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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:

STAGE 3 REVIEW REPORT
ITALY

CONTENT

INTRODUCTION

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

2. This annual review has concentrated on SO_2, NOx, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time series years 1990 – 2011, 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 17th to 21st June 2013 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 – Valentina Idrissova (Kazakhstan), Energy - Stephan Poupa (Austria) and Laetita Nicco (France), Transport - Michael Kotzula (Germany), Industry - Neil Passant (European Union), Agriculture + Nature - Hakam Al-Hanbali (Sweden), Waste - Intars Cakaras (Latvia). There was no expert available to review emissions from the Solvents sector.

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 Emissions Inventory Guidebook and the UN/ECE Reporting Guidelines.

6. Italy's inventory has improved since the last review in 2010 and Italy has followed almost all of the recommendations made in the 2010 review. The ERT commends Italy for the efforts undertaken.

7. The CLRTAP inventory submitted by Italy is of good quality with all sectors documented in the IIR. However, the ERT has noted that whereas the general chapters of the report (key category analysis, recalculations, trends etc.) are well presented in the IIR, some of the sectoral chapters lack important details (e.g. EFs, AD trends). The ERT has included, in this report, recommendations and encouragements to help Italy to improve the transparency of its inventory (see Part B of this report).

INVENTORY SUBMISSION

8. Italy has reported a full time series from 1980 up to 2011 (the latest year) for the main pollutants in the NFR09 format. Italy reported a full 1990-2011 time series for HMs, PMs, and POPs. Italy also submitted an Informative Inventory Report (IIR). The ERT has noted that submission took place after the reporting deadline. The ERT recommends that Italy improve its QA/QC procedures (timetable) to ensure that all future submissions take place before the reporting deadlines.

KEY CATEGORIES

9. Italy has compiled and presented, in its IIR, both level and trend Tier 1 Key Category Analysis (KCA) for 1990 and 2011. The ERT commends Italy for this information.

QUALITY

Transparency

10. The ERT commends Italy for the efforts undertaken to ensure transparent reporting of general issues in the IIR (e.g. on KCA, emission trends etc).

11. However, for the sectoral chapters of the IIR, the ERT has noted some aspects that reduce the overall transparency of the inventory, particularly the rather general descriptions of the methodologies used, a lack of EFs and AD trends for different categories, and the aggregation of some emissions in the energy sector (particularly 1.A.2). The ERT encourages Italy to extend the source-specific information given in the IIR (specific details are included in the sector-specific chapters of this report).

12. Also, the ERT noted that Italy reported emissions of PAHs at an aggregated level. Although explanations are provided in the IIR, aggregated reporting leads to a

reduction in transparency, making it difficult to assess the accuracy of the relevant estimates.

Completeness

13. The ERT commends Italy for reporting a full time series for emissions of all pollutants. The IIR provides explanations and reasons for reporting some sectors as NE in the inventory (e.g. NOX emissions from manure management, PM non-exhaust emissions from road abrasion, PCPs and SCCP from solvent use etc) due to the absence of AD and EFs. The ERT has also noted that Italy is planning to investigate the occurrence of these (not estimated) emissions and their significance. The ERT encourages Italy to assess the contribution of NE sources to the national totals and to report the results in the IIR of its next submission.

Consistency, including recalculations and time series

14. Italy has undertaken recalculations of the complete time series. Recalculations are transparently justified and documented in the IIR.

Comparability

15. The ERT notes that the inventory is comparable with the inventories of other reporting Parties, although aggregated reporting in some energy sectors (particularly 1.A.2) and aggregated PAH emissions reduce the overall level of comparability. The ERT encourages Italy to report emissions separately where possible.

Accuracy and uncertainties

16. Italy has not performed a quantitative uncertainty analysis, but presents in its IIR some qualitative assessment of emissions estimates and provides references to uncertainty studies undertaken on the Italian inventory. Also, the ERT has noted that Italy recognises the importance of undertaking a quantitative uncertainty assessment, which can then be used for assessing inventory quality, and the ERT has noted that Italy is planning to include such an assessment in its next submission. The ERT recommends that Italy include this quantitative uncertainty analysis and uses the results as indicated.

Verification and quality assurance/quality control approaches

17. Italy has a detailed QA/QC plan in place and has included details on this plan in the IIR. The ERT commends Italy for the information provided.

FOLLOW-UP TO PREVIOUS REVIEWS

18. Italy provided detailed responses to questions on outliers and implied emissions factors as identified in the Stage 2 reviews. The ERT commends Italy for their efforts.

AREAS FOR IMPROVEMENT IDENTIFIED BY ITALY

19. Several areas for improvement have been identified in the Italian IIR. These include:

(a) Application of updated emission factors wherever possible, with a focus on improving emission estimates of PAHs, dioxins/furans and heavy metals.

(b) Development of a quantitative uncertainty analysis, and use of the results for prioritising improvement activities.

(c) A number of source-specific improvements.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

20. The ERT noted that Italy's submission took place after the reporting deadline, and recommends that Italy improve its QA/QC procedures (timetable) to ensure that all future submissions take place before the reporting deadlines.

