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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:**

**The Netherlands**

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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 – 2008 reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). HMs and POPs have been reviewed to the extent possible.
3. This report covers the stage 3 centralised reviews of the UNECE LRTAP Convention and EU NEC Directive inventories of the Netherlands coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 21<sup>st</sup> June 2010 to 25<sup>th</sup> June 2010 in Copenhagen, Denmark, and was hosted by the European Environment Agency (EEA). The following team of nominated experts from the roster of experts performed the review: Generalist – Kevin Hausmann (Germany), Energy - Nina Holmengen (Norway), Mobile Sources – Michael Kotzulla (Germany), Industry – Dušan Vácha (Czech Republic), Solvents - Valentina Idrissova (Kazakhstan), Agriculture +Nature - Romain Joya (France), Waste - Sophie Hoehn (Switzerland).
4. Chris Dore (United Kingdom) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

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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 Netherlands' inventory is in line with the EMEP EEA inventory guidebook and UNECE Reporting Guidelines. Its data submission and Informative Inventory Report are generally complete.

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

### **INVENTORY SUBMISSION**

7. The Netherlands have reported emissions for its protocol base years and a full time series up to 2008 (the latest year) for its protocol pollutants in the NFR09 format. The Netherlands also submitted an Informative Inventory Report (IIR). The Netherlands did not provide 2008 gridded emissions.

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

### **KEY CATEGORIES**

9. The Netherlands have compiled and presented in its IIR a "Tier 1" Key Category Analysis (KCA) for the level assessment. The ERT notes that in this analysis, categories are considered key for up to 95% of the total emissions, as opposed to the methodology in the EMEP/EEA Guidebook, which sets the limit to 80%. The ERT recommends that the Netherlands change their methodology for the key category analysis to that given in the Guidebook.

10. The Netherlands do not compile a KCA using the trend assessment. The ERT encourages the Netherlands to include level assessments for key categories in the next submission.

### **QUALITY**

#### ***Transparency***

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

12. For the sectoral chapters of the IIR, the ERT took note of some shortcomings. The description of methodologies was found to be very brief and of too little detail to allow for full transparency and thorough review. The ERT encourages the Netherlands to extend the information given in the IIR and highlights particular areas with a need for improvement in part B of this report.

### ***Completeness***

13. The ERT acknowledges the effort to which the Netherlands have gone to provide estimates of emissions for all sub-sectors and all pollutants reviewed. The Netherlands' inventory for the pollutants reviewed is generally complete.

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

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

15. The Netherlands have undertaken recalculations of the complete time series within their 2010 submission. Recalculations are not particularly large considering total emissions: most pollutants have recalculations of less than 5%, with few pollutants (dioxins, heavy metals 2007 only) having recalculations of more than 10%.

16. Recalculations are generally explained in the improvements section (chapter 9.2) of the IIR, but the ERT suggests that the link between the changes in methodology and the resulting emissions are established more clearly.

### ***Comparability***

17. The ERT notes that the inventory of the Netherlands is comparable with those of other reporting Parties. The allocation of source categories follows that of the EMEP/UNECE reporting Guidelines and NFR categories with appropriate use of notation keys. The ERT complements the Netherlands for this, and encourages the Netherlands to continue with this approach for national inventory calculation.

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

18. The Netherlands' submissions for NECD and CLRTAP do not differ significantly.

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

19. The Netherlands compiled a quantitative uncertainty analysis using both the tier 1 and the tier 2 approach, and presenting this clearly in its IIR.

20. As the ERT understands, uncertainty analysis is not performed annually, but in the framework of distinct research projects. The ERT encourages the Netherlands to incorporate the compilation of the uncertainty analysis into the annual cycle of inventory preparation.

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

21. The Netherlands have elaborated and implemented a quality assurance/quality control (QA/QC) plan in accordance with the EMEP/CORINAIR Guidebook (Inventory Management Chapter). This includes general QC procedures (tier 1) and sector-specific procedures. The Netherlands also show good practice in defining roles and responsibilities for inventory preparation, improvement and QA/QC.

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

22. For the 2008 reporting round, the Netherlands provided detailed responses to the comments and the questions on outliers of implied emissions factors identified in the stage 2 review as carried out by the CEIP. For 2009 and 2010 these answers are still pending. The ERT encourages The Netherlands to respond to the stage 2 findings and to work with the CEIP on resolving these issues.

### **AREAS FOR IMPROVEMENTS IDENTIFIED BY THE NETHERLANDS**

23. The Netherlands' IIR identifies several areas for improvement. These include:
24. Re-evaluation of kilometre driven statistics for the transport sector.
25. Improve NMVOC and PAH emission reporting from duty vehicles.
26. Revision of ammonia emissions from the agriculture sector.

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

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

27. The ERT recommends that the Netherlands align their methodology for the key category analysis to that given in the EMEP/EEA Guidebook.
28. The ERT encourages the Netherlands to include level assessments for key categories in the next submission.
29. The ERT encourages the Netherlands to extend the information given in sectoral chapters of the IIR. Details on the additional explanation the ERT would like to see added is given in part B below.
30. The ERT encourages the Netherlands to give more detailed information about the links between improvements of the methodologies and resulting recalculations in future IIRs.
31. The ERT encourages the Netherlands to incorporate the compilation of the uncertainty analysis into the annual cycle of inventory preparation in order to provide more up-to-date information.
32. The ERT encourages the Netherlands to respond to the stage 2 findings for 2009 and 2010 and to work with the CEIP on resolving the issues raised.
33. Recommended improvements relating to specific source categories are presented in the relevant sector sections of this report.

