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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:**

MOLDOVA

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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*'⁽¹⁾ – hereafter referred to as the 'Methods and Procedures' document.
2. This annual review has concentrated on SO₂, NO_x, NMVOC, NH₃, plus PM₁₀ & PM_{2.5} as well as Persistent Organic Pollutants (POPs) for the time series years 1990 – 2010, reflecting current priorities from the EMEP Steering Body and the Task Force on Emission Inventories and Projections (TFEIP). Heavy Metals (HMs) 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 Moldova coordinated by the EMEP emission centre CEIP acting as review secretariat. The review took place from 25th – 29th June 2012 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 – Melanie Hobson (UK), Energy - Stephan Poupa (Austria) and Emmanuel Deflorenne (France), Transport & Mobile Sources – Jean-Marc Andre, Industry – Kristina Saarinen (Finland), Solvents – Ioannis Sempos (Greece), Agriculture & Nature - Bernard Hyde (Ireland), Waste – Kees Peek (The Netherlands).
4. Chris Dore (United Kingdom) was the lead reviewer. The review was coordinated by Katarina Marečková (EMEP Centre on Emission Inventories and Projections - CEIP).

¹ Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories reported under the Convention and its Protocols. Note by the Task Force on Emission Inventories and Projections. ECE/EB.AIR/GE.1/2007/16 <http://www.unece.org/env/documents/2007/eb/ge1/ece.eb.air.ge.1.2007.16.e.pdf>

PART A: KEY REVIEW FINDINGS

1. Moldova did not provide an Informative Inventory Report (IIR). Also, at the time of the review, Moldova had not provided a 2012 NFR submission. Therefore, the completeness, comparability, consistency and accuracy of the inventory could not be assessed.
2. During the review week, Moldova did not respond to any of the questions provided by the ERT. Since the review took place, Moldova has provided an NFR submission (at 24 July 2012), and the ERT commends Moldova for making progress with this. However, it has not been possible to review this submission.
3. The ERT assessed Moldova's previous inventory submission, and this appears to be partly in line with the *EMEP EEA Inventory Guidebook* and the UNECE Reporting Guidelines. It was considered to be generally complete for the years that were reported. But, since no IIR was submitted, the ERT could not review the data properly. **All of the comments in this report relate to previous year's submission.**

INVENTORY SUBMISSION

4. Prior to the review week in 2012, Moldova did not submit a CLRTAP inventory, so data for 2010 was not available. Moldova also did not provide an IIR (Informative Inventory Report) in 2012. During the review, Moldova indicated that they would submit recalculations for the whole time series of the CLRTAP pollutants. This has since been provided, but the information was submitted too late to be reflected in this report. However, the ERT welcomes the progress being made by Moldova in submitting data, and recommends that Moldova submit the NFR tables and IIR in a timely manner according to the deadlines set by the workplan for the implementation of the CLRTAP.
5. Moldova did not respond to any of the questions circulated by the ERT. This, together with the lack of an IIR, meant that a full review could not be undertaken. Despite this, it was possible to make a number of recommendations and these are presented in the chapters below.
6. The ERT strongly encourages Moldova to prepare and submit an IIR following the outline for an IIR as defined in the UNECE Reporting Guidelines (Recommended Structure for Informative Inventory Reports, Annex VI to ECE/EB.AIR/97, Version: 30 Sept 2009), for the next submission.

KEY CATEGORIES

7. Due to the absence of an IIR the ERT was not able to evaluate the key category analysis and whether it is used in the prioritization of improvements in the inventory.

QUALITY

Transparency

8. The ERT has noted that the estimates of the emissions are not reported transparently, since no IIR was submitted that contains information about the methods, activity data, data sources and assumptions used for the emissions estimation. The ERT could therefore not fully review the inventory of Moldova. Moreover, the activity data were not completely reported in the NFR tables, since the ERT has found that Moldova provided emissions for some categories, without reporting the respective activity data. The ERT recommends that Moldova include comprehensive activity data and methodology descriptions in their next IIR and NFR submission.

9. The ERT has found that Moldova reported in the NFR tables some source categories as IE and NE, without providing reasons for their use. The ERT recommends that whenever Moldova uses the notation keys NE and IE that an explanation of their use per source category is provided both in the "Additional Info" worksheet - Tables F1 and F2 of the NFR tables and the IIR.

10. Moldova uses zero values in the NFR table for some sources. The ERT has also found that Moldova has used notation keys inappropriately throughout the agriculture sector. The ERT recommends that Moldova review the use of notation keys and use the appropriate notation keys (e.g. NO where emissions are "Not Occurring", NE where emissions are "Not Estimated" and IE where emissions are "Included Elsewhere") for reporting where estimates are not available or necessary.

Completeness

11. Moldova's inventory seems to be generally complete for the years that were reported. But, since no IIR was submitted, the ERT cannot assess properly the completeness of the inventory. The ERT has also noted that Moldova has not reported emission estimates for the year 2010. The ERT strongly recommends that Moldova submit an IIR and an NFR table for the 2010 inventory.

