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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:

GERMANY

CONTENT

INTRODUCTION

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

2. This annual review has concentrated on SO_2, NOx, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time series years 1990 – 2008 reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.

3. This report covers the stage 3 centralised reviews of the UNECE LRTAP Convention and EU NEC Directive inventories of Germany coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 21st June 2010 to 25th June 2010 in Copenhagen, Denmark, and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: generalist - Jean Pierre Chang (France), Energy - Laetitia Serveau (France), Energy / mobile - Emilia Hanley (Ireland), Industry - Kees Peek (Netherlands), Solvents[2], Agriculture + Nature - Rocío Dánica Cóndor (Italy), Waste - Sophie Hoehn (Switzerland).

4. Justin Goodwin was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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

[2] For resource constraint reasons in the ERT the Solvents estimates were not reviewed

PART A: KEY REVIEW FINDINGS

INVENTORY SUBMISSION

5. In the 2010 submission, Germany provided national inventories for the years 1990 to 2008 for all of the required pollutants. Germany provided a detailed IIR report using an online web based wiki system as well as an exported series of linked html pages in a zipped document for the ERT.

6. The ERT recognises the level of effort undertaken by Germany in providing an inventory with a high level of detail regarding the description of processes and methodologies used to make estimates for all Sectors of the inventory. However, the ERT will encourage Germany to provide a PDF version of the IIR in order to facilitate a future review process.

7. Emissions and activity data (for 1990 to 2008) are reported in NFR 09 categories. Projection emissions are not provided in the 2010 submission, but were submitted in the previous submission.

8. The transport emissions are based on fuel sold as requested in the reporting guidelines.

9. The CLRTAP inventory submission 2010 is of good quality and is in general well documented in the informative inventory report (IIR). Whilst the ERT commends Germany on its innovative approach to presenting the IIR, the ERT recommends some adaptations to the online presentation to solve problems of version tracking and off-line access to material (e.g. PDF version from the wiki version) and to elaborate the IIR further for some categories (e.g. transport, IP, agriculture and waste) as indicated in the sectoral chapters below, as well as on its institutional arrangements, verifications and QA/QC plan and procedures.

KEY CATEGORIES

10. Germany has compiled and presented in its IIR a Key Category Analysis following the EMEP/EEA Guidebook for the different pollutants and for 2008. The ERT commends Germany for the presentation of KCA in level and trend in section 2.5 of the IIR which is complimented well by the detailed KCA per pollutant tables in the annex.

QUALITY

Transparency

11. The ERT recognises the detailed and transparent German inventory, including the clear and detailed descriptions in the IIR, enabling a good level of sectoral reviews. The ERT commends Germany for its innovative wiki based IIR which enables its inventory experts to update the text and tables in real-time. The ERT encourages Germany to develop functionality to allow a snapshot of the wiki to be taken as a PDF file for official records and for off-line working.

12. Explanations are provided for the use of "NE" notation keys, but some are too general and not very explicit, e.g. “The emissions are <0 Gg”. During the review, Germany informed the ERT that the explanations for these notation keys in its IIR will be checked and improved.

13. The ERT also commends Germany for its presentation and description in the IIR of key trends (1990-2008) for emissions and the main trend drivers but encourages Germany to elaborate on them further for some categories as indicated in the sectoral chapters below.

Completeness

14. Whilst Germany provides a generally complete inventory for the years 1990 to 2008 including activity data, the ERT noted some minor missing sources (“NE” not estimated sources) in the ndustrial processes, waste, energy and agriculture (PM) sectors. Germany does not submit emission estimates for the years before 1990. During the review, Germany explained that because of the division of Germany only very limited information is available for the years before 1990 in the eastern part of Germany; therefore, Germany does not plan to report for these years. The ERT encourages Germany to estimate emissions for NE (missing sources) and to explore possible methods / techniques / and data sources to estimate emissions for the years before 1990 and to assess the requirement of inventories for base years (before 1990) of Protocols that Germany has ratified.

Consistency, including recalculations and time series

15. The IIR includes a chapter on recalculations with a good synthesis of recalculations and their impacts (level and % of change) for 1990 and 2007. The IIR also provides access to more detailed explanations in a table per pollutant presentation. However the ERT encourages Germany to provide information, by sector, on the rationale for the recalculations in the IIR, in addition to the detailed tables of recalculation by pollutant.

16. Projection data were provided in the previous 2009 submission but not re-submitted for 2010. Some significant recalculations occurred in the 2010 inventory submission (e.g. NOx and NH_3), so previous projections may no longer be consistent with the 2010 inventory. During the review Germany indicated that it intended to provide updated projection data for the next (2011) submission.

Comparability

17. The ERT notes that the inventory of Germany is comparable with those of other reporting Parties. The allocation of source categories follows that of the (NFR) EMEP/UNECE reporting guidelines.

CLRTAP/NECD comparability

18. The ERT notes that the national German totals from the CLRTAP and NECD for the submitted years 1990->2008 are fully consistent.

Accuracy and uncertainties

19. Recognising that Germany already applies tier level 2 methods in a number of key areas, the ERT identified some additional areas where improvements concerning the accuracy of the inventory for some key categories could be applied in the future, e.g. for the energy sector (1A1) improving the tier level of the methods from the used tier 2 to tier 3 with plant-specific information, and for industrial processes, cement production using a tier level 2 or 3 using plant-specific information. See sectoral sections for more details.

20. Germany confirmed during the review that a plan is in place to develop its uncertainty analysis for future submissions.

Verification and quality assurance/quality control approaches

21. Information on institutional arrangements, verifications and a QA/QC plan and procedures is provided in the IIR but on a general rather than detailed level. The current German Quality System for Emission Inventories (QSE) (originally designed to serve the purposes of emissions reporting under the UN Framework Convention on Climate Change (UNFCCC) is being developed to adopt both: IPCC Good Practice Guidance and the UNECE-CLRTAP Guidelines for a QA/QC system. The ERT notes that the plan of implementing a unified system of QA/QC procedures is a matter of priority and encourages Germany to fully implement this plan and to continue to report on developments in the chapter “QA/QC and Verification Methods” of the IIR.

FOLLOW-UP TO PREVIOUS REVIEWS

22. The current stage 3 centralised review has used outputs from the stage 1 and stage 2 review processes. The ERT encourages Germany to also refer to these previous reviews when examining this review report, and when updating the improvement plans.

AREAS FOR IMPROVEMENT IDENTIFIED BY GERMANY

23. The IIR section 11.2 "Improvements" provides a list of possible improvements and the different general steps necessary to develop the Quality Management System. The ERT commends Germany for this important improvement programme.

24. During the centralised review and exchanges with ERT, some other improvements have been identified or specified by Germany :

(a) Continuing its plan for implementing a unified system of QA/QC procedures across CLRTAP and UNFCCC reporting.