## SECTOR-SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

### ENERGY

#### Review Scope

Pollutants Reviewed		SO <sub>2</sub> , NO <sub>x</sub> , NMVOC, NH <sub>3</sub> , PM <sub>10</sub> & PM <sub>2.5</sub>		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1	total energy	All		Yes
1.A.1.a	Public electricity and heat production	All		
1.A.1.b	Petroleum refining	All + HM (partially)		Yes
1.A.1.c	Manufacture of solid fuels and other energy industries	All		
1.A.2.a	iron and steel	All		
1.A.2.b	non-ferrous metals	All+ CO		Yes
1.A.2.c	Chemicals	All		
1.A.2.d	pulp, paper and print	All		
1.A.2.e	food processing, beverages and tobacco	All		
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	All + HM (Partially)		Yes
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction		All	
1 A 3 e	Pipeline compressors?		All	
1.A.4.a.i	commercial / institutional: stationary	All		
1.A.4.a.ii	commercial / institutional: mobile?		All	
1.A.4.b.i	residential plants	All		
1.A.4.b.ii	household and gardening (mobile)		All	
1.A.4.c.i	Agriculture/forestry/fishing. stationary	All		
1.A.4.c.ii	off-road vehicles and other machinery?		All	
1.A.4.c.iii	national fishing?		All	
1.A.5.a	other, stationary (including military)		All	
1.A.5.b	other, mobile (including military, land-based and recreational boats)?		All	
1.B.1.a	coal mining and handling	All		Yes
1.B.1.b	solid fuel transformation			
1.B.1.c	other fugitive emissions from solid fuels)	All		
1 B 2 a i	Exploration, production, transport	NMVOC	All other (NA, for the most part)	
1 B 2 a iv	Refining / storage	NMVOC	All other (NA, for the most part)	
1 B 2 a v	Distribution of oil products	NMVOC	All other (NA, for the most part)	
1 B 2 b	Natural gas		All other (NA, for the most part)	
1 B 2 c	Venting and flaring			
1 B 3	Other fugitive emissions from geothermal energy production , peat and other energy extraction not included in 1 B 2			

General recommendations on cross-cutting issues.

**Completeness:**

34. The ERT consider reporting from the Netherlands in the stationary energy sector to be complete.

35. The Netherlands report few emissions as not estimated (NE). The ERT identified one sector reported as NE in the NFR tables, which proved to be erroneous use of notation keys; see sub-sector specific recommendations (Category issue 1).

36. The ERT has identified a few areas where further disaggregation would improve the completeness and accuracy of the inventory; see sub-sector specific recommendations (Category issues 5 and 7).

**Transparency:**

37. The Netherlands have provided a detailed inventory with only few emissions included elsewhere (IE) for the stationary energy sector in the reporting tables.

38. The ERT finds that the IIR does not provide the necessary level of detail to assess methodology, emission factors and activity data in the stationary energy sector. The IIR should stand on its own, and as far as possible include enough information to assess the methodology of the inventory.

39. The transparency of the inventory would be improved if more explanations were provided on country specific emission factors, especially when emission factors are considerably different from the default emission factors provided in the EMEP/EEA Guidebook. The ERT suggests that brief descriptions of deviations between country-specific emission factors and Guidebook default emission factors are included in the IIR.

40. The website [www.prtr.nl](http://www.prtr.nl) provides good and comprehensive information regarding the methodology used in the Dutch inventory, but documents for CLRTAP gases are not provided in English. The Netherlands are in the process of translating methodology reports into English, and the ERT welcomes this.

41. The recalculations are thoroughly described in the IIR. The ERT has found no change from the 2009 to the 2010 submission in the stationary energy sector that is not explained in the IIR. However, the ERT finds that the transparency of the inventory could be improved if more information about causes of dips and jumps were to be included; see sub-sector recommendations (Category issues 3 and 4)

**Accuracy:**

42. The ERT commends the Netherlands for having assessed the uncertainty of the emission estimates quantitatively. The ERT encourages the Netherlands to utilise these quantitative uncertainty estimates to identify areas for further improvement within the stationary energy sector.

43. The Netherlands have extensive QA/QC procedures, as well as internal and external QA checks. The ERT commends the Netherlands for these QA/QC routines.

**Comparability:**

44. The methods used in the Dutch inventory are, as far as can be assessed, consistent with the methods proposed in the EMEP/EEA Guidebook. Country-specific methods are, however, not described at a sufficiently detailed level in the IIR. The ERT recommends that this is addressed by including substantially more information in the IIR.

**Consistency:**

45. The ERT finds that the Dutch inventory has an overall high level of consistency in the emission time series. However, a few inconsistent time series have been identified; see sub-sector specific recommendations (Category issue 2 and 6).

**Recalculations:**

46. The recalculations in the Dutch inventory are thoroughly described in the IIR. The ERT has found no change from the 2009 to the 2010 submission in the stationary energy sector that is not explained in the IIR.

**Improvement:**

47. The ERT notes that the Netherlands have no improvements planned for the stationary energy sector, and suggests that the Netherlands implement QA/QC procedures to identify dips and jumps in the time series, and routines to adequately deal with these if they do not reflect actual variations in emissions. Also, the methodology description of the stationary energy sector in the IIR could be provided at a more detailed level, in order to increase transparency.

*Sub-sector Specific Recommendations..*

**Category issue 1: 1 B 3 Other fugitive emissions: All Pollutants**

48. The ERT notes that emissions in source 1 B 3 are reported as not estimated (NE), while table 1.5 in the IIR states that these emissions are not occurring (NO) or not applicable (NA). The Netherlands has specified that these emissions are not occurring in the Netherlands. The ERT suggests that the notation key in sector 1 B 3 be changed from NE to NO. The Netherlands have expressed their intention to change the notation key for the next submission.

