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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
SPAIN

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, NO_x, NMVOC, NH_3, plus PM_{10} & $PM_{2.5}$ for the time series years 1990 – 2012, 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 Spain coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 23 June 2014 to 27 June 2014 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 – J Webb (UK), Energy - Stephan Poupa (Austria), Transport – Yvonne Pang (UK), Industry - Elo Mandel (Estonia), Solvents - Kees Peek (Netherlands), Agriculture + Nature - Mette Mikelsen (Denmark), Waste - Dirk Wever (Netherlands).

4. Anne Misra 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. The inventory for Spain is in line with the 2013 EMEP/EEA Inventory Guidebook and the UNECE Reporting Guidelines.

6. The CLRTAP inventory submitted by Spain is of good quality and is in general well documented in the informative inventory report (IIR). There is a very thorough tabulation of the results in the IIR. Emissions are reported by year and pollutant, based on EMEP criteria, by pollutant and NFR category, with quality levels, uncertainty calculations and by Key Category for each major pollutant.

7. The ERT notes that recalculations have been applied consistently through the entire time series for the five main pollutants (NO_x, NMVOC, SO_2, NH_3 and CO). These recalculations are detailed and justified in the IIR. The ERT commends Spain for that.

8. The ERT thanks the Party for facilitating the review process by providing detailed explanations and information during the review. The ERT recognises the effort made by the Party to refer to the original EMEP/EEA Guidebook version where default factors have been applied, and in many instances, the IIR also indicates whether the factors come from latest version of the EMEP/EEA Guidebook (i.e. 2013). The ERT commends and encourages the Party to continue to do so and, in particular, to indicate whether the emission factors are adopted in the latest version of the EMEP/EEA Guidebook.

INVENTORY SUBMISSION

9. In the 2012 submission, Spain has reported emissions for its Protocol base years (1990) and a full time series up to 2012 (the most recent year) for its Protocol pollutants in the NFR format. Emissions are reported in the NFR09 format.

10. Transport emissions are based on fuel used apart from 1A2fii and 1A4cii where fuel consumption is based on fuel used.

11. In addition, Spain has also provided a full NFR 1990 - 2012 time series for CO, the heavy metals Pb, Cd and Hg, dioxins and PAH together with a 2000 - 2012 time series for $PM_{2.5}$, PM_{10}, and TSP. Emissions of $PM_{2.5}$, PM_{10} and TSP are not reported for the period 1990 - 1999.

12. Methods have been applied consistently across the time series.

13. Spain has submitted a detailed IIR.

KEY CATEGORIES

14. Spain has compiled and presented in its IIR a level Key Source Category Analysis for the following pollutants: NO_x, NMVOC, SO_2, NH_3, CO, $PM_{2.5}$, PM_{10} and TSP, lead (Pb), cadmium (Cd), mercury (Hg), dioxins and PAHs. A Key Category Analysis is not presented for PCBs.

15. A Key Category Analysis is presented for the Energy, Industrial Processes, Solvents, Agriculture, LULUCF and Waste sectors.

16. An level and trend analysis has been carried out. The results of the analysis are used for inventory improvement.

QUALITY

Transparency

17. The ERT recognises the level of effort undertaken by Spain in providing an inventory of with a significant level of information to enable a thorough review. Spain's IIR is detailed and well presented. EF and activity time series are almost always presented in detail (SNAP level), assumptions are indicated and references are given. Trends are reported in Section 1.2.2 and are generally well accounted for.

Completeness

18. Spain has submitted a complete series of inventories for the years 1990 to 2012 covering all emissions other than those of $PM_{2.5}$, PM_{10}, and TSP, which have been submitted for 2000 - 2012. There are no significant gaps with regard to the sectors included or in the descriptions and relevant sections in the IIR.

19. Spain has listed the sources 'Not Estimated' (NE) in the inventory and given a qualitative assessment of their importance, together with an account of measures taken to determine if these sources can be calculated in the future. The ERT commends Spain for doing so.

20. Gases flared at oil refineries are not accounted for. A proxy has been used: crude oil processed.

21. The ERT acknowledges the effort to which Spain has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed.

22. The ERT recommends that Spain performs additional reviews of emission sources entered as NE to determine if these sources can be estimated or whether they should be indicated as 'Not Occurring' (NO) or 'Included Elsewhere (IE).

Consistency, including recalculations and time series

23. Spain has undertaken a number of recalculations and these are used to improve the inventory. Whenever recalculations have been carried out for an activity and/or a pollutant, the change made has been applied to the entire time series to ensure the homogeneity of the time series.

Comparability

24. The ERT notes that the inventory of Spain is comparable with those of other reporting parties. The allocation of source categories follows that of the EMEP/EEA Reporting Guidelines. The ERT encourages Spain to continue with this approach to national inventory calculation.

CLRTAP/NECD comparability

25. There are differences in the national totals reported for the entire territory between the CLRTAP and the NECD. For NO_x the totals are 920.54 Gg and 854.66 Gg respectively. For NMVOC, 598.22 Gg and 582.13 Gg respectively. For SO_2 407.52 Gg and 390.12 Gg respectively. For NH_3 379.92 Gg and 377.45 Gg respectively. The Party explained that the reason for the difference in national totals reported under the NECD and the CLRTAP was due to the fact that the Spanish territorial coverage under the NECD excludes the Canary Islands.

Accuracy and uncertainties

26. Spain compiled both qualitative and quantitative uncertainty estimates for their UNECE submission. The quantitative uncertainty estimate is provided for SO_2, NO_x, NH_3 and NMVOC, using a Tier 1 method. The quantitative uncertainty estimate has been carried out with both level and trend assessment and reported by SNAP code. The ERT commends Spain for doing so.

Verification and quality assurance/quality control approaches

27. Spain has elaborated and implemented a quality assurance/quality control (QA/QC) plan which is presented in section 2.6. The QA/QC plan is in accordance with the EMEP/EEA Guidebook (Inventory Management Chapter). A basic review is carried out by experts not involved in preparing the inventory (CIEMAT, ISPRA). An internal review process is carried out. A review of the Key Categories is included in the review of methodologies (page 2-16).