(b) Providing qualitative uncertainty analysis for the 2011 reporting and quantitative uncertainty analysis by 2012 for selected sectors as soon as uncertainty data are available.

(c) Providing updated projection data for the next submission with additional measures scenarios.

(d) Clearer description of the use of notation keys in the next submission.

25. The ERT commends Germany for its responsiveness to the ERT during the centralised review for all sectors except transport. For transport, sector-specific questions issued by the ERT to the Party were addressed late due to a shortage of resources during the review process (Germany's Transport Expert was unavailable due to engagement in his own ERT duties). The ERT recognises that this was not an ideal situation and thanks Germany for providing significant resources to the review teams as well as for being reviewed. The ERT also commends Germany for its willingness to improve its national emission inventory continuously and encourages Germany to continue its improvement programme.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

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

27. To explore methods / techniques / and data sources estimating emissions for the years before 1990.

28. Development of the IIR (wiki web version) to solve problems of issue tracking and off-line access to material. A static snapshot (e.g. PDF export) of the wiki version would solve the difficulty of version tracking and establish an official version of the annual submission.

29. The ERT encourages Germany to investigate "NE" sources, not yet estimated, in order to improve the completeness of the inventory.

30. The ERT encourages Germany to provide more detailed information on the rationale for recalculations at a sectoral level, to compliment the information already provided in the recalculation tables per pollutant.

31. Updating projection data as far as necessary, especially in case of significant recalculations of previous time series.

32. Implementation of uncertainty assessments, and use of the results as a relevant tool to prioritise improvements for key categories.

33. Widen the use of the existing QA/QC system, used for the set of activity data as well as the methods and emission factors for GHGs, for the needs of CLRTAP/NECD inventories and providing further details on its implementation in the IIR (general and sectoral descriptions).

34. The ERT encourages Germany to implement, as much as possible, the identified improvements in the IIR, and to prioritise them along with other identified improvements following this review.

35. 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, NOx, NMVOC, NH_3, particulates, CO, heavy metals		
Years		1990 – 2008		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.1.a	public electricity and heat production	X		X
1.A.1.b	petroleum refining	X		X
1.A.1.c	Manufacture of solid fuels and other energy industries	X		
1.A.2.a	iron and steel	X		X
1.A.2.b	non-ferrous metals	X		X
1.A.2.c	chemicals	X		
1.A.2.d	pulp, paper and print	X		
1.A.2.e	food processing, beverages and tobacco	X		
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	X		X
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)		X	X
1 A 3 e	Pipeline compressors?		X	
1.A.4.a.i	commercial / institutional: stationary	X		X
1.A.4.a.ii	commercial / institutional: mobile?		X	
1.A.4.b.i	residential plants	X		X
1.A.4.b.ii	household and gardening (mobile)		X	
1.A.4.c.i	Agriculture/forestry/fishing. stationary	X		X
1.A.4.c.ii	off-road vehicles and other machinery?		X	
1.A.4.c.iii	national fishing?		X	
1.A.5.a	other, stationary (including military)	X		X
1.A.5.b	other, mobile (including military, land based and recreational boats)?		X	
1.B.1.a	coal mining and handling	X		X
1.B.1.b	solid fuel transformation	X		
1.B.1.c	other fugitive emissions from solid fuels)	X		
1 B 2 a i	Exploration, production, transport	X		
1 B 2 a iv	Refining / storage	X		
1 B 2 a v	Distribution of oil products	X		
1 B 2 b	Natural gas	X		
1 B 2 c	Venting and flaring	X		
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2			
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which pollutants have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Completeness:

36. Some emissions are not estimated for some pollutants: heavy metals and POPs for 1A2a, particulates, heavy metals and POPs for 1A2b, heavy metals for 1A4 and NMVOC for 1B1a. For these missing sources the ERT recommends that Germany uses the EFs given in the EMEP Guidebook or other references to estimate these emissions.

Transparency:

37. Germany has provided a detailed and generally transparent emission inventory. Estimates are provided at the most detailed level for all energy sectors. Germany's methodology, activity data and emission factors in the IIR are considered by the ERT to be transparent and well described for the Energy Sector. The ERT encourages Germany to include other information in the IIR for some sub-sectors (cf. sub-sector specific recommendations).

38. The ERT notes that the explanations for the use of notations keys are given in the emissions template but not in the IIR. The ERT recommends that Germany includes a description of categories where notation keys have been applied and why in the IIR.

Accuracy:

39. The ERT encourages Germany to undertake uncertainty analysis for the Energy Sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

40. Germany describes general QA/QC procedures in its IIR. The ERT encourages Germany to describe the specific QA/QC procedures for the Energy Sector in the IIR and to show how its Quality System for Emission Inventories (applied for the GHG inventory reported to UNFCCC) is applied to cover AD and EFs specific to UNECE pollutant reporting.

41. The ERT notes that Germany generally applies the appropriate (higher – i.e. tier 2) methods for Key Categories. However, for the NFR codes 1A1a and 1A1b the ERT recommends that Germany develops a methodology based on individual plant data and fuel content information from regulatory information under IPPC, data reported under E-PRTR and the inventory of Large Combustion Plants under the LCPD, rather than using EF defaults.

Comparability:

42. The ERT commends Germany for following the recommendations of the Guidebook for the energy chapter and for providing completed NFR tables with minimal use of notation keys.

Recalculations:

43. The ERT encourages Germany to provide more detailed information on the rationale for recalculations for the energy sector, to compliment the information already provided in the tables per pollutant.

Improvement:

44. The ERT notes that Germany has provided a high quality description of the improvements planned for the next submission. A list which shows the main improvements is given. The ERT encourages Germany to continue to describe planned improvements in the next submission.

Sub-sector Specific Recommendations

Category issue 1: 1.A.1.a: Public Electricity and Heat Production - All pollutants

45. 1A1a is a key source for the main pollutants: NOx, SOx, particulate and CO. In the IIR, the sources/references of activity data and EFs are clearly given. It is also explained that the tier 2 methodology is used to calculate emissions. Actually, the methodology used is based on a German guidebook (Determination and evaluation of EFs for combustion systems in Germany for the years 1995, 2000 and 2010). The EFs proposed in this guidebook relate to only three years (1995, 2000 and 2010). The EFs for the other years are obtained via linear interpolation and the methodology does not take into account the fuel sulphur content and the implementation of abatement systems (particulates, SOx). Recognising the difficulties in collecting and validating regular measurement data, the ERT encourages Germany to collect and use, where possible in its inventory, estimates or - for verification - individual plant data, fuel contents and abatement information from regulatory information under IPPC, data reported under E-PRTR and the inventory of Large Combustion Plants under the LCPD.