**Category issue 2: 1 A 1 b Petroleum refining: NMVOC**

49. The ERT noted that emissions of NMVOC from 1 A 1 b were very low in 1999, compared to the emissions in the years prior to and after 1999. The Netherlands provided the information that this was the first year in which emission estimates from this source were based on environmental reports, and that the quality of such reporting might not have been up to standard. The ERT suggests that interpolation procedures be considered when data sources change and emission

estimates change in a manner that does not reflect changes in actual emissions. The Netherlands have expressed their intention to consider interpolation for years which lack consistency in the time series.

**Category issue 3: 1 A 2 b Non-ferrous metals : CO**

50. The ERT found that CO emissions from 1 A 2 b were considerably higher in 2002 than in the years before and after. The Netherlands has provided the information that the emissions from this sector are based on environmental reports from the industry, and that these reports are validated by the competent authority. The ERT suggests that an explanation on such dips and jumps be included in the IIR.

**Category issue 4: 1 A 1 b Petroleum refining: Cd and Hg**

51. The ERT identified Cd and Hg emissions from 1 A 1 b which were considerably lower in 2005 than in the years before and after. The Netherlands have provided the information that the emissions from this sector are based on environmental reports from Dutch refineries, and that these reports are validated by the competent authority. The ERT suggests that an explanation on such dips and jumps be included in the IIR.

**Category issue 5: 1 A 2 fi Stationary Combustion in Manufacturing Industries and Construction: Other: Hg (and all other pollutants)**

52. The ERT found that the implied emission factors for Hg from 1 A 2 f i were considerably higher in 2007 and 2008 than in previous years. The Netherlands have provided the information that these emissions might be biased, as process emissions could not be separated from combustion emissions. The ERT suggested that the national energy balance or some other data source should be explored to disaggregate combustion and process emissions from this sector. The Netherlands have provided the information that this has been tried several times, without any good data source being found. The ERT suggests that the Netherlands continue their search for a data source that disaggregates combustion and process emissions, and also that the national energy balance (or an equivalent data source) be used to ascertain that all stationary energy emissions are accounted for in the inventory.

**Category issue 6: 1 A 2 fi: Stationary Combustion in Manufacturing Industries and Construction: Other: SO<sub>x</sub>**

53. The ERT noted that the implied emission factor for SO<sub>x</sub> in 1 A 2 f i was very low in 2003 compared to the years before and after. The Netherlands provided information which indicated that this was due to an error in reporting in the NFR tables, and that the energy data in 1 A 2 f i and 1 A 2 f ii had changed places. The ERT suggests that this error be corrected for the next submission.

**Category issue 7: 1 B 1a Coal mining and handling: Particles**

54. The ERT noted that particle emissions from coal mining and handling (1 B 1 a) was reported as not occurring (NO) in the NFR tables, while the EMEP/EEA Guidebook includes a methodology for estimating particle emissions from storage and handling of coal. The Netherlands have provided the information that these emissions are reported as process emissions in category 2. The ERT suggests that

these emissions be disaggregated into particle emissions in 1 B 1 a and 2, or that the notation key be changed to IE.

## TRANSPORT

### 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>		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1 A 2 f ii	Other: Off-road construction vehicles and machinery	All		Yes
1 A 3 a i (i)	International Civil Aviation - LTO	All		
1 A 3 a i (ii)	International Civil Aviation - Cruise	All		
1 A 3 a ii (i)	Domestic Civil Aviation - LTO	All		Yes
1 A 3 a ii (ii)	Domestic Civil Aviation - Cruise	All		Yes
1 A 3 b i	Road Transport: Passenger Cars	All		
1 A 3 b ii	Road Transport: Light Duty Vehicles	All		
1 A 3 b iii	Road Transport: Heavy Duty Vehicles	All		
1 A 3 b iv	Road Transport: Mopeds & Motorcycles	All		
1 A 3 b v	Road Transport: Gasoline Evaporation	All		
1 A 3 b vi	Road Transport: Automobile tyre and brake wear	All		
1 A 3 b vii	Road Transport: Automobile road abrasion	All		
1 A 3 c	Railways	All		
1 A 3 d i (i)	International maritime navigation		All	
1 A 3 d i (ii)	International Inland Waterways		All	
1 A 3 d ii	National Navigation (Shipping)	All		
1 A 3 e	Pipeline Compressors	All		Yes
1 A 4 a ii	Commercial / institutional: Mobile	All		Yes
1 A 4 b ii	Residential: Household and gardening (mobile)	All		Yes
1 A 4 c ii	Agriculture/Forestry/Fishing: Off-road vehicles and other machinery	All		Yes
1 A 4 c iii	Agriculture/Forestry/Fishing: National fishing	All		Yes
1 A 5 b	Other, Mobile (including military, land based and recreational boats)	All		Yes
1 A 3	Transport (fuel used)		All	

### General recommendations on cross-cutting issues.

#### **Completeness:**

55. The ERT considers the Transport sector to be complete and comprehensive, encouraging the Party to further improve its inventory wherever necessary and possible, for example in terms of transparency and comparability.

#### **Transparency & Comparability:**

56. The ERT notes that there is only insufficient information provided about EF and IEF for some sub-categories within the Transport Sector. Therefore, the ERT warmly encourages the Party to include such information within future IIRs.

57. The ERT notes that the quality of the descriptions of the methodologies used for inventory compilation (at least within the Transport Sector) is very variable - with some methodologies explained with a lot of detail, and others with very little detail. Therefore, the ERT asks the Party to further develop the descriptions provided within

the IIR. For example, to provide separate data for the several sub-categories of the Road Transport as well as for all off-road categories to further improve the transparency and comparability of the inventory.