28. The ERT commends Spain on its general QA/QC activities. The ERT notes that all documentation generated throughout the inventory preparation is collected together in a register which records the operations carried out and the results obtained (Page 2-19). This documentation is then archived. The ERT acknowledges that this is an exemplary means of making the process of inventory preparation transparent and available for quality assurance. It would be very informative if a link could be provided to the electronic database for the use of CLRTAP reviewers. Alternatively, a table could be presented listing the documentation. However, sector-specific checks are not documented in the IIR. ERT recommends that Spain provides information on sector-specific information on QA/QC procedures in future submissions.

FOLLOW-UP TO PREVIOUS REVIEWS

29. In the 2009 review the ERT made the following recommendations:

(a) That Spain uses more detailed source category splits for the Key Source Analysis in future submissions. This recommendation has been implemented.

(b) To provide a quantitative uncertainty analysis to present and use it as a tool to focus on planned improvements in the Key Categories. This recommendation has been implemented.

(c) To provide a more detailed description of the time series of key sources in the IIR. This recommendation has been implemented.

(d) To provide sub-category level chapters to aid navigation in the document. This recommendation has been implemented.

(e) To use the appropriate notation keys in the IP (2A1 & 2A2) sector. This recommendation has been implemented.

(f) To continue to develop projects for the incorporation of high-quality facility level data (e.g. EUETS) into the national estimates and to generate country-specific emission factors. This recommendation has been implemented.

(g) Recommended improvements relating to specific source categories are presented in the relevant sector sections of this report.

30. The ERT commends Spain for implementing each of the cross-cutting recommendations made in the previous Stage 3 review report and encourages Spain to implement any further recommendations that are included in the current review.

AREAS FOR IMPROVEMENTS IDENTIFIED BY SPAIN

31. The IIR submitted by Spain states that for each new edition of the inventory, a list of improvement priorities is drawn up. The following improvement plans are listed in the IIR:

(a) Harmonisation of the Inventory with other registers and inventories.

(b) Continuation of the systematic review of emission factors based on the EMEP/EEA Guidebook (2009 and 2013 editions).

(c) Quantitative estimation of uncertainty and methodology improvements in the identification of key categories.

(d) Identification of tasks for the development of a finer grid resolution for the territorial breakdown of the emissions inventory.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO SPAIN

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

32. Based on the review of the 2012 inventory submission, the ERT has identified the following cross-cutting issues for improvement:

(a) The 2012 inventory submission includes first estimates of PCB emissions for many sectors. A Key Category Analysis needs to be presented for PCBs.

(b) To the extent possible, provide a web link to the register in which documentation relating to inventory preparation is contained, for use by CLRTAP reviewers. Alternatively, a table could be presented listing the documentation.

(c) Although efforts have been made to collect information from refining plants, gases flared at oil refineries could not be accounted for and, therefore, a proxy (crude oil processed) has been used.

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$, Cd, Hg, Pb, Dioxin, PAH		
Years		1990 – 2012		
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		x
1.A.2.a	iron and steel	x		x
1.A.2.b	non-ferrous metals	x		x
1.A.2.c	chemicals	x		
1.A.2.d	pulp, paper and print	x		
1.A.2.e	food processing, beverages and tobacco	x		
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	x		x
1 A 3 e	Pipeline compressors	x		
1.A.4.a.i	commercial / institutional: stationary	x		
1.A.4.b.i	residential plants	x		x
1.A.4.c.i	Agriculture/forestry/fishing. stationary	x		
1.A.5.a	other, stationary (including military)	IE		
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		
1 B 2 a iv	Refining / storage	x		
1 B 2 a v	Distribution of oil products			
1 B 2 b	Natural gas	x		
1 B 2 c	Venting and flaring	x		
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2	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:

33. The ERT considers the inventory of Spain to be generally transparent. The IIR includes references to studies, data providers of measured emissions and activity data. The IIR includes references to emission factors but does not provide a emission factor value for stationary combustion which makes it hard/impossible to follow the calculations and to review the accuracy of the calculations. Where data are recorded in Appendices these should be referred to in the relevant section of the IIR.

34. Spain reports emissions at the sector level of the NFR structure. The use of notation keys is transparent and the notation key 'IE' is only used for category 1A5a. Spain does not report any zero or empty values.

35. Spain reports emissions from commercial/institutional and household mobile machinery in categories 1A4ai and 1A4bi. The ERT encourages Spain to report emissions from mobile sources under the corresponding NFR categories.

36. The information contained in the IIR is consistent with the information in the NFR tables. The IIR includes general methodological descriptions by category and references to data sources as well as fuel consumption data by detailed type of fuel.

37. The IIR includes emission source descriptions by pollutant, which explains most of the emission and fuel consumption trends.

38. The ERT encourages Spain to include emission factor values in future IIR versions, or to provide explicit references within the IIR to any Appendices where these factors are reported, which would increase transparency significantly.

Completeness:

39. The ERT considers the Energy sector to be complete and comprehensive. The time series (emissions and activity data) for all pollutants are complete for 1990 to 2012 (and for 2000 to 2012 respectively, for PM emissions).

40. The notation key 'NE' is used for categories and pollutants which the ERT considers to be negligible. However, with the exception of categories 1A1a and 1A1c, NH_3 emissions are reported as 'NA' although (minor) emissions might be occurring from these sources and therefore 'NE' should be used instead.

Consistency including recalculation and time series:

41. Spain has recalculated the inventory for all sectors of stationary combustion. The IIR provides very detailed information about the recalculations carried out for each sector. Especially NO_x, SO_2, CO, dioxin and PAH emissions have been revised to a large extent for the whole time series.

Comparability:

42. According to the methodology described in the IIR, Spain uses emission factors from the old EMEP/EEA Guidebook. The ERT encourages Spain to review the emission factors and compare them with the most recent version of the EMEP/EEA Guidebook, especially for the key sources.

Accuracy and uncertainties:

43. The ERT commends Spain for providing a qualitative analysis at SNAP level 1 as well as a quantitative approach at SNAP level 3 for the four NEC pollutants.

44. Spain has implemented QA/QC procedures for the Energy sector. Energy sector-specific QA/QC procedures are mainly based on occasional expert

consultation and/or specific national or EU projects (ESD review), especially where energy consumption data are concerned. The QA/QC plan does not explicitly mention periodic reviews of the Energy sector by independent experts.

Improvement:

45. Spain has included a chapter about planned improvements in the IIR. Especially for the Energy sector a planned harmonisation with LCP and E-PRTR data is mentioned. Furthermore, Spain plans to review the emission factors currently applied by comparing them with the emission factors from newer versions of the EMEP/EEA Guidebook.

