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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  
BELGIUM**

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## INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document '*Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols*'<sup>(1)</sup> – hereafter referred to as the 'Methods and Procedures' document.
2. This annual review has concentrated on SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> & PM<sub>2.5</sub> for the time series years 1990 – 2012, reflecting current priorities of 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 Belgium 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 – Jim Webb (UK), Energy - Stephan Poupa (Austria), Transport - Jean-Marc Andre (France), Industry - Elo Mandel (Estonia), Solvents - Kees Peek (Netherlands), Agriculture + Nature - Mette Mikelsen (Denmark), Waste - Intars Cakars (Lithuania).
4. Anne Misra (UK) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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<sup>1</sup> 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 ERT recognises the level of effort undertaken by Belgium in providing an inventory with a significant level of information to undertake a thorough review.
6. Belgium has submitted a complete series of inventories for the years 1990 to 2012. There are no significant gaps with regard to the sectors included or in the descriptions and sections in the IIR. The ERT acknowledges the effort to which Belgium has gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed.
7. The inventory is generally in line with the 2013 EMEP EEA Inventory Guidebook and the UNECE Reporting Guidelines. However, the ERT notes that emissions have only been reported from 1990 onwards.
8. The Party participated actively in the stage 3 review process providing further information and data when requested, with fast turnaround times. Based on the additional information provided by Belgium, the ERT was able to review the inventory within the given time period.
9. Emission factors (EF) and activity time series are almost always presented in detail (SNAP level), assumptions are indicated and references are given. The ERT encourages Belgium to complement the excellent work done on the IIR with some additional descriptions as indicated below.

### **INVENTORY SUBMISSION**

10. For the 2014 submission Belgium has reported emissions for its Protocol base year (1990), 2000, 2005 and a full time series up to 2012 (the most recent year) in the IIR for its protocol pollutants in the NFR format (NO<sub>x</sub>, SO<sub>2</sub>, NMVOC, NH<sub>3</sub>, CO), particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub> and TSP), heavy metals (Pb, Cd, Hg, As, Cr, Cu, Ni, Se, Zn) and persistent organic pollutants (POPs – PCDD/PCDF, PAHs, HCB, HCH, PCB).
11. The CLRTAP inventory submitted by Belgium is of good quality and is, in general, well documented in the IIR.
12. For reporting, the latest NFR09 format has been used.

### **KEY CATEGORIES**

13. Belgium has compiled and presented, in its IIR, a Key Source Category Analysis using a Tier 1 approach for the following pollutants: NO<sub>x</sub>, NMVOC, SO<sub>2</sub>, NH<sub>3</sub>, PM<sub>2.5</sub>, PM<sub>10</sub> and TSP, CO, the heavy metals Pb, Cd, Hg, As, Cr, Cu, Ni, Se and Zn, dioxins, PAHs and PCBs. All sectors have been included. The ERT encourages Belgium to use a Tier 2 approach for all key categories.

## QUALITY

### ***Transparency***

14. The ERT recognises the level of effort undertaken by Belgium in providing an inventory with a significant level of information to undertake a thorough review. Belgium's IIR is detailed and well presented. EFs and activity time series are almost always presented in detail (SNAP level), assumptions are indicated and references are given.

15. There are a few omissions in the EFs reported in the IIR. These were discussed with Belgium during the review process and Belgium agreed to provide this information in the next IIR.

16. Belgium has listed the reasons for not estimating pollutants (Table 1.14), and explanations for the notation key *IE* are provided in Table 1.15.

### ***Completeness***

17. Belgium has submitted a complete series of inventories for the years 1990 to 2012. There are no significant gaps with regard to the sectors included or in the descriptions and sections in the IIR.

18. Estimates of individual PAHs could only be made for the Flemish region. Hence, only the totals of the 4 PAHs have been reported in the national inventory. Estimates of the POPs for the Flemish region could only be made for the years 1990, 1995, 2000 and 2005 up to 2012. Interpolation has been made for the intervening years.

19. Belgium has listed the sources not estimated in the inventory and given a qualitative assessment of their importance, together with an account of the measures taken to find out if these sources can be calculated in future.

### ***Consistency, including recalculations and time series***

20. Belgium has undertaken recalculations for the whole time series in the 2012 submission. Information is given on the recalculations which cover all sectors. The recalculations appear to be very thorough and well justified and they appear to have been used to improve the accuracy of the Inventory.

### ***Comparability***

21. The ERT notes that the Belgian inventory is comparable with those of other reporting parties. The allocation of source categories follows that of the 2013 EMEP/EEA Reporting Guidelines. The ERT encourages Belgium to continue with this approach to national inventory calculations.

### ***CLRTAP/NECD comparability***

22. There are differences between the inventories reported under CLRTAP and NECD, in both the sector and the national totals.

Differences (in ktonnes) in National Totals (CLRTAP/NECD):

- NO<sub>x</sub> 195.40/206.08, NMVOC 104.35/106.28, SO<sub>2</sub> 48.90/49.80, NH<sub>3</sub> 69.19/68.35.

Differences (in ktonnes) in Sector Totals (CLRTAP/NECD):

- NO<sub>x</sub> - 1 A 3 b i Road transport: Passenger cars 46.121/44.153.
- NO<sub>x</sub> - 1 A 3 b iii Road transport: Heavy duty vehicles 51.324/39.881

Belgium explained these differences during the review.

### ***Accuracy and uncertainties***

23. Belgium has not compiled uncertainty estimates for their LRTAP submission. However, uncertainty analysis is under development and should be available at the end of the year. The ERT recommends that Belgium compiles at least Tier 1 estimates for future submissions.

### ***Verification and quality assurance/quality control approaches***

24. Belgium does not appear to have implemented a quality assurance/quality control (QA/QC) plan in accordance with the 2013 EMEP/EEA Guidebook (Inventory Management Chapter). It is not clearly stated if there is a basic review by experts not involved in inventory compilation of individual sectors, if there has ever been an extensive review of the key categories, or if there is any periodic internal review of inventory preparation. This was discussed with Belgium during the review process. Belgium replied that an official external review had so far not taken place, although emission data are retrieved regularly by several competent authorities not involved in compiling the emission inventory. Internal reviews in the form of a structured and regular procedure as such do not take place, but because there are several perspectives (emissions per sector, emission inventory per pollutant, selection of data for specific reporting) on the emissions inventory, it is possible to perform cross-checks which can be considered as a form of auto-control.