21. The ERT is of the opinion that some parts of the IIR (sectoral chapters in particular) include only short descriptions of the methodologies used, with no EFs included, and no consideration of AD trends. The ERT recommends that Italy improve the details of its methodology descriptions in the IIR.

22. PAHs are reported at an aggregated level. Whilst explanations are included in the IIR, aggregated reporting impacts on both transparency and comparability. The ERT recommends that Italy investigate the possibility of improving the level of PAH reporting, and points out that this is included as a task in the national improvement programme.

23. Italy did not undertake a quantitative uncertainty analysis. The ERT recognises that Italy is planning to include a quantitative uncertainty analysis in its next submission, and recommends that they do so.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO_2, NO_X, NMVOC, NH_3, CO, PMs, HMs, POPs		
Years		1990 – 2011		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.1.a	public electricity and heat production	x		x
1.A.1.b	petroleum refining	x		
1.A.1.c	Manufacture of solid fuels and other energy industries	x		
1.A.2.a	iron and steel		IE	
1.A.2.b	non-ferrous metals		IE	
1.A.2.c	chemicals		IE	
1.A.2.d	pulp, paper and print		IE	
1.A.2.e	food processing, beverages and tobacco		IE	
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	x		
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)	x		x
1 A 3 e	Pipeline compressors ?	x		
1.A.4.a.i	commercial / institutional: stationary	x		
1.A.4.a.ii	commercial / institutional: mobile ?	x		
1.A.4.b.i	residential plants		IE	
1.A.4.b.ii	household and gardening (mobile)	x		
1.A.4.c.i	Agriculture/forestry/fishing. stationary	x		
1.A.4.c.ii	off-road vehicles and other machinery?	x		
1.A.4.c.iii	national fishing?	x		x
1.A.5.a	other, stationary (including military)	x		
1.A.5.b	other, mobile (including military, land based and recreational boats)?	x		
1.B.1.a	coal mining and handling	x		
1.B.1.b	solid fuel transformation	x		
1.B.1.c	other fugitive emissions from solid fuels)	x		
1 B 2 a i	Exploration, production, transport	x		x
1 B 2 a iv	Refining / storage	x		
1 B 2 a v	Distribution of oil products	x		
1 B 2 b	Natural gas		IE	
1 B 2 c	Venting and flaring		IE	
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2		IE	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues.

Transparency:

24. The ERT considers the inventory to be fairly transparent. The emission trends are well presented in the IIR. Although the IIR does not provide emission factors or activity data, Italy was able to provide satisfactory details on 2011 data when asked to do so by the ERT.

25. The ERT has noted that emissions from combustion of manufacturing industry (NFR 1 A 2 a, b, c, d) are not reported at the detailed level of the NFR tables but are aggregated and included in 1 A 2 f i Stationary Combustion in Manufacturing Industries and Construction: Other. During the review week, Italy provided detailed activity data and emission factors for category 1 A 2 f i for the year 2011. The ERT encourages Italy to report these sources separately.

26. The ERT identified a lack of methodological description and trend analysis for the key source 1 B 2 a iv Refining / Storage - SO_X and for the source 1 A 3 e Pipeline compressors. The ERT recommends that Italy complete the IIR by providing methodological descriptions for these and other sources, and in particular for key sources.

Completeness:

27. The ERT considers the energy sector to be mostly complete. Emissions of the main pollutants, PM, heavy metals, dioxin, PAH and HCB are reported for all relevant emission sources for the whole time series 1990 to 2011.

28. During the review week, Italy provided details on category '1 A 2 f i Stationary Combustion in Manufacturing Industries and Construction: Other' which shows that many of the estimation methods are based on a product-specific rather than a fuel-specific approach. The ERT was initially concerned that this approach might lead either to omissions or to double counting in 'manufacturing industry combustion' activities, especially for SOX, NOX and PMs emissions, which are also reported under categories 2.A and 2.C. However, the IIR indicates that the division into fuel combustion and process emissions of e.g. SOX emissions from cement production has been completed and is even based on point-source information (E-PRTR). The ERT was satisfied with his explanation.

Consistency including recalculation and time series:

29. The ERT has noted that trends and explanations for outliers (dips and jumps) are well addressed in the IIR and commends Italy for including this information.

30. The ERT considers that recalculations are well addressed in the IIR, that the recalculations are justified as they improve the inventory, and that the whole time series was recalculated. The ERT especially welcomes the efforts of Italy to improve estimates from residential wood combustion.

Comparability:

31. The ERT judges the inventory of Italy to be comparable to those of other countries. The ERT recognises that especially for priority (and even additional) heavy metals and POPs all relevant sources have been estimated.

Accuracy and uncertainties:

32. The ERT has noted that the Party has implemented a QA/QC plan which mainly handles the GHG inventory but is also used for the LRTAP inventory.