Sub-sector Specific Recommendations.

Category issue 1: 1 A 2 f i Stationary combustion in manufacturing industries and construction: Other – SO_2

46. The ERT noted that between 2007 and 2011 SO_2 emissions increased by about 120% and decreased by about 34% in 2012. Spain responded that this was mainly due to the increased petroleum coke consumption as reported in the energy statistics. Because this consumption accounts for a high share in the total SO_2 emissions, i.e. 124 kt SO_2 in 2011 (about 27% of national total), the ERT recommends that Spain investigates this high amount of petroleum coke consumption as well as the sulphur content.

Category issue 2: 1 A 2 a Stationary combustion in manufacturing industries and construction: Iron and steel - SO_2

47. The ERT notes that there is a strong dip in the time series of SO_2 emissions from the iron and steel industries, e.g. between 1999 and 2007 the SO_2 emission level is only about 70% of the previous or subsequent years while other pollutants (NO_x, CO, PM_{10}) show a more constant trend for the specific years. Spain explained that SO_2 emissions are calculated by means of the sulphur content of the fuels used. During the review Spain provided a time series for crude steel and iron production which did not indicate such a trend in SO_2 emissions either. The ERT recommends that Spain reviews the sulphur contents used for calculation and that it compares the results with other data sources such as measurement based data from the LCP Directive or the E-PRTR register.

Category issue 3: 1 A 4 b i Residential: Stationary plants - NMVOC, PM_{10}, PAH, Dioxin

48. The ERT noted that NMVOC, PM_{10}, PAH and Dioxin emissions increased by about 17% between 2007 and 2008, followed by a rather constant trend. The ERT also noted that the overall trend of those pollutants followed the trend in biomass consumption. Because this source is a key source of PM_{10}, PAH and dioxin, the ERT recommends that Spain includes a description of the emission trend in the IIR.

Category issue 4: 1 A 2 b Stationary Combustion in manufacturing industries and construction: Non-ferrous metals - PAH

49. The ERT noted that the PAH emissions reported from *non-ferrous metals industries* contributed 12% of the national total in 2012, and were mainly caused by anode furnaces in the primary aluminium industries. The ERT recommends that Spain reports emissions from primary aluminium under category 2.C.3 in order to increase the comparability of the inventory.

Category issue 5: 1 A 1 c Manufacture of solid fuels and other energy industries – NO_x, CO, NMVOC, PM_{10}

50. The ERT noted that between 2005 and 2006 gaseous fuel consumption increased from 2 PJ to 68 PJ. Emissions from various pollutants (NO_x, CO, NMVOC) also saw a strong increase. From 2009 to 2010 there quite a strong (and continuous) increase in PM emissions is observed. The ERT recommends that Spain investigates the source of 1.A.1.c natural gas consumption (e.g. by contacting statistics compilers) and includes this information in the future IIR, together with the selected emission factors.

Category issue 6: 1 A 1 a Public electricity and heat production – Dioxin, PAH

51. The ERT noted that between 1996 and 1997 dioxin emissions decreased by about 70%. The IIR (p. 3.39) states that this was due to *"the application, from 1997 onwards, of stricter abatement techniques required by the regulations on the reduction of emissions for these pollutants at incineration plants".* During the review Spain explained that from the year 2007 onwards, measured emissions had been considered, while prior to 2007 emissions had mainly been estimated by means of emission factors. The ERT recommends that Spain reviews the emission factors used until 2006 in order to avoid a potential overestimation of dioxin emissions.

TRANSPORT

Review Scope

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$, Pb, Cd, Hg, DIOX and PAHs		
Years		1990 – 2012		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)	x		
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	
1.A.3.b.i	road transport, passenger cars	x		x
1.A.3.b.ii	road transport, light duty vehicles	x		x
1.A.3.b.iii	road transport, heavy duty vehicles	x		x
1.A.3.b.iv	road transport, mopeds & motorcycles	x		x
1.A.3.b.v	road transport, gasoline evaporation	x		
1.A.3.b.vi	road transport, automobile tyre and brake wear	x		
1.A.3.b.vii	road transport, automobile road abrasion	x		
1.A.3.c	railways	x		
1.A.3.d.i (ii)	international inland navigation		NO	
1.A.3.d.ii	national navigation	x		x
1.A.4.a.ii	commercial / institutional: mobile		IE	x
1.A.4.b.ii	household and gardening (mobile)		IE	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)		IE	
1 A 3 d i (i)	International maritime navigation		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.

Transparency:

52. The IIR contains detailed methodology descriptions for the mobile sources, in particular for the aviation and road transport sectors. The ERT encourages the Party to include summary tables of emission factors (in particular for 1.A.4 – mobile sources[2]) in future IIRs in order to enhance transparency and comparability.

[2] During the review, the Party provided the ERT with a more transparent presentation of the emission factors used for mobile agriculture machinery under 1.A.4.c.ii (see Mobile agriculture machinery - SNAP 0806.doc).

Completeness:

53. The ERT considers the inventory of the mobile sources to be complete in terms of sources and years, except for a few pollutants (Pb, Cd, Hg, DIOX and PAHs) which are reported as NE (Not Estimated) in several sub-sectors. The ERT commends the Party for providing transparent reasons as to why these pollutants are currently not estimated for these sub-sectors.

54. Emissions of Pb and Hg from air traffic (1.A.3.a) are currently not estimated, but the Party acknowledges the suggestion made in the 2013 EMEP/EEA Guidebook for estimating heavy metals emissions from this source and will consider it in future inventories. The ERT encourages the Party to carry out this work plan.

55. Emissions of Pb, Hg and PAH from road vehicle tyre and brake wear (1.A.3.b.vi) are currently reported as NE. There are Pb and PAH factors available in the 2013 EMEP/EEA Guidebook for this source. The ERT recommends that the Party considers them accordingly and reports emissions in the next submission.

56. Dioxins emissions from railway traffic (1.A.3.c) are currently not estimated. The Party acknowledges the suggestion made in the 2013 EMEP/EEA Guidebook for estimating dioxin emissions from this source and will consider it for future inventories. The ERT encourages the Party to carry out this work plan.

