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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:**

AUSTRIA

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INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document '*Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols*'⁽¹⁾ – hereafter referred to as the 'Methods and Procedures' document.
2. This annual review has concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} for the time series years 1990 – 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 Austria 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 – Kevin Hausmann (Germany), Energy - Nina Holmengen (Norway), Mobile Sources – Michael Kotzulla (Germany), Industry – Dušan Vácha (Czech Republic), Solvents - Valentina Idrissova (Kazakhstan), Agriculture +Nature - Romain Joya (France), Waste - Sophie Hoehn (Switzerland).
4. Chris Dore (United Kingdom) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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

PART A: KEY REVIEW FINDINGS

5. Austria's inventory is in line with the EMEP EEA inventory guidebook and UNECE Reporting Guidelines. The ERT concluded that Austria's data submission and Informative Inventory Report are good examples of high quality inventory submissions.

6. Nevertheless, the ERT identified some minor issues and will provide recommendations for improvements in this report. Revised sections for future submissions should include key category analysis, recalculations, and NECD/CLRTAP comparability.

INVENTORY SUBMISSION

7. Austria has reported emissions for its protocol base years and a full time series up to 2008 (the latest year) for its protocol pollutants in the NFR09 format. Austria also submitted a detailed Informative Inventory Report (IIR). Austria did not provide 2008 gridded emissions.

8. The CLRTAP inventory submitted by Austria is of good quality with most sectors generally well documented in the IIR.

KEY CATEGORIES

9. Austria has compiled and presented in its IIR a "Tier 1" Key Category Analysis (KCA) for the trend assessment, mixing it with parts of the level assessment. The results of the analysis are used for inventory improvement.

10. Austria does not provide a full level assessment for key categories in its IIR. The ERT recommends that Austria completely separates the level and trend assessment for key categories, and revises this chapter of the IIR accordingly.

QUALITY

Transparency

11. The ERT recognises the level of effort undertaken by Austria in providing an inventory with a significant level of detail to undertake a detailed review. The ERT commends Austria for the exemplary work on the description of methodologies in the IIR.

12. Austria's IIR is generally well presented, but does not fully follow the IIR structure as proposed by the Guidelines. In particular the chapters on projections and improvement are missing (although the information is available elsewhere).

13. Austria's IIR provides a lot of detailed information on methodologies. However, it does not indicate the Tier level to which the methods correspond. Including this information as a summary table or together with each sector would be very helpful in improving transparency.

Completeness

14. The ERT acknowledges the effort to which Austria has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed. Austria's inventory for the pollutants reviewed is generally complete.

15. For more detailed information on minor gaps still in the inventory please refer to the sector-specific chapters in the second part of this report. These gaps include PM and HM emissions from industrial processes as well as PM and some main pollutant emissions from the waste sector.

Consistency, including recalculations and time series

16. Austria has undertaken recalculations of the complete time series within its submission in 2010. Recalculations are not particularly large considering total emissions: most pollutants have recalculations of less than 5%, and there are few pollutants (PAH, dioxins) with recalculations of more than 10%.

17. Recalculations are generally explained in the major changes section (chapter 3.3) of the IIR, but the ERT recommends that the link between the changes in methodology and the resulting emission numbers should be explained in more detail, to improve clarity.

Comparability

18. The ERT notes that the inventory of Austria is comparable with those of other reporting Parties. The allocation of source categories follows that of the EMEP/UNECE reporting Guidelines and NFR categories with the appropriate use of notation keys. The ERT encourages Austria to continue with this approach to national inventory calculation.

CLRTAP/NECD comparability

19. Austria's data submissions for NECD and CLRTAP differ significantly. As explained by the Party, this is due to the usage of emission totals derived from fuel used in the case of the NEC directive, as opposed to fuel sold for the CLRTAP submission. The ERT encourages Austria to improve the transparency of reporting by including an explanatory note at the beginning of the IIR.

Accuracy and uncertainties

20. Austria compiled a qualitative uncertainty analysis and presents this clearly in its IIR. Austria uses both the results from its uncertainty analysis and key category analysis for the prioritisation of inventory improvement activities.

Verification and quality assurance/quality control approaches

21. Austria has elaborated and implemented a quality assurance/quality control (QA/QC) plan in accordance with the EMEP/CORIANIR Guidebook (Inventory Management Chapter). This includes general QC procedures (tier 1) and sector-specific procedures. Austria has also defined roles and responsibilities for inventory preparation, improvement and QA/QC.