33. The estimation methods are in line with good practice, and higher tier methods are used for key categories.

34. The ERT has noted that Italy has made a special effort to ensure consistency between point-source data collected under E-PRTR, ETS and LCP reporting obligations, and that the Party plans to further improve consistency.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.1.a Public Electricity and Heat Production – heavy metals

35. The ERT has noted that PM10 emissions show a strong decrease, while heavy metals do not show similar reductions. Italy explained that heavy metal emission factors for 1990 to 2001 were derived from a country-specific study and that from 2001 onwards constant emission factors had been applied. However, Italy also stated that updates of these EFs are planned, especially for zinc.

36. The ERT appreciates the work already carried out to estimate heavy metal emissions from power plants and encourages Italy to refine this approach as outlined.

TRANSPORT

Review Scope

Pollutants Reviewed		NO_x, NMVOC, NH_3, SO_x, $PM_{2.5.}$, PM_{10}, TSP, CO, Main HM, PAH		
Years		1990, 2010, 2011		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.3.a.i.(i)	international aviation (LTO)	x		
1.A.3.a.i.(ii)	international aviation (cruise)	x		
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)	x		
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)	x		x
1.A.3.b.i	road transport, passenger cars	x		x
1.A.3.b.ii	road transport, light duty vehicles	x		x
1.A.3.b.iii	road transport, heavy duty vehicles	x		
1.A.3.b.iv	road transport, mopeds & motorcycles	x		
1.A.3.b.v	road transport, gasoline evaporation		NA, IE	x
1.A.3.b.vi	road transport, automobile tyre and brake wear	x		
1.A.3.b.vii	road transport, automobile road abrasion	x		x
1.A.3.c	railways		NA (NO)	
1.A.3.d.i (ii)	international inland navigation	x		x
1.A.3.d.ii	national navigation	x		x
1.A.4.b.ii	household and gardening (mobile)	x		
1.A.4.c	agriculture / forestry / fishing	x		
1.A.4.c.ii	off-road vehicles and other machinery	x		
1.A.4.c.iii	national fishing	x		
1.A.5.b	other, mobile (including military, land based and recreational boats)	x		x
1 A 3 d i (i)	International maritime navigation	x		x
1 A 3	Transport (fuel used)	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues.

37. The ERT considers the Italian inventory to be nearly complete regarding the inclusion of emission sources and the reporting of emissions likely to occur from these sources. Nonetheless, the ERT noted that some estimates were missing within the inventory, and asked the Party to clarify these issues and to provide proper estimates in the next submission (details are provided in the source-specific sections below).

38. In addition, the ERT considers the Italian IIR to be quite comprehensive with a very good level of detail as regards methodology description, especially for the road transport sector. By contrast, nearly no information is provided regarding all other mobile sources (e.g. rail and aviation). Here, the ERT encourages Italy to make improvements to the information provided in the IIR.

39. Unfortunately, some issues raised during the 2010 review have not yet been resolved by the inventory compilers (inclusion of all sectors reported in the NFR

tables within the IIR, presentation of AD time series etc.). It was therefore necessary for the ERT to reiterate these issues.

Transparency:

40. As mentioned above, the ERT considers the Italian IIR to be quite comprehensive with a very good level of detail as regards methodology description, especially for the road transport sector and off-road mobile sources allocated to NFRs 1.A.4. and 5. By contrast, nearly no information is provided regarding all other off-road mobile sources such as civil aviation, railways and navigation. Replying to a question raised on this issue during the review week, Italy provided good additional information. The ERT recognises the value of the information provided and encourages Italy to include this in the next IIR in order to improve the inventory's transparency and comparability.

41. Regarding the description of recalculations, the ERT has noted that good textual information is provided in the IIR at least for the sectors included. In order to improve the consistency and transparency of the inventory, the ERT encourages Italy to describe the changes that result from the recalculations by providing a comparison of the recalculated time series with the original emission estimates, as well as presenting the absolute and relative changes. Here, the ERT encourages Italy to do this not only for the sectors currently included in the IIR, but to provide this information also for the sectoral descriptions which are still to be included in the IIR.

42. In addition to the issues discussed above, the ERT encourages Italy to include information in the IIR on the tier methods that are being used to estimate the reported emissions sources. This could be presented in both an overview table and at the beginning of each sectoral chapter, with accompanying information on whether the sector is a key source.

Completeness:

43. As mentioned above, the ERT considers the Italian inventory to be nearly complete regarding emission sources and reported emissions likely to occur from these sources. Nonetheless, the ERT noted that some estimates were missing within the inventory such as particulate matter from road surface abrasion (NFR 1.A.3.b vii). For NFRs 1.A.3.d i (ii) and 1.A.4.a ii, where "NA" (*"The source exists but relevant emissions are considered never to occur."*) is reported, the ERT recommends that Italy check these issues and provide emissions estimates or notation keys "NE" or "IE" and, where necessary, include explanatory information in future IIRs. The ERT welcomes the solutions proposed by the inventory compilers during the review, commending Italy for the willingness to improve their inventory's completeness and transparency.