**Recalculations:**

58. The ERT commends the Netherlands for providing separate information on recalculations caused by re-allocations and due to improvements of the data available as well as the models used. Nevertheless, the ERT wants to encourage the Party to include more detailed information on the effect of the recalculations carried out for the emissions reported, by asking the Party furthermore to do this not only on an aggregated but, wherever possible, on a very disaggregated level, showing exactly what was recalculated where and why.

**Improvement:**

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

60. The ERT commends the Netherlands for providing good information on improvements that were carried out for the current submission as well as on planned improvements.

*Sub-sector Specific Recommendations.*

**Category issue 1: 1A3, 1A2fii, 1A4a ii, b ii, c ii, 1A5b - All Pollutants**

61. The ERT notes that there are no EFs or IEFs given within the IIR for these sub-categories. The Party has stated that emission factors that are used for the Dutch emissions inventory for transport are provided in Klein et al. (2009). (English version available at: <http://www.cbs.nl/en-GB/menu/themas/natuur-milieu/methoden/dataverzameling/overige-dataverzameling/2006-11-methoden-rapport-verkeer-eng1.htm>), adding that it is not planned to provide these emission factors in the IIR, given the large amount of emission factors used for the transport sector. The ERT thanks the Party for the information provided, encouraging the Party to include at least IEF on an aggregated level in their next IIR.

**Category issue 2: 1A3a ii (i) - All Pollutants**

62. The ERT notes that for this sub-category, Activity Data is reported as 'NO', but there are emissions reported. The Netherlands have stated that there is civil domestic aviation taking place, therefore the 'NO' notation key is incorrect, adding that there is no reliable information, however, on the number of domestic flights and the types of airplanes being used in the Netherlands. The air-polluting emissions of domestic aviation are therefore not calculated or reported separately. However, all emissions from national and international aviation are calculated and reported. In the Dutch emission inventory aviation emissions are reported separately for Schiphol Airport and for other airports. The emissions currently reported under 1A3a ii(i) are actually LTO emissions from other airports instead of emissions from domestic aviation. In future IIRs, this error will be corrected. The Party has also stated that the

reported activity rate from international aviation is incorrect, too, providing further information on the correct energy use at Dutch airports. -The ERT thanks the Party for the detailed information provided and welcomes its willingness to correct the stated errors.

**Category issue 3: 1A3a ii (i) – Ammonia**

63. In addition, the ERT notes that ammonia emissions are reported for 1A3a i (i) – International, LTO, but not for 1A3a ii (i) -Domestic, LTO where the notation key 'NO' is being used. The Netherlands stated that the implied emission factors are incorrect and that ammonia emissions from aviation will be reported as NE in the future. The ERT welcomes the correction planned by the Party.

**Category issue 4: 1A3b i – Pb**

64. The ERT notes that there are nearly constant values for Pb from this sub-category reported for the years 1998 to 2005. The Party stated that this trend is caused by the phasing out of lead in gasoline. The ERT recognises the Party's explanation, asking the Party to include such information which helps to understand trends in its future IIRs.

**Category issue 5: 1A3b i – Pb**

65. The ERT noted a gap (1998-2005) in the time series for Pb from 1A3bii, asking the Party whether there is new data available from 2006 onwards and if there are plans to recalculate back to 1998. According to the Party's answer this seems to be an error in the emissions database: Lead emissions from 1A3bii are available for the entire time series and will be provided with the next submission.

**Category issue 6: 1A3b iv – CO**

66. Furthermore, the ERT noted a jump for CO emissions from 1A3biv reported for 1994, asking the Party to clarify this issue. The Netherlands have stated that there has been a jump in activity data from motorcycles in 1994 as provided by Statistics Netherlands, and expressed their willingness to further try and clarify the cause of this increase. The ERT thanks the Party for the answer provided and warmly welcomes its intention to further investigate this issue.

**Category issue 7: 1A3e – all pollutants**

67. The ERT notes that in the NFR tables, all pollutants from 1A3e – Pipeline Compressors are reported as 'IE' although, on the other hand, in the IIR, there are no emissions reported in this category. The Party has pointed out that, as declared within the additional information sheet, the emissions from 1A3e Pipeline compressors are included in 1A2fi, 1A4cii and 1B2b. The ERT thanks the Party for clarifying this issue, and recommends including an explanation within the IIR.

## INDUSTRIAL PROCESSES

### 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>		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
2.A.1	Cement production	All + HMs		
2.A.2	Lime production		All	Yes
2.A.3	Limestone and dolomite use		All	Yes
2.A.4	Soda ash production and use		All	Yes
2.A.5	Asphalt roofing			
2.A.6	Road paving with asphalt			
2.A.7.a	Quarrying and mining of minerals other than coal			
2.A.7.b	Construction and demolition			
2.A.7.c	Storage, handling and transport of mineral products			
2.A.7.d	Other Mineral products	All		Yes
2.B		Diox		Yes
2.B.1	Ammonia production			
2.B.2	Nitric acid production		NO <sub>x</sub>	Yes
2.B.3	Adipic acid production			
2.B.4	Carbide production			
2.B.5.a	Other chemical industry	All		
2.B.5.b	Storage, handling and transport of chemical products			
2.C.1	Iron and steel production	All		Yes
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	All		
2.C.5.f	Storage, handling and transport of metal products			
2.D.1	Pulp and paper	All		Yes
2.D.2	Food and drink	All		Yes
2.D.3	Wood processing			
2.E	Production of POPs			
2.F	Consumption of HM and POPs (e.g. Electrical and scientific equipment)			
2.G	Other production, consumption, storage, transportation or handling of bulk products	All + HMs		Yes

### General recommendations on cross-cutting issues

68. The ERT notes that the Netherlands frequently use the IE notation key and provide the explanation that this is because of data confidentiality. The ERT is sympathetic to the restrictions that confidential data imposes. However, the ERT recommends that the Netherlands investigate ways of presenting aggregated data, or

data in some form, to provide transparency and to facilitate the inventory review process.

