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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:

Italy

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 Italy 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. Italy's inventory is in line with the EMEP EEA inventory Guidebook and UNECE Reporting Guidelines. Its data submission and Informative Inventory Report are almost complete, but leave out any information on TSP emissions.

6. The ERT identified some issues and will provide recommendations for improvements in this report. In particular, the ERT noted that whereas the general chapters of the report (key category analysis, recalculations, trends etc.) are fine, sectoral chapters generally lack detail. Part B of this review report provides information on the kind of additional data and explanation that should be included in future versions of the Italian submission.

INVENTORY SUBMISSION

7. Italy 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. Italy also submitted an Informative Inventory Report (IIR). It did not provide 2008 gridded emissions.

8. The ERT noted that Italy was late to submit its inventory data and report in 2010 and encourages Italy to improve punctuality in the future.

9. The CLRTAP inventory submitted by Italy is of good quality with most sectors documented in the IIR.

KEY CATEGORIES

10. Italy 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 the rules in the EMEP/EEA Guidebook, setting the limit to 80%. The ERT recommends that Italy changes its methodology for the key category analysis according to the Guidebook.

11. Italy does not compile a KCA using the trend assessment. The ERT encourages Italy to include a trend assessment for key categories in the next submission. The ERT thanks Italy for the indication of its willingness to do so in response to the ERT's questions.

QUALITY

Transparency

12. The ERT recognises the level of effort undertaken by Italy in providing an inventory with a significant level of detail to undertake a detailed review. The ERT commends Italy for the work on the description of the general topics in the IIR and for its overall appearance.

13. For the sectoral chapters of the IIR, the ERT took note of some shortcomings. The description of methodologies was found to be very brief and of too little detail to allow for full transparency and thorough review. The ERT encourages Italy to extend

the information given in the IIR and highlights particular areas with need for improvement in the part B of this report.

Completeness

14. The ERT acknowledges the effort to which Italy has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed. Italy's inventory for the pollutants reviewed is generally complete for most pollutants, but completely fails to include TSP emissions from any category. The ERT encourages Italy to include TSP emission estimates in future submissions.

15. For more detailed information on other minor gaps still in the inventory please refer to the sector specific chapters in the second part of this report.

Consistency, including recalculations and time-series

16. Italy has undertaken recalculations of the complete time series within its 2010 submission. Recalculations are not particularly large in the context of emission totals: most pollutants have recalculations of less 5%, with few pollutants (HCB, PCB) having recalculations of more than 10%. All recalculations are explained in the corresponding section (chapter 4.1) of the IIR.

Comparability

17. The ERT notes that the inventory of Italy 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 Italy to continue with this approach to national inventory calculation.

CLRTAP/NECD comparability

18. Italian submissions for NECD and CLRTAP differ significantly. In its response to the ERT questions, Italy noted that the differences result from different reporting dates and additional improvement work carried out between the submissions. The ERT recommends the alignment of NECD and CLRTAP submission as far as feasible.

Accuracy and uncertainties

19. Italy did not compile an uncertainty analysis, but states in its IIR that it is planning to include it in the next submission. The ERT encourages Italy to do so.

Verification and quality assurance/quality control approaches

20. Italy 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. Italy also defined roles and responsibilities for inventory preparation, improvement and QA/QC.

FOLLOW-UP TO PREVIOUS REVIEWS

21. Italy provided detailed responses to the questions on outliers of implied emissions factors identified in the stage 2 review as carried out by the CEIP.

AREAS FOR IMPROVEMENT IDENTIFIED BY ITALY

22. The Italian IIR identifies several areas for improvement. These include:

23. General revision of the emission estimates for heavy metals, PAH and dioxins.

24. Inclusion of uncertainty information and work on reducing uncertainties in the inventory.

25. Check for updated information in the new EMEP/EEA Guidebook.

26. Comparison of current emission inventory information with the data resulting from other reporting obligations such as E-PRTR, Large Combustion Plant (LCP) directive, emissions trading.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

27. The ERT encourages Italy to improve punctuality of its submission in the future.

28. The ERT encourages Italy to include TSP emission estimates in future submissions.

29. The ERT encourages Italy to include trend assessments for key categories in the next submission.

30. The ERT encourages Italy to extend the information given in the sectoral chapters of the IIR. Details on the additional explanations recommended by the ERT are given in part B below.