FOLLOW-UP TO PREVIOUS REVIEWS

22. Austria provided detailed responses to the questions identified during stage 2 on outliers of implied emissions factors. Given the quality of the IIR and Austria's responsiveness the ERT were able to review the inventory in detail and provide a number of detailed recommendations.

AREAS FOR IMPROVEMENTS IDENTIFIED BY AUSTRIA

23. Austria's IIR identifies several areas for improvement. These include:
24. Improved emission factors for space heating.
25. Introduction of an updated version of the "Handbook on Emission Factors" for transport.
26. Further investigation of the issue of possible double-counting in chipboard production.
27. Looking into the possible omission of NMVOC emissions from coal mining, storage and handling.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

28. The ERT recommends that Austria strictly separates level and trend assessment for key categories and revises the corresponding chapter of the IIR.
29. The ERT encourages Austria to follow the proposed structure of the IIR even more closely, in particular by introducing a chapter on projections and planned improvements at the end of the report.
30. The ERT recommends that Austria include an indication of the Tier levels for each of the methodologies explained in the IIR. This will improve transparency.
31. The ERT encourages Austria to give more detailed information about the links between improvements of the methodologies and resulting recalculations in future IIRs.
32. The ERT encourages Austria to improve the transparency of reporting by including an explanatory note on the differences between NECD and CLRTAP reporting at the beginning of the IIR.
33. The ERT encourages Austria to assess the possibilities for compilation of a quantitative uncertainty analysis in the future. The results of such analysis could be used to prioritize planned improvements.
34. 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 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1	total energy	All		
1.A.1.a	public electricity and heat production	All		
1.A.1.b	petroleum refining	All		
1.A.1.c	Manufacture of solid fuels and other energy industries	All		
1.A.2.a	iron and steel	All		
1.A.2.b	non-ferrous metals	All		
1.A.2.c	chemicals	All		
1.A.2.d	pulp, paper and print	All		
1.A.2.e	food processing, beverages and tobacco	All		
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	All		
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)		All	
1 A 3 e	Pipeline compressors?		All	
1.A.4.a.i	commercial / institutional: stationary	All		
1.A.4.a.ii	commercial / institutional: mobile?		All	
1.A.4.b.i	residential plants	All		
1.A.4.b.ii	household and gardening (mobile)		All	
1.A.4.c.i	Agriculture/forestry/fishing. stationary	All		Yes
1.A.4.c.ii	off-road vehicles and other machinery?		All	
1.A.4.c.iii	national fishing?		All	
1.A.5.a	other, stationary (including military)	All		
1.A.5.b	other, mobile (including military, land based and recreational boats)?		All	
1.B.1.a	coal mining and handling	All		Yes
1.B.1.b	solid fuel transformation	All		
1.B.1.c	other fugitive emissions from solid fuels	All		
1 B 2 a i	Exploration, production, transport	All		
1 B 2 a iv	Refining / storage	All		
1 B 2 a v	Distribution of oil products	All		
1 B 2 b	Natural gas	All		
1 B 2 c	Venting and flaring	All		
1 B 3	Other fugitive emissions from geothermal energy production, peat and other energy extraction not included in 1 B 2	All		

General recommendations on cross-cutting issues.

Completeness:

35. The ERT considers the inventory for the stationary energy sector to be quite complete and comprehensive, with good levels of detail in the methodology descriptions.

36. Only one case of incompleteness was identified. See sub-sector specific recommendations (Category issue 1).

Transparency:

37. Austria has provided a detailed and generally transparent emissions inventory. Estimates are provided at the most detailed level for all energy sectors. Austria's methodology and emission factors in the IIR are considered by the ERT to be transparent and well described for the stationary energy sector. The ERT has one comment about the transparency in the IIR. See sub-sector specific recommendations (Category issue 2).

38. Emission trends are described in a thorough manner. The focus of the trend description is on 1990 and the base year. The ERT suggests that more information could be included for the entire time series.

39. To improve transparency, the ERT recommends that rationales for choice of emission factors, when significantly different from default Guidebook emission factors, should be stated.

Accuracy:

40. The ERT encourages Austria to undertake a quantitative uncertainty analysis for the stationary energy sector in order to help identify potential areas for further improvements and to provide an indication of the reliability of the inventory data.

41. Austria has detailed QA/QC checks by the sector experts themselves, and there is a second audit for every sector. The ERT commends Austria for these thorough QA/QC procedures. The ERT encourages Austria to specify source-specific QA/QC procedures.