12. The ERT notes that Moldova did not provide a complete time series of emissions. For most categories, estimates for the following years are missing: 1990-1999, 2007 and 2010. The ERT recommends that Moldova provides a complete time series. If the required data are limited, Moldova could use data from databases of international organizations or countries with similar national circumstances and / or apply simple drivers such as population figures or GDP to provide an estimate of emissions.

Consistency, including recalculations and time series

13. In the NFR tables for some source categories, the use of the notation keys varies between pollutants for the same sector as explained in the chapters below. The ERT recommends that Moldova review the use of notation keys and use the appropriate notation keys in a consistent manner.

14. The ERT noted that no recalculations were reported. The ERT encourages Moldova to report information on this in subsequent IIR reports.

Comparability

15. Moldova reported emission estimates in the NFR format, which made a limited comparison with other countries possible. However, due to the absence of an IIR, the ERT could not further study the comparability with other inventories or the consistency with the EMEP/UNECE Reporting Guidelines. The ERT recommends that Moldova include comprehensive activity data and methodology descriptions in future IIR submissions.

Accuracy and uncertainties

16. The ERT notes that no information on an uncertainty analysis has been provided. The ERT recommends that Moldova include an uncertainty analysis and information on how the uncertainty analysis is used to prioritize further improvements in the next IIR submission.

Verification and quality assurance/quality control approaches

17. The ERT could not check the QA/QC procedures as no IIR is available. The ERT recommends that Moldova develop QA/QC procedures and provide a description in the IIR.

PART B: RECOMMENDATIONS FOR IMPROVEMENTS TO THE PARTY

CROSS-CUTTING IMPROVEMENTS IDENTIFIED BY THE ERT

18. From the reports provided over the last several years, it appears that there are not sufficient institutional and procedural arrangements in Moldova to ensure regular reporting of emission inventories of an acceptable quality by the current submission deadline. The inventory has not been provided on time, and an IIR was not submitted at all. The ERT reminds Moldova of their commitments under the LRTAP Convention, and strongly recommends that they report emissions annually by 15 February as requested by the UNECE Reporting Guidelines ECE/EB.AIR/97² and that they improve the transparency of the submission by providing the documentation in a standardised Informative Inventory Report (IIR).

19. The ERT recommends that Moldova also report information on LPS as requested by the UNECE Reporting Guidelines.

20. The ERT encourages Moldova to develop an improvement plan, focusing on the improvement of transparency, completeness and time series consistency. The ERT encourages Moldova to provide details on this in an IIR.

² http://www.ceip.at/fileadmin/inhalte/emep/reporting_2009/Rep_Guidelines_ECE_EB_AIR_97_e.pdf

SECTOR SPECIFIC RECOMMENDATIONS FOR IMPROVEMENTS IDENTIFIED BY ERT

ENERGY

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , PM ₁₀ & PM _{2.5} , Dioxin, PAH		
Years		2000 – 2010		
NFR Code	CRF_NFR Name	Reviewed ⁽¹⁾	Not Reviewed	Recommendation Provided
1.A.1.a	public electricity and heat production	x		
1.A.1.b	petroleum refining	-		
1.A.1.c	Manufacture of solid fuels and other energy industries	-		
1.A.2.a	iron and steel	x		
1.A.2.b	non-ferrous metals	x		
1.A.2.c	chemicals	-		
1.A.2.d	pulp, paper and print	-		
1.A.2.e	food processing, beverages and tobacco	x		
1.A.2.f.i	Stationary Combustion in Manufacturing Industries and Construction: Other (Please specify in your IIR)	x		
1.A.2.f.ii	Mobile Combustion in Manufacturing Industries and Construction: (Please specify in your IIR)	x		
1 A 3 e	Pipeline compressors ?	x		
1.A.4.a.i	commercial / institutional: stationary	x		
1.A.4.a.ii	commercial / institutional: mobile ?			
1.A.4.b.i	residential plants	x		
1.A.4.b.ii	household and gardening (mobile)			
1.A.4.c.i	Agriculture/forestry/fishing. stationary	x		
1.A.4.c.ii	off-road vehicles and other machinery?	x		
1.A.4.c.iii	national fishing?	-		
1.A.5.a	other, stationary (including military)	-		
1.A.5.b	other, mobile (including military, land based and recreational boats)?	-		
1.B.1.a	coal mining and handling	-		
1.B.1.b	solid fuel transformation	-		
1.B.1.c	other fugitive emissions from solid fuels)	-		
1 B 2 a i	Exploration, production, transport	x		
1 B 2 a iv	Refining / storage	x		
1 B 2 a v	Distribution of oil products	x		
1 B 2 b	Natural gas	x		
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	-		

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.

(1) A "-" indicates that no emissions have been reported.

General recommendations on cross-cutting issues.