44. Italy provides a general overview of the inventory's completeness within chapter 1.9 General Assessment of Completeness of the IIR. The ERT welcomes this overview, encouraging Italy to also provide information on the allocation of emissions reported as "IE" instead of "NA" (see also recommendations above, and sector-specific recommendations below).

Consistency including recalculation and time series:

45. As already stated for the energy sector, the ERT has noted that trends are well addressed in the IIR and commends Italy for including this information. Charts are only provided on an aggregated level, although shortened time series are provided on the sub-sector level. Hence, the identification of outliers especially in small sub-sectors and for early years is rather difficult.

46. The ERT also considers that the recalculations are well addressed in the IIR, that the recalculations are justified as they improve the inventory, and achknowledges that the whole time series was recalculated. Here, the ERT encourages Italy to also present all underlying data (old and new time series, absolute and relative changes) in coming IIRs.

Comparability:

47. During the 2010 review, the ERT noted that there was nearly no information on activity data (e.g. development of fuel sales, use of biofuels etc.) to be found in the IIR, and recommended that Italy include more detailed information on activity data in future IIRs.

48. With respect to the 2013 IIR, the ERT reiterates this encouragement, asking the Party to provide sector-specific activity data within the IIR to improve both the transparency and comparability of the report. During the review week Italy pointed out that most of the activity data had been reported in the NFRs in the relevant column, while further providing a complete time series (1990-2011) of activity data for mobile sources to the ERT. The ERT welcomes the data provided, nonetheless noting that NFR tables do not provide time series and are therefore not the right source of information to allow a review of fuel consumption across the time series. Consequentially, the ERT encourages Italy to include descriptive AD time series and/or charts in all future IIRs.

Accuracy and uncertainties:

49. In the IIR Italy provides thorough information on the QA/QC procedures specific to the two main areas of reporting, the road transport (NFR 1.A.3.b) and the civil sector (mobile sources in 1.A.4 and 5). Here, underlining the importance of the road transport sector as source of emissions, Italy implemented a *national expert panel in road transport which involves, on a voluntary basis, different institutions, local agencies and industrial associations cooperating for improving activity data and emission factor accuracy*. The ERT is impressed by this effort, and considers it an example of good practice that could be used by other countries.

50. Although an overall uncertainty analysis has not been undertaken yet, a Monte-Carlo analysis has been carried out for the road transport sector, once again underlining the importance of this sector. The ERT commends Italy for their overall and sector-specific QA/QC efforts to improve the inventory's accuracy, nonetheless encouraging Italy to implement the Monte-Carlo analysis mentioned for relevant sectors in addition to road transport.

Improvement:

51. Within the IIR, Italy provides good information on planned improvements at least for the sectors, with elaborate descriptions included in the report. Here, for road transport, Italy states that improvements will be made mainly on the basis of the annual update of the COPERT software, and also on the basis of new statistical data. By contrast, Italy indicates that improvements for mobile sources in the civil sector will be driven by an in-depth review of emission factors. The ERT welcomes these plans to improve the inventory, nonetheless encouraging Italy to also include the sector-specific issues raised during the review in their improvement plan.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.3.d i (ii) International inland waterways - All Pollutants

52. During the review the ERT noted that within NFR table 1 the notation key ”NA“ was used for the entire sector, suggesting that ”the source exists but relevant emissions are considered never to occur“ with no further explanation provided. The ERT asked Italy whether consumption data were available to allow the calculation of emissions from this sector and to provide further details on this issue. Italy replied that "*International inland waterways do not occur in Italy*", and therefore the ERT recommends the use of the notation key "NO" ("a *source or process does not exist within a country*") where appropriate.

Category issue 2: 1.A.4.a ii Commercial / Institutional: Mobile - All Pollutants

53. Again, the ERT noted that within NFR table 1 notation key ”NA“ was used for the entire sector with no further explanation provided in the IIR. It is likely that mobile sources are operated in the Italian commercial/institutional sector, and therefore the ERT considered the use of "NA" to be inappropriate, asking Italy to provide further details on this issue. Italy explained that separate activity data is available for sub-sectors 1.A.4c ii and b ii only, from the national Energy Balance (BEN). The ERT therefore recommends that Italy use the notation key "IE", and encourages Italy to further explain these national circumstances both in the NFR "Additional info" table and in the IIR.

Category issue 3: 1.A.3.d ii National Navigation - IEF for SO_2

54. The ERT noted that the IEF for SO2 emissions from national navigation did not decline sharply before 2002 whereas IEFs for other diesel-dominated mobile sources decreased around 1995 and 1997 (1.A.3.b iii, 1.A.3.c), and asked Italy to explain the differences between these trends.

55. Italy explained that for maritime transportation regulations on the sulphur content of fuels entered into force much later. Italy also provided detailed information on the legislatory background and the development of sulphur content boundary values. The ERT welcomes the explanation and data provided, and encourages Italy to include this information in future IIRs, and to further explain the national circumstances regarding navigation - e.g. does navigation also take place on the Po river? If so, is the associated legislation different from coastal navigation?