**Completeness:**

69. The ERT believes the industrial processes sector to be complete in terms of sector coverage. The ERT encourages the Netherlands to provide more details about methodology descriptions and the EFs used.

70. The ERT have identified an inconsistency with notation key use and information provided. The ERT encourages the Netherlands to improve notation key use and consistency e.g. by providing full and consistent "Additional information" for explaining the notation keys NE and IE.

**Transparency:**

71. The ERT notes that the transparency of the Netherlands inventory is currently not good, and can be improved by providing more information about methodologies and EFs. The ERT encourages the Netherlands to provide activity data which are not confidential and which are provided under other international obligations (e.g. under UNFCCC).

**Accuracy:**

72. The Netherlands have implemented the ISO 9001:2000 standard for a nationally based QA/QC model. The ERT encourages the Netherlands to provide more information about the practical implementation of the above mentioned systems and its results.

73. The ERT encourages the Netherlands to undertake uncertainty analysis for the industrial processes in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

**Comparability:**

74. The ERT have identified an issue with comparability. Many NFR categories and/or activity data are reported as IE and/or confidential. The ERT encourages the Netherlands to provide emissions, split up among NFR categories, as detailed as possible.

**Recalculations:**

75. The ERT notes that recalculation compared to the previous submissions is only briefly described and explained in the IIR. The ERT encourages the Netherlands to provide quantitative information on the impact of recalculation for individual sectors and pollutants.

**Improvement:**

76. The ERT notes that the Party intends to improve the heavy metals emission estimates from 2C1 Iron and steel production, and welcomes this improvement.

Sector-specific Recommendations

**Category issue 1: 2A2 Cement and lime production, 2 A 3 Limestone and dolomite use, 2 A 4 Soda ash production and use, 2B2 Nitric acid production**

77. The ERT identified an issue with notation key use and consistency between different reporting obligations (CLRTAP and UNFCCC). In response to the ERT's request for clarification, the Netherlands indicated that notation keys would be revised in the next submission, and the reasons for their use explained in the IIR.

**Category issue 2: 2C1 Iron and steel production**

78. The ERT identified an inconsistency between activity data reported under the CLRTAP and UNFCCC. The Netherlands have indicated that the information provided in the CRF/NIR is not correct and that information in the next submission will be corrected.

79. The Netherlands indicate that the priority heavy metals (Pb, Hg and Cd) have an incomplete time series for most categories (2B, 2C). The ERT acknowledges the Netherlands' intention to improve time series consistency for these pollutants and NFR categories, and welcomes this planned improvement.

**Category issue 3: 2D1 Pulp and paper, 2D2 Food and drink, 2 G Other production, consumption, storage, transportation or handling of bulk products**

80. The ERT notes that the category description for 2D1, 2D2 and 2G in the IIR is not sufficient and encourages the Netherlands to provide more information on: emission sources, used methodologies, EFs and activity data (where this is not confidential).

## SOLVENTS

### Review Scope

Pollutants Reviewed		NMVOC		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
3.A.1	Decorative coating application	NMVOC		Yes
3.A.2	Industrial coating application	NMVOC		Yes
3.A.3	Other coating application	NMVOC		
3.B.1	Degreasing	NMVOC		Yes
3.B.2	Dry cleaning	NMVOC		Yes
3.C	Chemical Products, Manufacture & Processing		IE (under 2B)	Yes
3.D.1	Printing	NMVOC		Yes
3.D.2	Domestic solvent use including fungicides	NMVOC		Yes
3.D.3	Other product use	NMVOC + DIOX, PAH, PM <sub>2.5</sub> , PM <sub>10</sub>		Yes

### General recommendations on cross-cutting issues

81. The Netherlands solvent emissions inventory is of good quality. The ERT noted that mainly bottom-up approaches were applied for emission estimates. However, the ERT recommends that Netherlands improve the transparency of the IIR by adding activity data and EFs for the sector.

#### **Completeness:**

82. The ERT considers the solvent sector is complete.

#### **Transparency:**

83. The solvent chapter of the IIR is not transparent enough in describing the methods used and assumptions made for estimating emissions. It provides general information on the methods used only for a few key sources (3A1, 3D2). For other sources nothing is included on the methodologies in the IIR. Also, no activity data are provided in the NRF tables. The ERT recommends that the Netherlands improve the transparency of the IIR and NRF tables by including descriptions of methodology and assumptions, particularly where country-specific methodologies were used.

#### **Accuracy:**

84. The Netherlands have conducted a quantitative uncertainty assessment of the emissions estimate using the Tier 1 method and expert judgements. Uncertainty of NMVOC emissions is given as  $\pm 25\%$ . The ERT encourages the Netherlands to develop the uncertainty assessment, and present uncertainties for activity data and EFs separately.

#### **QA/QC procedures:**

85. The QA/QC procedures are an integrated part of the inventory preparation process, and are of a good standard.

**Comparability and consistency:**

86. The Netherlands mostly use a bottom-up approach to estimate emissions in the solvents sector. The emission estimates in the solvent sector are consistent as far as can be determined.

**Recalculations:**

87. No recalculations were undertaken for the solvent sector.

**Improvement:**

88. No specific improvements are planned for the solvent sector. The ERT would encourage the Netherlands to use the uncertainty assessment to indicate priorities for improvement, even if other sectors are considered to be of higher priority than the solvent sector.

