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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:**

SWITZERLAND

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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 Switzerland 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 – Kees Peek (Netherlands).
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. Switzerland's inventory is in line with the EMEP/EEA inventory Guidebook and UNECE Reporting Guidelines. Its data submission and Informative Inventory Report are generally complete.
6. The ERT identified some minor issues and will provide recommendations for improvements in this report. In particular, the ERT encourages Switzerland to include a trend assessment for key categories and an uncertainty analysis in future reports.

INVENTORY SUBMISSION

7. Switzerland 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. Switzerland also submitted a detailed Informative Inventory Report (IIR).
8. The CLRTAP inventory submitted by Switzerland is of good quality with most sectors generally well documented in the IIR.

KEY CATEGORIES

9. Switzerland has compiled and presented in its IIR a "Tier 1" Key Category Analysis (KCA) for the level assessment. The ERT notes that in this analysis, categories are considered key for up to 95% of the total emissions, as opposed to guidance in the EMEP/EEA Guidebook setting the limit to 80%. The ERT recommends that Switzerland change their methodology for the key category analysis according to the Guidebook.
10. Switzerland does not compile a KCA using the trend assessment. The ERT encourages Switzerland to include trend assessments for key categories in the next submission.

QUALITY

Transparency

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

Completeness

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

Consistency, including recalculations and time series

13. Switzerland has undertaken recalculations of the complete time series within its 2010 submission. Recalculations are significant for some pollutants: PM₁₀, PM_{2.5}, TSP, CO, Pb, Cd, dioxins and PAH have been revised by more than 10%, with some differences as much as 35%.

14. Recalculations are generally explained in the section 10.1 of the IIR, but the ERT recommends that the link between changes in the methodology and the resulting emission figures should be presented more clearly in the IIR.

Comparability

15. The ERT notes that the inventory of Switzerland 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 appropriate use of notation keys. The ERT encourages Switzerland to continue with this approach to national inventory calculation.

CLRTAP/NECD comparability

16. Switzerland does not have reporting obligation reporting report under the National Emission Ceilings (NEC) Directive.

Accuracy and uncertainties

17. Switzerland did not compile an uncertainty analysis for its air pollution inventory. The ERT encourages Switzerland to explore the possibilities to include at least a qualitative uncertainty analysis in the next submission report.

Verification and quality assurance/quality control approaches

18. Switzerland has elaborated and implemented a quality assurance/quality control (QA/QC) plan in accordance with the EMEP/EEA Guidebook. This includes general QC procedures (tier 1) and sector specific procedures. Switzerland also defined roles and responsibilities for inventory preparation, improvement and QA/QC.

FOLLOW-UP TO PREVIOUS REVIEWS

19. Switzerland did not provide any responses to the questions identified in the Stage 2 Review, on outliers of implied emissions factors. The ERT encourages Switzerland to respond to the Stage 2 Review findings and to work with the CEIP on resolving these issues.

AREAS FOR IMPROVEMENTS IDENTIFIED BY SWITZERLAND

20. Switzerland's IIR states that "there are no major improvements planned" (chapter 10.4). In its response to the corresponding question from the ERT, Switzerland nevertheless indicated its willingness to work on the further improvement of the data submission and the inventory report. The ERT recommends that Switzerland derives an inventory improvement plan based on the full key category analysis and the uncertainty analysis as soon as these become available.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

21. The ERT recommends that Switzerland aligns its methodology for the key category analysis with the guidance provided in the EMEP/EEA Guidebook.
22. The ERT encourages Switzerland to include a trend assessment for key categories in the next submission.
23. The ERT encourages Switzerland to give more detailed information about the links between improvements of the methodologies and resulting recalculations in future IIRs.
24. The ERT encourages Switzerland to respond to the Stage 2 Review findings for 2009 and 2010 and to work with the CEIP on resolving the issues raised.
25. The ERT recommends that Switzerland establishes an inventory improvement plan based on the key category and the uncertainty analysis. The plan should be presented in the next IIR.
26. Recommended improvements relating to specific source categories are presented in the relevant sector sections of this report.