25. The ERT recommends that Belgium provides information on sector-specific information on QA/QC procedures in future submissions.

## **FOLLOW-UP TO PREVIOUS REVIEWS**

26. The ERT commends Belgium for implementing all but one of the recommendations of the previous Stage 3 Review.

27. The previous review identified the following cross-cutting issues for improvement:

28. Recalculating the different reference years of the Protocols, including those before 1990, and providing explanations in the IIR. There appears to have been no calculation of emissions before 1990. Belgium informed the ERT that an inventory of NMVOC emissions had been reported in 2013 for the base year 1988.

29. Extending the existing QA/QC plan for LRTAP/NECD inventories and reporting accordingly in the IIR. This recommendation has been complied with.

30. Explaining the use of notation keys (in particular IE, NE, etc.) in both the NFR tables and the IIR. Replacing the zero values with data or appropriate notation keys. This recommendation has been complied with.

31. Starting to implement the new recommended IIR structure and provide information as recommended as far as possible according to defined priorities. This recommendation has been complied with.

32. Explaining, in the IIR, at a sufficiently detailed level the issues associated with time series consistency, including more detailed information on recalculations, and on the impacts of recalculations on the national totals and trends. Specific examples of areas which require improvement are included in the source specific-sections later on in this report. This recommendation has been complied with.

33. Using the results from the Stage 1 and 2 time series analysis to target improvements on time series consistency in future inventories. This recommendation has been complied with.

34. Significantly improved co-ordination on methodological issues between the three regions. This should result in improved consistency. Reporting an improvement plan in the IIR would also provide inputs for prioritising future improvements and inventory development. An improvement plan has been included in the IIR.

35. To continue the incorporation of high quality facility level data into the national estimates and to generate country-specific emission factors. This recommendation has been complied with.

### **AREAS FOR IMPROVEMENT IDENTIFIED BY BELGIUM**

36. In the IIR several areas for improvement are identified. These improvements are listed for each sector except for Waste. These include:

37. The emission factors of the 2013 EMEP/EEA Emission Inventory Guidebook (Tier 2) will be used for wood burning in Flanders.

38. Wallonia will evaluate the implementation of recommendations coming from the 2013 EMEP/EEA Guidebook for the next submission (Energy sector).

39. In the Flemish region, the following improvements are planned for the Solvents sector:

- (a) Fine tuning emissions of polyurethane processing.
- (b) Fine tuning emissions of polystyrene foam processing.
- (c) Estimating emissions of solvent production: tetrachloromethane.

40. In Wallonia, the following improvements are planned for the Solvents sector:

- (a) Revision of the emissions from wood paint application and other industrial paint application.

- (b) Revision of the emissions of non-chlorinated solvents used for metal degreasing, dry cleaning and other industrial cleaning.
- (c) Revision of the emissions from polyester processing, polyvinylchloride processing, polyurethane processing, polystyrene processing.
- (d) Estimating emissions from textile finishing.
- (e) Estimating emissions from glass wool induction, mineral wool induction and fat, edible and non-edible oil extraction.
- (f) Estimating emissions from wood preservation for the years 1990-2000.

41. Wallonia will evaluate the implementation of recommendations coming from the 2013 EMEP/EEA Guidebook for the next submission (Agriculture).

## **PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY**

### **CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT**

42. The ERT identifies the following cross-cutting issues for improvement:
- (a) Reconcile the differences in NO<sub>x</sub>, NMVOC, SO<sub>2</sub> and NH<sub>3</sub> emissions submitted under LRTAP and NECD as announced by Belgium during the review week.
  - (b) Compile an uncertainty analysis at at least Tier 1 level for future submissions.
  - (c) Provide information on sector-specific information on QA/QC procedures in future submissions.
  - (d) Produce an improvement plan for the Waste sector.
  - (e) Fill in the gaps by reporting EFs in the next IIR as discussed during the review process.

## SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

### ENERGY

#### Review Scope

Pollutants Reviewed		SO <sub>2</sub> , NO <sub>x</sub> , NMVOC, NH <sub>3</sub> , PM <sub>10</sub> & PM <sub>2.5</sub> , 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		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		
1.A.2.c	chemicals	x		x
1.A.2.d	pulp, paper and print	x		x
1.A.2.e	food processing, beverages and tobacco	x		x
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other	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		
1.A.4.c.i	Agriculture/forestry/fishing, stationary	x		x
1.A.5.a	other, stationary (including military)	NE		
1.B.1.a	coal mining and handling	x		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		x
1 B 2 a v	Distribution of oil products	x		
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:**

43. The ERT considers the inventory of Belgium to be generally transparent.

44. The IIR includes references for emission factors and data providers of the measured emissions. The IIR includes references to activity data but does not provide any activity data values for stationary combustion. However, activity data for each fuel group has been provided in the NFR.

45. The IIR includes emission source descriptions for each pollutant which explain most of the emission and fuel consumption trends.

46. The inventory of Belgium can be defined as the sum of three regional inventories and the emission factors are provided for all three regions separately, mostly in a different structure, which limits the transparency of the Belgian inventory in general. However, viewed from the perspective of three independent regional inventories, transparency is high.

47. Belgium reports emissions at sector level according to the NFR structure. The use of notation keys is transparent and the notation key 'IE' is only used for some heavy metals from category 1 A 1 c (which are reported under category 2 C 1).

48. Belgium does not report any zero or empty values.

49. The information provided in the IIR is consistent with the information in the NFR tables. The IIR includes methodological descriptions by category and references to data sources as well as emission factors for each detailed type of fuel.

50. The ERT proposes that Belgium includes overview tables with emissions broken down by region and category (e.g. for selected years) in order to further increase the transparency of the inventory.

#### **Completeness:**

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

52. The rarely used notation key 'NE' is used for categories and pollutants which the ERT judges to be negligible or where no emissions factors are available in the current 2013 EMEP/EEA Guidebook.

#### **Consistency including recalculation and time series:**

53. Belgium has recalculated the inventory for selected sectors and years of stationary combustion. The IIR provides detailed information about the recalculations carried out for each sector but does not provide a quantification of the recalculations.

#### **Comparability:**

54. According to the methodology description, default emission factors from the 2013 EMEP/EEA Guidebook are used in case where no country or plant/specific information is available. The emission sources are allocated to categories accordingly.