31. The ERT recommends the alignment of NECD and CLRTAP submissions as far as feasible.

32. The ERT encourages Italy to include an uncertainty analysis in its next submission.

33. 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, PM_{10} & $PM_{2.5}$		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1	total energy	All		Yes
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		Yes
1.A.2.b	non-ferrous metals	All		Yes
1.A.2.c	chemicals	All		Yes
1.A.2.d	pulp, paper and print	All		Yes
1.A.2.e	food processing, beverages and tobacco	All		Yes
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	All+ HM (partly)		Yes
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		
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	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which emissions have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues.

Completeness:

34. The ERT considers the stationary energy sector to be relatively complete. Except for the emissions of TSP, which are not reported for any sector, emissions are calculated for most likely emission sources. The ERT makes one recommendation for inclusion of a source; see sub-sector specific recommendations (Category issue 1).

Transparency:

35. The ERT finds that emission trends are very well presented in the IIR, with good explanations of the reasons for developments.

36. The ERT finds that for the stationary energy sector, the transparency of the Italian inventory is not satisfactory. From the IIR it is not possible to assess the methodology used or the activity data and emission factors applied. The IIR refers to the NIR for descriptions of methodology, activity data and emission factors. The ERT recommends that the IIR is expanded. Ideally, the document should stand on its own as a description of methodology used in the CLRTAP inventory.

37. For heavy metals and particles, information on methodology, activity data and emission factors is not provided in the IIR or in the NIR. The ERT notes that this reduces the transparency of the inventory, and commends Italy for its plans to expand the IIR, and include such information.

38. Italy has provided emission estimates on a detailed level in the NFR tables, with limited use of emissions included elsewhere (IE). The ERT has noted one exception from this high standard; see sub-sector specific recommendations (Category issue 2).

39. The ERT would like to thank Italy for providing thorough answers for the stationary energy sector during the review process.

Accuracy:

40. The ERT encourages Italy 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.

41. Italy has a thorough QA/QC check for each sector. The ERT encourages Italy to specify the sector-specific QA/QC procedures in the IIR.

Comparability:

42. As far as can be assessed, the methods used in the inventory are consistent with those proposed in the EMEP/EEA Guidebook. However, because of a lack of transparency the ERT has not been able to fully assess the quality of methodologies, activity data and emission factors.

Recalculations:

43. Recalculations are not specified for NFR sectors. This reduces the transparency of the inventory, as differences between the years in a sector cannot be identified as intentional or unintentional. The ERT recommends that Italy provides more specific information in the recalculation chapter of the IIR.

Improvement:

44. The ERT notes Italy's intention to finalise a database for gathering data collected from different sources. Italy also intends to improve emission estimates for NMVOC and PM from 1 A 4 by distributing fuels by technologies. This improvement is welcomed by the ERT. The ERT encourages Italy to disaggregate emissions within sector 1 A 2 and perform a quantitative uncertainty analysis to identify areas of the inventory that might need further improvement. The ERT also strongly recommends that Italy expands the IIR with methodology, activity data and emission factors, in order to improve the transparency of the inventory.

Sub-sector Specific Recommendations.

Category issue 1: 1 B 1 a: NMVOC

45. The ERT notes that NMVOC emissions from coal mining and handling are reported as NA in the NFR tables. Emission factors for NMVOC from this sector are provided in the EMEP/EEA Guidebook. The ERT encourages Italy to apply the default emission factors from the Guidebook and to estimate NMVOC emissions from coal mining and handling. Italy has indicated that they will consider these emissions in the next submission.

Category issue 2: 1 A 2: All pollutants

46. Italy has reported combustion emissions of all pollutants from 1 A 2 in 1 A 2 f, using IE for the other sub-sectors in 1 A 2. Using this methodology, the sector 1 A 2 f i becomes a key category for many pollutants. The ERT finds that this methodology reduces the information value of the inventory. Italy states that the reason for this is a need for further verification of details in the activity data. The ERT recommends that emissions are reported on a disaggregated level within the sector 1 A 2, and welcomes Italy's plans to improve reporting in this sector during the next years.

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	All		
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		Yes
1 A 3 b ii	Road Transport: Light Duty Vehicles	All		Yes
1 A 3 b iii	Road Transport: Heavy Duty Vehicles	All		Yes
1 A 3 b iv	Road Transport: Mopeds & Motorcycles	All		Yes
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	
1 A 5 b	Other, Mobile (including military, land based and recreational boats)		All	
1 A 3	Transport (fuel used)		All	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which emissions have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues.

Completeness:

47. The ERT considers the Transport Sector to be complete and comprehensive. However, as stated by the Party within itsIIR, there are still some issues associated with the allocation of emissions where there is not sufficient data available to split the information.