Category issue 2: 1.A.1.b: Petroleum Refining - All pollutants

46. 1A1b is a key source for SO_x and some heavy metals. In the IIR, the sources/references of activity data and EFs are clearly given. It is also explained that the tier 2 methodology uses a German guidebook (Determination and evaluation of EFs for combustion systems in Germany for the years 1995, 2000 and 2010). The EFs for the other years are obtained via linear interpolation and the methodology does not take into account the fuel sulphur content and the implementation of abatement systems (particulates, SO_x). Recognising the difficulties in collecting and validating regular measurement data, the ERT encourages Germany to collect and use, where possible in its inventory, estimates or - for verification - individual plant data, fuel contents and abatement information from regulatory information under IPPC, data reported under E-PRTR and the inventory of Large Combustion Plant under the LCPD.

Category issue 3: 1.A.2: Manufacturing Industries and Constructions – All pollutants

47. In the IIR, part 1.A.2, section "Short description", Germany presents a tier 2 or 3 approach. However, during the review Germany indicated that only the tier 2 approach was used. Germany agreed to correct this point in the IIR.

Category issue 4: 1.A.2.a: Iron and steel industry – All pollutants

48. In the IIR, the ERT notes that for this NFR code the sources/references for the activity data and EFs are clearly defined. The list of sub-sectors included in this NFR code and the number of integrated steel works are also given for 2008. However, the ERT notes that emissions for only some pollutants are estimated and reported under 1A2a (only particulates and CO) while the other pollutants (NOx, SOx, VOC, NH3) are reported under 2C1 and the remaining pollutants (HM and POPs) as "NE" in the emissions template. The ERT recommends that Germany explains in its IIR the pollutants included in the different NFR codes, gives reasons for NEs and tries to estimate emissions for sources that are NE, using at least tier 1 of the EMEP Guidebook or by developing a new methodology based on individual plant data for the 6 integrated steel works in Germany. In addition, the ERT encourages Germany to provide details of the number of integrated steel works over the time series (1990-2008) for 1.A.2.b – Non ferrous metal industries – all pollutants

49. In the IIR, the ERT notes that for this NFR code the sources/references for the activity data and EFs are clearly defined. The list of sub-sectors included in this NFR code is also given. However, the ERT notes that emissions for only some pollutants are estimated and reported under 1A2b (NOx; NMVOC, SO2, NH3 and CO) while other pollutants are reported as "NE" (HMs, Particulates and POPs) in the emissions template. The ERT recommends that Germany explains in its IIR the pollutants included in the different NFR codes, gives the reasons for NEs and tries to estimate emissions for sources that are NE or by developing a new methodology based on individual plant data or at least tier 1 of the EMEP Guidebook.

Category issue 5: 1.A.2.e: Food Processing, Beverages and Tobacco - All pollutants

50. During the review Germany clarified that the emissions of NOx, NMVOC, SOx, NH_3 and CO under 2D2 come from sugar production. The ERT also noted that the methodology was unclear and did not include enough detail. The ERT recommends that Germany report these emissions under 1A2e and include a more detailed description of the sub-categories, the methodology used, the source of activity data, the source of EFs and consistency across the time series (1990-2008).

Category issue 6: 1.A.2.f i: Other industries – All pollutants

51. The ERT notes that the IIR provides a good general description of the sources/references for the activity data and EFs. However, the ERT noted a lack of clarity about the units of the activity data used (which could be fuel consumption or production, depending on the pollutant). The ERT recommends that Germany include details of the units of AD used in its estimations.

Category issue 7: 1.A.4: Other Sectors-Residential / Commercial – All pollutants

52. The ERT notes that the IIR provides a good general description of the sources/references for the activity data, but that the details of the emissions factors are too general and cover only 2005. The ERT also notes that some pollutants are reported as "NE" in the emissions template, especially heavy metals. The ERT recommends that Germany provides more detail on the emission factors used, including their applicability for the different years and sub-categories of the time series. The ERT also recommends that Germany tries to find EFs to estimate emissions for heavy metals (for example: using tier 1 in the EMEP Guidebook, inventories in other countries).

Category issue 8: 1.A.5: Other-Stationary – All pollutants

53. In the IIR the methodology indicated for 1A5 is Tier 1. However, during the review Germany confirmed that the methodology used was tier 2 and tier 3. The ERT recommends that Germany corrects the general section 1A5 of the IIER to reflect that T2 or T3 methodologies are used.

Category issue 9: 1.B.1.a: Fugitive emissions from solid fuels - Coal Mining and Handling – All pollutants

54. For NFR code 1B1a the notation key "NE" is indicated in the emissions template for particulates and “NA” for NMVOC. The ERT notes that the emissions depending on the nature of the activity (open cast mining or underground mining), NMVOC and/or particulate emissions do exist (see EMEP Guidebook). The ERT recommends that Germany identify the type of coal mining, using the EFs from the EMEP Guidebook or other references to estimate emissions for this sector. The ERT recommends changing the notation key from "NA" to "NE"if emissions do not occur.

TRANSPORT

Review Scope

Pollutants Reviewed		SO_2, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1 A 2 f ii	Other: Off-road construction vehicles and machinery	x		x
1 A 3 a i (i)	International Civil Aviation - LTO	x		x
1 A 3 a ii (i)	Domestic Civil Aviation - LTO	x		x
1 A 3 b i	Road Transport: Passenger Cars	x		x
1 A 3 b ii	Road Transport: Light Duty Vehicles	x		x
1 A 3 b iii	Road Transport: Heavy Duty Vehicles	x		x
1 A 3 b iv	Road Transport: Mopeds & Motorcycles	x		x
1 A 3 b v	Road Transport: Gasoline Evaporation	x		
1 A 3 b vi	Road Transport: Automobile tyre and brake wear	x		
1 A 3 b vii	Road Transport: Automobile road abrasion	x		
1 A 3 c	Railways	x		
1 A 3 d i (i)	International maritime navigation	x		x
1 A 3 d i (ii)	International Inland Waterways		IE	x
1 A 3 d ii	National Navigation (Shipping)	x		x
1 A 3 e	Pipeline Compressors	x		x
1 A 4 a i & ii	Commercial / institutional: Stationary & Mobile	x	1 A 4 a ii*	x
1 A 4 b i & ii	Residential: Household and gardening (stationary & mobile)	x		x
1 A 4 c i & ii	Agriculture/Forestry/Fishing: (Stationary & Off-road vehicles and other machinery)	x		
1 A 4 c iii	Agriculture/Forestry/Fishing: National fishing		IE	x
1 A 5 a & b	Other, Stationary & Mobile (including military, land based and recreational boats)	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which pollutants have been reviewed and which have not in the respective columns.				