*Sector-specific Recommendations*

**Category issue 1: 3A Paints and Coatings – NMVOC**

89. The IIR states that emissions from paint use decreased from 84.7 Gg to 21.8 Gg for 1990-2009, mainly due to the reduction of the average VOC content in paints. However, no activity data are provided to support that trend. During the review, the Netherlands presented tables with activity data and solvent content in paints. The ERT recommends that the Netherlands improve the transparency of the IIR by including activity data and EFs used for emissions estimates, and provide supporting text for the emission trends.

**Category issue 2: 3B Degreasing and Dry Cleaning – NMVOC**

90. NMVOC emissions from 3B-Degreasing are constant for 2000-2008 and the IIR explains that no activity data are available for the years 2000 onwards. The emission trend shows that NMVOCs from degreasing rose from 3.08 Mg to 3.54 Mg during 1995-1999 with some decrease to 2.9 in 2000. It is also stated in the IIR that the Netherlands plan to consider a recalculation of emissions in this category in the next submission. The ERT recommends that the Netherlands collect activity data for 2000 onwards if possible, and report recalculated emissions for the relevant period to avoid under/overestimations of NMVOCs in this category. If new activity data cannot be sourced, the ERT recommends that the Netherlands provide supporting text to explain why reporting a constant emission is considered the most appropriate extrapolation method.

**Category issue 3: 3C Chemical Products – NMVOC**

91. NMVOC emissions from 3C Chemical Products are reported as Included Elsewhere (under 2B – Industrial Processes, Chemical industry). Moreover, in the IP chapter it is written that "...due to allocation problems, all emissions from the chemical industry (2B) are reported in category 2B5a". Because 2B category is a key

category for several pollutants, disaggregation of reported emissions is desirable. The ERT encourages Netherlands to improve the inventory, to allow the reporting of emissions from production and processing of related chemical products under 3C.

**Category issue 4: 3D Other Product Use – PAH, DIOX**

92. Category 3D3 also includes the emissions from the use of creosoted wood products (PAH) and dioxin emissions from PCP-treated wood. This is the largest source of dioxin emissions in the Netherlands. The emissions are estimated by using a "specific Dutch method". During the review the Netherlands explained that, based on a 1995 study, the amount of wood used in the Netherlands is available. Further experts calculate the square metres which are in contact with the air and, using an emission factor, estimate emissions. Since 1999 the use of impregnated woods has been forbidden so that emissions have decreased since then. The ERT recommends that the Netherlands include this explanation in their IIR to improve transparency.

**AGRICULTURE.**Review Scope:

Pollutants Reviewed		NO <sub>x</sub> , NMVOC, NH <sub>3</sub> , PM <sub>10</sub> & PM <sub>2.5</sub>		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	All		Yes
4 B 1 b	Cattle non-dairy	All		Yes
4 B 2	Buffalo	All		
4 B 3	Sheep	All		
4 B 4	Goats	All		
4 B 6	Horses	All		Yes
4 B 7	Mules and asses	All		
4 B 8	Swine	All		Yes
4 B 9 a	Laying hens	All		Yes
4 B 9 b	Broilers	All		Yes
4 B 9 c	Turkeys	All		
4 B 9 d	Other poultry	All		
4 B 13	4 B 13 Other	All		
4 D 1 a	Synthetic N fertilisers	All		Yes
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products	All		
4 D 2 a	Off-farm storage, handling and transport of bulk agricultural products	All		
4 D 2 c	N excretion on pasture range and paddock unspecified		All	
4 F	Field burning of agricultural wastes		All	
4 G	Agriculture other(c)	All		
11 A	(11 08 Volcanoes)		All	
11 B	Forest fires		All	

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

93. The agriculture inventory of the Netherlands covers the most important sources of emissions with the exception of estimates of emissions of NO<sub>x</sub> from all the NFR codes from the agriculture sector. The EMEP/EAA Guidebook provides methodologies for the emission estimate of NO<sub>x</sub> emissions from the excreta of livestock and from agricultural soils (related to nitrogen fertilisers applied). The Netherlands' inventory does not cover PM emissions from horses either. The ERT thanks the country for its willingness to assess the emissions from these sources for future submissions, using default factors from the EMEP/EAA Guidebook.

**Transparency:**

94. Although the calculation methods seem to be elaborate, the Netherlands chose to provide a very short agricultural chapter in their IIR, with very brief descriptions of the methods used and the EFs used (referring most of the time to scientific publications). The ERT strongly recommends that the Netherlands provide

activity data, EFs and emissions related to each NFR source to improve the transparency of the methods and figures employed.

95. The ERT also identified issues in the current use of notation keys for NH<sub>3</sub>. 4B2 Buffalo, 4B7 Mules and Asses are reported as NO. The ERT suggests that these might be present in the Netherlands, even if the numbers are small. Therefore NE or IE is more appropriate. 4D2c Pasture Range and Paddock is also reported as NO, and the ERT suggests that an emission estimate, NE or IE would be more appropriate here. The ERT also encourages the Netherlands to use the appropriate notation keys for NO<sub>x</sub> emissions. The notation key "NE" would be more appropriate than "NO" because emissions exist but are not assessed by the country. The ERT also strongly encourages the Netherlands to explain these notation key choices in paragraph 1.8 of the Dutch IIR.

96. The ERT encourages the Netherlands to provide activity data for 4D1a (synthetic fertiliser in kg N/year) and to disaggregate the quantity applied by type of fertiliser in the IIR, because EFs depend on the type of nitrogen fertiliser applied. This activity should be provided for the whole time series, in order to understand emission trends from 4D1a.

**Accuracy:**

97. The IIR explains the general QA/QC and verification plan for the whole inventory. The ERT encourages the Netherlands to explain sector specific QA/QC procedures for sectors 4B, 4D and 4F in future IIR submissions.