#### **Accuracy and uncertainties:**

55. Belgium has not carried out an uncertainty analysis up to now but the IIR states that an ongoing study will be completed at the end of 2014. The ERT commends Belgium for the ongoing efforts.

56. Belgium has implemented QA/QC procedures for the Energy sector. The three regional inventories are checked with respect to trends and completeness

when aggregated for the national inventory. Other Energy sector-specific QA/QC procedures are mainly based on occasional expert or industry expert consultation. The QA/QC plan does not explicitly mention periodic reviews of the Energy sector by independent experts.

**Improvement:**

57. Belgium has included a short chapter in the IIR covering two items of planned improvements within the Energy sector. Belgium plans to implement methodologies of the new 2013 EMEP/EEA Guidebook for specific categories and regions.

Sub-sector Specific Recommendations..

**Category issue 1: 1 A 1 a Public electricity and heat production – NO<sub>x</sub>, SO<sub>2</sub>, PM**

58. The ERT notes that plant-specific data has been considered and that calculations have been carried out by means of emission factors. During the review Belgium provided the amount of emissions measured at regional level as well as a table with the share of emissions in the national total for each of the three regions. Because the methodology is described for the regional level the ERT recommends that Belgium includes similar information in the IIR in order to increase transparency.

Emissions of public power plants are based on continuous measurements for 97.2 % of NO<sub>x</sub>, 98.2 % of SO<sub>2</sub> and for 37.6 % of TSP in Flanders.

Share in national total emissions of NO<sub>x</sub>, SO<sub>2</sub> and PM by region:

	Flanders	Brussels	Wallonia
NO <sub>x</sub>	72.30%	2.30%	25.40%
SO <sub>2</sub>	23.60%	0.40%	75.90%
PM <sub>2.5</sub>	23.60%	0.40%	75.90%
PM <sub>10</sub>	28.40%	0.40%	71.20%
TSP	31.00%	0.40%	68.70%

**Category issue 2: 1 A 1 a Public electricity and heat production – NO<sub>x</sub>, SO<sub>2</sub>**

59. The ERT noted that between 1998 and 1999 SO<sub>2</sub> emissions decreased by 45% and NO<sub>x</sub> emissions decreased by 30%. During the review Belgium provided a description of the various reasons. The ERT recommends that Belgium includes a description of this trend in the IIR.

**Category issue 3: 1 A 1 a Public electricity and heat production – Cd, Pb, Hg**

60. The ERT noted that between 1992 and 1993 Cd and Pb emissions decreased by 95 % and remained quite constant thereafter. Belgium responded that this decrease was mainly due to the installation of controls in waste incineration plants. The ERT also notes that for Hg there was a similar decrease but also a high peak during the years 2002 to 2004. Belgium has responded that for the 2002 -2004 period emissions are based on the detection limit for power plants but that from 2005 onwards emissions have been calculated. The ERT recommends that the current trend should be investigated and the methodologies over the time series harmonised.

**Category issue 4: 1 A 1 a Public electricity and heat production – PAH**

61. The ERT noted a high peak in PAH emissions 2007 and 2008. Belgium has responded that it plans to revise the (high) emission factor for wood combustion plants which is used by the Walloon region.

**Category issue 5: 1 A 1 b Petroleum refining – SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub>**

62. The ERT notes that between 2007 and 2008 emissions from refineries show a very strong decrease (SO<sub>2</sub>: -56%, NO<sub>x</sub>:-34%, PM<sub>10</sub>: -80%), although Belgium has five refinery plants. Belgium has responded that this was due to legislation. The ERT recommends that Belgium includes this information in the IIR.

**Category issue 6: 1 A 1 c Manufacture of solid fuels and other energy industries – CO, PM**

63. The ERT noted that between 2006 and 2007 CO emissions increased by over 400% and that PM<sub>10</sub> emissions increased by over 100%. Belgium has responded that emissions from 2007 onwards are based on reported emissions of coke plants while emissions up to 2006 had been calculated by means of emission factors. The ERT recommends that Belgium considers a harmonisation of the methods in its improvement plan.

**Category issue 7: 1A2 a,c,d,e,fi – Hg**

64. The ERT noted that between 1990 and 1991 Hg emissions decreased by about 95% for almost all sub-categories of 1 A 2. Belgium responded that this was due to an error and would be corrected in the next submission.

**Category issue 8: 1 A 2 f i Stationary combustion in manufacturing industries and construction: Other– Pb**

65. The ERT noted that Pb emissions increased by a factor of 10 between 1995 and 1997. Belgium has responded that this is due to a change in methodologies. The ERT recommends that Belgium includes a harmonisation of the methods in the improvement plan.

**Category issue 9: 1 A 2 f i Stationary combustion in manufacturing industries and construction: Other– SO<sub>2</sub>**

66. The ERT noted that SO<sub>2</sub> emissions decreased by about 70% between 1993 and 1994. Belgium has responded that this is due to an inconsistent methodology and that it plans to change the methodology which will lead to more harmonised time series. The ERT welcomes Belgium plans to improve the methodology.

**Category issue 10: 1 B 1 a Fugitive emission from solid fuels: Coal mining and handling – NMVOC**

67. The ERT noted that Belgium reported coal production in the NFR tables for the years 1990 to 1992 but that NMVOCs from coal mining were reported as 'NO'. Belgium has responded that NMVOC emissions of coal mining have been reported under category 1 A 1 c and that it plans to revise the notation key to 'IE'. The ERT recommends that fugitive emissions are reported under the corresponding category 1 B 1 a rather than included in the fuel combustion sector.

**Category issue 11: 1 B 2 a iv Refining / storage – Hg**

68. The ERT noted that Hg emissions increased by a factor of 200 between 1999 and 2000. Belgium has responded that this is due to a change in the methodology. The ERT recommends that Belgium harmonises the methodologies in order to ensure that the emission estimates prior to 1999 are complete.