Category issue 4: 1.A.3.d ii National Navigation - SO_2, NH_3, PM, CO

56. In addition to the issue discussed above, and as NFR 1.A.3.d ii – National Navigation is a key source for emissions of SO_2, NH_3, PM, CO in Italy, the ERT has noted that no information on the tier approach applied is given in the IIR (see Transparency above). The ERT asked Italy to specify the tier method and the methodology used to estimate emissions for this key source. Italy provided a description of the detailed methodology used to estimate emissions from national navigation, and the ERT was satisfied that this was in line with the requirements of using a higher tier method.

57. However, the ERT encourages Italy to report the tier method in the IIR, as well as to include a separate sectoral chapter describing the estimation methodology with all necessary background information.

Category Issue 5: 1.A.3.b Road Transportation - development of biodiesel AD

58. In the 2010 review, the ERT noted that, according to the NFR tables, there was no biodiesel sold in 1997. The ERT also observed a jump in consumption levels after 2007. With no information provided during the review week, the ERT asked Italy to explain these circumstances in future IIRs. In the current review, the ERT has noted that information on these national circumstances is still missing in the IIR. Italy explained that biodiesel fuel had been tested from 1994 to 1996 before entering production in 1998, resulting in no deliveries in 1997. In addition, the strong increase in consumption after 2007 is a result of the targets set in the framework of the European 20-20-20 directive. The ERT thanks Italy for its answer and the consumption data provided. However, the ERT recommends that Italy include a descriptive time series and/or AD graphs as well as relevant information in the IIR, especially on trends, in order to improve the transparency of the inventory and to avoid further reiteration of this issue in future reviews.

Category Issue 6: 1.A.3.c Development of liquid fuels AD

59. During the review week the ERT noted that liquid fuels used in railways showed a declining trend over the entire time series 1990-2011 with an additional sharp drop in 2008 (2007: 4.5 Mio GJ, 2008: 3 Mio GJ). Given the lack of specific information in the IIR regarding NFR 1.A.3.c, the ERT asked Italy to provide some information on the overall trend as well as on the sharp decline after 2007.

60. Italy stated that emissions arising from power generation for railways had been reported under NFR 1.A.1.a, and pointed out that most of the Italian railway system is electrified with diesel engines only used in the limited areas without electrification. The declining trend reflects the decrease in the use of these railways. The ERT thanks Italy for this explanation.

61. Nonetheless, the ERT encourages Italy to include information, especially on trends, in the IIR.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		SOx, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$, Pb, Cd, Hg, POPs		
Years		1990 – 2011		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2.A.1	cement production	x		
2.A.2	lime production	x		
2.A.3	limestone and dolomite use		NA	
2.A.4	soda ash production and use		x	
2.A.5	asphalt roofing		x	
2.A.6	road paving with asphalt	x		
2.A.7.a	Quarrying and mining of minerals other than coal		NA, NE	x
2.A.7.b	Construction and demolition		NA, NE	x
2.A.7.c	Storage, handling and transport of mineral products		NA, NE	
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes columr to the right)		NA	
2.Bb.1	ammonia production		x	
2.B.2	nitric acid production		x	
2.B.3	adipic acid production		x	
2.B.4	carbide production		NA	
2.B.5.a	Other chemical industry (Please specify the sources included/excluded in the notes columr to the right)	x		
2.B.5.b	Storage, handling and transport of chemical products (Please specify the sources included/excluded in the notes column to the right)		NA	
2.C.1	iron and steel production	x		x
2.C.2	ferroalloys production		x	
2.C.3	aluminium production	x		
2.C.5.a	Copper Production		NA	
2.C.5.b	Lead Production		NA	
2.C.5.c	Nickel Production		NA	
2.C.5.d	Zinc Production		NA	
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes columr to the right)		NO, NA	
2.C.5.f	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)		NA, NO	
2.D.1	pulp and paper		x	
2.D.2	food and drink	x		x
2.D.3	Wood processing		NA	
2.E	production of POPs		NA	
2.F	consumption of HM and POPs (e.g. Electrical and scientific equipment)		NA	

2.G	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)		x	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Transparency:

62. The Italian IIR provides a brief but adequate description of industrial sectors that are key categories, including information on the numbers and types of plants, and some information on the trends in each sector. Very little or no information is included on non-key categories. The ERT encourages the Party to include at least some description of each reported emission category, although it recognises that the information included in the IIR on sectors that are not key categories does not need to be as detailed as the information on key categories.

63. The IIR includes a description of the methodology used for key categories which allows the approach to be understood, and emission factors and activity data time series are also provided in the IIR. The ERT encourages the Party to provide similar information on other, non-key, categories, albeit at a lower level of detail, as appropriate.

64. Italy reports emissions using a good level of sectoral detail with very limited use of the notation key "IE", which enables a high level of transparency.

65. Individual PAH species are reported as IE in the NFR tables for all sectors where total PAHs are estimated. The ERT assumes that, since emissions of these individual PAH species have not been estimated for any of the source categories, the use of IE is intended to mean that the emissions of each individual PAH are included in the figures for total PAHs, rather than that the emission estimates for a specific PAH are included in the estimates of another sector.