*Sector reported as NE

General recommendations on cross-cutting issues.

55. The ERT recognises the level of effort undertaken by Germany in providing an inventory with a high level of detail regarding the description of processes and methodologies used to make estimates for the Transport Sector. Germany's Transport chapter is generally well presented. However, sector specific questions issued by the ERT to the Party were addressed late due to a shortage of resources during the review process (Germany's Transport Expert was unavailable due to engagement in his own ERT duties). . The ERT encourages Germany to continue with its programme of improvement for the Transport Sector.

Completeness:

56. The ERT considers the Transport Sector and the other sectors including mobile sources to be broadly complete, with very few single main pollutant applications of NE (Not Estimated) in several sub-sectors (i.e. NH_3 in Aviation (1.A.3.a), PM2.5 and PM10 in Road Transport: mopeds & motorcycles (1.A.3.b iv)

and also in international inland waterways (1.A.3.d i (ii)), all 3 Particulate Matter pollutants in Residential: household and gardening (mobile) (1.A.4.b ii) and one NE for all pollutants in one sub-sector (1.A.4.a ii: Off-road mobile: commercial / institutional: mobile).

Transparency:

57. The ERT recognises the good level of detail of the description provided for the very advanced methodology applied to estimates of mobile sources emissions in the Party's IIR 2010 report (especially in the Aviation sub-sector). A few minor clarifications are required for the time series for certain pollutants and certain transport sub-categories have been identified. For more details see sub-sector specific recommendations below.

Consistency:

58. The ERT noted a number of time-series variations that had not been explained in Germany's IIR. Detailed questions were presented to Germany during the review for a number of categories including 1.A.2.f ii (NOx & CO), 1.A.3.d i (i) (NOx & CO), 1.A.3.d ii (NOx), 1.A.3.e (NOx), 1.A.4.a i (NOx & CO), 1.A.4.b i (NOx & CO), 1.A.3.a ii (i) (NOx & CO). In its response, Germany took note of these ERT questions / recommendations and explained that in most cases, trends are caused by changes in the fuel mix composition behind the source categories – often in conjunction with the problem of running two different calculation systems for emissions during the early 1990s – separated for the eastern and the western part of Germany. During the review Germany also agreed to provide a more detailed description of these trends in the next IIR. The ERT encourages the Party to include (in future IIRs) detailed information on the circumstances underlying all the above inconsistencies in NOx and CO emissions time series for all specific transport sub-sectors (i.e. in the form of a table).

Accuracy and Uncertainty:

59. Key Categories in the transport / mobile sub-sectors (defined in the KCA) were estimated using at least T2 methodologies and Road Transport emissions were estimated using T3 with T1 used for natural gas and lubricants in Passenger Cars (1.A.3.b i) and small combustion in Agriculture/Forestry/Fishing: Off-road Vehicles and other Machinery (1.A.4.c ii). No quantitative or qualitative uncertainty analyses were undertaken for the Party's IIR 2010. The ERT has made a note of Germany's plan to carry out a qualitative uncertainty assessment using qualitative indicators (according to the EMEP/CORINAIR Guidebook) in next year's submission.

60. The ERT commends Germany for newly implemented split in emission estimates in category 1.A.3.a - Civil Aviation. Emissions from both national (domestic) and international civil aviation were reported and based on separate data for flight phases LTO (Landing/Take-off: 0-3,000 feet) and Cruise (above 3,000 feet), which is not fully in line with EMEP Reporting guidelines' requirements (only

emissions from LTO from both national and international flights have to be included in the national totals).

61. To enable better understanding of the Party's pilot application of aviation data and models from Eurocontrol for making high-level estimates the ERT encourages Germany to include all (the ERT acknowledges the many links that are already included in the IIR) source documents (especially regarding the advanced models used and specific emission factors derived for making those calculations) in an accessible format, i.e. website links.

QA/QC Procedures:

62. Germany has not fully described its QA/QC system and whether it is consistent with the UNECE-CLARTAP Good Practice Guidelines. The ERT notes that the German Quality System for Emission Inventories (QSE) currently in use, designed to serve the purposes of emissions reporting under the UN Framework Convention on Climate Change (UNFCCC)), has been developed to adopt both: IPCC and the Good UNECE-CLRTAP Good Practice Guidelines for a QA/QC system. The ERT encourages Germany to describe the specific QA/QC procedures for the transport sector in the IIR and to show how its Quality System for Emission Inventories (applied for the GHG inventory reported to UNFCCC) is applied to cover AD and EFs specific to UNECE pollutant reporting.

Recalculations:

63. The Party has presented detailed tables (with references to further details linked to the main tables) including the level of emissions for each pollutant reported in the 2009 and 2010 IIRs. Apart from providing absolute and relative changes between the two last IIRs submissions, a rationale was given for any changes in the estimates for each pollutant and sub-sector affected. The ERT commends this and encourages Germany to continue using this approach in its IIR.

Improvements:

64. A number of improvements are planned for the next submissions and described in detail in a separate chapter of Germany's IIR. The ERT commends Germany for the level of detail provided. However, no specific future improvements were assigned specific to the Transport sector are mentioned.

Sub-sector Specific Recommendations

Category issue 1: 1.A.3.b i & ii & iii & iv Road transport - Passenger cars, Light duty vehicles, Heavy duty vehicles, Mopeds & Motorcycles - All pollutants - emission factors

65. The ERT has found that the following statement made by the Party in all road transport sub-chapters of the IIR is too ambiguous / OR: is not quite clear: *"Emission factors for RT are taken from the 'Handbook on Emission Factors for Road Transport' (HBEFA, v2.1) where they are mostly provided on a Tier 3 level and processed within the TREMOD software used by the Party. Therefore, it is not possible to display them in a clear and comprehensible table. - For further information, please see the 'Handbook on Emission Factors for Road Transport' (HBEFA, current version: 2.1) and the TREMOD software".*

66. The ERT acknowledges Germany's response to the ERT question and its intention to address this issue in future IIRs. The ERT also recommends, for transparency and comparability purposes, that tables of EFs for all Road Transport sectors should be included in future IIR submissions of the Party.

Category issue 2: 1.A.4.a ii Off road Mobile - Commercial / institutional - Mobile - All main pollutants reported as NE

67. For the sub-sector 1.A.4.a ii (Off-road Mobile: Commercial / institutional: Mobile) emission estimates for all main pollutants were reported as IE in Germany's IIR. The ERT encourages the Party to investigate further statistical resources for missing estimates in this sector and include a progress report within the next IIR.