21. Moldova provides estimates for the years 1990, 2000-2006, 2008 and 2009. The ERT recommends that a complete time series 1990 onwards is provided.

22. Manufacturing industries (NFR 1.A.2) is only reported for category 1.A.2.e and 1.A.2.f. Emissions from 1.A.2.a are reported as "IE". The ERT recommends that Moldova aim to report emissions for each of these sources.

23. Almost all 1.A sub-categories show a strong decreasing trend between 1990 and 2000. The ERT recommends that thorough explanations for this decrease are included in the IIR for the next submission.

Transparency:

24. No IIR was provided, so the ERT had no information on the underlying methodologies that had been used by Moldova.

Completeness:

25. The ERT considers the energy sectors 1.A and 1.B to be complete for the reporting year 2009.

Consistency including recalculation and time series:

26. Moldova reports the categories 1A1c and 1A2b,c as "not occurring" and all pollutants of category 1A2d as "not applicable", which suggests an incorrect use of notation keys.

27. Moldova did not provide an IIR with information on recalculations.

Comparability:

28. Moldova did not provide an IIR with information on methods.

29. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Improvement:

30. Moldova did not provide an IIR with information on planned improvements.

Sub-sector Specific Recommendations.

Category issue 1: 1A1a; 1A4ai; 1A4bi; 1A4cii – NOX, SOX, PM10

31. The ERT has found that Moldova reports remarkable reductions of NOx, SOx and PM₁₀ emissions between 1990 and 2000. It is not clear how these large reductions can be achieved for all sectors. ERT recommends explaining or correcting the data. See the following table:

Gg	1 A 1 a			1 A 4 a i			1 A 4 b i		
	NOx	SOx	PM10	NOx	SOx	PM10	NOx	SOx	PM10
1990	50,90	75,56	5,89	2,52	20,71	12,50	6,25	60,16	30,88

2000	13,09	2,25	0,17	0,42	3,54	1,78	1,15	3,53	1,81
2001	7,04	2,90	0,34	0,38	3,16	0,97	0,98	2,28	1,12
2002	6,35	2,23	0,23	0,53	4,17	2,04	1,34	4,50	2,21
2003	9,37	7,71	0,82	0,64	4,58	2,15	1,37	3,79	1,73
2004	15,25	3,13	0,24	0,52	2,95	2,15	1,24	3,28	2,19
2005	4,21	3,45	0,49	0,46	1,93	1,07	1,09	0,10	3,19
2006	4,17	3,46	0,49	0,42	1,43	1,11	1,12	2,18	3,55
2007	-	-	-	-	-	-	-	-	-
2008	4,56	0,22	0,05	0,55	1,37	0,24	2,40	1,42	1,92
2009	3,96	0,19	0,05	0,72	1,80	0,31	2,54	1,50	2,03

Category issue 2: 1A1a Public Electricity production and Heat – NOx

32. The ERT has found that Moldova reports a high increase (from 9.4 to 15.3 Gg) in NOx emissions from 1A1a for the year 2004 which goes down to 4.2 Gg for 2005. The ERT recommends that this is explained in an IIR.

Category issue 2: 1A1a Public Electricity production and Heat – SOx

33. The ERT has found that Moldova reports a high increase (from 2.2 to 7.7 Gg) in SOx emissions from 1A1a for the year 2003 which goes down to 3.1 Gg for 2004. The ERT recommends that this is explained in an IIR.

Category issue 3: 1A4bii Residential: Household and gardening (mobile) – NOx

34. The ERT has found that Moldova reports remarkably high NOx emissions (7.5 Gg) for 2009 from mobile machinery in households. Reported activity data is at a similar level to road transport. However, because emissions from passenger cars are reported to be included elsewhere they might be considered within this category. The ERT recommends that this is explained in an IIR.

TRANSPORT

Review Scope

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5} , POP's, HM		
Years		1990 – 2010 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
1.A.3.a.i.(i)	international aviation (LTO)	X		X
1.A.3.a.i.(ii)	international aviation (cruise)	X		X
1.A.3.a.ii.(i)	civil aviation (domestic, LTO)	X		X
1.A.3.a.ii.(ii)	civil aviation (domestic, cruise)	X		X
1.A.3.b.i	road transport, passenger cars	X		X
1.A.3.b.ii	road transport, light duty vehicles	X		X
1.A.3.b.iii	road transport, heavy duty vehicles	X		X
1.A.3.b.iv	road transport, mopeds & motorcycles	X		X
1.A.3.b.v	road transport, gasoline evaporation	X		X
1.A.3.b.vi	road transport, automobile tyre and brake wear	X		X
1.A.3.b.vii	road transport, automobile road abrasion	X		X
1.A.3.c	railways	X		X
1.A.3.d.i (ii)	international inland navigation	X		X
1.A.3.d.ii	national navigation	X		X
1.A.4.b.ii	household and gardening (mobile)		X	
1.A.4.c	agriculture / forestry / fishing		X	
1.A.4.c.ii	off-road vehicles and other machinery		X	
1.A.4.c.iii	national fishing		X	
1.A.5.b	other, mobile (including military, land based and recreational boats)		X	
1 A 3 d i (i)	International maritime navigation	X		X
1 A 3	Transport (fuel used)		X	

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues.