Transparency & Comparability:

48. The ERT notes that there is virtually no information provided on the methodologies used, including activity data and EF. The ERT therefore recommends that this information is provided in future IIRs. All sectors should be reported in much more detail. Within the Energy Sector, this would mean a splitting of stationary and mobile combustion, where methodologies as well as technologies differ strongly.

49. In addition to the point above, the ERT encouraged the Party to provide a much more detailed assessment of the different sub-categories of the Transport Sector in future submissions, including detailed information on methods used as well as activity data and EFs. The Party expressed its willingness to improve the description of methodologies in the future submission. The ERT commends this aim to improve especially the transparency of the inventory by providing the descriptions, information and explanations asked for.

50. The ERT notes that the IIR states that *"TSP emissions from all the relevant categories are not accounted for in the inventory",* giving no information on the reasons for this. The ERT asked the Party to provide further information on that issue, and Italy pointed out that the estimation of TSP emissions is not mandatory and estimation of TSP emissions is not relevant in any context. The Party therefore prefers to dedicate resources to the estimation of other pollutants which are not required for international reporting but more relevant for health and air quality effects. The ERT recognises the Party's explanation as well as the decision to dedicate resources to the estimation of pollutants that are more relevant for health and air quality effects than TSP. Nonetheless, the ERT wants to encourage the Italy to consider provision of the TSP emissions as soon as the resources allow it.

51. During the review the ERT noted that as there was nearly no information on activity data (e.g. development of fuel sales, use of biofuels etc.) to be found in the IIR. The ERT encourages the Party to include more detailed information on activity data in future IIRs.

52. The ERT also noted that information provided by Italy during the review suggested that there was no biodiesel sold in 1997. The ERT asks Italy to explain this in future IIRs.

Accuracy:

53. Within its IIR, Italy states that an overall uncertainty analysis has not been undertaken yet, referring to different studies and a quantitative assessment of the Italian GHG inventory performed by the Tier 1 method defined in the IPCC Good Practice Guidance (IPCC, 2000) instead. The Party also pointed out that the completion of such a quantitative uncertainty assessment is a planned improvement for the next submission. The ERT warmly welcomes this planned step to improve the accuracy of the Italian inventory.

Recalculations:

54. Italy has recalculated its inventory for almost all sectors, providing some information on the reasons as well as the effects on the emission estimates for each pollutant. The ERT commends this, encouraging Italy to provide even more detailed data on sub-category level, including the data reported for the last as well as the current submission and underpinning the explanations provided.

Improvement:

55. In its IIR the Party states that specific improvements are given in the 2010 QA/QC plan. Italy has also indicated that a general revision of PAH, dioxin and heavy

metals estimates will be considered, in order to improve accuracy and reduce uncertainty. This will be done by using the new chapters of the EMEP/CORINAIR Guidebook 2009/2010 and the latest methodologies for the next submission. The ERT warmly welcomes these plans.

56. The ERT wants to encourage the Party to include the QA/QC plan mentioned within its IIR as well as to provide information on planned improvements at the sub-category level.

Sub-sector Specific Recommendations.

Category issue 1: 1A3b Road transport – Activity Data

57. The ERT notes that within the NFR, consumption of biomass is reported for 1A3bi only, and asked the Party to include detailed information on activity data for biomass in its IIR. The Party stated that biomass fuel refers to biodiesel only which is not sold separately, but is mixed with the diesel fuel and that in the COPERT model used by the Party biodiesel consumption is added and included in the diesel fuel consumption. Consequently, emissions from the diesel vehicle sub-sectors refer to diesel and biodiesel fuel consumption for all the sub-sectors (PC, LDV, HDV, buses). But because no statistics are available regarding the distribution of biomass fuel among vehicles and in consideration of the small quantities involved, biomass has been assumed to be consumed by passenger cars for reporting purposes. The ERT thanks Italy for the information and explanation provided.

58. Following the point above, the ERT asked the Party to further clarify the issue of biodiesel being sold as an additive to fossil diesel in Italy. The ERT pointed out that if biodiesel is sold as a fixed percentage it should be no problem to distribute the total amount of biodiesel across all vehicle types running on diesel, and encourages the Party to further check whether this improvement can be made.