Category issue 3: 1.A.3.a ii (i) Civil aviation (Domestic, LTO), 1.A.3.a i (i) - International Aviation (LTO) – NH_3 reported as NE

68. No estimates of NH_3 emissions were reported for the sectors: 1.A.3.a ii (i) (Civil aviation (Domestic, LTO)) and 1.A.3.a i (i) (International Aviation (LTO)). In the NFR tables the notation key used for these emissions was NE. If emissions from these sectors occur, the ERT recommends that the Party investigates further possibilities for estimating these emissions. However, if emissions of NH_3 do not occur for the Aviation Sector, the ERT recommends using the proper notation key: Not Occurring (NO).

Category issue 4: 1.A.3.d i (ii) Shipping-International Inland Waterways, 1.A.4.c iii: Shipping - Agriculture / Forestry / Fishing - National fishing - All main pollutants reported as IE

69. For the sub-sectors: 1.A.3d i (ii) (Shipping: International Inland Waterways) and 1.A.4.c iii (Shipping: Agriculture/Forestry/Fishing: National fishing), emission estimates were reported with the IE (Included Elsewhere) notation key in the Party's inventory report. The ERT commends the Party for indicating the location of the sectors into which the categories reported as IE were merged. However, the ERT encourages Germany to make separate emission estimates for these sectors in future IIR reports and, in the meantime, a separate summary table of all categories (fully or partially reported as IE) an and where they have been moved to would be a great addition to what is already a very good inventory.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		See below		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.A.1	cement production	NOx, PM10, Hg, PAH, HCB		X
2.A.2	lime production		X	
2.A.3	limestone and dolomite use		X	
2.A.4	soda ash production and use		X	
2.A.5	asphalt roofing		X	
2.A.6	road paving with asphalt		X	
2.A.7.a	Quarrying and mining of minerals other than coal	PM10		X
2.A.7.b	Construction and demolition	PM10		X
2.A.7.c	Storage, handling and transport of mineral products		X	
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)	PM2,5, NOx, SOx		X
2.B.1	ammonia production		X	
2.B.2	nitric acid production	NOx		X
2.B.3	adipic acid production		X	
2.B.4	carbide production		X	
2.B.5.a	Other chemical industry (Please specify the sources included/excluded in the notes column to the right)	SO2, NH3		X
2.B.5.b	Storage, handling and transport of chemical products (Please specify the sources included/excluded in the notes column to the right)		X	
2.C.1	iron and steel production	NOx, SO2, PM10, Cd, DIOX		X
2.C.2	ferroalloys production		X	
2.C.3	aluminium production	CO, PM10, Cd, DIOX,PAH		X
2.C.5.a	Copper Production	DIOX		X
2.C.5.b	Lead Production		X	
2.C.5.c	Nickel Production		X	
2.C.5.d	Zinc Production		X	
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes column to the right)		X	
2.C.5.f	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)		X	
2.D.1	pulp and paper	NMVOC		X
2.D.2	food and drink	NMVOC		X

2.D.3	Wood processing		X	
2.E	production of POPs		X	
2.F	consumption of HM and POPs (e.g. Electrica and scientific equipment)		X	
2.G	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)	PM10		X
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which pollutants have been reviewed and which have not in the respective columns.				

General recommendations on cross cutting-issues

Completeness:

70. The ERT considers the industrial processes sector to be complete for the main sources and comprehensive with good levels of detail in the methodology descriptions.

Transparency:

71. The ERT noted that the wiki based IIR is generally well organised but had some difficulties adjusting to this dynamic approach to providing descriptions.

72. The ERT encourages Germany to include tables with activity data (so that these can be used to support methodology descriptions) and more detailed explanations for trends in the next submission to improve transparency.

Accuracy:

73. The ERT commends Germany for using country-specific information, to estimate emissions at a high tier (2/3) level for most categories (with the exception of cement production, see below).

74. Germany describes general QA/QC procedures in its IIR. The ERT encourages Germany to describe the specific QA/QC procedures for the industrial processes sector in the IIR and to show how its Quality System for Emission Inventories (applied for the GHG inventory reported to UNFCCC) is applied to cover AD and EFs specific to UNECE pollutant reporting.

75. Germany has neither carried out a qualitative nor a quantitative uncertainty assessment for any of the pollutants or pollutant groups relevant so far. The first step of accomplishing a substantiated qualitative uncertainty assessment is planned for next year's submission. A quantitative uncertainty assessment should follow. The ERT compliments Germany on this plan.

Comparability:

76. Germany has reported its emissions inventory in accordance with the reporting requirements and submitted it in the requested NFR format.

Recalculations:

77. The ERT has noted that a number of recalculations have been made for the Industrial Processes sector for NOx emissions in 2B1, 2B2 and 2C1, AD for NH3 emissions from ammonia production (2B1), NMVOC emissions in 2A5 and TSP,PM_{10} and $PM_{2.5}$ emissions in 2G. The ERT commends Germany for these recalculations and encourages it to describe these clearly in its IIR.

Improvement:

78. The ERT has identified a number of possible improvements for the Industrial Processes sector in the IIR. The improvements planned for the next submissions are:

- Revision of Mineral Fertilizer Production (NFR 2.B.5 Other)
- Revision of Bulk & Storage (NFR 2.G)
- Revision of POP data
- Uncertainty analysis

Sector-specific Recommendations

Category issue 1: 2.A.1 Cement production

79. Cement production is a key source for Hg, HCB and for NOx, PM_{10} and PAH. For the calculation of the emissions of these pollutants, however, Germany uses the tier 1 method and the ERT believes that Germany could implement a higher tier level methodology using plant-specific data. The ERT encourages Germany to use plant-specific data collected as part of the LCPD, IPPC and E-PRTR to develop a tier 2 or 3 methodology in the near future and to document these in its IIR.

Category issue 2: 2.C.1 Iron and steel production

80. The IIR describes the emission factors used for emission calculations as based on figures for individual plants and from research projects as well as expert judgements. During the review Germany confirmed this and told the ERT that the emission factors for SO_2, NOx, NMVOC, NH_3 and PM_{10} were based on research projects, the EFs for dioxin on expert judgement and emissions of heavy metals not estimated for 2.C.1;

81. Germany also confirmed that a new research project would provide new EFs for dioxin and for heavy metals. The ERT compliments Germany on this research and encourages it to include the new emission time series for dioxin and heavy metals in future submissions and to document the methods, data sources and assumptions used in its IIR.

Category issue 3: 2.G: Handling of bulk products - TSP, PM_{10}, $PM_{2.5}$

82. All emissions are calculated using a tier 1 method because no detailed data are available. A research project has been started to evaluate activity data and emission factors. As a first step of the current research project, the evaluation of activity data was completed. Based on these revised activity data TSP, PM_{10} and $PM_{2.5}$ emissions in 2G were recalculated. The ERT compliments Germany on this.