Transparency:

35. Moldova did not submit an IIR, so the ERT did not have any information on the methodologies used to estimate transport sector emissions.

36. The ERT notes that no additional information was provided in the sheet to explain all notation keys used in the NFR table. The ERT recommends that Moldova complete at least the NFR "additional info" sheet and also explain the use of notation keys in the IIR.

Completeness:

37. The ERT considers the transport sector to be nearly complete. However, some NE notation keys are used where emissions are expected to exist (e.g. SO_x emissions in 1A3c). The ERT recommends that Moldova consult the EMEP/EEA

Emissions Inventory Guidebook to obtain EFs for sources which are currently reported as NE in the NFR tables.

38. The ERT notes that Moldova did not provide a complete time series of emissions. The ERT recommends that Moldova provide a consistent time series.

Consistency including recalculation and time series:

39. Moldova did not provide an IIR with information on recalculations.

Comparability:

40. Moldova did not provide an IIR with information on methods.

Accuracy and uncertainties:

41. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Improvement:

42. Moldova did not provide an IIR with information on planned improvements.

Sub-sector Specific Recommendations.

Category issue 1: 1A3ai(i): all pollutants

43. The ERT notes that Moldova provided emissions for this sub-sector, but the activity data is not available. ERT recommends that Moldova estimate and report such activity data.

Category issue 2: 1A3bii: BaP and BkF

44. The ERT notes that these pollutant emissions have not been estimated. As the EMEP/EEA Guidebook provides such EF, the ERT recommends that Moldova estimate these emissions.

Category issue 3: 1A3bvi and 1A3bvii: TSP, PM₁₀, PM_{2.5}

45. The ERT notes that Moldova provided emissions for these sub-sectors, but the activity data is not given. ERT recommends that Moldova estimate and report such activity data (traffic).

Category issue 4: 1A3c: SO_x

46. The ERT notes that SO_x emissions are not estimated although these emissions are directly linked to the sulphur content of fuels. ERT recommends that Moldova obtain such data to estimate and report emissions.

INDUSTRIAL PROCESSES

Review Scope

Pollutants Reviewed		all		
Years		2010		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed * source not occurring	Recommendation Provided
2.A.1	Cement production	x		x
2.A.2	Lime production	x		x
2.A.3	Limestone and dolomite use			x
2.A.4	Soda ash production and use		x *	x
2.A.5	Asphalt roofing	x		x
2.A.6	Road paving with asphalt	x		x
2.A.7.a	Quarrying and mining of minerals other than coal	x		x
2.A.7.b	Construction and demolition	x		x
2.A.7.c	Storage, handling and transport of mineral products	x		x
2.A.7.d	Other Mineral products (Please specify the sources included/excluded in the notes column to the right)	x		x
2.B.1	Ammonia production		x *	x
2.B.2	Nitric acid production		x *	x
2.B.3	Adipic acid production		x *	x
2.B.4	Carbide production		x *	x
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)	x		x
2.C.1	Iron and steel production	x		
2.C.2	Ferroalloys production		x *	
2.C.3	Aluminium production		x *	x
2.C.5.a	Copper Production		x *	
2.C.5.b	Lead Production		x *	
2.C.5.c	Nickel Production		x *	
2.C.5.d	Zinc Production		x *	
2.C.5.e	Other metal production (Please specify the sources included/excluded in the notes column to the right)		x *	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		x
2.D.1	Pulp and paper	x		x
2.D.2	Food and drink	x		x
2.D.3	Wood processing	x		x
2.E	Production of POPs		x *	x
2.F	Consumption of HM and POPs (e.g. Electrical	x		x

	and scientific equipment)			
2.G	Other production, consumption, storage, transportation or handling of bulk products (Please specify the sources included/excluded in the notes column to the right)	x		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:

47. Moldova did not submit an IIR, so the ERT did not have any information on the methodologies used to estimate transport sector emissions.

48. The ERT notes that no additional information was provided in the sheet to explain all notation keys used in the NFR table. The ERT recommends that Moldova complete at least the NFR “additional info” sheet and also that it explain the notation keys in the IIR.

49. Moldova uses zero values in the NFR table for some industrial sources. The ERT recommends that Moldova report NA instead of zero values in cases where no emissions occur or where they are negligible.

Completeness:

50. The ERT notes that some sources may be missing from the industrial processes sector inventory and that also other pollutants are likely to be emitted from those sources currently included in the inventory, as indicated in the chapters below.

51. The ERT notes that Moldova did not provide a complete time series of emissions. The ERT recommends that Moldova provide a consistent time series.