Comparability:

42. The methods used are - as far as the ERT can understand - consistent with the methods proposed by the EMEP/EEA Guidebook.

43. No over- or underestimates have been discovered during the review process.

Consistency:

44. The ERT finds that the time series in the Austrian inventory is consistent throughout, for the most part. One minor inconsistency has been identified. See sub-sector specific recommendations (Category issue 3).

Recalculations:

45. The recalculations in the Austrian inventory are thoroughly explained in the IIR, including a description of how the recalculations affect the emissions. However, the IIR does not explain the rationale for all recalculations. The ERT encourages Austria to provide the rationale for all recalculations in its IIR.

Improvement:

46. The ERT commends the Party for its clear improvement plan in the stationary energy sector. The ERT encourages Austria to perform a quantitative uncertainty analysis in order to identify other areas of the stationary energy sector where improvements of activity data or emission factors could be appropriate.

Sub-sector Specific Recommendations.

Category issue 1: 1 B 1 a: NMVOC

47. The ERT notes that Austria does not estimate emissions of NMVOCs from coal mining and handling. Emission factors for NMVOC from this sector are provided in the EMEP/EEA Guidebook. Austria notes that there has been no coal mining in Austria after 2007. The ERT encourages Austria to apply the default emission factors from the Guidebook and to estimate NMVOC emissions from coal mining and handling for the years prior to 2007. Austria will consider including this in its improvement plan.

Category issue 2: 1 A 4 c i: All pollutants

48. The ERT has noted that the emission factors used in sector 1 A 4 are somewhat unclear. The ERT recommends that Austria clarifies this chapter by a more detailed description of the emission factors used for each fuel type throughout the time series.

Category issue 3: 1 A 4 c i: NMVOC and CO

49. The ERT noted a jump in NMVOC emissions from 1 A 4 c i between 1996 and 1997. Austria provided information stating that this was due to a change in methodology, with new emission factors arising from this change. No interpolation method has been used to smooth the resulting jump in the emission time series. The ERT recognizes the challenges connected to finding good methods for merging separate time series, but recommends that Austria uses interpolation to splice the two time series more gradually.

TRANSPORT

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , 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	All		
1 A 3 a i (i)	International Civil Aviation - LTO	All		Yes
1 A 3 a i (ii)	International Civil Aviation - Cruise	All		Yes
1 A 3 a ii (i)	Domestic Civil Aviation - LTO	All + Pb		Yes
1 A 3 a ii (ii)	Domestic Civil Aviation - Cruise	All + Pb		Yes
1 A 3 b i	Road Transport: Passenger Cars	All + Pb		Yes
1 A 3 b ii	Road Transport: Light Duty Vehicles	All + Pb		Yes
1 A 3 b iii	Road Transport: Heavy Duty Vehicles	All		
1 A 3 b iv	Road Transport: Mopeds & Motorcycles	All		
1 A 3 b v	Road Transport: Gasoline Evaporation	All		
1 A 3 b vi	Road Transport: Automobile tyre and brake wear	All + TSP, other HM		Yes
1 A 3 b vii	Road Transport: Automobile road abrasion	All + TSP, other HM		Yes
1 A 3 c	Railways	All		
1 A 3 d i (i)	International maritime navigation		All	
1 A 3 d i (ii)	International Inland Waterways		All	
1 A 3 d ii	National Navigation (Shipping)	All		
1 A 4 a ii	Commercial / institutional: Mobile	All		Yes
1 A 4 b ii	Residential: Household and gardening (mobile)	All		Yes
1 A 4 c ii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	All		
1 A 4 c iii	Agriculture/Forestry/Fishing: National fishing		All	
1 A 5 b	Other, Mobile (including military, land-based and recreational boats)	All		
	Transport (fuel used)		All	

General recommendations on cross-cutting issues.

Completeness:

50. The ERT considers the Transport sector to be complete and comprehensive for the pollutants reviewed.

Transparency & Comparability:

51. The ERT commends the already good levels of detail in the methodology descriptions for the main sources within the transport sector (1A3a, b), encouraging the Party to further improve the transparency and comparability of its inventory by providing even more details where necessary.

52. On the other hand, the ERT notes that, compared to the main transport sub-categories, little information is provided on the “off-road” vehicles. Here, the Party

provides information for all off-road vehicles together without further separation of sub-categories such as railways or navigation. The ERT therefore recommends that the Party includes much more detailed information and descriptions in its next submission for the sub-categories summed up under "off-road" at the moment.