98. The Netherlands do not provide uncertainty analysis for the agriculture sector in the IIR, although the ERT notes that quantitative analysis is undertaken, as explained in part 1.7 of the IIR. The Dutch IIR only provides references (Van Gijwijk et al., 2004) in their IIR. The figures from this publication should be reported in the IIR to allow a clearer understanding. Thus, the ERT encourages Netherland to provide detailed uncertainty analysis for the agriculture sector in the IIR, at least for the main gases, in order to help inform the improvement process and to provide an indication of the reliability of the inventory data.

**Recalculations:**

99. ERT notes that the time series are not consistent for NH<sub>3</sub> emissions from horses (4B6). Indeed, there is emission fluctuation between 2004 and 2005, although the activity, is relatively stable. The Netherlands have informed the ERT that this is due to the fact that emissions from animal manure applied to nature and gardens are included in the emissions from horses. Before 2005, these emissions were included in the emissions of cattle, pigs and poultry. ERT notes that recalculations have not been undertaken and thanks the Netherlands for expressing their willingness to make necessary recalculations as far back as possible in time for the next submission.

**Improvement:**

100. The ERT notes that the Netherlands have made recent improvements by assessing NH<sub>3</sub> emissions from horses. This has resulted in an increase of ammonia emissions. There are no planned improvements for the agricultural sector. However, the ERT strongly recommends improving the agriculture inventory by providing NO<sub>x</sub> emissions.

Sector specific recommendations

**Category issue 1: 4D1 Agricultural Soils:- NH<sub>3</sub>**

101. The ERT encourages the Netherlands to provide activity data for 4D1 with detailed information on the breakdown of national fertiliser consumption into the relevant compounds in use, which are accounted for in emission estimates under 4D1 Direct Soil Emissions.

## WASTE

### 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> , TSP, DIOX, PAH, Hg, Pb, CO		
Years		1990 – 2008 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
6.A	Solid waste disposal on land	All		Yes
6.B	Waste-water handling	All		Yes
6 C a	6 C a Clinical waste incineration (d)	All		Yes
6 C b	Industrial waste incineration (d)	All		Yes
6 C c	Municipal waste incineration (d)	All		Yes
6 C d	Cremation	All		Yes
6 C e	Small scale waste burning	All		Yes
6.D	other waste (e)	All		Yes
7	Other	All		Yes

### General recommendations on cross-cutting issues.

102. The CLRTAP submission from the Netherlands regarding Chapter 6 (Waste) and 7 (Other) presents emissions for major pollutants, and follows the EMEP/EEA Guidebook 2009. Trends, key sources and improvements are documented. However, the IIR does not present EFs and activity data for all sources. So, the emission calculation methodology cannot be followed in all cases. The processes included in each sector are not mentioned, meaning that there is a lack of transparency.

103. The ERT has also noticed that the choice of source category in the Netherlands submission is not always entirely consistent with the 2009 EMEP/EEA Guidebook. Details are included in the sector-specific paragraphs below.

#### **Completeness**

104. The inventory regarding Waste is not complete at the moment. Improvements are recommended by the ERT, and are detailed in the sections below.

#### **Transparency**

105. The Netherlands IIR provides some information about emission sources for Waste. However, descriptions of the methodologies for calculating emissions, activity data and EFs are totally missing. The ERT strongly encourages the Netherlands to continue developing chapter 6, and to include much more detailed explanations on activity data and methodologies, with tables of activity data and EFs. In addition, the ERT would like to see a list of the processes which are included, or not included, in each category and sub-category of the Waste chapter.

#### **Accuracy**

106. The Netherlands used a Tier 1 default approach for all sources following the recommendation from the EMEP/EEA Guidebook 2009. The Netherlands have provided a clear picture of the key sources in the IIR for the Waste sector. The

Netherlands provide an uncertainty analysis and basic QA/QC checks for the waste sector.

### **Comparability**

107. The IIR and NFR tables presented by the Netherlands are easily comparable to other IIR and NFR Tables. The NFR Tables and NECD report the same amount of emissions which is consistent.

### **Recalculations**

108. All recalculations and improvements made in the 2010 submissions are explained, but not clearly presented for each sector. The ERT commends Netherlands for detailed (using NFR Codes) reporting in each chapter.

### **Improvement**

109. No specific improvements were reported in the IIR for waste sectors. The ERT strongly suggests that the Netherlands include information on improvements in the IIR for each Chapter - whether there are any planned or not, giving the reasons for the relevant choices.

### **Category issue 1: 6A Solid waste disposal on land: All pollutants except NMVOC and NH<sub>3</sub>**

110. Only NMVOC emissions are reported in category 6A. Following questions from the ERT, the Netherlands confirmed that emissions of NH<sub>3</sub> were not estimated. The ERT recommends that the Netherlands estimate NH<sub>3</sub> emissions following information from the EMEP/EEA Guidebook. Moreover, SO<sub>x</sub> and NO<sub>x</sub> directly emitted from landfill sites (coming from flaring or from open burning) are not reported, and no information was found in the IIR. As these emissions are expected to occur, the ERT recommends that the Netherlands estimate them for the sake of completeness. If emission estimates are not available for the next submission, then the notation key should be changed from "NA" to "NE".

### *Sector-specific recommendations*

### **Category issue 2: 6B Wastewater handling: All pollutants**

111. No emissions are reported in category 6B (the notation keys NA or NO are used). Following questions from the ERT, the Netherlands mentioned the presence of waste-water handling in the country, explaining that the whole of the NL is connected to the sewage system (Question 2). Consequently, the ERT strongly recommends improving the IIR and NFR Tables by providing emissions for this sector. The Notation keys should also be changed if emissions are not reported in the next submission - "NA" should be replaced by "NE".