Consistency including recalculation and time series:

52. In the NFR tables for many industrial source categories the use of the notation keys varies between pollutants for the same sector as explained in the chapters below. The ERT recommends that Moldova check the use of the notation keys in cases where the source does not exist and that it change the notation key to NO for those sources.

53. It is not possible to estimate the consistency of emissions due to a lack of documentation of the methods used in calculating emissions.

Comparability:

54. Moldova did not provide an IIR with information on methods.

Accuracy and uncertainties:

55. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Improvement:

56. Moldova did not provide an IIR with information on planned improvements.

Sub-sector Specific Recommendations.

Category issue 1: 2A1 Cement industry categories - All Pollutants

57. Moldova reports a comprehensive set of pollutants from the cement industry for 2000-2006 and 2008-2009. The ERT commends Moldova for providing these estimates. The ERT notes that the emissions fluctuate very much over the years. Due to the lack of documentation of the methods used in the calculation of emissions it is not possible for the ERT to evaluate the quality of the reported values. The ERT recommends that Moldova complete the time series for the missing years and provide a description of the source and document the methods used for quantifying emissions in an IIR.

Category issue 3: 2A2 Lime production - All pollutants

58. Moldova reported a comprehensive set of pollutants from the cement industry for 2000-2006 and 2008-9. The ERT commends Moldova for providing these estimates. However, due to the lack of documentation of the method used in the calculation it is not possible to review the quality of the estimates.

59. The ERT recommends that Moldova complete the time series by estimating emissions since 1990 and that it provide a description of the source and document the methods used for quantifying emissions in an IIR.

Category issue 3: 2A3 Limestone and dolomite use - All pollutants

60. Limestone and dolomite use is a source of particle emissions. It is not clear if this source exists or not in Moldova. In the NFR table all pollutants are reported either as NA, NE or NO for 2000-2006 and 2008-9, depending on the year of the data.

61. The ERT recommends that Moldova investigate if the source exists and that it estimate possible emissions since 1990, or that it revise the notation keys accordingly. The description of the source as well as documentation of the methods used to calculate possible emissions should be provided in an IIR.

Category issue 4: 2A4 Soda ash production and use - All pollutants

62. Soda ash production and use is a source of ammonia and particle emissions. From the NFR table it is not clear if the source exists in Moldova, as a mix of the notation keys NA, NE and NO is used for the different pollutants over the years 2000-2006 and 2008-9 for this source.

63. The ERT recommends that Moldova investigate if the source exists and that it estimate possible emissions since 1990, or that it revise the notation keys accordingly. The description of the source as well as documentation of the methods used to calculate possible emissions should be provided in an IIR. Methodologies to estimate emissions are presented in the EMEP/EEA Emission Inventory Guidebook (2009).

Category issue 5: 2A5 Asphalt roofing - All pollutants

64. Asphalt roofing is a source of NMVOC and particle emissions. Moldova has not reported any emissions from this source but used instead the notation keys NA, NE and NO for the years 2000-2006 and 2008-9.

65. The ERT recommends that Moldova collect activity data and use the methodologies presented in the EMEP/EEA Emission Inventory Guidebook (2009) to calculate a full time series of emissions since 1990, and that it document relevant information in the IIR.

Category issue 6: 2A6 Road paving with asphalt - All pollutants

66. Road paving with asphalt is a source of NMVOC, particle and PCDD/F emissions. Moldova has not reported any emissions from this source but used instead the notation keys NA, NE and NO for the years 2000-2006 and 2008-9.

67. The ERT recommends that Moldova collect activity data and use the methodologies presented in the EMEP/EEA Emission Inventory Guidebook (2009) to calculate a full time series of emissions since 1990, and that it document relevant information in the IIR.

Category issue 7: 2A7a Quarrying and mining of minerals other than coal - All pollutants

68. Moldova has reported TSP, PM₁₀ and PM_{2.5} emissions in the NFR table from this source for 2008-2009. The ERT commends Moldova for estimating these emissions.

69. Due to the lack of documentation of the methods used it is not possible for the ERT to evaluate the quality of the reported values. The ERT recommends that Moldova reports a full time series from 1990 onwards and provide relevant information on the source and calculation of emissions in an IIR.

Category issue 8: 2A7b Construction and demolition - All pollutants

70. Construction and demolition is a source of particle emissions. Moldova does not report emissions from this source but uses instead the notation key NA for 2008-9.

71. The ERT recommends that Montenegro collect activity data and use the methodologies presented in the EMEP/EEA Emission Inventory Guidebook (2009) to calculate a full time series of emissions since 1990, and that it document the methods used in the calculations. The reason for not estimating emissions should be explained in an IIR.

Category issue 9: 2A7c Storage, handling and transport of mineral products - All pollutants

72. Moldova had not reported emissions from this source but used the notation key for 2008-2009 instead. The storage, handling and transport of mineral products is a source of particle emissions.

73. The ERT recommends that Moldova collect data to estimate a full time series of emissions, and that it provide a description of the source and document the calculations in an IIR.