Accuracy:

53. The ERT commends the Party for the QA/QC procedures implemented and the description of these procedures in the IIR.

54. The ERT encourages Austria to undertake specific uncertainty analysis for the Transport Sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Recalculations:

55. Austria has recalculated its inventory for almost all sectors in the year 2010, providing not only good information on the reasons within the IIR but also detailed data on the recalculated emissions on a very detailed level. The ERT commends the Party's efforts, encouraging Austria to try and provide such data on a level as disaggregated as possible.

Improvements:

56. The ERT commends the Party for its improvements carried out and still planned within the transport sector, encouraging the Party to further improve its inventory by attaching more attention to off-road mobile sources.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.3a ii - Air Transport: Pb

57. During the review the Party stated that production and import of leaded gasoline has been prohibited since 1993. In Austria and that earlier emission estimates are based on a lead content of 0.56 g Pb/litre for aviation gasoline. The Party also provided further explanatory information on the issue of emission factors used for lead emissions from avgas. The ERT thanks Austria for the information provided, and recommends that the Party provides additional explanatory information within the relevant IIR chapters in its next submission.

Category issue 2: 1.A.3.bi & ii Road transport - Pb

58. During the review the ERT asked the Party to provide additional information on the development of Pb emissions reported for these categories. Besides the information given above for avgas, Austria stated that from 1996 on a lead content of 0,1 mg/GJ has been estimated for gasoline due to the assumed use of lead additives for old non-catalyst vehicles and that a lead content of 0.02 mg/GJ has been assumed for diesel oil. The ERT thanks the Party for its detailed answer, asking the Party to include these assumptions in its IIR.

Category issue 3: 1.A.3.b i: NMVOC, CO, NH₃

59. The ERT noted some dips in the trends reported for 1990 emissions of NH₃, NMVOC and CO, asking the Party to provide some explanation on these issues. The ERT recommends that the Party include explanations in its IIR.

Category issue 4: 1.A.3.b vi & vii: PM, TSP

60. The ERT notes that particle emissions from tyre and brake wear (1A3bvi) are reported as 'IE', asking the Party to provide some information as to whether these emissions are part of 1A3bvii and why no separate reporting is possible. Austria states that PM emissions from tyre and brake wear are included in road abrasion and that it is not possible to develop separate emission factors (by road and vehicle type) from field emission measurements which consider total vehicle emissions. The ERT accepts this answer but wants to encourage the Party to further develop its models and to provide separate estimates for both sub-categories in future submissions.

Category issue 5: 1.A.3.b vi & vii: Other HM

61. The ERT notes that Austria reports emissions of all HM (besides Cd, Hg and Pb) as not reported (NR). The Party states that no such estimations have been carried out up to now. The ERT accepts this answer but anyhow wants to encourage Austria to provide estimates for 'Other HMs' in its next submission.

Category issue 6: 1.A.4.a ii – All pollutants

62. The ERT notes that Austria reports all emissions from 1A4aii as 'IE', giving no information, where these emissions are included. In contrast, under activity data only 'NO' occurs. The Party stated that emissions from mobile machinery are included in category 1A4bii and that it is not possible to split the data into commercial and non-commercial use. The ERT thanks Austria for the answer provided, and encourages the Party to provide more information on the notation keys used in its inventory in both IIR and NFR in its next submission. The ERT also encourages Austria to investigate whether it will be possible to gather new data to allow these two sources to be reported separately in the future.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.A.1	Cement production	All		Yes
2.A.2	Lime production	All		
2.A.3	Limestone and dolomite use			
2.A.4	Soda ash production and use			
2.A.5	Asphalt roofing			
2.A.6	Road paving with asphalt			
2.A.7.a	Quarrying and mining of minerals other than coal	All		
2.A.7.b	Construction and demolition	All		
2.A.7.c	Storage, handling and transport of mineral products	All		
2.A.7.d	Other Mineral products			
2.B.1	Ammonia production	All		
2.B.2	Nitric acid production	All		
2.B.3	Adipic acid production			
2.B.4	Carbide production			
2.B.5.a	Other chemical industry	All		
2.B.5.b	Storage, handling and transport of chemical products			
2.C.1	Iron and steel production	All + HMs		Yes
2.C.2	Ferrous alloys production	All		
2.C.3	Aluminium production	All		Yes
2.C.5.a	Copper Production			
2.C.5.b	Lead Production			
2.C.5.c	Nickel Production			
2.C.5.d	Zinc Production			
2.C.5.e	Other metal production			
2.C.5.f	Storage, handling and transport of metal products			
2.D.1	Pulp and paper	All + CO		
2.D.2	Food and drink	All + diox		
2.D.3	Wood processing	All		
2.E	Production of POPs			
2.F	Consumption of HM and POPs (e.g. Electrical and scientific equipment)			
2.G	Other production, consumption, storage, transportation or handling of bulk products			