Consistency including recalculation and time series:

57. The Party has substantially recalculated its fuel consumption estimations of national navigation (1.A.3.d.ii) across the inventory time series due to a change in the reference source used for information. The ERT noted that the emissions of NO_x, SO_2 and $PM_{2.5}$ provided in the current (2014) submission now show opposite trends compared to the previous (2013) submission; however, the IIR has not provided further explanations as to why this might be the case (see Sub-sector Specific Recommendations).

Comparability:

58. The ERT considers the methods used by the Party to estimate emissions from mobile sources to be generally consistent with those proposed in the EMEP/EEA Guidebook.

59. The ERT has not identified any apparent outliers in the trend of implied emission factors for Spain and the Party has provided explanations on the trends of the implied emission factors for CO and VOC (1.A.3.a)[3], and dioxins (1.A.3.b.iv) in response to the questions posed by the ERT during the review.

60. The ERT noted that implied emission factors for $PM_{2.5}$ and PM_{10} for Spain under 1.A.4.c.iii (national fishing) are at the lower end of the scale when comparing them with a selected group of Parties (AT, BE, DE, DK, FI, FR, GB, IE, IT, NL, NO). The ERT recommends that the Party reviews the emission factors for this sector.

[3] Additional information provided by Spain during the review: Aircraft fleet (1999-2002). CO and HC EFs.xls

Accuracy and uncertainties:

61. The Party has provided data quality labels associated with the estimated emissions for each pollutant by SNAP group (including SNAP 07 and 08 for mobile sources). Moreover, the Party has adopted a Tier 1 approach from the EMEP/EEA Guidebook to quantify the uncertainty for each activity by SNAP group and for the main pollutants (SO_2, NO_x, NMVOC and NH_3).

62. The IIR outlines the general QA/QC procedures conducted at the different stages of the inventory cycle, although it does not mention sector-specific QA/QC procedures. The ERT notes that a quality assurance exercise was conducted for mobile sources in 2012 by experts from ISPRAmbiente (an institution that is involved in preparing the Italian Emission Inventories). The ERT encourages the Party to provide more details on the sector-specific OA/QC procedures that have been applied to the mobile sources in future IIRs.

Improvement:

63. A number of improvements are planned or have already been initiated for civil aviation, road transport, navigation, mobile agricultural and forestry machinery. The ERT commends the Party for the level of detail provided in its IIR regarding these improvement plans.

Sub-sector Specific Recommendations.

Category issue 1: 1.A.3.b Road Transport – All Pollutants

64. The ERT commends the Party for providing a detailed discussion in its IIR of the input data, assumptions and the methodology applied to the Road Transport sector. However, as the final emissions reported by Spain for this sector are based on fuel sold, the process of reconciling fuel consumption as estimated from traffic activities with fuel sales statistics has not been discussed in the IIR. During the review, the Party provided a detailed document[4] explaining this process. The ERT encourages the Party to include this information in future IIRs.

Category issue 2: 1.A.3.d.ii National Navigation – All Pollutants

65. The Party has substantially recalculated its fuel consumption estimates for national navigation across the inventory time series due to a change in the reference source used for information. The IIR states that data on oil from international questionnaires provided by MINETUR, which are the source of information for the national energy balances estimated by IEA and EUROSTAT, have been used to estimate fuel consumption in the current (2014) submission. This replaced the previous approach which combined information from the national energy balances with information provided by the Spanish Ship-owners Association (ANAVE). The ERT notes that emissions of NO_x, SO_2 and $PM_{2.5}$ in the current (2014) submission now show opposite trends compared to the previous (2013) submission. The current submission suggests an overall downward trend for these pollutants while the

[4] Annex Road Transport distance travelled and fuel consumption.doc

previous submission indicated an upward trend. It was not clear to the ERT why these two datasets gave such different emission trends.

66. During the review, the Party explained: "*The Inventory Team has performed a comparative analysis between the two main available sources: MINETUR international questionnaires and information from ANAVE (acronym of the Spanish Ship-owners Association) - State Ports Authority and, given the difficulties to justify the inter-annual variations in the most recent period of the series in the estimate performed for the previous inventory edition, the Project Management decided to respect in its totality the information gathered by the international questionnaires on oil"*. The Party took note of the ERT's recommendation and will include a comparative analysis and explanation of the rationale behind this activity compilation process in the next IIR and indicated its intention to collaborate with MINETUR to further work on this issue.

67. The ERT also notes the Party's intention to verify the foundation of the MINETUR series as a priority improvement plan. The ERT strongly supports this work plan and encourages the Party to pursue it.

Category issue 3: 1.A.4.a.ii Commercial and institutional mobile machinery – All Pollutants

68. The ERT notes that emissions from this source are currently included in 1.A.4.a.i (commercial and institutional – stationary combustion). The IIR explains that the activity data source does not distinguish between different source types (stationary or mobile) in the case of fuel consumption and no additional information was available in the inventory to separate them. The IIR also states that fuel consumption from stationary sources is believed to be the dominant type. The ERT encourages the Party to make separate estimates for the 1.A.4.a.ii sub-sector to avoid a potential underestimation of the emissions from the 1.A.4.a sector, in particular NO_x and PM.

Category issue 4: 1.A.4.b.ii Household and gardening mobile machinery – All Pollutants

69. Emissions from this source are currently included in 1.A.4.b.i (residential – stationary combustion). The IIR explains that the activity data source does not distinguish between different source types (stationary or mobile) in the case of fuel consumption and no additional information was available in the inventory to separate them. The IIR also states that fuel consumption from stationary sources is believed to be the dominant type. The ERT encourages the Party to make separate estimates for the 1.A.4.b.ii sub-sector to avoid a potential underestimation of the emissions from the 1.A.4.b sector, in particular NO_x and PM.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		NO_x, NMVOC, SO_2, NH_3, $PM_{2.5}$, PM_{10}, TSP, CO, Cd, Hg, Pb, POPs		
Years		1990 – 2012		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
2.A.1	cement production		IE	
2.A.2	lime production		IE	
2.A.3	limestone and dolomite use		NA/NE	
2.A.4	soda ash production and use		NA/NE	
2.A.5	asphalt roofing	x		
2.A.6	road paving with asphalt		NA/NE	
2.A.7.a	Quarrying and mining of minerals other than coal		NA/NE	
2.A.7.b	Construction and demolition		NA/NE	
2.A.7.c	Storage, handling and transport of mineral products		NA/NE	
2.A.7.d	Other Mineral products	x		
2.B.1	ammonia production	x		
2.B.2	nitric acid production	x		
2.B.3	adipic acid production		NO	
2.B.4	carbide production	x		x
2.B.5.a	Other chemical industry	x		x
2.B.5.b	Storage, handling and transport of chemical products		NA/NE	
2.C.1	iron and steel production	x		
2.C.2	ferroalloys production	x		
2.C.3	aluminium production	x		
2.C.5.a	Copper Production		IE	
2.C.5.b	Lead Production		IE	
2.C.5.c	Nickel Production		NO	
2.C.5.d	Zinc Production		IE	
2.C.5.e	Other metal production		IE/NE	x
2.C.5.f	Storage, handling and transport of metal products		NA/NE	
2.D.1	pulp and paper	x		x
2.D.2	food and drink	x		
2.D.3	Wood processing		NA/NE	
2.E	production of POPs		NA/NE	
2.F	consumption of HM and POPs (e.g. Electrical and scientific equipment)		NA/NE	
2.G	Other production, consumption, storage, transportation or handling of bulk products	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:

70. The Spanish Industrial Processes inventory is generally transparent and comprehensive with a good level of detail in the methodology descriptions.

71. However, the previous Stage 3 Review Report revealed that activity data and emission factors were not provided in the Spanish NFR tables or IIR. [] Furthermore, the ERT notes that in the IIR there are still tables missing about emissions factors and activity data. During the review process Spain provided the ERT with details of emission factors and activity data. The ERT thanks Spain for this extra information and recommends that Spain includes this data in the submissions to improve the transparency of future IIRs, in accordance with any confidentiality restrictions that some of these data may be subject to.

72. The previous Stage 3 review report also revealed that Spain used notation keys incorrectly for the Cement and Lime production category. ERT notes that Spain has used the correct notation keys this time and compliments Spain on this. However, the ERT notes that individual PAH species in some sub-sectors are reported as IE in the NFR tables, while at the same time NE is used for the PAH total of the same sub-category (see paragraphs under "Sector-specific recommendations").

73. The ERT notes that the explanations for the dips/jumps or other changes in the emission time series of all sub-sectors of the Industrial Processes sector are clearly presented.

Completeness:

74. The ERT considers the Industrial Processes sector to be complete for the main sources and comprehensive with a good level of detail in the methodology descriptions. However, Spain uses NE notation keys (Not Estimated) for categories where emissions are to be expected (see paragraphs under “Sector-specific recommendations”). To avoid under-estimations, the ERT encourages Spain to include plans for addressing the missing emissions (NE) in its IIR, either by obtaining data allowing for an emission estimate to be made, or by reporting the emissions as not applicable (NA).

Consistency including recalculation and time series:

75. The ERT notes that Spain has performed recalculations for the 2A6, 2B5, 2C1, 2C3, 2D2 categories for different years and different pollutants and commends Spain for this.

Comparability:

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

77. Spain uses both default emission factors from the EMEP/EEA Guidebook and operator-reported site-specific emissions data. These methods are consistent with the guidance provided in the EMEP/EEA Guidebook

78. The ERT notes that the emission figures are comparable with Spain's emission reports to the EU (NECD) and CLRTAP, respectively.

Accuracy and uncertainties:

79. ERT notes that Spain uses two different uncertainty assessment approaches for all activities of the basic SNAP nomenclature: a) a qualitative approach, covering all pollutants; and b) a quantitative approach for the main pollutants (SO_2, NO_x, NMVOC and NH_3). The ERT commends Spain for this and encourages Spain to present the uncertainties for the Industrial Processes sector according to NFR in order to help support the improvement process when reporting emissions.

Improvement:

80. Spain has identified improvement plans for the Industrial Processes sector (especially for the 2C1 and 2C3 categories). The ERT encourages Spain to implement these plans and continue to document them to improve the IIR.

Sub-sector Specific Recommendations

Category issue 1: e.g. 2C5e & 2B5a & 2B4 & 2D1:- PAHs

81. The ERT notes that individual PAH species are reported as IE in the NFR tables for 2C5e, 2B5a, 2B4 and 2D1, and that at the same time NE is used for the PAH total of the same sub-category. The ERT recommends that NE should be used instead of IE, since the emissions of individual PAH species are not quantified anywhere else in the submitted estimates.

Category issue 2: e.g. 2A7 & 2A7b & 2D3 – PM_{10}, PM2,5 TSP

82. The ERT noted that Spain used NE for TSP, PM_{10} and $PM_{2,5}$ in the 2A7, 2A7b, 2D3 sectors. During the review process Spain explained that they already had preliminary estimates of these substances but had not included them in the 2014 submission. The ERT thanks Spain for this explanation and encourages the Party to improve their submission's completeness and provide the PM_{10}, $PM_{2,5}$ and TSP data time series with the next submission.

SOLVENTS

Review Scope

Pollutants Reviewed		NMVOC and PAH		
Years		1990 – 2012		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
3.A.1	Decorative coating application	**x**		x
3.A.2	Industrial coating application	**x**		x
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)	**x**		x
3.B.1	Degreasing	**x**		x
3.B.2	Dry cleaning	**x**		x
3.C	Chemical products,	x		x
3.D.1	Printing	**x**		x
3.D.2	Domestic solvent use including fungicides	x		x
3.D.3	Other product use	x		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:

83. The Solvents and Other Product Use sector of Spain is not completely transparent. Where information is provided in Appendices or on websites this should be cited in the relevant sections of the IIR.

84. The ERT notes that different levels have been used in the NFR Tables (3A1, 3A2, etc) and in the IIR (3A, 3B, etc). After consulting with the Party, they replied that the Spanish inventory emission estimates were made at SNAP level, because reporting at NFR level is reporting at an aggregated level where methodological details cannot be entered, and provided the ERT with the national report, in SNAP nomenclature, on Solvents and Other Product Use. In this report the methodology, activity data, emissions and emission factors at SNAP activity level, and the corresponding NFR code are shown[5]. After analysing this document it became clear to the ERT that, based on this document, it is possible to prepare an IIR chapter "Solvents and Other Product Use" at source category level (3A1, 3A2, etc). The ERT encourages Spain to reconsider the structure of the "Solvents and Other Product Use" chapter at NFR source category level in the next submission.