Category issue 10: 2A7d Other Mineral products - All pollutants

74. Moldova has not estimated emissions from this source but used a mix of notation keys NE, NA and NO instead in this sector for the years 2000-2006 and 2008-9, except for PCDD/F, for which Moldova reports zero. Other mineral products manufacturing may be a source of various emissions depending on the industrial activity. For instance, glass manufacturing falls under this category.

75. The ERT recommends that Moldova investigate sources that could fall under other mineral products, that it estimate relevant emissions from these sources and that it describe the sources and document the methods used in the calculation of the emissions in an IIR.

Category issue 11: 2B1-4 Ammonia, Nitric acid, Adipic acid and Carbide production - All pollutants

76. Moldova reports a mix of the notation keys NO and NA for pollutants under these chemical industry source categories for the years 2000-2006 and 2008-9.

77. The ERT recommends that Moldova investigate if these industrial activities exist in the country and that it revise the current notation key NA to NO for sources that do not occur and estimate emissions from existing sources, as well as provide relevant information in an IIR.

Category issue 11: 2B5a Other chemical industry - All pollutants

78. Moldova reports the notation key NO for all pollutants under this source. The ERT recommends that Moldova explain in the IIR that this source does not exist in Moldova.

Category issue 11: 2B5b Storage, handling and transport of chemical products - All pollutants

79. Moldova uses the notation key NA for all pollutants under this source for the years 2008-2009.

80. The ERT recommends that Moldova investigate if the source exists, and estimate emissions and that it describe the source and the calculation methods used in an IIR.

Category issue 12: 2C1 Iron and steel production - All pollutants

81. Moldova has reported particle, zinc and lead emissions for 2008-9 from this source, as well as provided zero values for the heavy metal and POP emissions. The ERT commends Moldova for providing this data.

82. It is not possible for the ERT to estimate the quality of the values reported due to the lack of an IIR. The ERT recommends that Moldova provide the relevant information in an IIR and report a full time series of emissions since 1990.

Category issue 13: 2C2 Ferroalloys production - All pollutants

83. Moldova has reported all pollutants from this source as not occurring (NO). The ERT recommends that Moldova explain in the IIR that this source does not exist in Moldova.

Category issue 14: 2C3 Aluminium production - All pollutants

84. Moldova has reported all pollutants from this source as not occurring (NO). The ERT recommends that Moldova explain in the IIR that this source does not exist in Moldova.

Category issue 15: 2C5a-d Non-ferrous metals production categories - All pollutants

85. Moldova has reported all pollutants from this source as not occurring (NO). The ERT recommends that Moldova explain in the IIR that this source does not exist in Moldova.

Category issue 16: 2C5e Other metal production - All pollutants

86. Moldova has reported a comprehensive set of pollutants from this source for 2000-2006 and 2008-9. For heavy metal and POP emissions Moldova reports zero emissions. The ERT commends Moldova for providing this data.

87. The ERT notes that there are large variations in the time series for some of the pollutants. Due to the lack of an IIR it is not clear from which activities the emissions originate. Neither is it possible for the ERT to estimate the quality of the values reported. The ERT recommends that Moldova provide the relevant information in an IIR and report a full time series of emissions since 1990.

Category issue 17: 2C5f Storage, handling and transport of metal products - All pollutants

88. Moldova has used the notation key NA for all pollutants from these sources for 2008-2009. The ERT recommends that Moldova investigate if the source exists, estimate the possible emissions and provide relevant information on the sources and methods used in an IIR.

Category issue 13: 2D1 Pulp and paper - All pollutants

89. Moldova has used a mix of the notation keys NO and NA for all pollutants for the years 2000-2006 and 2008-9. The ERT recommends that Moldova investigate whether the source exists, and revise the notation keys accordingly. If the source

does exist in Moldova, then a full time series of emissions should be reported and relevant supporting information provided in an IIR.

Category issue 14: 2D2 Food and drink industry – NMVOC

90. Moldova has estimated NMVOC emissions from food and drink industries for 2000-2006 and 2008-9. It is not possible for the ERT to estimate the quality of the NMVOC values due to the lack of an IIR. The ERT recommends that Moldova provide an IIR with the relevant information and report a full time series of emissions since 1990.

91. Moldova has reported particle emissions from this source as NE. The ERT recommends that Moldova estimate a full time series of emissions since 1990 and document relevant information in the IIR.

Category issue 15: 2D3 Wood processing – All pollutants

92. Moldova has reported TSP emissions from this source for 2008-9. For PM_{2.5} and PM₁₀ emissions Moldova has used the notation key NE.

93. The ERT recommends that Moldova estimate also the PM_{2.5} and PM₁₀ particle fractions and provide a full time series of emissions since 1990, and that it document relevant information of the sources and methods used in an IIR. The methodology to estimate particle emissions is presented in the EMEP/EEA Emission Inventory Guidebook (2009).