General recommendations on cross-cutting issues

Completeness:

63. The ERT considers the industrial processes sector to be almost complete. Only an emissions estimate for the Ferroalloys production is missing. TSP emissions are assumed to be negligible and would contribute 0.02% to the national total.

Transparency:

64. The ERT notes that the Industrial Processes sector in the Austrian IIR is in general very well organised and includes almost all necessary information. This approach provides a high level of transparency. However, there are some categories which would benefit from improved transparency (see chapter Sector-specific Recommendations).

Accuracy:

65. The ERT encourages Austria to undertake sector-specific quantitative uncertainty analysis for the industrial processes in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

66. Austria has implemented a quality management system (QMS) which is based on ISO/IEC 17020 *General criteria for the operation of various types of bodies performing inspections* and which incorporate many of the EMEP/EEA emission inventory guidebook 2009 requirements. ERT encourages Austria to provide more sector-specific information in the next submission.

Recalculations:

67. Because of changes in methodologies and activity data, the ERT noted that Austria revised the emissions of the year 2007 for 2.D.2 Other Production – Food and Drink (Bread, Wine, Beer and Spirits). This recalculation had an insignificant influence on the total NMVOC emissions. Austria also revised emissions estimates of TSP, PM₁₀ and PM_{2.5} emissions from limestone and dolomite and excluded these emissions from the inventory. These recalculations had a very significant influence on the total TSP, PM₁₀ and PM_{2.5} emissions. The ERT appreciates Austria's plans to revise these emissions.

Improvement:

68. The Austrian IIR includes only very limited information about sector-specific improvements plans. The ERT encourages Austria to provide more sector-specific information about planned improvements in the next submission.

Sector-specific Recommendations**Category issue 1: 2 A 1 Cement production**

69. The ERT noted that Austria reported SO₂ emissions from Cement production as NA. Austria has responded that the methodology does not allow combustion and process emissions to be split. The ERT encourages Austria to try and separate emissions from combustion and from processes and to report them under the relevant categories in future submissions. Where this is not possible the ERT encourages Austria to use the IE notation key and to provide comments in the IIR and NFR.

Category issue 2: 2 C 1 Iron and steel production

70. The ERT notes that some data used for HM estimates are provided in table 162 of the IIR. However, the ERT suggests that Austria should present some activity data more clearly - in particular activity data for coke production, coke consumption in sinter plants and blast furnace gas production.

Category issue 3: 2 C 3 Aluminium production

71. The ERT notes that the Austrian IIR does not use terminology used in NFR for chapter titles. This makes the IIR difficult to follow. The ERT recommends that Austria should increase the transparency of industrial processes reporting by ensuring that each category is described under individual and appropriately named chapters.

SOLVENTS

Review Scope

Pollutants Reviewed		NMVOC		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.E	production of halocarbons and SF ₆			
2.F	consumption of halocarbons and SF ₆			
2.G	other (please specify in a covering note)			
3	total solvent and other product use			
3.A	paint application			
3.A.1	Decorative coating application	NMVOC		Yes
3.A.2	Industrial coating application	NMVOC		Yes
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)	NMVOC		
3.B.1	Degreasing	NMVOC		Yes
3.B.2	Dry cleaning	NMVOC		Yes
3.C	Chemical Products, Manufacture & Processing	NMVOC + Cd, Pb		Yes
3.D.1	Printing	NMVOC		Yes
3.D.2	Domestic solvent use including fungicides	NMVOC		Yes
3.D.3	Other product use	NMVOC + PM _{2.5} , PM ₁₀ , TSP		Yes

General recommendations on cross-cutting issues

72. The Austrian solvent emissions inventory is complete and accurate. The ERT appreciates the efforts of Austria to provide a very good quality report.