SECTOR-SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , TSP, PM ₁₀ , PM _{2.5}		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1	total energy			
1.A.1.a	public electricity and heat production	All+dioxin (partly)		Yes
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	All + CO (partly)		Yes
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction:		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		
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		Yes
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:**

27. All important sources within the stationary energy are included in the inventory. There are no NEs reported within the stationary energy sector. The ERT considers the energy sector to have a good level of detail in the descriptions.
28. HCBs and PCBs are not reported in the energy sector, nor in the other sectors. The ERT recommends that these pollutants are included in the inventory.
29. For a few emission sources, emissions of some pollutants are not reported. The ERT recommends that these pollutants are included in the inventory. See the sub-sector specific recommendations (Category issue 1 and 2).

Transparency:

30. Switzerland's methodology and emission factors in the IIR are considered by the ERT to be transparent and well described for the stationary energy sector. Emission factors and activity data are thoroughly described in the IIR, with a few exceptions. See the sub-sector specific recommendations (Category issue 3 and 4).
31. Switzerland has provided a detailed and generally transparent emissions inventory. Estimates are provided at a detailed level for all energy sectors. The ERT encourages Switzerland to include more detail for the sector 1 B in the IIR.
32. The use of notation keys is consistent and good. An acceptable number of sectors are reported as IE.

Accuracy:

33. The ERT encourages Switzerland to undertake uncertainty analysis for the stationary energy sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.
34. Switzerland has some basic QA/QC checks performed in parallel with the quality assurance for GHG gases. This QA/QC procedure is not described thoroughly in the IIR, and no sector-specific QA/QC is described. The ERT encourages Switzerland to describe QA/QC procedures in more detail in the IIR, and to include sector-specific QA/QC when applicable.

Comparability:

35. The methods used in the inventory are as far as can be deducted consistent with those proposed in the Guidebook.
36. No over- or underestimates have been identified.

Recalculations:

37. Switzerland's recalculations concerning the stationary energy sector have been thoroughly described in the IIR.

Improvement:

38. The IIR states that no major improvements are planned. The ERT recommends that Switzerland performs a quantitative uncertainty analysis in order to find areas to improve data quality. The ERT also recommends that the calculations of fugitive emissions from fuels are revised in order to include more pollutants from this source.

Sub-sector Specific Recommendations.

Category issue 1: 1 B 2 a iv: SO₂ (and other pollutants)

39. The ERT notes that Switzerland does not estimate emissions of pollutants other than NMVOC from 1 B 2 a iv. Although this is likely to be a small source of SO₂ and emissions of other pollutants compared to the national totals, emission factors are provided in the EMEP/EEA Guidebook. The ERT encourages Switzerland to apply these default factors and to estimate SO₂ emissions from 1 B 2 a iv in future submissions. Switzerland has indicated that it will consider revising the emissions from refineries.

Category issue 2: 1 B 1 a: Particulate matter

40. Switzerland has reported fugitive particle emissions from coal mining and handling as not occurring (NO) in the NFR, while the EMEP/EEA Guidebook states that particle emissions occur from the handling and storage of coal. The ERT recommends that the fugitive emissions of particles from the handling and storage of coal are included in the inventory. Switzerland has indicated its intention to report particle emissions from this sector according to the Guidebook in future submissions.

Category issue 3: 1 A 1 a: PM_{2.5} and dioxins

41. Emission factors for 1 A 1 a are nicely presented in tables in the IIR, but the ERT notes that emission factors for dioxins and PM_{2.5} are lacking. This is only a minor issue concerning the completeness of tables in the IIR. The ERT recommends that emission factors for all pollutants with reported emissions are presented in the IIR.

Category issue 4: 1 A 2 f i: CO and NMVOC

The ERT noted that the emission factors for CO and NMVOC used in 1 A 2 f i (cement production) was outside the 95 % confidence interval of the Tier 2 emission factors provided in the EMEP/EEA Guidebook, and requested that the causes for this discrepancy be clarified. Switzerland has responded that this low emission factor originates from the splitting of the CO and NMVOC emissions into two processes: Emissions from the kiln (1 A 2 f i) and Emissions from raw materials (2 A 1). The combined emission factor for these two emissions is well within the 95 % confidence interval of the emission factor given in the EMEP/EEA Guidebook. The ERT recommends that these two reported emissions should be joined together in 1 A 2 f i, and that the emission factor be increased accordingly. Switzerland will revise the emission factors and the allocation of emissions between 1 A 2 f i and 2 A 1.