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

59. The ERT notes that the IIR presents emissions from wear and abrasion as sum under 1A3bvi, and has found no information on the reasons for doing this. The ERT asked the Party to provide information on this issue and recommended reporting emissions from both sub-categories separately in future submissions in order to keep the inventory comparable. The Party explained that for verification purposes, in preparing the reported data, they started from the COPERT export which contains emissions detailed at technology level but which reports all non-exhaust emissions together. They expressed their willingness to report 1A3bvi and 1A3bvii separately in their next submission. Again, the ERT commends the Party's aim to further improve the comparability 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	SO_2, PMs		Yes
2.A.2	Lime production	PMs		
2.A.3	Limestone and dolomite use			
2.A.4	Soda ash production and use	CO		
2.A.5	Asphalt roofing	PMs, MNVOC		
2.A.6	Road paving with asphalt	PMs, MNVOC		
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			
2.B.1	Ammonia production	All		
2.B.2	Nitric acid production	All		
2.B.3	Adipic acid production	All		
2.B.4	Carbide production			
2.B.5.a	Other chemical industry (Please specify the sources included/excluded in the notes column to the right)	All		Yes
2.B.5.b	Storage, handling and transport of chemical products			
2.C.1	Iron and steel production	All		Yes
2.C.2	Ferroalloys production	All		
2.C.3	Aluminium production	All		
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		
2.D.2	Food and drink	PMs, NMVOC		Yes
2.D.3	Wood processing			
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:

60. The ERT considers the industrial processes sector to be complete and comprehensive, but the levels of detail in the methodology descriptions should be

improved in the next submission. The ERT noted that the Party reported all emissions from 2A7a Quarrying and mining of minerals other than coal, 2A7b Construction and demolition and 2A7c Storage, handling and transport of mineral products as NE. This was because activity data are not available for any emissions estimates. The ERT encourages Italy to source relevant data to allow emission estimates to be made.

Transparency:

61. The ERT noted that the Industrial Processes description in the IIR is very short and general and cites many different source of information. This makes it very difficult to find all necessary data and methodology descriptions. The ERT thanks the Italy for providing comprehensive and quick responses during the review process. The ETR encourages the Party to include more detail on the methodologies used, and to provide information about activity data and EFs in the next IIR.

62. The ERT appreciates the very illustrative and comprehensible way in which key categories are presented in the IIR.

63. The ERT appreciates the basic category trend description in the Italian IIR. The ERT encourages Italy to provide more detailed category trend descriptions in future, to increase transparency.

Accuracy:

64. Italy has developed an inventory QA/QC procedures manual. The ERT appreciate that the above mentioned document is publicly available on the internet and notes that the manual is primarily aimed at GHG emissions inventories. The ERT encourages the Party to present more sector-specific QA/QC information and procedures description for other non-GHG emissions in the next IIR.

65. The ERT notes that the Italian IIR does not include any sector specific uncertainty estimates. The ERT encourages Italy 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.

Comparability:

66. The ERT notes that Italian reporting under CLRTAP and NECD is comparable for many Industrial Processes categories and pollutants, except some minor differences. The ERT encourages Italy to investigate and describe these discrepancies in the next IIR.

Recalculations:

67. The ERT notes Italy has carried out CO, NO_X, PMs emissions estimates based on improved and extended methodology for the years 2000–2008 and for Cd, Hg, Pb, SOx, NMVOC emissions estimates for 2007. The ERT compliments Italy on this and encourages Italy to provide more detailed information about recalculations.

Improvement:

68. The ERT appreciates the Party's improvement plans for preparing a database where information can be collected in the framework of different directives (Large Combustion Plant, E-PRTR and Emissions Trading). The ERT encourages Italy to provide more information in the IIR about this and other projects aimed at improving the quality of the inventories.

Sector-specific Recommendations

Category issue 1: 2A1 Cement production

69. The ERT thanks Italy for providing comprehensive methodology, EFs and activity data description during the review process. The ERT notes that this is the key category for SO_2. The ERT encourages Italy to provide these data in the IIR to increase transparency. The methodology for splitting SO_2 emissions into separate combustion and processes emissions should be used as a good example for other countries.

Category issue 2: 2B5a Other chemical industry (chlorine production)

70. The ERT noted that the 2B5a "Other chemical industry (chlorine production)" category was identified by Italy as key category for Hg emissions. The ERT also notes that this category is not described or mentioned in the IIR, nor the NIR. The ERT encourages Italy to provide methodology, EFs and activity data descriptions in the IIR or at least links to the reports, where relevant information could be found.

Category issue 1: 2C1 Iron and Steel Production

71. The ERT noted that the 2C1 "Iron and Steel Production" category was identified by Italy as key category for CO, PM_{10}, $PM_{2.5}$, Pb, Cd, Hg, PAH, Diox, PCB emissions. The ERT asked for trend descriptions, especially for HMs emissions where trends do not correlate. Italy provided trend descriptions and also supporting information on a study of EF estimates. The ERT thanks Italy for this information and encourages Italy to include this information and links in the IIR.