Completeness:

73. The ERT considers the solvent sector to be complete and comprehensive.

Transparency:

74. Estimation approaches, activity data, assumptions and relevant documentation are transparently presented in the IIR.

Accuracy:

75. The IIR indicates that no quantitative uncertainty assessment for any of the pollutants or pollutant groups has been made. The qualitative assessment provides the typical error range of 10-30% for NMVOC emissions in solvent sector. The ERT

encourages Austria to present quantitative uncertainty assessments for the categories in the solvent sector to support future submissions.

QA/QC procedures:

76. According to information provided, QA/QC procedures are set up for the solvents sector. The procedures are both general and sector-specific, and are regarded as being sufficient.

Comparability:

77. Austria applied a combination of bottom-up and top-down approaches to estimate emissions from solvent uses. The output format complies with the latest NFR categories, and allows comparison with other Parties.

Consistency:

78. Austria used the 2000 data (e.g. solvent content in paints, waste gas purification efficiency) for the subsequent years to estimate solvent use data as no new survey has been conducted. The approach is conservative though it might significantly overestimate NMVOC emissions in the solvent sector as some solvent uses and regulations associated with mitigating emissions were amended after 2000. The ERT encourages Austria to consider improving the estimates of data for 2000 onwards, and recalculating emissions.

Recalculations:

79. Recalculations which have been done in the sector are transparently explained in the IIR.

Improvement:

80. No improvements are planned for the sector.

Sector-specific Recommendations

Category Issue 1: 3.A. Paints and Coatings – NMVOC

81. Austria uses the “Not Applicable” notation key for the NMVOC emissions from the 3A3 “Other coating application” category. However, the Party explained that the paint use, and hence associated emissions, under 3A3 are accounted for in 3A1. The ERT recommends that Austria should use the appropriate notation key IE (“Included Elsewhere”) and provide an explanation in the IIR that all paint use emissions are included under 3A1.

AGRICULTURE

Review Scope:

Pollutants Reviewed		NO _x , 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	All		
4 B 1 b	Cattle non-dairy	All		
4 B 2	Buffalo	All		
4 B 3	Sheep	All		
4 B 4	Goats	All		
4 B 6	Horses	All		
4 B 7	Mules and asses	All		
4 B 8	Swine	All		
4 B 9 a	Laying hens	All		
4 B 9 b	Broilers	All		
4 B 9 c	Turkeys	All		
4 B 9 d	Other poultry	All		
4 B 13	4 B 13 Other	All		
4 D 1 a	Synthetic N fertilizers	All		
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products	All		
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products	All		
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)	All		
4 F	Field burning of agricultural wastes	All		
4 G	Agriculture other(c)	All		
11 A	(11 08 Volcanoes)	All		
11 B	Forest fires	All		

General recommendations on cross-cutting issues

Completeness:

82. The agriculture inventory of Austria covers a wide set of pollutants and the inventory is complete with respect to the most important sources of emissions. The ERT commends Austria for the completeness and the quality of the agriculture inventory.

Transparency:

83. The inventory is generally transparent and the IIR explains the methodology used to estimate several pollutants and source combinations. Emission Factors and activities are always provided in a very detailed manner. The ERT commends Austria for its efforts to make the inventory transparent. It is an example of good practices which other countries could learn from. Nevertheless, PM emissions from animal

husbandry could be reported in 4B NFR sub-sectors instead of being reported in 4G or, at the minimum, reported as IE “Included Elsewhere” (instead of NA). The ERT also recommends that Austria provides a summary table indicating the tier levels used for each of the agriculture sources.

Accuracy:

84. The uncertainty analysis provided is qualitative (level B for agriculture). The ERT encourages Party to undertake a quantitative uncertainty analysis for the agriculture sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Recalculations:

85. The ERT notes that recalculations were undertaken in response to the implementation of new statistical data, in particular AWMS. Recalculations (§ 7.2.2) are provided in a very detailed manner for each source in the Austrian IIR and the reporting is an example of good practice.

Improvement:

86. The ERT commends Austria for its improvements in the 4B and 4D sectors because NO_x emissions from 4B and 4D are estimated for the first time, and also because the NH₃ emission model has recently been revised. The ERT also commends the Party for the good descriptions of the improvements achieved, which are clearly provided in the IIR.