85. Furthermore, the ERT notes that tables with activity data and details on which Tier methods have been used are missing. During the review process the Spanish inventory team replied that to provide activity data would require an aggregation of

[5] Spain responded to the findings of the ERT that information is publicly available at the Spanish inventory website: http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/sistema-espanol-de-inventario-sei-/volumen2.aspx

data from different sources, which may lead to misunderstandings. The Party replied that in the IIR they differentiated, within each NFR category (3A, 3B, 3C and 3D), between default (Tier 1) and advanced methodology (i.e. methodologies that could be considered more advanced than the default Tier 1 approach). Despite this, the ERT recommends that Spain includes information on which Tier methods have been used in the next submission.

86. The ERT also notes that Spain uses the appropriate notation keys in the NFR tables for all the source categories of the Solvents and Other Product Use sector and commends Spain for this. The ERT notes that the explanations for the use of the notation keys NE and IE are provided in the NFR tables and/or the IIR.

87. The ERT notes that the explanations for the dips/jumps or other changes in the emission time series for all categories of the Solvents and Other Product Use sector are presented very clearly.

Completeness:

88. The ERT considers this chapter to be almost complete and comprehensive with a good level of detail in the methodology descriptions. The only information that is missing is detailed information on which Tier methods have been used to calculate emissions and the ERT recommends that Spain considers including these in the next submission (see also Transparency).

89. The ERT notes that Spain does not report activity data in the NFR tables. While understanding the reasons given for not including these data, the ERT encourages Spain to consider, where possible, how activity data could be included clearly and unambiguously in the NFR Tables in the next submission.

90. To avoid under-estimations, the ERT recommends that Spain includes plans addressing the missing emissions (NE) in its IIR, either by obtaining data allowing for an emission estimate to be made, or by reporting the emissions as not applicable.

Consistency including recalculation and time series:

91. The ERT notes that several recalculations, based on revised activity data (3A1, 3B1, 3C, 3D2 and 3D3) and revised emission factors (3A2, 3A3 and 3D3), have been performed.

92. The ERT notes that the time series of the activity data and the EFs used to calculate emissions of the key sources are consistent.

Comparability:

93. Spain reported its emissions inventory in accordance with the reporting requirements and submitted it in the requested NFR format.

94. The ERT notes that there are differences between the CLRTAP and NECD emissions in the Solvents and Other Product Use sector, affecting all NFR codes. The ERT recommends that Spain explains these differences, iwhich are due to the

different geographical coverage under the NECD and LRTAP, also in the “Solvent” chapter in the next submission.

Accuracy and uncertainties:

95. In the previous Stage 3 review report, the ERT encouraged Spain to implement sector-specific OA/QC procedures for the key sources in the Solvents and Other Product Use sector in their next submission. The ERT notes that this has not been done and reiterates its encouragement to implement sector-specific OA/QC procedures for the key sources in the next submission.

96. The ERT notes that Spain’s uncertainty analysis has been carried out for the main pollutants (SO_2, NO_x, NH_3 and NMVOC) of the main sources, both for emission levels and for emission trends at SNAP level and for the national total. The ERT encourages Spain to carry out the uncertainty analysis at NFR level in the future.

97. The ERT notes that the emissions of the key sources were not all calculated based on the Tier 2 methodology and recommends that the Party calculates all key sources based on the Tier 2 methodology. For more information see the relevant sector section.

Improvement:

98. The ERT also notes that Spain has improved several activity variables and will continue carrying out improvements on activity variables, the VOC contents of products and emission factors. The ERT compliments Spain for doing so.

Sub-sector Specific Recommendations.

Category issue 1: 3A1, 3A2 and 3A3 - NMVOC

99. In the previous Stage 3 review Report (from 2009) the ERT encouraged Spain to determine key sources using the more disaggregated level of the NFR nomenclature (such as 3A1, 3A2 and 3A3 instead of 3A). The ERT notes that this has not been done and reiterates its encouragement to report key sources using a more disaggregated level of the NFR nomenclature (such as 3A1, 3A2 and 3A3 instead of 3A) in the next IIR submission.

Category issue 2: 3A1, 3A2 and 3A3 - NMVOC

100. In the previous Stage 3 review report, the ERT encouraged Spain to implement improvements in the “application of paints” sector (NFR codes 3A1, 3A2 and 3A3) in its future submissions. The ERT notes that in this submission emission factors for 3A2 and 3A3 have been estimated on the basis of average NMVOC content limits as established by Directive 2004/42.

101. Despite this, the ERT recommends that Spain determines emission factors based on the real solvent contents of products in the future.

Category issue 3: 3B1, 3C, 3D1, 3D2 and 3D3 - NMVOC

102. In the previous Stage 3 review report, the ERT encouraged Spain to consider developing a methodology compatible with a Tier 3 methodology as recommended by the EMEP/EEA Guidelines for key sources to better take into account the progress made in the reduction of NMVOC emissions. The ERT notes that this has not been done and reiterates its encouragement to develop methodologies compatible with higher Tier methods (with the use of emission factors based on the real solvent contents of products).

Category issue 4: PER, Others - 3B2

103. The ERT notes that Spain makes robust estimates of emissions based on PER consumption as provided by chlorinated solvent producers. The ERT assumes that PER represents 90% of the solvents used.

104. In the previous Stage 3 review report, the ERT encouraged Spain to investigate and estimate emissions from the consumption of solvents other than PER to consolidate the estimation of the consumption of non-chlorinated solvents. The ERT notes that this has not been done and reiterates its encouragement to investigate and estimate emissions from the consumption of solvents other than PER in order to consolidate the estimation of the consumption of non-chlorinated solvents in the next submission.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10}, $PM_{2.5}$, TSP, CO, PCDD/PCDF, PAHs		
Years		1990 – 2012 + (Protocol Years) PM: 2000 -2012		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	x		x
4 B 1 b	Cattle non-dairy	x		x
4 B 2	Buffalo	NO		
4 B 3	Sheep	x		x
4 B 4	Goats	x		x
4 B 6	Horses	x		x
4 B 7	Mules and asses	x		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		x
4 B 9 d	Other poultry	x		x
4 B 13	4 B 13 Other	NO		
4 D 1 a	Synthetic N fertilisers	x		x
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products	x		x
4 D 2 b	Off-farm storage, handling and transport of bulk agricultural products	NA		
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)	x		x
4 F	Field burning of agricultural wastes	x		x
4 G	Agriculture other(c)	NA		
11 A	(11 08 Volcanoes)	NO		
11 B	Forest fires	NO		
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

105. Spain has provided a detailed and transparent emissions inventory. Spain covers the most important agricultural emissions sources. The ERT commends Spain for doing further improvements regarding completeness by estimating emissions of NO_x, NMVOC and the remaining PM sources. The ERT appreciates Spain's efforts to implement the 2013 EMEP/EEA Guidebook in the next submission. The ERT thanks Spain for its responsiveness and for providing informative answers during the review process.