Category issue 1: 2D2 Food and Drink

72. The ERT noted that Italy reported NMVOC, $PM_{2.5}$ and PM_{10} emissions from 2D2 Food and Drink category. The ERT notes that this is the key category for NMVOC. The ERT encourages Italy to provide methodology, activity data and EFs in the IIR.

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	NMVOC		
3.B.1	Degreasing	NMVOC		Yes
3.B.2	Dry cleaning	NMVOC		Yes
3.C	Chemical Products, Manufacture & Processing	NMVOC + $PM_{2.5}$, PM_{10}		Yes
3.D.1	Printing	NMVOC		Yes
3.D.2	Domestic solvent use including fungicides	NMVOC		Yes
3.D.3	Other product use	NMVOC + PAH		Yes
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which emissions have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

73. The Italian solvent emissions inventory is generally complete and accurate. The ERT noted that Italy used a lot of country-specific data in NMVOC estimations in the Solvents and product use sector. However, the ERT recommends that Italy improve the transparency of its IIR.

Completeness:

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

Transparency:

75. The solvent chapter of the IIR is not transparent enough in describing the methods used and assumptions made for estimating emissions. The IIR refers to the NIR for more methodological details; the EFs can be derived from reporting tables, but are not transparently presented in the IIR. A lot of references are provided in the IIR on the data used, but not the data itself. The ERT recommends that Italy include additional explanatory information in the IIR to improve the transparency of reporting (description of method, EFs, VOC content in solvents, etc.) especially when a detailed methodology is applied.

76. The IIR's solvent chapter is not well organised and presents information for the whole sector in general. The ERT encourages Italy to provide more category-specific explanations under the corresponding sub-chapter.

Accuracy:

77. No quantitative uncertainty is presented. The qualitative assessment in the IIR states that the quality of emissions estimates of the main pollutants is generally of a high level. The ERT noted that Italy is planning improvements by including quantitative uncertainty estimates in its next submission. The ERT encourages Italy to present quantitative uncertainty assessments for the categories in the solvent sector in order to provide an indication of the reliability of the inventory data.

QA/QC procedures:

78. According to the information provided, QA/QC procedures are set up for all sectors and the work being done annually is robust.

Comparability and consistency:

79. Emissions of NMVOC from solvent use have been estimated according to the methodology reported in the EMEP/CORINAIR, 2007. The ERT notes that Italy is planning to consider the new chapters of the EMEP/CORINAIR Guidebook 2009/2010 and to apply the latest methodologies and update emission factors in its next year submission. The ERT encourages Italy to use the updated information in its solvent inventory preparation where appropriate and recalculate the whole time series.

Recalculations:

80. Recalculations were done for the whole time series and are transparently explained in the IIR.

Improvement:

81. No specific methodological improvement plans are reported for the solvent sector. The ERT encourages Italy to provide plans for improvement at the sector level.

Sector-specific Recommendations

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

82. Italy reported the NMVOC emissions from the 3A3 "Other coating application" category as "Not Applicable". As Italy explained, all paint application activities are reported under 3A1 and 3A2 and no other paint applications occur in Italy. The ERT recommends that Italy use the appropriate notation key ("Not Occurring") and provide a suitable explanation in the IIR.

AGRICULTURE.

Review Scope:

Pollutants Reviewed		NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2008 + (Protocol Years)		
NFRCode	CRF_NFRName	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		
4 B 9 c	Turkeys	All		
4 B 9 d	Other poultry	All		
4 B 13	4 B 13 Other	All		Yes
4 D 1 a	Synthetic N fertilizers	All		Yes
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products	NR		
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products	NR		
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		
4 G	Agriculture other(c)	NR		
11 A	(11 08 Volcanoes)		All	
11 B	Forest fires		All	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which emissions have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Completeness:

83. The agriculture inventory of Italy covers the most important sources of emissions with the exception of estimates of emissions of NOx from 4B and 4D. The EMEP/EEA Guidebook specifies methods for estimating NOx emissions from the excreta of livestock and from agricultural soils (related to nitrogen fertilizers applied). The ERT thanks the country for its willingness to assess the emissions from these sources for future submissions, using default factors from the EMEP/EEA Guidebook.

84. PM emissions from 4B and 4D are provided. The ERT encourages Italy to provide emissions of TSP for these sectors.

Transparency:

85. The ERT commends Italy for using the relevant notation keys for sector 4 in the NFR table. It is an example of good practice which other countries could learn from.