Sector-specific recommendations

87. There are no sector-specific recommendations.

WASTE

Review Scope:

Pollutants Reviewed		SO ₂ , NO _x , 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	All		Yes
6.B	waste-water handling	All		Yes
6 C a	6 C a Clinical waste incineration (d)	All		Yes
6 C b	Industrial waste incineration (d)	All		Yes
6 C c	Municipal waste incineration (d)	All		Yes
6 C d	Cremation	All		Yes
6 C e	Small scale waste burning	All		Yes
6.D	other waste (e)	All		
7	Other	All		Yes

General recommendations on cross-cutting issues.

88. The CLRTAP submission from Austria regarding Chapter 6 (Waste) is quite complete and presents emissions for major pollutants and for major activities following the EMEP Guidebook 2009. The methodologies and reasons for decreases or increases in emissions for sectors 6 A 1, 6 C and 6 D are well developed and presented in a way that allows good comprehension. Recalculations for all sectors are also well explained.

Completeness:

89. With regard to Waste, the inventory is currently quite complete. However, some improvements have also been suggested from Austria during the review process. These are considered in detail in the Category Issues below.

Transparency:

90. The Austrian IIR provides information about emission sources for Waste, as well as activity data and EFs. Trends are also clearly explained. A list of measures implemented for the sector is also present in the IIR, which increases transparency.

91. The methodology and references for 6 A 1 are well documented and different types of waste deposited are also described. For sector 6 C, sources of emissions are completely listed. Data and assumptions for the estimation of activity data for 6 C are clearly explained. It would help to improve transparency in 6 C if the data in the IIR were clearly allocated to the different NFR sub-categories (6 C a,b,c,d,e), and the ERT recommends that this should be undertaken. The NFR tables report emissions for each sub-category, and the corresponding data is thus assumed to be readily available.

Accuracy:

92. Austria has provided a clear picture of the key sources in the IIR for the Waste sector. Austria also provided complete QA/QC checks for the waste sector.

93. Uncertainty analyses are presented for the waste sector. The majority are defined as category "C" or "D" which presents quite a high error range. The ERT notes that Austria uses the uncertainty assessment in prioritising improvements, and therefore encourages Austria to try and improve data to achieve a lower error range for the waste sectors.

Comparability:

94. The IIR and NFR tables presented by Austria are easily comparable to other IIR and NFR Tables.

Recalculations:

95. All recalculations and improvements made in the 2010 submissions are explained well, and clearly presented in the Waste sector. The ERT commends Austria for its detailed reporting.

Improvements:

96. Specific improvements were reported in the IIR for waste. Especially for the documented categories 6 A 1, 6 C and 6 D.

Sector-specific recommendations

Category issue 1: 6 A Solid waste disposal on land: SO_x, NO_x, TSP, PM₁₀, PM_{2.5}

97. The ERT noticed that no emissions of SO_x and NO_x were reported under 6 A. Austria has indicated that they are reported under Chapter 1, energy. However, Austria mentions in its IIR (page 269, 8.2.1) that most active landfills in Austria have gas collection systems. For those without energy recovery systems, NO_x and SO₂ emissions arise when burning (flaring) occurs and they should be reported as waste emissions. The ERT therefore recommends that Austria should use the notation key "IE" in the NFR Tables instead of "NA" to improve the transparency of the way in which emissions from flaring are reported. Or, if data on flaring are available, emissions should be reported in the Waste chapter.

98. The ERT encountered another transparency issue in 6 A 1. The ERT were not able to understand whether the emissions of TSP, PM₁₀ and PM_{2.5} which are reported under 6 A 1 came from burning (flaring) or from deposition of waste (e.g. handling). Austria has confirmed that the emissions are from waste handling at landfills, and the ERT recommends that this explanation is included in the IIR.

Category issue 2: 6 B Wastewater handling: All pollutants

99. No emissions are reported in category 6B (the notation keys NA or NR are used). Following questions from the ERT, Austria has explained that activity data are unknown for this category. Consequently, the ERT strongly recommends the use of the "NE" notation key instead of "NA". However, the ERT encourages Austria to try

and obtain activity data for this category to make emission estimates, and therefore improve the IIR and the NFR tables.

Category issue 3: 6 C Waste incineration:

100. Austria's IIR explains that some emissions from hazardous waste and sewage sludge incineration are reported in 1 A 4 a (and 1 A 1 a) for 1992 onwards. Where a plant recovers heat or generates electricity from waste burning for its own purposes, allocation to 1 A 4 a is correct. However, this is not a particularly common occurrence across Europe. So the ERT recommends that some text is added to explain this logic.