Transparency:

106. Spain has provided a detailed and generally transparent emissions inventory. The IIR includes information with references to activity data and emission factors.

Furthermore, time series have been implemented and trends are explained. It would be helpful to summarise the information on key sources in one specific chapter.

Completeness:

107. The emission inventory covers NH_3 emissions for the period 1990-2012 and PM emissions from 4B for 2000-2012, NO_x emissions from the use of synthetic fertilisers and certain pollutants associated with the field burning of agricultural wastes. These are considered to be all of the most important agricultural emission sources. The ERT recommends that Spain estimates NO_x and NMVOC emissions from 4B and 4D, PM emissions from sheep and goats and PM emission from the field burning of agricultural wastes.

Consistency including recalculation and time series:

Comparability:

108. In general, the comparability of the Spanish emission inventory is considered to be good. However, comparability could be improved for certain emission sources by implementing emission factors and methodologies as recommended in the 2013 EMEP/EEA Guidebook.

Accuracy and uncertainties:

109. The IIR includes no information on uncertainty analysis or QA/QC checks regarding the agricultural sector. The ERT encourages the Party to undertake uncertainty analysis and to implement QA/QC checks to avoid errors.

Improvement:

110. During the review Spain informed the ERT that they were planning to implement the 2013 EMEP/EEA Guidebook either as part of the 2015 submission or, at the latest, for the 2016 submission. The ERT commends Spain for its efforts to use the 2013 EMEP/EEA Guidebook.

Sub-sector Specific Recommendations..

Category issue 1: 4D - NO_x

NO_x emissions from 4D are based on the emission factor recommended in the 2006 EMEP/EEA Guidebook and Spain uses a conversion factor of 46/14. It has to be noted that the emission factor is 0.026 kg NO/kg N applied. The reference Stehfest and Bouwman (2006) indicates that the unit is NO and not NO-N, which means that a conversion factor of 46/30 should be used when NO emissions are converted to NO_x (as NO_2) emissions.

Category issue 2: 4B – NH_3

111. N excretion in goats is around 11 kg/head/yr, which is more than twice the N excretion in sheep, despite the fact that sheep and goats normally have a similar feed intake and grazing period. During the review Spain explained that this difference was due to a difference in the methodology. N excretion in sheep is based on

national values, while N excretion in goats is based on the IPCC Reference Manual. Spain also stated that it was planning to develop a national methodology for sheep and goats and that, based on this work, Spain expected to reduce the difference in N excretion between sheep and goats in future submissions.

Sector.specific recommendations

Category issue 3: 4.B Manure management

112. The ERT notes that the Spanish implied emission factors for NH_3 are lower than the EMEP default emission factor for all animal categories. The difference cannot be explained by the use of the emission factor in the 2006 EMEP/EEA Guidebook because the emission factors are nearly the same as in the 2013 EMEP/EEA Guidebook. During the review Spain provided an example, i.e. an estimate made for horses, which indicated that the lower emission factor was due to the exclusion of emissions from the application of manure to the soils. In general, most countries report emissions from the application of manure to soils in 4B. The ERT recommends that Spain implements the new NFR format, because 4D has been extended to include a new category "3Da2a – Animal manure applied to soils".

Category issue 4: 4.D.1 Agricultural Soils

113. During the review process the ERT noted that Spain included not only NH_3 and NO_x emissions from synthetic fertilisers in 4D1a, but also emissions from other fertilisers such as animal manure, compost and sewage sludge applied to soil. Spain argues that the underlying emitting process is the same as for synthetic fertilisers and that it therefore is more appropriate to report these emissions in 4D. The ERT agrees with the Spanish argument. However, 4D1a should only include emissions from the use of synthetic fertilisers. If other emission sources are included, it disturbs the transparency of the IEF. The ERT encourages Spain to implement the NFR format 4D with the extended two new categories "3Da2a – Animal manure applied to soils" and "3Da2b – Sewage sludge applied to soils" and 3Da2c "Other organic fertilisers applied to soils (including compost)". Until the new NFR is implemented, 4B is considered the most appropriate category to insert the emissions from application and 4G for the emissions from sewage sludge and compost.

Category issue 5: 4.F Field burning of agricultural wastes

114. Estimates of NO_x, NMVOC, SO_2, NH_3, CO, dioxins and PAH for Spain are based on the 2006 EMEP/EEA Guidebook. It is not clear if these emissions are in accordance with 2009 EMEP/EEA Guidebook or the latest 2013 version. Spain informed the ERT that work on implementing the 2013 methodology was underway. The ERT welcomes Spain's efforts to improve the inventory.

WASTE

Review Scope:

Pollutants Reviewed		SO_2, NO_x, NMVOC, NH_3, PM_{10} & $PM_{2.5}$ and HG		
Years		1990 – 2012		
NFR Code	**CRF_NFR Name**	**Reviewed**	**Not Reviewed**	**Recommendation Provided**
6.A	solid waste disposal on land	X		X
6.B	waste-water handling	X		X
6 C a	Clinical waste incineration (d)	X		
6 C b	Industrial waste incineration (d)	X		
6 C c	Municipal waste incineration (d)	X		
6 C d	Cremation	X		X
6 C e	Small scale waste burning	X		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.

Transparency:

115. Spain provides a generally transparent overview of the Waste sector. In response to the encouragements from the 2009 review, Spain has improved on the details of and referring to the emission factors used. The ERT encourages Spain to continue these improvements.

Completeness:

116. The IIR and NFR provide a generally complete report. However, the ERT notes that from the IIR it is not always clear why sources and emissions are not included, e.g. waste water treatment, incineration of animal carcasses, latrines and emissions other than those from burning from unmanaged landfills. The ERT encourages Spain to add this information in its submissions or, if possible, to include the sources in the inventory to avoid possible underestimations.