86. For the agriculture sector, EFs and activities are generally not provided in the Italian IIR. The ERT strongly recommends that Italy provide activity data, EFs and emissions related to each NFR source to improve the transparency of the methods and figures employed. The IIR often refers to the NIR or to scientific publications and this does not make the descriptions of the methods transparent. Thus, the descriptions of the methodologies employed could be more precise and detailed in the IIR.

87. Italy does not specify tier levels for each method used. During the review week, Italy provided tier levels for each emission source and Italy replied that this information on the methodologies would be included in the next submission.

88. For activity and emissions, jumps and dips sometimes occur in time series and inconsistencies between activity and emission trends can also be observed. Unfortunately, the IIR does not provide explanations for these time series inconsistencies. In a response to questions raised by the ERT during the review week, Italy indicated that the data came from ISTAT and were very reliable. Italy also specified that livestock trends are explained in the NIR. The ERT encourages Italy to provide explanations for general trends, jumps and dips in the IIR, especially where there is an apparent inconsistency between activity and emission trends.

Accuracy:

89. In a response to questions raised by the ERT during the review week, Italy explained that it drew up a QA/QC procedure manual and annually drafted a QA/QC plan both for the UNFCCC and LRTAP inventory. These documents are available on-line. The ERT commends the Party for compiling such a complete QA/QC manual, but encourages Italy to provide some information on QA/QC procedures in the IIR.

90. Currently, Italy does not provide uncertainty information on agriculture. In a response to questions raised by the ERT during the review week, Italy explained its plan to estimate uncertainties for LRTAP pollutants in the next submission. The ERT thanks the country for its willingness to assess uncertainty and encourages Italy to undertake 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.

Improvement:

91. The ERT strongly recommends improving the agriculture inventory by providing NOx emissions. The ERT also notes that Italy has realized improvements thanks to the MeditAIRaneo project. The ERT thanks the country for its willingness to implement a survey during the 2010 agricultural census to provide data on farming systems and mitigation practices across the country.

Sector-specific recommendations

Category issue 1: e.g. 4.B Manure management:- NH_3

92. The ERT noted that the methodology description for NH3 and PM emissions from 4B Manure Management was not clearly presented. Activity and EFs should be provided as a minimum in the IIR. The ERT encourages Italy to undertake a revision of the description of the methodology for future submissions.

Category issue 2: e.g. 4.D.1 Agricultural Soils:- NH_3

93. The ERT encourages Italy 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. The ERT also recommends that Italy includes a detailed explanation of how the calculations are made and to use EMEP guidebooks published in 2009 (2007 is currently used by Italy).

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	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		Yes
7	Other	All		Yes

General recommendations on cross-cutting issues.

94. The CLRTAP submission from Italy for Chapter 6 (Waste) is quite complete and presents emissions for major pollutants and for major activities following the EMEP/EEA Guidebook 2009. The methodology and reasons for the decrease or increase of emissions for sectors 6 A are well developed, allowing a good understanding to be obtained. The methodology for sector 6 C is also suitably well developed. The IIR for Italy presents EFs and activity data for the major sources, allowing the emission calculations to be followed. Italy informed the ERT during the review week that emissions from flaring and furnaces in sector 6 A and also 6 B will be added to the next submission. The ERT welcomes this future development. The ERT recommend that Sector 6 B is also improved, by including emissions from biological treatments.

95. Sectors 6Ca to 6Ce require more information in the IIR, in particular methodological explanations. Whilst some information is included in the IIR, the ERT found it difficult to relate processes and NFR codes. The ERT recommends that the inclusion and exclusion of processes in each NFR is explained more clearly. No emission is reported for 6Cd because of missing activity data. The ERT welcomes Italy's willingness to continue trying to get these data for the next submission.

96. The ERT also recommends that the methodological explanation for sector 6D is improved.

97. Finally the ERT welcomes Italy's intention to include sources relevant for Sector 7 in its IIR (as mentioned in 4.2 of the current IIR).

Completeness:

98. The inventory regarding Waste is not totally complete at the moment but improvements have been suggested from Italy during the review process. The ERT welcomes this intention to improve the inventory.

Transparency:

99. The Italian IIR provides good information about emission sources for Waste, and presents activity data and EFs in the IIR. However, descriptions of the methodologies for calculating emissions from several sources are still missing and/or are not clearly related to the NFR Code they belong to. The ERT encourages Italy to continue developing Chapter 6 with more detailed explanations about activity data and methodologies, and to mention clearly which processes are included or not included in each category.