**Category issue 3: 6C Waste incineration: All**

112. All waste incineration emissions from the Netherlands are reported under 6Cc (with the exception of 6Cd), which is not consistent with the LRTAP/UNECE Guidebook 2009. Sub-categories 6Ca, 6Cb, 6Cc, 6Ce should be used, in accordance with the Guidebook. In addition, activity data, EFs and methodologies used for calculating these emissions should be reported in the IIR. Therefore, the ERT recommends that the Netherlands improve their inventory by using the sub-categories of 6C. Moreover, the Netherlands replied to an ERT question stating that *“This is an omission/fault in the IIR. In former years we included the waste combustion emissions in 1A1A as we do in the NIR. This year we decided to report the emissions as requested in CLRTAP in the waste incineration sector 6. This was done because the required substances in the IIR are typical for incineration and the current reporting now explicitly shows the emissions from waste incineration which in former years were hidden between the emissions from the energy sector”*. The ERT did not completely understand this explanation, but wishes to remind the Netherlands that emissions of waste incineration in plants with energy recovery definitively belong to Chapter 1, and emissions coming from plants without an energy recovery system have to be reported in Chapter 6 and in the right sub-category. The ERT recommends that more detailed explanation should be included in the IIR, for example which categories the sources are allocated to.

**Category issue 4: 6Ca, 6Cb, Clinical and Industrial waste incineration: All**

113. No emissions were reported from the Netherlands in these subcategories, because they are allocated to 6Cc. The ERT asks the Netherlands to improve reporting and to use the appropriate sub-categories.

**Category issue 7: 6Cd Cremation: All pollutants but PM<sub>10</sub>, PM<sub>2.5</sub>, TSP**

114. The cremation of animal carcasses or human corpses also causes NO<sub>x</sub>, SO<sub>2</sub>, CO, etc. emissions. These emissions are not related to the fuel used for the furnace (i.e. gas), which are reported in Energy Chapter (1), but they are related to the carcasses or corpses (EFs are available in the Guidebook). Therefore, these emissions have to be reported in 6Cd and not in Chapter 1A4ai. The ERT asks the NL to clarify the NFR Tables and the IIR.

**Category issue 8: 6Ce Small-scale waste burning: All Pollutants**

115. This sub-category is not complete, no emissions were reported from the Netherlands, it was assumed that open burning of agricultural waste does not happen anymore because it is banned. Moreover, some illegal waste may happen in private areas. The ERT strongly encourages the Netherlands to make estimations of these emissions because they are not negligible, particularly for PMs.

**Category issue 9: 6D Other Waste(s): All pollutants**

116. No information on the sources included in 6D is included in the IIR, and the ERT recommends that details are added. The Netherlands has informed the ERT that emissions from the discarding of refrigerators/freezers are allocated to 6D. Whilst this seems like a sensible choice, 6D is actually for more biologically orientated waste sources. 2F is actually the best place to report these emissions to

be consistent with the 2009 EMEP/EEA Guidebook (although it initially looks like a rather strange choice).

**Category issue 10: 7 Other (new sector from Guidebook 2009): All pollutants**

117. The ERT was pleased to see emissions reported in Chapter 7 and encourages Netherlands to continue improving these estimates. Two sources were identified as having been allocated to the wrong NFR category. Smoking of cigarettes and lighting of fireworks are currently reported in Chapter 7, but should be reported in Chapter 3D3. The ERT asks the Netherlands to make this change in time for the next submission.

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

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

The Netherlands-Energy-Stationary\_resolved.doc

NL\_Transport\_24-0610\_responseGG\_v2.doc

Netherlands-IP-10-06-14-Q1v2\_NLRESPONSE\_10-06-22-Q2\_24-06-2010ResponseNL-Final.doc

Netherlands-Solvents-24-06-2010Q2\_24-06-2010ResponseNL\_KP.doc

NL\_Agriculture\_17\_06\_2010Q1 responseLEI\_SvdS\_BJ.doc

Netherland\_Waste\_230610\_Q2\_responseBJ.doc

2. Netherlands IIR, 2008

3. Netherlands CRF, 2010

4. Netherlands NIR, 2010

5. Emission factors that are used for the Dutch emissions inventory for transport:

Klein et al. (2009), URL: <http://www.cbs.nl/en-GB/menu/themas/natuur-milieu/methoden/dataverzameling/overige-dataverzameling/2006-11-methoden-rapport-verkeer-eng1.htm>)

6. Trends for heavy metals (not included in IIR 2010):

The Netherlands' IIR 2009

7. NIR for the Netherlands and the dataset they provided during the review (see below).

Sector	Year	Paints used (ton)	VOC-content %
Industrial applications	2000	38074	41.5
	2001	38593	38.7
	2002	36101	37.6
	2003	20630	56.9
	2004	32940	34.0
	2005	31263	34.1
	2006	33217	28.6
	2007	34409	29.8
	2008	33318	30.5
Construction	2000	133782	10.5
	2001	133458	8.5
	2002	125983	8.8
	2003	124056	6.9
	2004	108207	6.5

	2005	121228	6.7
	2006	124365	6.2
	2007	128808	6.1
	2008	122588	6.6
DIY	2000	86566	7.7
	2001	75822	8.0
	2002	75050	7.2
	2003	70120	6.7
	2004	68824	5.5
	2005	71300	5.8
	2006	65309	5.9
	2007	66873	5.4
	2008	61800	5.6
Car repair	2000	6275	49.2
	2001	6935	44.5
	2002	6657	44.5
	2003	6846	44.9
	2004	6467	46.6
	2005	5757	45.6
	2006	5778	41.0
	2007	5715	42.3
	2008	6142	39.1