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		Yes
1 A 3 a i (i)	International Civil Aviation - LTO	All		
1 A 3 a i (ii)	International Civil Aviation - Cruise	All		
1 A 3 a ii (i)	Domestic Civil Aviation - LTO	All		
1 A 3 a ii (ii)	Domestic Civil Aviation - Cruise	All		
1 A 3 b i	Road Transport: Passenger Cars	All		
1 A 3 b ii	Road Transport: Light Duty Vehicles	All		
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 + PM, HM		Yes
1 A 3 b vii	Road Transport: Automobile road abrasion	All + PM, 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 3 e	Pipeline Compressors	All		Yes
1 A 4 a ii	Commercial / institutional: Mobile	All		
1 A 4 b ii	Residential: Household and gardening (mobile)	All		
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		Yes
1 A 5 b	Other, Mobile (including military, land based and recreational boats)	All		
1 A 3	Transport (fuel used)	All		

General recommendations on cross-cutting issues.

Completeness:

42. The ERT considers the Transport sector to be complete and comprehensive in most parts. Nevertheless, there are still some smaller improvements which could be made (emissions from 1A3e, non-exhaust PM emissions from 1A3bvi & vii – see sector-specific recommendations below).

Transparency & Comparability:

43. The ERT notes that there is insufficient information on the reasons for the notation keys used, and asks Switzerland to provide such information in its next IIR as well as its NFR tables.

44. The ERT commends the already quite good levels of detail of the methodology descriptions, encouraging the Party to further improve the transparency and comparability of the inventory.

Accuracy:

45. The ERT encourages Switzerland 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:

46. Switzerland has recalculated its inventory for almost all sectors. The changes within the Transport Sector and for some other mobile sources result from re-allocations, mostly, needing no further explanations. However, the ERT encourages Switzerland to provide detailed data on sub-category level, underpinning the explanations provided.

Improvement:

47. During the review, the Party affirmed its willingness to improve the inventory in the way described in the sector-specific recommendations. The ERT warmly welcomes this willingness.

Sub-sector Specific Recommendations.

Category issue 1: 1A2fii:- All Pollutants

48. The ERT notes that within the NFR tables emissions from 1A2fii are marked as 'NO', whereas activity data is reported as 'IE', and asks the Party to clarify this issue. The Party has stated that, since the data are available for the first time, the assignments "NO" and "IE" in the NFR tables are wrong and will be changed with the next submission. The ERT warmly welcomes this correction.

Category issue 2: 1A3bvi & vii Road transport – PM, TSP, HM

49. The ERT notes that Switzerland reports all emissions relevant for these two sub-categories as well as the corresponding activity data as 'NO', providing no explanatory information within the IIR. The Party has stated that emissions from tyre and brake wear (1A3bvi) and road abrasion (1A3bvii) are both included in the categories of the respective vehicle types (1A3bi – iv) and that, hence, the notation key has to be changed into "IE". The ERT thanked the Party for its willingness to correct that error, and encouraged Switzerland to further develop their models and emission factors to provide separate data on non-exhaust particle emissions within future submissions. The Party has explained that it will aim to report non-exhaust particle emissions separately in its next submission. The ERT commends the Party's decision to clearly improve the inventory in the way described.

Category issue 3: 1A3e: All Pollutants

50. The ERT notes that within the IIR there is no information to be found on this category whereas within the NFR, emissions and activity data are reported as 'IE', giving no information on another category where pipeline compressors are included. Switzerland has stated that emissions and activity data for 1A3e are included in 1B2b. Furthermore, as emissions from the pipeline compressor in Ruswil, Lucerne, result from fuel combustion activities, the ERT welcomes the Party's plan to report these emissions separately under 1A3e in future submissions and so to improve the transparency of the inventory.

Category issue 4: 1A4ciii: All Pollutants

51. Again, the ERT notes that no explanatory information is to be found on the use of 'IE' for this category. Switzerland has stated that since there is no Fishing industry in Switzerland, the assignment "*IE*" is wrong and will be replaced by "*NO*". In addition, the ERT welcomes the Party's plan to include a note on the non-existence of this category in their next IIR, thus further improving the transparency of its inventory.