66. The ERT recommends that "NE" be used instead of "IE", since the emissions of individual PAH species are not quantified anywhere else in the submitted estimates.

Completeness:

67. The Italian submission contains relatively few cases where NE is used, and therefore the level of completeness appears to be very good. However, NA is used in a number of cases where emissions might reasonably be expected to arise - e.g. particulate matter from soda ash production, PAH from asphalt processes. The ERT considers that using NE would be more appropriate. The ERT recommends that Italy review the use of notation keys, and encourages it to either provide a justification for the use of NA (where it is not already given in the reporting template), or to use NE or another notation key.

Consistency including recalculation and time series:

68. In general, the consistency of the methodology used for the Italian data appears to be good.

69. Activity data time series are provided in the IIR for key categories and in many cases there is some commentary on the trends observed.

Comparability:

70. The ERT found that methods used seem to be consistent with the EMEP/EEA Emissions Inventory Guidebook, with emission factors from the Guidebook used for many source categories, or country-specific factors used where available. Country-specific methods are described with an appropriate level of detail.

Accuracy and uncertainties:

71. Italy has not provided any quantitative or qualitative uncertainty analysis for the sector. Data are verified, for example by cross-checking information from different sources. The quite extensive use of country-specific factors in the Italian inventory of industrial process emissions makes it more difficult for the ERT to judge the accuracy of the emission estimates and, as previously stated, the ERT recommends that Italy include a quantitative uncertainty analysis.

Improvement

72. The ERT notes that Italy is taking steps to improve the quality of emission data on POPs reported by operators, which should in turn lead to improvements in the accuracy of the national emission estimates. The ERT commends Italy for making this improvement.

Sub-sector Specific Recommendations.

Category issue 1:

73. Particulate matter has not been reported for 2A7a and 2A7b. The ERT recommends that Italy estimate and report emissions from these source categories.

Category issue 2:

74. For 2.C.1, reported dioxin emissions cover electric arc furnaces but do not cover oxygen steel production, where emission estimates are reported under 1.A.2.a. The ERT recognises that different Parties adopt different approaches for reporting dioxins from steelmaking, and that problems exist with the comparability of data for 1.A.2.a / 2.C.1 for different Parties. The ERT therefore recommends that Italy ensure that their approach for reporting emissions of dioxins and other pollutants is clearly described in the IIR.

Category issue 3:

75. For 2D2, the activity data time series for bread and alcoholic drinks include some moderately large inter-annual changes and no information on these trends is given in the IIR. During the review week, Italy provided additional information on the

methods used to derive these data, and factors that may help to explain the inter-annual variations. The ERT recommends that Italy include this type of information in the IIR in future.

SOLVENTS

Review Scope

Pollutants Reviewed		SO_2, NOx, NMVOC, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2006 + (Protocol Years)		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
3.A.1	Decorative coating application		x	
3.A.2	Industrial coating application		x	
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)		x	
3.B.1	Degreasing		x	
3.B.2	Dry cleaning		x	
3.C	Chemical products,		x	
3.D.1	Printing		x	
3.D.2	Domestic solvent use including fungicides		x	
3.D.3	Other product use		x	
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

No solvents experts were available for the review.

AGRICULTURE

Review Scope:

Pollutants Reviewed		NOx, SOx, NH_3, PM_{10} & $PM_{2.5}$		
Years		1990 – 2011		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	X		
4 B 1 b	Cattle non-dairy	X		
4 B 2	Buffalo	X		
4 B 3	Sheep	X		
4 B 4	Goats	X		
4 B 6	Horses	X		
4 B 7	Mules and asses	X		
4 B 8	Swine	X		X
4 B 9 a	Laying hens	X		X
4 B 9 b	Broilers	X		X
4 B 9 c	Turkeys	X		
4 B 9 d	Other poultry	X		
4 B 13	4 B 13 Other	X		
4 D 1 a	Synthetic N fertilisers	X		
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products			
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products			
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)			
4 F	Field burning of agricultural wastes	X		X
4 G	Agriculture other(c)	X		
11 A	(11 08 Volcanoes)			
11 B	Forest fires			
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

76. The agriculture inventory 2013 submitted by Italy includes emissions for the time series 1980 to 2011. Italy estimated agricultural emissions for manure management (4B), agricultural soils (4D), field burning of agricultural wastes (4F) and use of pesticides (4G). The emission inventory is generally complete for the main pollutants. Emission trends for several pollutants from different sub-categories are presented in the IIR. The agricultural sector is well organised in the IIR but transparency can be further improved. The ERT recommends that Italy enhance the quality of reporting in the IIR by including more diagrams of emission trends from different sub-categories, and encourages it to enhance the transparency of emission trends by including more detailed information on the methodologies used, particularly for emissions of NH3 from 4B 8 swine and 4B 9a (laying hens).