83. The second step of the current research project will yield revised emission factors. Because “Handling of bulk products” is an important key source for TSP, PM_{10} and $PM_{2.5}$, the ERT encourages Germany to use these results to calculate emissions in the future submissions.

SOLVENTS (NO CHAPTER).

For resource constraint reasons in the ERT the Solvents estimates were not reviewed.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO_2, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	a	-	No
4 B 1 b	Cattle non-dairy	a	-	No
4 B 2	Buffalo	a	-	No
4 B 3	Sheep	a	-	No
4 B 4	Goats	a	-	No
4 B 6	Horses	a	-	No
4 B 7	Mules and asses	a	-	No
4 B 8	Swine	a	-	No
4 B 9 a	Laying hens	a	-	No
4 B 9 b	Broilers	a	-	No
4 B 9 c	Turkeys	a	-	No
4 B 9 d	Other poultry	a	-	No
4 B 13	4 B 13 Other	a	-	No
4 D 1 a	Synthetic N-fertilizers	a	-	Yes
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products	a	b	No
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products	a	-	No
4 D 2 c	N excretion on pasture range and paddock unspecified (Please specify the sources included/excluded in the notes column to the right)	a	-	No
4 F	Field burning of agricultural wastes	a	-	No
4 G	Agriculture other (c)	a	-	No
11 A	(11 08 Volcanoes	a	-	No
11 B	Forest fires	a	-	Yes
11C	Other sources	a	-	Yes
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which pollutants have been reviewed and which have not in the respective columns.				

(a) Reviewed main pollutants, PM_{10} and $PM_{2.5}$
(b) Not reviewed POPs, dioxins, furans, HM

General recommendations on cross-cutting issues

84. The ERT commends Germany for its efforts undertaken for the preparation of the agriculture emission inventory.

Completeness:

85. The CLRTAP submission included emissions from 1990 to 2008 for NH_3, NMVOC, NOx, PM_{10}, $PM_{2.5}$ and TSP emissions. The ERT commends Germany for its complete, accurate and detailed inventory for the agriculture sector for the main

pollutants and sources. The ERT has identified only minor PM_{10} and $PM_{2.5}$ emissions which are not estimated under 4D1a. The ERT encourages Germany to estimate PM_{10}, and $PM_{2.5}$ emissions for 4D, in future submissions, following the EMEP/EEA Guidebook recommendations.

Transparency:

86. Germany provides detailed information on activity data, emission factors (EFs), key sources and methodologies in the IIR (available only on-line). Germany has provided information regarding activity data, EFs, key sources and methodologies. The IIR is transparent and contains detailed information, with links to reports and peer reviewed articles. An excel file containing activity data, EFs, and parameter time series for GHG and CLRTAP pollutants estimated in the agriculture sector was also made available for the review process. The ERT recommends including in the IIR information on the complete time series of the activity data, description of emission drivers, recalculations and improvements for the agriculture sector. The ERT thanks Germany for providing information upon request during the review.

87. The Party has used the notation keys for reviewed pollutants appropriately. The ERT encourages Germany to provide some more detailed descriptions of trends and drivers for trends and complete *PDF* version of the IIR in order to facilitate the review process.

Accuracy:

88. Key sources were identified for NH_3 (4B1a, 4B8, 4B1b, 4D1a), NOx (4D2a), NMVOC (4B1a, 4B8, 4B1b), PM_{10} (4D2a, 4B8) and TSP (4D2a, 4B8) emissions. The ERT commends Germany for using country-specific information and tier 2/3 methods for NH_3 key source categories (4B), tier 2 for 4D1a synthetic N fertilisers, tier 3 for 4D2a farm-level agricultural operations including storage, handling and transport of agricultural products, and tier 1 (for NO) and tier 3 (for NH_3) for 4D2c N excretion on pasture range and paddock. For particulate matter,´a tier 1 default approach is used. No specific information on uncertainty analysis is provided in the agriculture sector. In the uncertainty chapter of the IIR, Germany explains that it has neither carried out a qualitative nor a quantitative uncertainty assessment for any of the pollutants or pollutant groups relevant so far. The ERT requested further information regarding the uncertainty analysis of the RAUMIS agricultural sector model, with information on activity data and other parameters. Germany has replied that for the agricultural sector a NH_3 uncertainty analysis was performed according to the Tier 1 approach described in IPCC Good Practice Guidance 2000 document. The ERT encourages Germany to clarify and specify, in future IIR submissions, whether uncertainty analysis is carried out.

Germany describes general QA/QC procedures in its IIR. The ERT encourages Germany to describe the specific QA/QC procedures for the agriculture sector in the IIR and to show how its Quality System for Emission Inventories (applied for the GHG inventory reported to UNFCCC) is applied to cover AD and EFs specific to UNECE pollutant reporting.

Comparability:

89. Germany follows the EMEP/EEA 2009 Guidebook for estimating emissions and uses the detailed NFR codes for reporting its emissions. Tier 1, tier 2 and tier 3 approaches for 4B and 4D are used (EFs are default and country-specific).

Recalculations:

90. The ERT has identified recalculations for the agriculture sector submission. Recalculations for most pollutants are due to improvements in parameters and activity data. However, the ERT has found that the descriptions of the recalculations are not detailed enough. During the review Germany explained that recalculations were due to improvements of models that estimate N excretion of animals, to the correction of errors, and to the use of improved/changed activity data. The ERT encourages Germany to describe these changes in more detail in future IIRs.

Improvement:

91. No specific improvements are described in the IIR for the agriculture sector. However, during the review Germany indicated that it would include an estimation of animal categories (ducks, geese, turkeys) in the next submission (2011 for 2009).

Sector-specific recommendations

Category issue 1: 4.B: Manure management

92. Germany has estimated all emission sources recommended in the EMEP/EEA 2009 Guidebook for 4B (NH_3, NO, NMVOC, PM_{10}, $PM_{2.5}$ and TSP). The Party uses tier 2/3 approach for NH_3 key source categories. Methodologies, EFs and key sources are clearly provided in the on-line version of the IIR.

93. The ERT noted differences between official statistics and the number of animals used in the German inventory. Germany uses the RAUMIS agricultural sector model that estimates activity data and the frequency distributions for feeding, housing (including shares of grazing and housing, housing types), storage types and spreading techniques (for manures). During the review, Germany explained that the GHG inventory team performs corrections on data which is collected from different sources (Federal Ministry of Consumer Protection, Nutrition and Agriculture, Statistisches Bundesamt, etc) and expert judgement (e.g. mules and asses). The Party also explained that the estimation of the number of animals is done by a number of different organisations (the Johann Heinrich von Thünen-Institut, Federal Research Institute for Rural Areas, Forestry and Fisheries, Institute of Agricultural Climate Research). The ERT suggests that, to improve the transparent linking of the inventory AD to national statistics, Germany could present a table where all livestock categories are included together with the source for the number of animals (official statistics, associations etc.) and the type of elaboration/correction that has been done.