Category issue 4: 6 C a Clinical waste incineration: TSP, PM₁₀, PM_{2.5}, AD

101. Emissions from TSP, PM₁₀ and PM_{2.5} are not reported (NE) although activity data are known and EFs are provided in the EMEP Guidebook 2009 (at least for TSP). The ERT has recommended that Austria should include emission estimates in its next submission.

102. The IIR also explains that activity data are based on a waste flow database at the Umweltbundesamt which only has data for the years 1990 and 1994, the remaining time series being extrapolated from these data. This estimation is probably a good first approximation, but long extrapolations such as this should be avoided or supported by some new data. Consequently, the ERT recommends that Austria should investigate ways of obtaining new activity data to improve emission reporting.

Category issue 5: 6 C b Industrial waste incineration: TSP, PM₁₀, PM_{2.5}, AD

103. Emissions from TSP, PM₁₀ and PM_{2.5} are not reported (NE) whereas activity data are known and EFs are provided in the EMEP Guidebook. The ERT has recommended that Austria should include emission estimates in its next submission.

104. The IIR does not provide details on the activity data used for the category 6 C b (the ERT thinks that this is possibly Waste Oil). The ERT encourages Austria to describe the sub-categories reported in the NFR tables in the IIR.

Activity data on all types of incinerated waste is provided in table 225 of the IIR.

Category issue 6: 6 C c All pollutants

105. No emissions are reported under 6 C c but the ERT has noticed from page 267 of the IIR ("Although an increasing amount of waste is incinerated, NO_x, NMVOC and NH₃ emissions from Waste Incineration (without energy recovery) are decreasing. Emissions arising from incineration of waste with energy recovery are taken into account in NFR Sector 1 A.") that waste incineration without energy recovery is still present and the ERT therefore presumes that emissions are still produced. It leads to a small inconsistency because these emissions are not reported. The ERT encourages Austria to clarify this point, and update reporting accordingly.

Category issue 7: 6 C d Cremation: TSP, PM₁₀, PM_{2.5}, AD

106. Activity data for this source are based on expert judgement and have been constant since 2005. For more accurate emissions reporting, the ERT suggests that Austria should try to obtain statistical data from crematoria. Furthermore, emissions from TSP, PM₁₀ and PM_{2.5}, are not reported (NE) although activity data are known and EFs are provided in the EMEP Guidebook 2009 (at least for TSP). The ERT has recommended that Austria should include emission estimates in its next submission.

Category issue 8: 6 C e Small-scale waste burning: All pollutants

107. No emissions for this category are reported. Austria explained that any biomass waste incineration is prohibited in Austria. However, illegal waste incineration does take place, but Austria sets it as "NE". The ERT suggests that even if it is banned, illegal fires will happen, and therefore the ERT recommends making an emissions estimate - particularly because emissions (mostly PM) are still quite important. Austria may benefit from considering the methodologies used by other countries which report emissions from this source (for example the UK).

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

108. Austria does not report emissions in NFR 7. This NFR sector may be used to report emissions of e.g. NH₃ emissions from Cats and Dogs, from Zoo animals, and human NH₃ emissions etc. In addition, although the Guidebook has methods for car and house fires, it may be more transparent to include these under NFR sector 7 as Chapter 6D is more focused on compost and sludge. The ERT recognises that there is no prescriptive guidance on which sources should be included in Sector 7, but encourages Austria to consider including some of these emissions in its next submission, as some of the sources may not be negligible.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to questions raised prior to, and during the review

Austria-Energy-Stationary_closed.doc

AT_Transport_23-06-2010_Answers.doc

Austria-IP-10-06-14-Q1_MP_10-06-22-Q2-R2_10-06-23-Q3_A3.docx

Austria-Solvents-22062010.doc

AT_Agriculture_17_06_2010_Q2R1.doc

Autriche_waste_Q2A2.docx

2. Austria IIR 2008

3. Austrian UN FCCC CRF Tables

4. Projections in Austria's report:

http://www.umweltbundesamt.at/publikationen/publikationssuche/publikationsdetail/?&pub_id=1853 (Projection for air pollutant emissions 2010 - 2020).

5. Pb content of fuel:

Lead emission factors 1990-2008 for transport fuels:

Year	Motor gasoline mg/GJ	Aviation gasoline mg/GJ	Diesel & Kerosin mg/GJ
1990	2.060	15.915	0.02
1991	1.694	15.915	0.02
1992	1.328	15.915	0.02
1993	962	15.915	0.02
1994	596	15.915	0.02
1995-2008	0.10	0.10	0.02