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 + HMs, CO		Yes
2.A.2	Lime production	All + HMs, CO		Yes
2.A.3	Limestone and dolomite use			
2.A.4	Soda ash production and use			
2.A.5	Asphalt roofing	All		
2.A.6	Road paving with asphalt	NMVOC		
2.A.7.a	Quarrying and mining of minerals other than coal			
2.A.7.b	Construction and demolition			
2.A.7.c	Storage, handling and transport of mineral products			
2.A.7.d	Other Mineral products	All		
2.Bb.1	Ammonia production	All		
2.B.2	Nitric acid production	NO _x , NH ₃		
2.B.3	Adipic acid production	Notation keys		Yes
2.B.4	Carbide production	All		
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	Ferroalloys production			
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		All	
2.C.5.e	Other metal production		All	
2.C.5.f	Storage, handling and transport of metal products			
2.D.1	Pulp and paper	All		
2.D.2	Food and drink	All		
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:

52. The ERT considers the industrial processes sector to be complete and comprehensive with excellent levels of detail in the methodology descriptions.

Transparency:

53. The ERT notes that the Industrial Processes sector in Switzerland IIR is in general very well organised and includes almost all necessary information. This approach provides a high level of transparency.

54. The ERT thanks Switzerland for providing very comprehensive and clear responses during the review process and for providing access to the EMIS Com (EMIS-Kommentar) database, which includes all reference files for the emissions estimates.

Accuracy:

55. The ERT encourages Switzerland to undertake 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. The ERT notes that the EMIS Com (EMIS-Kommentar) database includes many of the underlying data for the preparation of the uncertainty analysis. The ERT understands that this is a serious undertaking, and suggests that Switzerland start with a qualitative analysis.

56. Switzerland has implemented the ISO 9001:2000 standard, which was certified by the Swiss Association for Quality and Management Systems in December 2007 and re-audited in Dec 2008 for a GHG inventory, which is partly common to the air pollution emissions inventories and also for projections. The ERT encourages Switzerland to provide more information about its QA/QC system in the IIR.

Recalculations:

57. The ERT notes that recalculation compared to the previous submissions is briefly described and explained in the IIR, including quantitative impact analysis for some years and air pollutants. The ERT encourages Switzerland also to provide individual sector impact analysis.

Improvement:

58. The ERT encourages Switzerland to improve the use of notation keys (see Category Issue 2 below). The ERT notes the Party's intention to improve SO₂ emissions estimates from the 2A1 cement production category.

Sector-specific Recommendations

Category issue 1: 2A1 & 2A2 Cement and lime production

59. The ERT noted that the SO₂ IEF from cement production shows a slightly decreasing trend during the 1990 – 2008 period. The ERT thanks Switzerland for

providing detailed background information and explanation in response to the ERT questions and the EMIS-Kommentar. The ERT welcomes Switzerland's plan for improving the inventory and plans for SO₂ EF revision.

Category issue 2: 2A1 & 2A2 Cement and lime production

60. The ERT notes that SO₂ emissions from calcinations and from blasting operations are allocated in different ways. Switzerland has explained that for lime production the SO₂ emissions from blasting operations are considered in 2A2 only, whereas the SO₂ from the raw material is reported in category 1A2fi together with the emissions of the combustion process. By contrast, 2A1 (clinker) comprises the SO₂ emissions of the raw material as well as the SO₂ from the blasting operations. The ERT encourages Switzerland to provide this information in the IIR.

Category issue 3: 2B3 Adipic acid production

61. The ERT identified issues with the use of notation keys - mainly that NA is being used where NO is more appropriate. The ERT encourages Switzerland to improve and harmonise notation keys among sectors in the next submission.

Category issue 4: 2C1 Iron and steel production

62. The ERT notes that Pb emissions from iron and steel production rapidly decrease in two steps. Switzerland has responded that this is the result of closing down two steel production sites and the installation of new filter plants. The ERT encourages Switzerland to provide this information as well as other pollutant trend descriptions in the IIR.

Category issue 5: 2C3 Aluminium production

63. The ERT identified an inconsistency with aluminium production activity data presented in the IIR and NFR. Switzerland has responded that values in the NFR are incorrect. The correct values are presented in the IIR and in UNFCCC reporting. The ERT welcomed Switzerland's stated intention to improve reporting, and provide correct values in the IIR and NFR.