Accuracy:

100. Italy used Tier 1 default approach for all sources, following the guidance from the EMEP/EEA Guidebook 2009. Italy has provided a clear picture of the key sources in the IIR for the Waste sector. Italy has also provided an uncertainty analysis and basic QA/QC checks for the waste sector.

Comparability:

101. The IIR and NFR tables presented by Italy are easily comparable to other IIR and NFR Tables. However, the NFR Tables and submissions under the NEC Directive do not report the same emissions. This has already been flagged in paragraph 18. Whilst the ERT recognises the need for continual development and improvement, the ERT encourages Italy to ensure that the LRTAP and NEC submissions are comparable.

102. **Recalculations:** All recalculations and improvements made in the 2010 submissions are explained but not clearly presented for the each sector. The ERT commends Italy for the details included in the report, but recommends that information on recalculations is included in each of the relevant chapters.

103. **Improvement:** Specific improvements were reported in the IIR for waste sectors, for EFs, activity data and methodologies. In particular, the availability of information on waste composition and other parameters following the new European landfill directive was included in the report, and the ERT commends Italy for including such detail.

Sub-sector Specific Recommendations.

Category issue 1: 6A Solid waste disposal on land: All pollutants but NMVOC and NH_3

104. Only NMVOC and NH3 emissions are reported in category 6A. Following questions from the ERT, Italy has confirmed that improvements are planned for the 2011 submission by adding emissions resulting from flaring. Moreover, the ERT encourages Italy to use the notation key “NE” instead of “NA” where emissions exist, but are not estimated.

Category issue 2: 6B Wastewater handling: All pollutants

105. Emissions are reported in category 6B as “NA”. Following questions from the ERT, Italy has confirmed that improvements are planned for future submissions. Moreover, emissions resulting from biological treatment have to be reported under

6B too. As discussed during the review week, the ERT recommends that Italy provides the methodological explanation regarding NH3 emissions of sewage sludge.

106. The ERT encourages Italy to estimate emissions for 6B for the latest and all years from 1990, and include them in its future submissions. The ERT recommends that Italy then includes details of the methods, activity data and emission factors used in the Italian IIR, and presents tables of activity data and EFs.

Category issue 3: 6Ca Clinical waste incineration: NH_3, PAH

107. Italy reported emissions for the major pollutants. However, no NH_3 and TSP emissions are reported and no explanation for the notation key "NE" is provided in the IIR (although comments are provided in the NFR).

108. The notation key "IE" is used for individual PAH emissions (while total PAH emissions are estimated) and no explanation is included in the IIR (although comments are provided in the NFR). The ERT encourages Italy to improve the IIR by providing reasons for the notation keys, and include an explanation in the NFR tables. In addition, the ERT recommends that Italy explains why they report a total for PAH, but are not able to report the individual PAHs.

109. The ERT recommends that Italy includes, in its IIR, clear explanations of which processes are included or not included in each source category.

Category issue 4: 6Cb Industrial Waste incineration: TSP, PAH

110. It was not clear to the ERT if incineration of Oil has been included in this sector or not. For this reason, the ERT recommends that Italy clearly mentions in the IIR the processes included or not included in each source category.

111. No TSP emissions are reported for this source category, and no explanation for the notation key "NE" is provided in the IIR. The notation key "IE" is used for individual PAH emissions (although a total of PAH emissions is estimated), and no explanation is reported in the IIR. The ERT encourages Italy to improve the IIR (and NFR tables) by providing reasons for the use of notation keys.

Category issue 5: 6Cc Municipal waste incineration: TSP, PAH

112. The ERT recommends that Italy clearly mentions, in its IIR, the processes included or not included in each category. No TSP emissions are reported, and no explanation for the notation key "NE" is provided in the IIR. The notation key "IE" is used for individual PAH emissions (although a total of PAH emissions is estimated), and no explanation is included. The ERT encourages Italy to improve the IIR and NFR tables accordingly.

Category issue 6: 6Cd Cremation: All Pollutants

113. No emissions are reported in this sector because activity data are not available. The ERT encourages Italy to source activity data for this sector to improve completeness of the IIR and the NFR tables.

Category issue 7: 6Ce Small scale waste burning: All Pollutants

114. Table 3.11 in the IIR presents key sources for NOx, NMVOC, CO, PM10, PM2.5, PAH and DIOX for sector 6Ce. However, the ERT could not find any activity data or EFs in the IIR for this sector. Activity data are not reported in the NFR tables either. The ERT encourages Italy to improve the IIR and the NFR tables by including activity data and EFs, and clearly describing in the IIR the processes which are included or not included in each category.