94. The ERT noted a lack of transparency in the description of emission trends. During the review Germany provided information on the drivers for the reduction in

the number of animals for key categories including IEFs for dairy cattle and swine cattle. Germany also explained that abatement technologies are not yet directly represented in the German inventory due to a lack of actual data on the distribution of housing systems, storage systems and practices used for the application of manure. Data will be collected by the German statistical agencies in 2010 and 2011. The ERT encourages Germany to include in the IIR a complete time series of activity data and an explanation of the drivers for changes in emissions as provided to the ERT during the review.

95. In the IIR it is mentioned that data on buffalo is available from 2000 onwards and for previous years an extrapolation has been done following recommendations from the UNFCCC review process. National estimations of NH_3 emissions have been reported in the NFR since 1996. During the review Germany explained that buffalo farming started in 1996 (German Buffalo Society expert judgement). The ERT encourages Germany to specify clearly the reason for estimating national buffalo emissions since 1996.

96. The ERT identified some NE notation keys in the 4B source. Germany explained that for PM_{10}, $PM_{2.5}$, TSP emission estimations would not be implemented because there are no EFs reported in the EMEP/EEA Guidebook for buffalo, sheep and goats. For ducks, geese, turkeys, emission estimations will be included in the next submission. For NMVOC, Germany is not planning to implement estimations, because there are no EFs.

97. Differences between the national and federal state totals were found in the additional reporting tables containing information on the N excretion rates. Germany explained that this was due to an error made during the compilation of results for these tables. The Party also added that the data in these tables was not used for estimating N emissions, and that the data presented in “EXCR” had been calculated ex post from the inventory results. The ERT encourages Germany to correct this inconsistency for the next submission.

Category issue 2: 4.D Agricultural Soils

98. Germany estimates NH_3, NO and NMVOC emissions for the 4D1a Synthetic N fertilisers source. No estimations are provided for PM_{10} and $PM_{2.5}$ emissions. The ERT encourages Germany to estimate emissions for the missing pollutants according to recommendations provided in the EMEP/EEA 2009 Guidebook.

99. Germany estimates NH_3, NO, PM_{10}, $PM_{2.5}$ and TSP emissions for the 4 D 2 a Farm-level agricultural operations including storage, handling and transport of agricultural products. Germany also estimates NH_3 and NO emissions for 4 D 2 c N excretion on pasture range and paddock source. The ERT commends Germany for providing estimations from these sources.

100. In the IIR Germany provides information on activity data (year 1990, 1995, 2000 and 2008). Following questions from the ERT, additional information was provided by Germany containing the whole time series for parameters, IEF and emissions (excel file Table 2010). In addition, the Party explained that 4D emissions

decreased because of the lower amounts of manure spread and mineral fertiliser sold. Germany also mentioned that the variation in the use of N fertiliser is mainly market driven. The ERT encourages the Party to provide this useful information in future IIRs to improve transparency.

Category issue 3: 11 Natural sources

101. Germany uses the NE notation key for natural sources. The ERT encourages the Party to describe which sources are important and to try and include estimates of emissions in future submissions.

WASTE

Review Scope

Pollutants Reviewed		SO_2, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$,TSP, DIOX, PAH, Hg, Pb, CO		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
6.A	solid waste disposal on land	x		Yes
6.B	waste-water handling	x		Yes
6 C a	6 C a Clinical waste incineration (d)	x		Yes
6 C b	Industrial waste incineration (d)	x		Yes
6 C c	Municipal waste incineration (d)	x		Yes
6 C d	Cremation	x		Yes
6 C e	Small scale waste burning	x		Yes
6.D	other waste (e)	x		Yes
7	Other	x		Yes
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes please indicate which pollutants have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Completeness:

102. The Waste CLRTAP submission from Germany presents emissions for major pollutants and for major activities following the EMEP/EEA Guidebook 2009. The inventory regarding Waste is currently not complete, with missing estimates for 6A solid waste disposal, 6B waste water handling, 6Ca clinical waste incineration, 6Cd cremation: PM10, PM2.5, NH3, CO, PAH. During the review Germany indicated that improvements would be made to complete the Waste sector inventory. The ERT encourages Germany to make these improvements and to document them as well as the methods, data sources and assumptions in future IIRs.

Transparency:

103. Trends, key sources and improvements are generally well documented. However, the IIR from Germany does not provide EFs and AD for all sources, which means that emission calculations cannot be followed. The ERT notes that all incineration activities (except cremation) with energy recovery and relevant emissions are reported under Chapter 1. However, there is very little clarity in Chapter 1 about these emissions. The ERT encourages Germany to describe 6C emissions more clearly in the IIR with strong links between Chapter 6 and Chapter 1 and to make improvements to categories 6A, 6B, 6Ca, 6Cd and 6Ce as indicated below. The ERT would also welcome improvements of the new Chapter 7 in the NFR tables and in the IIR.

104. The German IIR provides some information about emission sources for cremation but descriptions of the methodologies for calculating emissions are missing. All other waste incineration activities are reported in Chapter 1 without

methodological explanation. The ERT encourages Germany to continue to develop Chapter 6 with elaborated explanations for activity data, explanations for emission methodologies and drivers and specific information on key notations (NE, IE) including details of sources included or not included in each category, and to include documentation of planned and expected improvements in the IIR.

Accuracy:

105. In the IIR, Germany does not provide key sources for the Waste chapter because only one sub-chapter (6Cd) is reported. Germany describes general QA/QC procedures in its IIR. The ERT encourages Germany to describe the specific QA/QC procedures for the Waste sector in the IIR and to show how its Quality System for Emission Inventories (applied for the GHG inventory reported to UNFCCC) is applied to cover AD and EFs specific to UNECE pollutant reporting.

Comparability:

106. Germany follows the EMEP/EEA 2009 Guidebook for estimating emissions and uses detailed NFR codes for reporting its emissions. NFR tables and the NECD report are consistent, i. e. showing the same amount of emissions.

Recalculations:

107. All recalculations and improvements made in the 2010 submission are explained for each pollutant but not clearly presented for each sector. The ERT commends Germany for detailed (using NFR codes) reporting for each chapter but encourages it to provide category-specific explanations for the recalculations.