## TRANSPORT

### Review Scope

Pollutants Reviewed		All		
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		X
1.A.3.a.i.(i)	international aviation (LTO)	X		X
1.A.3.a.i.(ii)	international aviation (cruise)	X		
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)	X		X
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)	X		
1.A.3.b.i	road transport, passenger cars	X		
1.A.3.b.ii	road transport, light duty vehicles	X		
1.A.3.b.iii	road transport, heavy duty vehicles	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	X		
1.A.3.d.ii	national navigation	X		
1.A.4.a.ii	commercial / institutional: mobile	X		
1.A.4.b.ii	household and gardening (mobile)	X		
1.A.4.c.ii	off-road vehicles and other machinery	X		X
1.A.4.c.iii	national fishing	X		
1.A.5.b	other, mobile (including military, land based and recreational boats)	X		
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:**

69. Belgium has provided a detailed and generally transparent emissions inventory. Estimates are provided at the most detailed level for all transport sub-sectors. The descriptions of the methodologies used by the Party in the IIR, as well as the descriptions of the emission factors, are transparent. In particular, comparability between the three Belgian regions is explained in each sub-sector.

#### **Completeness:**

70. The ERT considers the Transport sector and the other sectors, including mobile sources, to be nearly complete, with some gaps to be filled. The ERT encourages the Party to improve the inventory, i.e. replace NE notation keys by appropriate ones.

### **Consistency including recalculation and time series:**

71. During the review, the ERT identified some outliers. The Party has justified them by pointing out that the Belgian inventory has to be understood as the sum of the inventories of the three separate regions and that sometimes the information on the activity data and emission factors is not consistent across the different regions. The ERT encourages the Party to improve the consistency of the inventory by improving the consistency between the regions.

72. The time series for emissions from mobile sources have been recalculated in this submission for many sub-sectors in some Belgian regions, and the majority of the information is provided in the IIR. The ERT strongly recommends providing tables showing the main recalculations (absolute and percentage) in the IIR.

### **Comparability:**

73. The Belgian inventory is generally consistent with the Guidebook. But there is a problem with the consistency along the time series (see above) when comparing it with other inventories. The ERT encourages the Party again to improve the consistency of the inventory to be able to compare it with other inventories.

### **Accuracy and uncertainties:**

74. The Party explains in the IIR that uncertainty calculations and analysis will be provided by the end of the year except for road transport since there is no adapted methodology for uncertainty estimation at the moment. The ERT encourages Belgium to undertake uncertainty analysis for the Transport sector and for all other sectors, including mobile sources, in order to help support the improvement process and to provide an indication of the reliability of the inventory data.

75. The ERT encourages Belgium again to implement sector-specific QA/QC procedures for the Transport sector and all other sectors, including mobile sources. In this way, areas within the inventory that need further improvement would be automatically identified.

### **Improvement:**

76. Following the improvements already carried out (which are well explained in the IIR), the ERT encourages Belgium to continue with checks for further improvement.

### **Sub-sector Specific Recommendations.**

#### **Category issue 1: 1 A 3 a i (i) International aviation (LTO) / Zn, Se, Cd**

77. During the review, the ERT detected some inconsistency in the reported emissions. The Party explained that on the one hand there were mistakes in reporting and that on the other hand, a revision of the Flemish emission inventory of heavy metals had taken place covering the time period from 2000 onwards. The Party explained that no emissions could be calculated before 2000 due to a lack of data. The ERT encourages the Party to improve the QC and the consistency of the inventory in the three regions.

**Category issue 2: 1 A 4 c ii Agriculture/Forestry/Fishing: Off-road vehicles and other machinery / Ni, Se, Zn, HCB, NH<sub>3</sub>**

78. During the review, the ERT detected some inconsistency in the reported emissions. The Party explained that on the one hand, there were mistakes in reporting (Se, Zn, NH<sub>3</sub>) and that on the other hand, HCB emissions had increased from 2007 onwards because that was the only year for which a HCB emission factor was provided. The ERT encourages the Party to improve the QC and HCB emissions prior to 2007.

79. During the review, the ERT detected a big jump in Ni emissions in 2007 compared to 2006 (+1476%). The Party explained that this was due to a change in the methodology applied to the activity data. The ERT encourages the Party to improve the consistency of the inventory for the whole time series.

**Category issue 3: 1 A 3 a ii (i) Civil aviation (Domestic, LTO) / HCB, NO<sub>x</sub>**

80. During the review, the ERT detected some inconsistency in the reported emissions. The Party explained that on the one hand, there were mistakes in reporting (HCB) and that on the other hand, the NO<sub>x</sub> emissions were linked to the activity data of two airports in the Walloon region. The ERT encourages the Party to improve the QC.

**Category issue 4: 1 A 2 f ii Mobile Combustion in manufacturing industries and construction / PAH, PCDD-F**

81. During the review, the ERT detected some inconsistency in the reported emissions. The Party explained that on the one hand, there were mistakes in reporting (PCDD-F) and that on the other hand, the PAH emissions between 2002 and 2009 were included in the 1A2Fi sector. The ERT encourages the Party to improve the QC and to improve the consistency of the time series.

**Category issue 5: 1 A 3 b iv Road transport: Mopeds & motorcycles / PAH**

82. During the review, the ERT detected a big jump in the emissions in 1995 compared to 1994. The Party explained that this had been caused by keeping the emissions constant from 1990 to 1994. The Party stated that it would calculate these emissions accurately for the next submission. The ERT encourages the Party to improve the accuracy of the inventory.

## INDUSTRIAL PROCESSES

### Review Scope

Pollutants Reviewed		All		
Years		1990 – 2012 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.A.1	cement production	x		
2.A.2	lime production	x		x
2.A.3	limestone and dolomite use			
2.A.4	soda ash production and use			
2.A.5	asphalt roofing			
2.A.6	road paving with asphalt	x		x
2.A.7.a	Quarrying and mining of minerals other than coal	x		
2.A.7.b	Construction and demolition			
2.A.7.c	Storage, handling and transport of mineral products			
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)	x		
2.Bb.1	ammonia production	x		
2.B.2	nitric acid production	x		
2.B.3	adipic acid production			
2.B.4	carbide production			
2.B.5.a	Other chemical industry (Please specify the sources included/excluded in the notes column to the right)	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)			
2.C.1	iron and steel production	x		x
2.C.2	ferroalloys production			
2.C.3	aluminium production			
2.C.5.a	Copper Production			
2.C.5.b	Lead Production			
2.C.5.c	Nickel Production			
2.C.5.d	Zinc Production			
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes column to the right)	x		
2.C.5.f	Storage, handling and transport of metal products (Please specify the sources included/excluded in the notes column to the right)	x		
2.D.1	pulp and paper	x		
2.D.2	food and drink	x		x
2.D.3	Wood processing			
2.E	production of POPs			
2.F	consumption of HM and POPs (e.g. Electrical and scientific equipment)	x		
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)			
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 ERT considered the inventory submitted by Belgium to be generally transparent and well-documented, with a good level of detail in the methodology descriptions. The ERT notes that Belgium has also clearly indicated which sources are the key sources of the Industrial Processes sector. The ERT commends Belgium for this effort.