Transparency:

77. The IIR includes good descriptions of activity indicators, data sources and methodologies. The ERT encourages Italy to provide more detailed information on the methodologies adopted by Italy regarding emission estimates of NH3 from all sources in 4.B (livestock emissions), and to enhance the transparency of the agricultural sector in its IIR for the next submission.

78. The use of notation keys in the NFR templates, especially for (4F) Field burning of agricultural waste, can be further improved. The ERT noted that the Party indicated in the IIR that for 4F Field burning emissions of NH3 and SOx were not estimated and the notation key 'not applicable ("NA")' was used in NFR templates for these pollutants. The ERT recommends that the Party uses appropriate notation keys, "NE" instead of not applicable "NA" in order to enhance the transparency of the inventory.

Completeness:

79. The 2013 submission of agricultural emissions estimates for Italy is complete with respect to the largest sources of the main pollutants emissions (NH_3, NMVOC and particulate matter), and generally complete for the smaller sources such as 4F (NOx, NMVOC, particulate matter and CO). The Party indicates in the IIR (page 101) that it is in the process of investigating whether NOx emission estimates can be made for those categories which have as yet not been estimated. The ERT encourages the Party to consider including emissions of NOx from (4B) and emissions of NH_3, SOx, the main heavy metals (HMs) and POPs from field burning of agricultural wastes (4F) in future submissions to further enhance the completeness of the inventory.

Consistency including recalculation and time series:

80. Emission data included in the agricultural sector is generally consistent over the time series. The ERT commends Italy for this consistency and encourages them to maintain this good practice.

Comparability:

81. Italy has prepared the agriculture inventory in accordance with the recommendations given in the EMEP/EEA Emissions Inventory Guidebook and the IPCC Guidelines (IPCC, 1997; IPCC, 2006 and the IPCC Good Practice Guidance (IPCC, 2000) and the inventory is generally comparable with those of other reporting Parties. The ERT encourages the Party to continue with this approach and to ensure that the methodologies applied refer as far as possible to the international agreed guidelines.

Accuracy and uncertainties:

82. Italy has indicated that it undertakes QA/QC procedures for the agricultural sector which are in line with the IPCC Good Practice Guidance and consistent with the EEA/EMEP Guidebook. The Party has also drawn up a manual for QA/QC procedures and elaborates annually a QA/QC plan for the UNFCCC and

UNECE/CLRTAP inventories. However, and as indicated by Italy, these procedures are currently carried out only for the GHG emissions inventory. Italy did not undertake a QA/QC procedure for the air pollutants inventory but plans to estimate uncertainties for some pollutants such as NH3 and PM. The ERT recommends that Italy undertake a consistent uncertainty analysis for the agriculture sector and provide an indication of the reliability of the inventory data in its next submissions.

Improvement:

83. Since 2006, Italy has undertaken some improvements in the agriculture inventory. Results from specific projects have been implemented such as the results from the MeditAIRaneo Agriculture project, which have been included in the preparation of the UNFCCC/UNECE-CRLTAP agricultural emissions inventory (CRPA, 2006). Moreover, Italy plans to estimate uncertainties regarding the emissions of NH3, particulate matter and other relevant pollutants. The ERT commends Italy for these planned improvements and encourages them to implement them in the next submissions.

84. Currently, Italy does not include emission estimates from 4D2a Farm-level agricultural operations including storage, handling and transport of agricultural products and 4D2b Off-farm storage, handing and transport of bulk agricultural products. Emissions from these sources have been reported as not applicable "NA". The ERT recommends that Italy estimate emissions from (4D2a) and (4D2b) wherever AD and EFs for these sources are available.

85. The ERT also encourages Italy to implement the results from the “Survey on Agricultural Production Methods” (SAPM) regulated by the EU in the agricultural sector in order to improve the quality of the emissions inventory.

Recalculations

86. Italy indicated that recalculations of the time series were undertaken for the agriculture emissions inventory of the sub-sector (4F). These recalculations include emissions related to burning of agricultural waste from rice and emissions of HCB from the use of pesticides, resulting in an increase of particulate, NOx and NMVOC and HCB emissions. The Party has also made minor recalculations regarding emissions of particulate matter from 4B1b (non-dairy cattle), 4B2 (Buffaloes) and emissions of NH3 from (4B8) sows. All of these recalculations resulted in changes of less than 1% for the relevant categories. The ERT commends Italy for the recalculation procedures and encourages them to continue to undertake recalculations annually to cover the whole agricultural sector to further improve the consistency and quality of the emissions inventory.

Sub-sector Specific Recommendations.

Category issue 1: 4.B 8 Swine: NH3

87. Italy indicated in its IIR that information reported in the National Inventory Report/Common Reporting Format (NIR/CRF) on the GHG inventory is coherent and consistent with information reported in the Informative Inventory Report’s

nomenclature for Reporting (IIR/NFR). The ERT noted that activity data concerning swine population (4B 8) reported in the IIR/NFR is not consistent with the activity data included in NIR/CRF and that the difference is significant (about 18% lower in IIR/NFR). During the review week, Italy explained that piglets (swine of less than 20 kg) are included in the swine population in the NIR/CRF for estimates of CH4 emissions from enteric fermentation. Italy also stated that the population of swine reported in the NFR templates excludes piglets as the EF for sows used in Italy is higher than the EF normally used for sows alone, and that emissions from small pigs are thus taken into consideration indirectly. The ERT recommends that Italy provide detailed information in the IIR regarding this methodology in order to enhance the transparency of the agricultural inventory in its next submission.