Improvement:

108. No specific improvements were reported in the IIR for Waste.

Sector-specific recommendations

Category issue 1: 6.A Solid waste disposal on land - NH_3, NMVOC

109. No emissions are reported in category 6A (NA) CH_4 flaring from landfill. Germany's IIR indicates that emissions from plants with energy recovery are reported in Chapter 1. However, no methodological explanations are provided in the IIR. If emissions from waste disposal on land are all associated with energy recovery (for the full time series) and included in Chapter 1, the ERT encourages Germany to add information about the methodology of solid waste disposal on land in Chapter 1. Following questions from the ERT, Germany clarified that there was no legal regulation on flaring of landfill gas, so that data were not available. The ERT encourages Germany to use the EFs and relation between CH_4 and NMVOCs provided in the EMEP/EEA Guidebook 2009 to calculate NH_3 and NMVOC emissions from landfills and to report them under 6A in future submissions. The ERT also encourages Germany to include estimates of flaring emissions.

Category issue 2: 6.B Wastewater handling - All pollutants

No emissions are reported in category 6B (NA). During the review Germany confirmed that emissions from incineration and digestion of sludge are all associated with energy recovery (for the full time series) and included in Chapter 1. However, no methodological explanations are provided in the IIR. The ERT encourages Germany to add information about the methodology of waste water handling and sewage sludge incineration in Chapter 1 and to use the notation key "IE" in the NFR and provide an explanation in the Waste chapter of the IIR. The ERT notes that waste water handling plants also have emissions from flaring and from sludge digestion or furnaces (without energy recovery). The ERT encourages Germany to verify all possible emission sources of 6B and to report on them in Chapter 6 in future IIRs.

Category issue 3: 6.C.a: Clinical waste incineration - All pollutants

110. No emissions are reported in category 6Ca (NE). Emissions from plants with energy recovery are reported in Chapter 1. However, no methodological explanations are provided in the IIR. If emissions from clinical waste are all associated with energy recovery (for the full time series) and included in Chapter 1, the ERT encourages Germany to add information about the methodology of clinical waste incineration in Chapter 1 and to use the key category "IE" and explain this in Chapter 6 of the IIR. The ERT also encourages Germany to investigate emissions from plants without energy recovery systems and to report on these in future submissions.

Category issue 4: 6.C.b: Industrial waste incineration - All pollutants

111. No emissions are reported in category 6Cb (NO). Emissions from plants with energy recovery are reported in Chapter 1. However, no methodological explanations are provided in the IIR. If emissions from industrial waste are all associated with energy recovery (for the full time series) and included in Chapter 1, the ERT encourages Germany to add information about the methodology of industrial waste incineration in Chapter 1 and to use the key category "IE" and explain this in the IIR. The ERT also encourages Germany to investigate emissions from plants without energy recovery systems and to report on these in future submissions.

Category issue 5: 6.C.c: Municipal waste incineration - All pollutants

112. No emissions are reported in category 6Cc (NO). Germany has not provided any information as to whether emissions from plants with energy recovery are reported in Chapter 1. No methodological explanations are provided in the IIR. If emissions from municipal waste are all associated with energy recovery (for the full time series) and included in Chapter 1, the ERT encourages Germany to add information about the methodology of municipal waste incineration in Chapter 1 and to use the key category "IE" and explain this in the IIR. The ERT also encourages Germany to investigate emissions from plants without energy recovery systems and to report on these in future submissions.

Category issue 6: 6.C.d: Cremation - PM_{10}, $PM_{2.5}$, NH3, CO, PAH

113. The ERT notes that cremation results in non-fuel based PM10, PM2.5, NH3, CO, PAH emissions (for which EF are available in the Guidebook) but that Germany does not report these emissions in Chapter 6 of the NFR. No explanations are provided for the notation key "IE" used for the PAH emissions. The ERT encourages

Germany to improve the clarity of reporting and to include emissions and descriptions of methods, data sources and assumptions in Chapter 6Cd. The ERT also recommends that Germany improve the activity data, which are currently extrapolated from 2004 onwards.

Category issue 7: 6.C.e: Small scale waste burning - All

114. This sub-category is not complete; no emissions were reported by Germany; it has been assumed that open burning of agricultural waste does not occur as such practices are banned. The ERT remarks that, as with most Parties, some illegal waste burning may occur. The ERT encourages Germany to make estimations of these emissions because they are not negligible, particularly for PM.

Category issue 8: 6.D: Other Waste(s) - All pollutants

115. No emissions are reported in category 6D (NO). Germany's IIR indicates that emissions from plants with energy recovery are reported in Chapter 1. However, no methodological explanations are provided in the IIR. If emissions from other waste are all associated with energy recovery (for the full time series) and included in Chapter 1, the ERT encourages Germany to add information about the methodology of other waste incineration in Chapter 1 and to use the key category "IE" and explain this in the IIR. The ERT also encourages Germany to investigate emissions from plants without energy recovery systems and to report on these in future submissions.

Category issue 9: 7 Other (new sector from Guidebook 2009) - All pollutants

116. Chapter 7 may be used to report emissions from - for example - NH_3 emissions from Cats and Dogs, from Zoo animals, and human ammonia emissions, etc. In addition, although the Guidebook has methods for car and house fires in Chapter 6, it may be more transparent to include these in Chapter 7 as Chapter 6D is more focused on compost and sludge. The ERT encourages Germany to consider including some of these emissions in the next submissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

Waste

1. Response to preliminary question raised prior to the review: answers-germany- Waste-21-06-10Q1.doc, answers-germany- Waste, additions - 23-06-10Q1.doc, answers-germany- Waste- additions - 24-06-10R2.doc
2. Response to questions raised during the review: answers-germany- Waste-additions - 24-06-10R3.doc
3. Germany Stage 2 S&A report
4. Germany Stage 1 report 2008
5. Germany IIR 2008

Transport

6. Germany Stage 2 S&A report
7. Germany Stage 1 report 2008
8. Germany IIR 2008
9. Response to questions raised during the review

Industrial Processes

10. Response to preliminary question raised prior to the review: answers-germany-Industrial Processes-21-06-10Q1.docx
11. Response to preliminary question raised during the review: answers-germany-Industrial Processes- additions 23-06-10Q1.docx

Agriculture

12. Response to preliminary question raised prior to the review: Germany q1-q4 (ReviewQ&ATemplate-v2 Germany 18_06_2010.doc)
13. Response to questions raised during the review: Germany q5-q17 (answers-germany-_agriculture_-_part_2_-23-06-10Q1_follow_up(II).doc).
14. Additional information regarding methodologies, emission and parameter time series was provided in a zip file: lbf_sh334_incl_cd_contents_2010.zip

Energy

15. Response to preliminary question raised prior to the review: answers-germany-Energy-21-06-10Q1
16. Document received during the review: emission_factors_unece.xls
17. Germany Stage 2 S&A report
18. Germany Stage 1 report 2008
19. Germany IIR 2008

General

20. Responses to questions from the generalist reviewer during the stage 3 review: DE-General-24-06-10-Q1.docx