Category issue 16: 2E Production of POPs – All pollutants

94. Moldova has reported all pollutants from this source as NA or NO for the years 2008-9.

95. The ERT recommends that Moldova investigate whether the source exists, that it estimate possible emissions and document relevant information in the IIR.

Category issue 17: 2F Consumption of POPs and heavy metals– All pollutants

96. Moldova has reported mercury and PCB emissions from this source as zero for the years 2008-9. The other pollutants are reported as NA.

97. The ERT recommends that Moldova provide a description of the source in the IIR and change the zero values to the notation key NA if emissions do not occur or are negligible (or provide estimates for the emissions and document the calculations in an IIR).

Category issue 15: 2G Other - All pollutants

98. Moldova has reported a mix of the notation keys NO and NA for this source for the years 2000-2006 and 2008-9.

99. Industrial processes such as ceramics and bricks (tile) manufacturing fall under these category and are likely to occur in Moldova. The ERT recommends that Moldova investigate which industrial sources in the country fall under this category,

provides a description of the sources, collects data and estimates a full time series of emissions since 1990, and that it documents the methods used for the calculations in the IIR.

SOLVENTS

Review Scope

Pollutants Reviewed		NMVOC, POPs, HMs, TSP, PMs		
Years		1990 – 2010		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
3.A.1	Decorative coating application	X		
3.A.2	Industrial coating application	X		
3.A.3	Other coating application (Please specify the sources included/excluded in the notes column to the right)	X		
3.B.1	Degreasing	X		
3.B.2	Dry cleaning	X		
3.C	Chemical products,	X		
3.D.1	Printing	X		
3.D.2	Domestic solvent use including fungicides	X		
3.D.3	Other product use	x		
Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.				

General recommendations on cross-cutting issues

Completeness:

100. Since no IIR was submitted, the ERT cannot properly assess the completeness of the inventory of the solvents sector. The ERT strongly recommends that Moldova submit an IIR. In the IIR, Moldova should provide an explanation as to why the categories 3A2 and 3B1 for NMVOC emissions have been reported as NE and a description of the efforts that the Party is making to provide an estimation of them. In the EMEP/EEA Air Pollutant Emission Inventory Guidebook, there are simple-to-apply Tier 1 methods for each of these categories. Moreover, the Party should report in the IIR which SNAP categories have been reported under 3A1, 3B2 and 3D2 / NMVOC emissions, in order to enable the ERT to assess the completeness of the sector.

101. The Party has reported PAHs emissions from the 3C and 3D3 source categories as NA. PAHs are emitted from asphalt blowing and wood preservation when creosote preservatives are used. In the EMEP/EEA Air Pollutant Emission Inventory Guidebook, there is a simple-to-apply Tier 2 method for estimating these emissions by using the asphalt produced as activity data. Emission factors are provided for other pollutant emissions from asphalt blowing, too, such as NMVOC, TSP and heavy metals. A method for 3D3 is also provided. The ERT recommends that Moldova verify the use of the notation key NA for the above mentioned categories and pollutants, and report accordingly in the next submission.

Transparency:

102. Moldova did not submit an IIR, so the ERT did not have any information on the methodologies used to estimate solvent sector emissions. In order to improve the transparency of reporting and enable the ERT to assess the solvents sector, the ERT recommends that Moldova provide disaggregated emission estimations per SNAP category in the next IIR.

103. The ERT encourages Moldova to report in the next submission to which SNAP categories the heavy metals emissions that were reported under the 3D3 category correspond.

Accuracy and uncertainties:

104. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Comparability:

105. Moldova did not provide an IIR with information on methods.

106. The ERT has noted that the index of per capita NMVOC emissions from the 3B category for Moldova is too low compared to other neighbouring countries. For example, it is about 70 times lower than the respective index of Romania. This is an indication of a possible underestimation of emissions in this category. The ERT recommends that Moldova examine the emission estimates of this category, the completeness of the SNAP activities that were considered, and report accordingly in the next submission.

107. After the review week, Moldova provided the ERT with NMVOC emission estimations from the 3B category for the year 2010, which are comparable to other neighbouring countries. The ERT commends Moldova for this, and encourages Moldova to continue its efforts for improving the inventory.

Consistency including recalculation and time series:

108. Moldova did not provide an IIR with information on recalculations.

109. The ERT noted that the time series of the reported NMVOC emissions present a peculiar profile with many gaps, peaks and drops. The ERT recommends that Moldova investigate the activity data, EFs, and the methodologies and assumptions used for emission estimations in order to improve time series consistency.