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 sf6			
2.F	consumption of halocarbons and sf6			
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		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

64. The solvent emissions inventory of Switzerland is considered to be complete and accurate. The ERT recommends that Switzerland improve the transparency of the IIR and add explanatory information where country-specific methods are used.

Completeness:

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

Transparency:

66. Activity data and emission factors are transparently presented in the IIR, and emissions trends are explained in the corresponding chapters. However, jumps in the activity data are either not explained or referred to the EMIS database which is only available in German. The ERT recommends that Switzerland include additional explanatory information in the IIR to improve the transparency of the peculiarities in the activity data trends.

67. The ERT notes that country-specific methods are not always transparently explained in the IIR. The ERT encourages Switzerland to extend methodology descriptions to improve the transparency of the report (e.g. 3D category “Other solvent use”).

Accuracy:

68. No quantitative uncertainty assessment is presented in the IIR. Estimates of the total GHG emission uncertainties are provided as an example. A qualitative assessment presented in the report indicates that for the other pollutants the uncertainties may be in the range of 20% to 50%. The ERT encourages Switzerland to present quantitative uncertainty assessments for the categories in the solvent sector.

QA/QC procedures:

69. According to the information provided, the preparation of the solvents sector inventory is covered by the existing quality management system.

Comparability and Consistency:

70. Switzerland has mostly applied a bottom-up approach to estimate emissions from solvent uses. The emissions are presented in the most recent NFR format, allowing comparison with other national submissions.

Recalculations:

71. Recalculations which have been done in the sector are transparently explained and justified in the IIR.

Improvement:

72. No improvements are planned for the sector. The ERT recommends that a prioritised list of improvements is compiled.

Sector-specific Recommendations

Category issue 1: 3A Paints and Coatings – NMVOC

73. The IIR presents a sharp decrease in the industrial paint application since 2002. It is mentioned in the IIR that the activity data correspond to the annual consumption of paints coming from industry. However, no further clarification is provided. During the review Switzerland explained that the decrease was due to structural changes within the Swiss industrial sector and the replacement of conventional paint with far more efficient powder coatings “(rough estimate: 1 t of powder coating replaces 3 t of conventional paint)”. The ERT thanks the Swiss team for their explanation, and recommends that Switzerland include this explanation in the IIR.

Category issue 2: 3D Other Product Use – NMVOC

74. The IIR states that the NMVOC emissions from the production of cosmetics, perfume and aroma are calculated per employee, with no further explanation. During the review Switzerland explained that the bottom-up approach estimated the NMVOC emissions of representative production sites and then used the number of employees to calculate the Swiss total. The ERT encourages Switzerland to include this explanation in the IIR to improve transparency. The ERT also recommends that Switzerland look into the Austrian IIR 2010 submission (p. 226) on this issue, as it uses a methodology which is a good practice example.

AGRICULTURE.Review Scope:

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

General recommendations on cross-cutting issues**Completeness:**

75. The inventory is complete with respect to the most important sources of emissions. The IIR is generally transparent for the Agriculture sector with some exceptions outlined below for 4B, 4D and 4F.

Transparency:

76. The ERT encourages Switzerland to review the use of notation keys, and some specific examples are included below in the Sector-specific Recommendations. The ERT also encourages Switzerland to include more details about the use of the notation keys in the IIR, especially the allocation of IE notation keys. This is because many sources are “included elsewhere” in the Swiss agriculture inventory, but the allocation of these sources to other NFR categories is not always provided for the agriculture sector.

77. The ERT recommends that Switzerland provides activity data for each emission source, and thanks the country for its willingness to provide more details in the IIR next year (this is also mentioned in the sector-specific recommendations below). The ERT has noticed that activity data is not provided for 4F and that activity reporting can be improved for 4D2a.

Accuracy:

78. Switzerland does not provide an uncertainty analysis for the agriculture sector. The ERT encourages Switzerland to undertake uncertainty analysis for the agriculture sector, at least for the main gases, in order to help inform the improvement process and to provide an indication of the reliability of the inventory data. For NH₃, the AGRAMMON model considers uncertainties and therefore uncertainty figures for ammonia emissions from agriculture could be compiled. Thus, the ERT encourages Switzerland to provide a quantitative uncertainty analysis for NH₃ in future submissions.