#### **Completeness:**

84. The ERT considers the Industry sector to be complete and comprehensive and commends Belgium for this.

85. Belgium provides, in its IIR, a list of sectors and pollutants that are not estimated, or that are included in other categories with relevant explanations for using these notation keys. The ERT commends Belgium for this assessment, and encourages it to investigate the feasibility of calculating these sources in the future.

#### **Consistency including recalculation and time series:**

86. The ERT notes that Belgium has made recalculations to NMVOCs in 'other chemical industry' and to PCBs in 'transformers and capacitors'. The ERT encourages Belgium to continue to describe clearly the recalculations made, and recommends that it provides detailed information on the impact of these recalculations on emissions levels and on time series consistency.

87. Belgium provided (in section 2.2 in the IIR) explanations concerning trends and time series inconsistencies due to changes in environmental legislation over time, and due to differences in legislation in Flanders, Wallonia, and Brussels. However, it is not always clear in the dedicated industry category sections which are the specific reasons for the inconsistencies in the activity data and emissions. The ERT recommends that Belgium includes specific explanations for the trends in each category.

88. The ERT identified significant variations in the time series for several categories (2A6, 2B2, 2C1, 2C5e, 2D1). During the review, Belgium explained that in Flanders, there data had been handled at different levels for some years, resulting in the allocation of emissions to different sectors each year. Belgium stated that it was planning to optimise the allocation methodology in order to obtain more consistent time series. The ERT commends Belgium for this planned improvement and encourages it to continue investigating further improvements of time series consistency.

**Comparability:**

89. The ERT found the methods used to be consistent with those proposed in the EEA/EMEP Guidebook, with results comparable to those of other Parties, and commends Belgium for this.

**Accuracy and uncertainties:**

90. The ERT notes that Belgium uses a large amount of point source data to estimate emissions and emission factors in its inventory. The ERT commends Belgium for this and encourages it to continue with this approach.

91. Belgium has not yet performed an uncertainty analysis. It has indicated in its IIR that a study for calculating uncertainty values (related to the emissions reported under NECD and LRTAP) is currently being developed. The ERT encourages Belgium to include an uncertainty analysis for Industrial Processes in its next submission.

**Improvement:**

92. The ERT notes Wallonia's intention to evaluate the implementation of recommendations coming from the 2013 EMEP/EEA Guidebook for the next submission. The ERT recommends that this evaluation be extended to Flanders and Brussels and encourages Belgium to continue with its improvement of the consistency between data from Flanders, Wallonia, and Brussels.

**Sector-specific Recommendations****2A2 Lime production**

93. The ERT notes that emission factors for PM<sub>10</sub> and PM<sub>2.5</sub> are not consistent for the time series and do not seem to be correlated with the TSP emission factor for 2005-2008. During the review, Belgium explained that since 2005, the lime plants had performed a PM<sub>10</sub> analysis and estimated their PM<sub>2.5</sub> emissions. Before 2005, the proportion of PM<sub>10</sub> and TSP had been consistent with the EEA/EMEP Guidebook. No recalculation had been made to the plant data. The ERT recommends that Belgium harmonises the TSP/PM<sub>10</sub>/PM<sub>2.5</sub> proportion with plant data for the entire period.

**2A6 Road paving**

94. The ERT identified significant variations in the time series for activity data and emissions. During the review, Belgium explained that several facilities had emissions that fluctuated around the threshold values. So, in some years they have to provide an integrated environmental report and in some years they do not. Moreover, due to the different levels of data handling over several years, emissions are allocated to the NFR sector 2A6 where detailed information is available or to the NFR sector 1A2a if not. For the next reporting round, Belgium is planning to optimise the allocation methodology in order to obtain a more consistent time series. The ERT commends Belgium for its planned improvement and encourages it to continue with its investigation of further improvements of time series consistency.

## **2C1 – Iron and steel**

95. The ERT identified significant variations in the time series for NO<sub>x</sub>, SO<sub>2</sub>, and CO. During the review, Belgium explained that for 1990-1992, combustion and process emissions had been allocated to 2C1, while from 1993 onwards emissions had been split between 1A2a and 2C1. The ERT encourages Belgium to investigate the feasibility of splitting combustion and process emissions for 1990-1992 to ensure time series consistency.

## **2D2 – Food and drink**

96. The ERT identified a peak in CO emissions for 2010. During the review, Belgium explained that an error had been made in the source file of the reported data. Belgium indicated that this would be corrected in time for the next submission and the ERT welcomes this intention.

## SOLVENTS

### Review Scope

Pollutants Reviewed		NMVOC, HCB, HCH, PAH, Cu		
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:**

97. The Solvents and Other Product Use sector inventory of Belgium is not completely transparent. The ERT notes that tables with activity data and emission factors (including references) and the information on Tier methods used are missing. During the review Belgium provided the ERT with three excel files with detailed information. The ERT recommends that Belgium, where possible, includes this information in the next submission.

98. The ERT notes that Belgium uses the appropriate notation keys in the NFR tables for all the source categories of the Solvents and Other Product Use sector. The ERT commends Belgium for that.

99. The ERT notes that the explanations for the use of the notation keys NE and IE are provided in the NFR tables.

#### **Completeness:**

100. In the previous Stage 3 Review Report (from 2009) the ERT strongly encouraged Belgium to include a chapter on Solvents and Other Product Use in its next submission. The ERT notes that Belgium has included a chapter on Solvents and Other Product Use in its IIR and compliments Belgium for doing so.

101. The ERT considers this chapter to be almost complete and comprehensive with a good level of detail in the methodology descriptions. Only 3D3 is incomplete. For more information see the relevant sector section.

102. In the previous Stage 3 Review Report (from 2009) the ERT suggested that Belgium should report the activity data in the NFR tables in future submissions. The ERT notes that Belgium still has not reported activity data in the NFR tables. After consultation, the Party replied that part of the activity data were confidential, that the source categories consisted of several sources and that the different activity data were sometimes expressed in different units, and that it therefore was not possible to show aggregated activity data for these categories. The ERT compliments the Party for this clear explanation.