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

115. During the review week, Italy provided data relating to emissions from this sector (see additional information below). This is useful information and the ERT therefore encourages Italy to provide these data along with a methodological explanation in its IIR.

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

116. Chapter 7 may be used to report emissions, for example NH3 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 it may be more transparent to include these under Chapter 7 as Chapter 6D is more focused on compost and sludge. The ERT supports the improvement (see section 4.2 of the IIR) planned by Italy, namely to consider including some of these emissions in future submissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Response to question raised prior to and during the review:

Italy-Generalist-21-06-10-Q1_22-06-10-R1.doc

Italy-Energy-Stationary_24-06-10Q4 R4.doc

ITA_Transport_21-06-2010_VERSION2 24-06-10R1_reply_24-06-2010 R2.doc

Italy-IP-10-06-14-Q1_10-06-21-R1_10-06-22-Q2_10-06-22-R2 final.doc

Italy-Solvents-22062010 response.doc

IT_Agriculture_17_06_2010Q1_ 21_06 2010_Q2R1_final.doc

Italy_Waste_v2_23-06-10-R1_Q2-24-06-10-R2.doc

2. Italian Stage 2 S&A report
3. Italian Stage 1 report 2008
4. Italian IIR 2008
5. Italian NIR 2008
6. Activity data provided in relation to questions on emissions from 1B.
7. QA/QC Plan for the 2010 Inventory

   http://www.isprambiente.it/site/_contentfiles/00004000/4080_rapp_121_2010.pdf
8. QA/QC Procedures Manual
   http://www.isprambiente.it/site/_contentfiles/00004100/4194_QA-QC_ITALY_procedures.pdf

Refineries activities and losses

	1990	1995	2000	2005	2006	2007	2008
Crude Oil losses (Mg)	1,004	937	757	576	608	603	642
Crude oil processing (Gg)	93,711	91,014	98,003	106,542	104,388	105,384	99,696

Source: MSE, UP

National production of oil and natural gas

	1990	1995	2000	2005	2006	2007	2008
Oil (Gg)	4,641	5,208	4,555	6,084	5,757	5,838	5,220
Natural gas (Mm^3)	17,296	20,383	16,766	11,963	10,837	9,596	9,070

Source: MSE

Length of low and medium pressure distribution network (km)

Material	1990	1995	2000	2005	2008
Steel and cast iron	102.061	131.271	141.848	154.886	191.567
Grey cast iron	24.164	23.229	21.314	15.080	5.036
Polyethylene	775	7.300	12.550	31.530	45.570

Total	**127.000**	**161.800**	**175.712**	**201.496**	**242.173**

Source: AEEG

9. Transport. Activity data for biofuels:

Fuel (Mg)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
leaded gasoline	12,516,894	13,144,639	13,322,655	12,150,573	10,879,998	10,069,853	9,362,495	8,545,391	7,602,948	6,484,358
unleaded gasoline	651,433	980,383	2,079,990	3,883,557	5,575,974	7,030,788	7,925,744	8,834,314	10,060,695	10,892,341
diesel	15,278,022	14,992,414	15,205,020	15,095,635	14,535,507	14,445,441	14,349,957	14,715,236	15,492,672	16,352,171
LPG	1,342,000	1,293,000	1,187,000	1,294,000	1,386,000	1,478,000	1,510,000	1,530,000	1,540,000	1,364,000
biodiesel					80,138	53,425	53,425	0	34,867	44,174
Fuel (Mg)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	
leaded gasoline	4,484,242	2,942,590	0	0	0	0	0	0	0	
unleaded gasoline	12,020,685	13,331,814	15,819,251	15,187,365	14,313,985	13,300,132	12,466,684	11,666,560	10,826,478	
diesel	17,214,010	18,298,585	19,510,185	20,586,562	22,216,731	22,847,864	24,064,683	25,009,437	24,203,122	
LPG	1,422,000	1,390,000	1,313,000	1,209,000	1,106,000	1,029,000	987,000	942,000	1,004,000	
biodiesel	77,719	110,000	160,000	257,000	286,000	185,000	180,000	202,000	744,000	

10. Waste. Composting activity data

	1990	1995	2000	2005	2006	2007	2008
Waste treated in composting plants (t)	363,319	784,648	3,302,113	6,819,624	7,256,526	7,488,147	7,166,890
NMVOC (Gg) from Compost production (6D)	0.018	0.040	0.168	0.346	0.369	0.380	0.364