Recalculations:

79. The reporting of recalculations is clear and the ERT notes that important recalculations were undertaken with the new ammonia emissions model AGRAMMON. This has resulted in an increase of ammonia emissions. Data updates from the Swiss Farmers Union also lead to minor recalculations.

Improvement:

80. The ERT commends Switzerland for its improvement in NH₃ calculation thanks to the AGRAMMON model. Switzerland has reported that no major improvements are planned. However, the ERT also notes the Party's intention to improve calculations based on the EMEP/EEA Guidebook, by updating its work with 2009 Guidebook methodologies and data for the next submission.

Sector-specific recommendations

Category issue 1: e.g. 4B Manure management:- NH₃

81. Switzerland is encouraged by the ERT to provide more detailed information in its next IIR submission on the IE notation key for the 4B sector.

82. Switzerland is also encouraged by the ERT to provide more detailed descriptions of the AGRAMMON model, especially on the way it calculates NH₃ emissions.

83. Concerning NO_x emissions, the notation keys for 4B sub-sectors should be IE instead of NA, because all the animal categories are reported in 4B1a. A note should also explain this point in the NFR table. In addition, the ERT recommends that Switzerland disaggregates NO_x emissions in order to fill all the NFR categories from 4B.

84. Emissions from 4B9 are aggregated in the 4B9a sub-sector. For 4B9b, 4B9c and 4B9d, the notation key for activity should be changed to IE. Switzerland is also

encouraged by the ERT to disaggregate the emissions (and the activity as a consequence) from 4B9 in order to provide detailed emissions by poultry category.

85. The ERT notes matching problems between AGRAMMON model outputs and the NFR categories. For example, EFs for 4b reflect the sum of the emissions from animal housing, grazing, and manure storage and application, and a disaggregation of the EFs is not feasible. Thus, the emissions resulting from grazing are included in source category 4B instead of being reported in 4D. The AGRAMMON model seems to work at a very precise level with a decomposition of activity and emission sources. It seems to the ERT that the outputs from this model could be disaggregated to provide emissions by NFR sub-sector. Therefore, the ERT encourages the Party to adapt the outputs from AGRAMMON, in order to match them with NFR classification.

Category issue 2: e.g. 4D1 Agricultural Soils:- NH₃

86. The ERT encourages Switzerland to provide detailed information on the breakdown of national fertilizer consumption into the relevant compounds in use, which are accounted for in emission estimates under 4D1 Direct Soil Emissions.

87. The ERT notes that NO_x emissions from 4D1a and 4D2c are reported by error under category 4D2a, where the sum of both emissions is reported. As a consequence, the actual reporting is not correct and the ERT team recommends that Switzerland provides these emissions in categories 4D1a and 4D2c for the next submission.

88. The ERT notes that Switzerland provides emission data from field burning (4F) but that no activity is reported. The ERT thanks the Party for its willingness to provide activity data for 4F next year and to report activity data for a sector when emissions are reported.

89. The ERT takes due note that for the 4D1a NFR category, Switzerland has mentioned that the reported activity data as “kg N/year” does not fit. According to Switzerland, the EF is based on surfaces so the activity data should be reported in “ha”. This problem of reporting would explain why NH₃ emissions from 4D1a have decreased while activity has increased. The ERT is sympathetic to this unit’s issue associated with the reporting templates, and suggests that Switzerland either convert the activity data into the specified units, or report hectares but include a note which clearly indicates this in the Excel file. Switzerland has also mentioned that providing surface area as activity data will be discussed with the responsible modeller. This has not been finalised during the review week and the ERT strongly encourages Switzerland to clarify this issue with a view to improve the next submission.

WASTEReview Scope:

Pollutants Reviewed		NO _x SO ₂ , NMVOC, NH ₃ , CO, TSP, PM ₁₀ PM _{2.5} , Pb, Cd, Hg, DIOX, PAH		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
6.A	solid waste disposal on land	All		
6.B	waste-water handling	All		
6 C a	Hospital waste incineration (d)	All		Yes
6 C b	Industrial waste incineration (d)	All		
6 C c	Municipal waste incineration (d)	All		Yes
6 C d	Cremation	All		
6 C e	Small-scale waste burning	All		
6.D	other waste (e)	All		

General recommendations on cross-cutting issues.**Completeness:**

90. The ERT considers the waste sector to be complete and comprehensive with good levels of detail in the methodology descriptions and compliments Switzerland for this.