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

**Consistency including recalculation and time series:**

104. The ERT notes that the following recalculations have been performed:

- Flemish region: 3C and 3D1
- Wallonia: 3A1, 3A2, 3A3, 3B1, 3C, 3D1 and 3D3
- Brussels: 3A2 and 3D1.

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

**Comparability:**

106. Belgium provided its emissions inventory in accordance with the reporting requirements and submitted it in the requested NFR format.

107. Furthermore, the ERT notes that there are no differences between CLRTAP and NECD emissions in this sector.

**Accuracy and uncertainties:**

108. The ERT notes that Belgium uses the following verification procedures for the Solvents sector: All emissions delivered by the plants are validated and verified by a team of people experienced in emission inventories. In addition, a trend analysis is carried out every year for all emissions per industrial plant and sector. If any inconsistencies or problems are detected by the team, the industrial company involved is contacted. Numerous contacts take place with the plant operators and with the federations or associations involved. The ERT commends Belgium on having this very thorough process in place.

109. In the previous Stage 3 Review Report (from 2009) the ERT encouraged Belgium to undertake an uncertainty analysis for the Solvent sector in order to improve the process of reporting and to provide an indication of the reliability of the inventory data. The ERT notes that a study for calculating uncertainty values related to the emissions reported for NECD and LRTAP is currently being developed. The results of this study will be available at the end of this year.

110. As mentioned before, Belgium provided the ERT with three excel files with detailed information. After an analysis of these files it became clear that not all emissions from the key sources had been calculated according to the Tier 2 methodology. The ERT encourages Belgium to move from a Tier 1 to a Tier 2 methodology in the next submission for all key sources.

**Improvement:**

111. In both the Flemish and Walloon region several improvements are planned. The ERT commends the Party for these efforts.

*Sub-sector Specific Recommendations*

**Category issue 1: 3D3 – Cu, HCH, PAHs**

112. 3 D 3 Other Product Use is a key source of NMVOC, HCH, PAHs and Cu. In the IIR only information on NMVOC is included. The ERT recommends that Belgium adds information about HCH, PAHs and Cu from 3D3 in its next IIR.

**Category issue 2: 3A2 and 3B1 - Heavy metals; 3D1 - CO**

113. According to the additional information sheet in the NFR table and the 2014 IIR (Table 1.15), 3A2 and 3B1 are included in 2G and 3D1 in 3D3. After consulting the Party, they responded that the emissions of heavy metals, included in the sectors 3A2 and 3B1, were referring to the period 1990-1999. In Flanders, prior to 2000, emissions had been reported by the respective facilities. However, reporting on heavy metals was not always complete, so emissions (generally very low emissions, less than 1%) were not always reported for all years. It improves the consistency of the time series to report the emissions in 2G. From 2000 onwards, a revision of the Flemish emission inventory of heavy metals had taken place (study VITO-TNO 2009, under the authority of the Flemish Environment Agency).

114. Emissions of CO included in sector 3D1 (small amounts of emissions, less than 0.1%) are not always reported by the facilities for all years. It improves the consistency of the time series to report the emissions in 3D3.

**Category issue 3: NMVOC – 3A2 and 3A3**

115. These source categories include the emission figures from degreasing in Wallonia. The Party replied that it was sometimes not easy to distinguish between emissions from painting and degreasing. For example, when emissions are reported by a facility under the Solvents Directive COV08, solvent emissions are provided for both equipment cleaning and paint application together. The ERT compliments Belgium for this clear explanation, but encourages the Party to report the emissions from painting and degreasing separately in future.

**Category issue 4: NMVOC - 3A**

116. In the previous Stage 3 Review Report (from 2009) the ERT encouraged Belgium to implement the results of a study undertaken by the University of Ghent in the 2010 submission under 'Coating'. The Flemish region implemented these results

in 3A2 (only Flemish results were included in the study). The ERT notes that also a more recent study (2010) in the Brussels region has been used to calculate the emissions for the categories 'Decorative coating application' and 'Domestic solvent use'. Thanks to this study, the NMVOC emissions of paint applications for construction and building were completely revised in 2010 for the 3 regions in Belgium. The ERT commends the Party for the effort.

**Category issue 5: NMVOC - 3A1**

117. In the previous Stage 3 Review Report (from 2009) the ERT recommended that Belgium should explain the decrease in NMVOC emissions of 3.A.1 between 1990 and 1991. The ERT notes that the decrease in NMVOC emissions of 3.A.1 between 1990 and 1991 has disappeared from the completely revised NMVOC emissions.

**Category issue 6: NMVOC - 3D2**

118. In the previous Stage 3 Review Report (from 2009) the ERT encouraged Wallonia to improve the NMVOC emissions inventory of the sector "Use of solvents" for the years 2005–2007. The ERT notes that Wallonia has improved the NMVOC emissions inventory for this sector for the years 2005–2007 and commends the Party on this.

## AGRICULTURE

### Review Scope:

Pollutants Reviewed		NH <sub>3</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , TSP		
Years		NH <sub>3</sub> : 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	x		x
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		
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products	x		x
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	
4 F	Field burning of agricultural wastes	NO		
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

119. The emission inventory covers NH<sub>3</sub> emissions for the time period 1990-2012 and PM emissions for the time period 2000-2012. The ERT encourages Belgium to estimate the PM emissions from the remaining animal categories and to estimate agricultural emissions of NO<sub>x</sub> and NMVOC.

120. Belgium has provided sufficient information in the IIR and the ERT welcomes further improvements in the form of more information on time series for emissions and activity data. The ERT strongly encourages the Party to harmonise the two data sets of Wallonia and Flanders as this could improve transparency and comparability considerably.

121. The ERT commends Belgium for their efforts to implement the latest 2013 EMEP/EEA Guidebook for the next submission.

122. The ERT thanks Belgium for its responsiveness and for providing informative answers during the review process.

**Transparency:**

123. Belgium has provided sufficient information in the IIR. The inventory's transparency is negatively affected by the fact that most of the activity data and emission factors are separated into two datasets; one for the Flemish region and one for the Walloon region. It makes it difficult to compare the national values with default estimates in the 2013 EMEP/EEA Guidebook and other countries. During the review Belgium provided emission factors as weighted emission factors covering data sets from both Flanders and Wallonia. The NH<sub>3</sub> implied emission factors for 4B key source categories and N excretion for 4B are now available. The ERT encourages Belgium to include this information in their next submission, which will improve transparency.