Comparability:

117. In general, the Party has provided an emissions inventory in accordance with the reporting requirements, and submitted its emissions in the requested NFR format. The methods used are in general in line with the EMEP/EEA Guidebook. The ERT notes that there are several discrepancies between the NFR tables and the NECD reporting tables, both in the notation keys used and in the reported emissions. The ERT recommends that Spain explains this fully in future submissions, i.e. where these differences arise from different geographical coverage. Spain made a big improvement in quantifying the emission uncertainties of the main sources for the main pollutants (SO_2, NO_x, NH_3 and NMVOC), for both emission levels and emission trends. However, despite the recommendations made in the review of 2009, Spain still reports on SNAP level and for the national total. The ERT reiterates its

recommendations from the 2009 review and encourages the Party to report the uncertainties also in NFR.

118. Spain describes an elaborate plan for QA/QC, which is generally in line with Good Practice. In 2007, 2008, 2012, 2013 reviews were performed of parts of the inventory. The QA/QC plan will be at least reviewed once a year. The ERT encourages Spain to include in future reports an overview of documents related to the results of the quality checks listed in the QA/QC plan and further to include a summary of conclusions and advice in the annual review of the QA/QC plan.

Improvement:

119. The ERT complements SPAIN for the improvements implemented since the 2009 review. The ERT notes that Spain describes further improvements it intends to undetake in the relevant IIR chapters. However, the ERT encourages Spain to make these descriptions more SMART (specific, measureable, achievable, relevant and time-bound).

Sub-sector Specific Recommendations.

Category issue 1: 6A Solid waste disposal on Land: – NMVOC

120. Spain reports NMVOCs from this source as NA while the landfill gas capture efficiency for managed landfills, according to the IIR, was set at max 70%. Therefore, assuming that gas is potentially emitted from the remaining landfill, this is an under-estimation of NMVOCs. It is also likely that there will be NMVOC emissions from the unburnt fraction of MSW in unmanaged landfills. Spain indicated that they would consider incorporating the EF from the 2013 EMEP/EEA Guidebook in future inventory reports. The ERT recommends implementing the 2013 EMEP/EEA Guidebook in the next submission.

Category issue 2: 6B Wastewater handling – NMVOC and NH_3

121. Emissions from wastewater handling are reported as NE. In this sub-sector mainly NMVOCs from wastewater treatment and NH_3 from latrines are of interest. The Party responded in the 2009 review that emissions from wastewater handling would be included in 2010 reporting.

122. Concerning NH_3 from latrines, the Party indicated that there was no activity date available. However, the Eurostat database showed that only 2% of the Spanish inhabitants are not connected to a sewage treatment plant. Using NA for this source seems the correct notation.

123. The Party indicated that they considered the NMVOC emissions from wastewater treatment to be small and that the EMEP/EEA Guidebook for the default emission factor stated that “the emission factor should be handled with care”. For this reason the Party concluded that it would not include emissions of wastewater handling in the inventory. The ERT points out that activity data is available (see for instance Eurostat) and that the appropriate care and handling of the emission factor is reflected in the confidence interval. Therefore, the ERT reiterates its

encouragement from the 2009 review, namely to calculate emissions from this source using country-specific data or the 2013 EMEP/EEA Guidebook.

Category issue 3: 6Cd Cremation – All pollutants

124. The main source of mercury emissions from the cremation of human remains is amalgam used for dental fillings. As such, the level of dental care will influence the mercury emission factor. Spain uses the EFs from the 2009 EMEP/EEA Guidebook. Spain indicated in the 2009 review that they would investigate the representativeness of these factors for Spain. However, Spain still uses the 2009 EMEP/EEA Guidebook default emission factors for the emission estimates, stating that without any reference to possible differences in the scientific quality between them, the EF in the 2013 EMEP/EEA Guidebook is older than that the one in the 2009 EMEP/EEA Guidebook. Since mercury from cremations is considered a potential key source, the ERT encourages Spain to use a country-specific emission factor for mercury arising from the cremation of human remains.

125. Spain does not include the incineration of animal carcasses in this sub-category. The Party indicates that the main issue is the gathering of activity data and that they will continue working on this issue. Spain indicates further that the EMEP/EEA Guidebook only provides emission factors for the incineration of cows and sheep and that they will probably need to include other animal species. The ERT encourages Spain to include this source in future submissions.

Category issue 4: 6Ce Small scale burning: – all pollutants

126. In response to a request from the ERT, Spain stated that the emissions in 6Ce came exclusively from the burning in unmanaged landfills. All other burning of MSW in Spain is with energy recovery and therefore reported under 1A1a. Further, Spain mentions in the recalculation chapter of the IIR that they introduced the emission factor for PCB from the 2013 EMEP/EEA Guidebook for the burning of MSW without energy recovery. Furthermore, table 9.3.2.1.5.1. in the IIR gives an overview of the time and amounts of MSW disposed of and burnt in unmanaged landfills. The IIR states further that the burning of MSW at these landfill sites has been set to zero since 2001, as reflected in the table. It is now unclear where the reported emissions from 2001 onwards are allocated to. The ERT recommends that the Party improves the transparency of this issue in future submissions.

Sector-specific Recommendations

Category issue 1: 6 Sector Waste: – Key category analysis NH_3

127. In table 2.5.4. of the IIR, the Waste sector is considered to be a key category of NH_3 levels for the years 2008 to 2012. However, at least for both 2011 and 2012 the agricultural sub-sectors 4B and 4D together already account for over 90% of the national total. The ERT recommends correcting this entry in future submissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

1. Aircraft fleet (1999-2002). CO and HC EFs.xls
2. Annex Road Transport distance travelled and fuel consumption.doc
3. Extract of EFDI.zip
4. Flaring in oil refinery (SNAP 09.02.03).doc
5. Mobile agriculture machinery - SNAP 0806.doc
6. Open burning of MSW in Unmanaged Landfills.doc
7. Spain Stage 2 S&A report
8. Production of compost (SNAP 09.10.05).doc
9. Response to questions raised during the review
10. Spain's 2014 IIR
11. Spain's 2009 Stage 3 report, ES_Stage3_Review_Report_2009.pdf
12. 03 Combustion in manufacturing industry VNC.pdf
13. 04 Industrial Processes VNC.pdf
14. 06 Solvent and other product use VNC.pdf