Transparency:

91. Switzerland has provided sufficient information in the IIR for emission factors, activity data, methodologies and key source categories. The IIR is generally transparent and well organised. The ERT also notes that Switzerland has used a lot of country-specific Emission Factors. The ERT encourages Switzerland to continue with this approach.

Accuracy:

92. The ERT notes that Switzerland has implemented a QA/QC system, including a verification plan, for the national emissions inventory. The ERT notes that so far no specific uncertainty analysis has been carried out for the EMEP inventory. The ERT encourages Switzerland to undertake an uncertainty analysis for the whole inventory, including waste sector key sources, in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

Comparability:

93. Emissions are calculated on the basis of the standard methods and procedures of UN-ECE Guidelines for Estimating and Reporting Emission Data under the CL RTP and EMEP/EEA Guidebook. The method used for the key sources of the waste sector is the country-specific Tier 2 method.

Recalculations:

94. The ERT notes that recalculations have been carried out for the NFR sources 6A1, 6Cb, 6Cd and 6D.

Improvement:

95. There are no major changes planned. The ERT encourages Switzerland to list desired improvements (e.g. uncertainty analysis) in its IIR to help to support improvement prioritisation.

Sector-specific Recommendations

Category issue 1: 6Cc Illegal waste incineration

96. For the calculation of the emissions of this source a country-specific Tier 2 method is used. In general, emissions are calculated by multiplying the waste quantity incinerated by emission factors. For the key source illegal waste incineration, the waste quantities used are based on rough expert estimates. After consulting, the Party informed the ERT that it would try to revise this source and obtain more accurate figures for future submissions.

Category issue 2: 6Ca Hospital waste incineration

97. The IIR clearly explains that clinical (or hospital) waste has been incinerated in MSW incinerators from 2002 onwards, and hence emissions in 6Ca in the NFR tables are reported as "0", whereas the use of "IE" (Included Elsewhere) would be more appropriate. The Party has informed the ERT that it will use "IE" (starting from 2002) for category 6Ca in future submissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

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

Switzerland-Generalist-21-06-10-Q1A1.doc

Switzerland-Energy-Stationary-22-06-10Q2A2.doc

CH_Transport_22-06-20101_reply_23-06-2010

Switzerland-IP-10-06-22-Q2-R2-final2.doc

CH-Solvent 21-06-2010_replies.doc

CH_Agriculture_21_06_2010Q2R11.doc

Switzerland_Waste_22-06-2010_Q1A1

2. Switzerland's IIR 2008

3. EMIS-Kommentar: Zementproduktion, Emissionen aus dem Rohmaterial, 2 A 1_Zementwerke Rohmaterial 20100215.pdf

4. EMIS-Kommentar: Zement-Produktion, übriger Betrieb 2 A 1_Zementwerke übriger Betrieb 20100215.pdf

5. EMIS-Kommentar: Kalkproduktion, übriger Betrieb 2 A 2_Kalkproduktion, übriger Betrieb 20100112.pdf

6. Swiss UN FCCC CRF Tables

7. Response to issue of emissions of particles (TSP, PM10, PM2.5) and heavy metals from road vehicle tyre and brake wear (1A3bvi) and road surface wear (1A3bvii), which are both included in the categories of the respective vehicle types:

SAEFL 2004, Annex 4 table A6 : Mario Keller & René Zbinden,(INFRAS): ENVIRONMENTAL SERIES No. 355: Pollutant emissions from road transport 1980-2030, Swiss Agency for the Environment, Forests and Landscape SAEFL, Berne, 2004; URL:

<http://www.bafu.admin.ch/publikationen/publikation/00519/index.html?download=NHZLpZig7t,lnp6lONTU042l2Z6ln1ad1lZn4Z2qZpnO2Yug2Z6gpJCGdn5,f2ym162dpYbUzd,Gpd6emK2Oz9aGodetmqaN19Xl2ldvoaCVZ,s-.pdf&lang=en>