**Completeness:**

124. The emission inventory covers NH<sub>3</sub> emissions for 1990-2012 and PM emission for 2000-2012, which - in an agricultural context - are considered as the most important pollutants. The ERT encourages Belgium to estimate the PM emission from the remaining animal categories: sheep, goats and horses by using the 2013 EME/EEA Guidebook.

125. Furthermore, the ERT recommends that Belgium estimates agricultural emissions of NO<sub>x</sub> and NMVOC.

**Consistency including recalculation and time series:**

126. The PM emissions from Flanders are recalculated. However, both Flanders and Wallonia use an emission factor which is much lower than the default EFs. During the review Wallonia informed the ERT that it was planning to use the latest updated 2013 EMEP/EEA Guidebook for the next submission. It was also mentioned that default PM emission factors would be discussed with the scientific experts.

127. The ERT encourages Belgium to continue working on the improvement of their IIR, which could be done by providing time series for activity data and emissions e.g. the numbers of animals, N excretions for key source categories, PM and NH<sub>3</sub> emissions. Trends and main drivers have to be explained.

**Comparability:**

128. The NH<sub>3</sub> emissions for 4B are estimated based on a Tier 2 approach. Emissions of PM emission are based on two different sets of emission factors for Wallonia and Flanders. As mentioned above, the mix of two independent data sets makes it difficult to ensure comparability of the Belgium inventory with those of other countries.

### **Accuracy and uncertainties:**

129. The IIR includes no information on agricultural key sources and the Party provides no uncertainty analysis. 4B1a, 4B1b, 4b8 and 4D1a are key sources of NH<sub>3</sub>, 4B8 is a key source of PM<sub>10</sub> and 4B1b and 4B9b are key sources of TSP. The ERT recommends that Belgium implements information on key sources and introduces uncertainty estimates.

130. In the previous Stage 3 in-depth review in 2009, Belgium indicated that QA/QC procedures had been undertaken for the Agricultural sector. However, no information has been included in the IIR and the ERT recommendation from 2009 is reiterated here. The ERT encourages Belgium to include a detailed description of QA/QC procedures in their IIR for the next inventory submission.

### **Improvement:**

131. The IIR states that no improvement is planned for Flanders; while Wallonia will investigate the implementation of recommendations from the 2013 EEM/EEA Guidebook.

132. The ERT acknowledges Belgium's efforts to implement the 2013 EMEP/EEA Guidebook regarding PM emissions, as mentioned during the 2014 Stage 3 review.

133. The ERT appreciates that Belgium plans to redesign the NH<sub>3</sub> model, so that it will be possible to distinguish between emissions and N excretion from dairy cattle and suckler cows, respectively.

### **Sub-sector Specific Recommendations.**

#### **Category issue 1: 4B1a – NH<sub>3</sub>**

134. The Tier 2 approach is used to estimate NH<sub>3</sub> emissions from dairy cattle. Emissions depend on N excretion, which depends on the milk yield. During the review Belgium provided milk yield data for both the Flemish and Walloon region. The ERT encouraged the Party to include information on milk yield and include time series in the next submission. The ERT noticed some differences in the milk yield for the two regions. The milk yield in Wallonia is higher, but at the same time N excretion is higher compared to Flanders.

#### **Category issue 2: 4B - PM**

135. PM emissions from 4B are based on emission factors, which for most of the animal categories are much lower compared with the default EFs in the 2009 and 2013 EMEP/EEA Guidebook. During the review Belgium informed the ERT that they were planning to use the latest updated 2013 EMEP/EEA Guidebook as much as possible in Wallonia for the next submission. In Flanders, the emission factors from the new 2013 EMEP/EEA Guidebook will be discussed with the scientific experts.

#### **Category issue 3: 4B8 and 4B9a – NH<sub>3</sub>**

136. NH<sub>3</sub> implied emission factors (IEF) for swine in Belgium are estimated to be 6.5 – 7.5 kg NH<sub>3</sub>/animal/yr for 1990-1999. From 2000-2012 the IEF is 4-3 kg

NH<sub>3</sub>/head/yr. Belgium argues that the significant decrease (around 40%) is due to the implementation of Manure Action Plans, which are focused on the reduction of manure surplus. A dramatic decrease can also be seen for laying hens - a 60% reduction from 1999 to 2000, and a small reduction for non-dairy cattle and dairy cattle. The ERT recommends double-checking the reduction of NH<sub>3</sub> emissions from swine and hens from 1999 to 2000. However, more information is needed in the IIR on this specific issue. The ERT encourages the Party to provide more information on exactly where this reduction takes place, i.e. feeding improvements, emission factors for housing, storage or application of manure.

#### **Category issue 4: 4B7 – NH<sub>3</sub>**

137. The ERT noted that Belgium used the notation key “IE” for NH<sub>3</sub> emissions from 4.B.7. (Mules and Asses). Belgium informed the ERT as part of the previous Stage 3 review (2009) that emissions from mules and asses were included under 4.B.6 (Horses). The ERT recommends that the Party includes information on this issue in the IIR.

#### **Sector-specific recommendations**

#### **Category issue 5: 4.B Manure management - NH<sub>3</sub>**

138. To ensure comparability with the 2013 EMEP/EEA Guidebook and other countries, it is important to estimate implied emission factors covering Belgium as one country, at least for the key sources 4B1a, 4B1b and 4B8. During the review Belgium provided these implied emission factors (IEF) based on emissions in the NFR tables and animal populations in the IIR. However, Flanders includes suckler cows in NFR category 4B1a dairy cattle, which results in a significantly lower IEF (17 kg NH<sub>3</sub>/head/yr). During the review Flanders responded that they would undertake extra efforts to redesign the NH<sub>3</sub> model, so that suckler cows could be reported in the right NFR category in future. The ERT commends the Party for doing so. The ERT also encourages the Party to include information on IEF in the next submission for all animal categories. ERT strongly recommends calculating the emissions for 4B1a from dairy cattle alone.