Category issue 2: 4.B 9a (laying hens): NH_3

88. During the review week, the ERT requested Italy to clarify why 4B 9a (laying hens) and 4B 9b (Broilers) exhibit very different NH3 emission trends, although their populations have followed a similar trend since 1990. Italy explained that the reason for the decreasing trend for 4B 9a (laying hens) is that abatement technologies have been applied to chicken manure. The Party added that from 1995 onwards, a chicken-dung drying process system has been used for laying hens which has been improved since being introduced. The ERT welcomes the explanation from Italy and recommends that the Party includes this explanation and other relevant information in the IIR of its next submission in order to enhance the transparency of the agricultural inventory.

WASTE

Review Scope:

Pollutants Reviewed		All pollutants		
Years		1990 – 2011		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
6.A	solid waste disposal on land	x		
6.B	waste-water handling			x
6 C a	6 C a Clinical waste incineration (d)	x		x
6 C b	Industrial waste incineration (d)	x		x
6 C c	Municipal waste incineration (d)	x		x
6 C d	Cremation	x		
6 C e	Small scale waste burning	x		
6.D	other waste (e)	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues.

89. The ERT commends Italy for the transparency of the IIR but recommends that Italy improve the completeness of the waste sector, as explained in the individual sections below.

Transparency:

90. The transparency of the waste sector in the IIR has been found to be good (methodological descriptions, activity data and EFs are provided). However, to improve the transparency of the report, the ERT encourages Italy to specify in its IIR detailed references for applied EFs and activity data (including the version used of the EMEP/EEA Guidebook or other methodological sources) for all emission sources.

Completeness:

91. The ERT encourages Italy to review NFR 6, and to include missing sources in its inventory (in particular wastewater treatment). The ERT recommends that Italy calculate NMVOC and NH3 emissions for sector 6B-Wastewater handling. According to the “EMEP EEA Emission Inventory Guidebook 2009”, data on waste water amounts and the percentage of the population using latrines are needed to be able to undertake this calculation.

Consistency, including recalculation and time series:

92. Waste incineration emissions show fluctuations from 1990 onwards, due to activity data changes. The ERT encourages Italy to explain the sharp increases and decreases of waste incineration emissions in the IIR of their next submission.

Comparability:

93. Italy has prepared its waste inventory in accordance with the recommendations given in the EMEP/EEA Emissions Inventory Guidebooks and the

IPCC Guidelines. The inventory has been compiled with the most up-to-date NFR tables, and is generally comparable with those of other reporting Parties. The ERT commends Italy for this, and encourages them to continue with this approach. The methodologies applied refer as far as possible to the internationally agreed guidelines.

Accuracy and uncertainties:

94. The ERT encourages Italy to undertake an uncertainty analysis for the waste sector in order to help inform the improvement process and to provide an indication of the reliability of the inventory data. The Party has a QA/QC plan for the inventory, and has indicated its intention to undertake an uncertainty analysis for the inventory as a whole.

Improvement:

95. Further improvements are mentioned in Italy's IIR. The ERT encourages Italy to implement these improvements in their inventory in time for their next submission.

Sub-sector Specific Recommendations.

Category issue 1: 6.B Waste-water handling

96. Italy has not estimated emissions from waste-water handling for any pollutant for any of the years. The ERT encourages Italy to estimate the fraction of the population using latrines, and to estimate the associated NH3 emissions. The ERT also encourages Italy to investigate how NMVOC emissions from waste-water treatment plants can be estimated. Where it is not possible to make reliable estimates, the ERT encourages Italy to explain the reasons for excluding them from the IIR, and to plan improvements to allow the emissions to be estimated.

Category issue 2: 6.C Waste incineration

97. The ERT encourages Italy to explain the fluctuations in the amounts of clinical waste incinerated in their IIR.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. **Energy**: During the review the Party submitted the following seven data files:

File name	Content
EF combustion.xlsx	SNAP02 and 03 Activities and EFs for 2011
question 3 energy answer (1.A.1a).xlsx	1A1a Activity data 1990 - 2011
question 5 energy answer (1.A.2.f i)xlsx.xlsx	SNAP 03 Activities and EFs 2011
question 7 energy answer (1A QA-QC).xlsx	LCP and E-PRTR data QA/QC
question 8 energy answer (1.B.2b).xlsx	Natural gas composition and pipeline system
question 9 energy answer (1.A.4b i).xlsx	SO2 – EFs 1990 and 2011 by fuel for 1A4bi

2. **Agriculture:** The Party has provided during the review process an Excel file “Abatement technologies.xls” about the abatement technologies adopted by Italy.