioxins/furans, as indicated in both IIRs provided (table 28 in the Polish IIR, and table 2.8 in the English IIR). However, these data are not consistent with the data that is presented in the submission. These important values seem to correspond to the data reported under NFR 7A. The ERT recommends that Poland check the allocation in the data submission, and update the information that is reported as necessary.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to preliminary question raised prior to the review:
 - Po_Ind_Proc_Initial_Qns_v1_resp1.doc (not complete: question 4 under preparation)
 - Po_Waste_Initial_Qns_v2 resp 1a.doc (answers to the part of the 1st set of questions)
 - JSBD PL_Prelim_Quest_General 2.doc

2. Response to questions raised during the review:
 - Waiting for response to Industrial Processes
 - Po_Mobile_Initial_Qns_v1_answers.doc
 - Po_Mobile_Secnd_Qns_v1_answers.doc
 - Po_Qns resp b.doc (Mobile sources)
 - PL_Gen_Qns_set2_Cleared_250609.doc

3. Additional materials provided by the Country during the Review
 - JS Activity_uncert_GHG_2007 b.doc'
 - PM_EF_sources.xls'
 - IK Waste General PCDD-1doc
 - Incinerated wastes Poland 2007.doc
 - BDAO QA-QC programme EMEP PL en.doc
 - JC trends HM quest.doc
 - IIR and associated submission, data analysis provided by the CEIP
 - Review Stage 2: Synthesis and Assessment Country report

4. Materials provided by the Country after the Review
 - Po_NEC to ERT Report.doc