139. Belgium works with two different data sets for N excretion, and for the purpose of transparency and comparability, it needs to provide a weighted average for the Flemish and Walloon regions. The climate conditions are probably the same for both regions, but differences in the agricultural conditions can, of course, result in differences in emission data, e.g. different feed strategies resulting in different N excretion. The ERT encourages Belgium to provide a table in their IIR, showing the N excretion for each region, the weighted N excretion for Belgium and explain if N excretion differs from the default values or if it is different in the two regions. N excretion from suckler cows has to be included in 4B1b.

#### **Category issue 6: 4.D.1 Agricultural Soils- NH<sub>3</sub>**

140. NH<sub>3</sub> emissions from the use of synthetic fertilisers very much depend on the fertiliser type and especially the use of urea, which has a high emission factor. During the review Belgium provided information on the emission factors used for each

fertiliser type and the share of the different fertiliser types. ERT encouraged the Party to include this information in the IIR because it would help to explain the differences observed compared with the defaults. Wallonia plans to implement emission factors based on the new 2013 EMEP/EEA Guidebook.

## WASTE

### Review Scope:

Pollutants Reviewed		All		
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	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		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.

141. For Belgium data are available in the NFR tables for the years 1990 - 2012. Belgium reports emissions in seven sub-sectors (out of eight) in the Waste sector. In the 2014 IIR, emissions trends are presented for the period 1990-2012. Activity data are available for the years since 1990. The ERT commends Belgium for the work undertaken to ensure that the Waste sector (data submission and IIR) of the inventory is of good quality.

### **Transparency:**

142. Belgium is divided into three regions. All emissions for the Waste sector are calculated separately for each region. This creates problems with the transparency and consistency of the calculations, because different methods are used for estimating emissions. The ERT strongly encourages the three regions to apply one coherent approach.

### **Completeness:**

143. Belgium reports emissions in seven waste sub-sectors (out of eight) for the year 2012. The Party only reports "IE" for "6 C a Clinical waste incineration". The ERT commends Belgium for the good completeness of the inventory.

### **Consistency, including recalculation and time series:**

144. The emission times series presented in the IIR are not always consistent. A re-allocation of the emissions of waste incineration from 1A1c to 6C has taken place only in the Walloon region for the complete time series.

145. Modifications of the number of cremations for the year 2001 and 2004 were only done for the Brussels inventory. Explanations about emissions fluctuations are

not provided. Emission fluctuations depend on activity data fluctuations. The ERT encourages the Party to provide more information on the activity time series for each source.

**Comparability:**

146. Emission calculations methods are explained in the IIR. Emission data are only partly comparable because Belgium uses national emission factors for some sectors. The ERT encourages the Party to provide references for all EFs used in the compilation process.

**Accuracy and uncertainties:**

147. Information about the QA/QC plan and all procedures implemented for the Belgian inventory can be found in the NIR (National Inventory Report) submitted in March 2014 to the UNFCCC, more specifically in chapter 1.6. Information on the QA/QC plan including verification and treatment of confidentiality issues is included. The three regions have their own QA/QC procedures. The regional inventories are compiled by the Belgian Interregional Environment Agency which is responsible for the international emission reporting obligations.

148. For all emission measurements or estimations, a particular uncertainty can be determined that is inseparably related to the emission value.

**Improvement:**

149. No improvements are mentioned for the Waste sector in the 2014 IIR.

***Sub-sector Specific Recommendations.***

**Category issue 1: 6A - solid waste disposal on land**

150. NMVOC emissions from land disposal of solid waste are calculated in Flanders and in Wallonia. For each region a different approach is used to determine these emissions. The ERT encourages Belgium to use a consistent methodology for estimating emissions. The ERT recommends calculating emissions of other gases from solid waste disposal where EFs are available in the Guidebook.

**Category issue 2: 6B Wastewater handling**

151. In Belgium, emissions originating from septic tanks are estimated by multiplying the emission factor (an NH<sub>3</sub> emission factor of 750 g/person is used) by the number of inhabitants not connected to a municipal wastewater treatment plant. The ERT recommends that the Party provides references for the emissions factors used in the IIR. The NH<sub>3</sub> EF mentioned above is 2 times lower than the default factor stated in the 2013 EMEP/EEA Guidebook.

152. The ERT encourages Belgium to estimate other emissions from waste water treatment where EFs are available in the 2013 EMEP/EEA Guidebooks.

**Category issue 3: 6Ca, 6Cb, 6Cc – Waste incineration (clinical, industrial, municipal)**

153. A small part of the emissions from municipal waste incineration is still allocated to the Waste sector, category 6C, where waste is incinerated without energy recovery because of occasional problems in the energy recovery systems. In 2010, this represented 2% of the incinerated waste. The ERT encourages the Party to explain the kind of problems occurring in energy systems and how the 2% is estimated.

154. For clinical waste incineration emissions the Party reports “IE” as clinical waste incineration is allocated to category 6Cb (industrial waste incineration).

**Category issue 4: 6Cd Cremation**

155. Belgium reports emissions in this sub-sector. The ERT commends Belgium for using a national emission factor in this sector. Activity data are combined from all three regions. The ERT encourages Belgium to use the same methodology for emission calculations from all regions.

**Category issue 5: 6Ce Small-scale waste burning**

156. Belgium reports emissions in this sector only for the Flanders region. To estimate emissions, it is assumed that 5% of the average amount of municipal waste is burned in open barrels. The ERT encourages the Party to estimate the amount of open burned wastes for the other regions and include these calculations in the next submission.

**Category issue 6: Other wastes**

157. Belgium reports emissions from composting for this sub-sector. From the IIR is not clear for which regions the emissions have been estimated in this submission. References to the Walloon data are provided. The ERT encourages the Party to describe in more detail for which regions the emissions are estimated. The ERT recommends investigating new possible data sources for this sub-sector.

**LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING  
THE REVIEW**

1. Belgium's Stage 2 S&A report
2. Belgium's 2014 IIR
3. Belgium's 2009 Stage 3 report, BE\_Stage3\_Review\_Report\_2009.pdf
4. Response to questions raised during the review
5. SolventsQ1Q2-BCR.xlsx
6. SolventsQ1Q2-Flanders.xlsx
7. Solvents\_Q1Q2\_Flanders\_v2.xlsx
8. SolventsQ1Q2-Wallonia CONFIDENTIAL.xlsx
9. Questions BE Agriculture.docx
10. Questions BE General.docx
11. Questions BE Waste.docx