Improvement:

110. Moldova did not provide an IIR with information on planned improvements.

AGRICULTURE

Review Scope:

Pollutants Reviewed		SO ₂ , NO _x , NMVOC, NH ₃ , PM ₁₀ & PM _{2.5}		
Years		1990 – 2010 + (Protocol Years)		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
4 B 1 a	Cattle dairy	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 1 b	Cattle non-dairy	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 2	Buffalo			
4 B 3	Sheep	NMVOC, NH ₃		
4 B 4	Goats		IE	
4 B 6	Horses	NH ₃ , PM _{2.5} , PM ₁₀		
4 B 7	Mules and asses			
4 B 8	Swine	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 9 a	Laying hens	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 9 b	Broilers	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 9 c	Turkeys		IE	
4 B 9 d	Other poultry	NMVOC, NH ₃ , PM _{2.5} , PM ₁₀		
4 B 13	4 B 13 Other			
4 D 1 a	Synthetic N fertilizers	NH ₃ , PM _{2.5} , PM ₁₀		
4 D 2 a	Farm-level agricultural operations including storage, handling and transport of agricultural products			
4 D 2 b	Off-farm storage, handling and transport of bulk agricultural products			
4 D 2 c	N excretion on pasture range and paddock unspecified (Please specify the sources included/excluded in the notes column to the right)			
4 F	Field burning of agricultural wastes	All		
4 G	Agriculture other(c)			
11 A	(11 08 Volcanoes)			
11 B	Forest fires			

Note: Where a sector has been partially reviewed (e.g. some of the NFR codes) please indicate which codes have been reviewed and which have not in the respective columns.

General recommendations on cross-cutting issues

Transparency:

111. Moldova reports estimates of NMVOC, NH₃, PM_{2.5} and PM₁₀ for the majority of sub-sectors in the agriculture sector. However, no information is provided with respect to the activity data or methodological approaches employed. The ERT could therefore not fully review the agriculture sector. The ERT encourages Moldova to provide information on methodological choices, the emission factors used and the

activity data employed in an Informative Inventory Report as part of future submissions.

112. The ERT has found that Moldova has used notation keys inappropriately throughout the agriculture sector. The ERT encourages Moldova to review the use of notation keys for all sub-sectors in the agriculture sector for future submissions.

Completeness:

113. Moldova, in its 2012 submission, did not provide complete estimates for the agriculture sector. Emission estimates for NMVOC, NH₃, and particulates were only provided for a number of sub-sectors in agriculture for the years 1990, 2000-2006, 2008 and 2009. For some sub-sectors only the years 2008 and 2009 have been reported (e.g. 4B9a, 4B9b and 4B9c). In addition, activity data is only available for the years 2008 and 2009 and not for all sub-sectors. The ERT encourages Moldova to provide estimates for the complete time series in its next and in future annual submissions.

114. Moldova currently includes estimates of NMVOC emissions from the agriculture sector. The ERT encourages Moldova to include estimates of NMVOC emissions for each of the source categories in agriculture for which emission factors and methodological approaches are presented in the latest EMEP/EEA Emission Inventory Guidebook.

115. Moldova does not currently include estimates of NO emissions from the agriculture sector (with the exception of sector 4F). The ERT encourages Moldova to include estimates of NO emissions for each of the source categories in agriculture for which emission factors and methodological approaches are presented in the latest EMEP/EEA Emission Inventory Guidebook.

Consistency including recalculation and time series:

116. Moldova did not provide an IIR with information on recalculations.

Comparability:

117. Moldova did not provide an IIR with information on methods.

Accuracy and uncertainties:

118. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Improvement:

119. Moldova did not provide an IIR with information on planned improvements.

Sub-sector Specific Recommendations.

120. These are all included in the “general issues” above.

Sector specific recommendations

121. These are all included in the “general issues” above.

WASTE

Review Scope:

Pollutants Reviewed		NO _x , NMVOC, SO _x , NH ₃ , PM ₁₀ , PM _{2.5} , TSP, HM, POPs		
Years		1990 – 2010		
NFR Code	CRF_NFR Name	Reviewed	Not Reviewed	Recommendation Provided
6.A	solid waste disposal on land	X		X
6.B	waste-water handling	X		X
6 C a	Clinical waste incineration (d)	X		X
6 C b	Industrial waste incineration (d)	X		X
6 C c	Municipal waste incineration (d)	X		X
6 C d	Cremation		NO	
6 C e	Small scale waste burning		NO	
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.

Transparency:

122. The Republic of Moldova did not submit an IIR, so the ERT did not have any information on the methodologies used to estimate waste sector emissions.

123. The ERT has noted that no explanations of the use of notation keys have been included in the “additional information” sheet. The ERT recommends that Moldova include this information in next submission.

124. The ERT has noted that 6B, Wastewater handling, is a key source for NH₃ (13.6% of the national total). It is not clear how the NH₃ emissions from this source have been estimated by Moldova. The ERT recommends that the Republic of Moldova submit an IIR in which this information can be provided.

Completeness:

125. The Republic of Moldova ERT only submitted NFR Tables for 2008 and 2009. The ERT encourages the Republic of Moldova to include NFR tables for the complete time series in the future

126. After the review the Republic of Moldova submitted new NFR tables for the period 2007-2010. Although these figures were submitted after the review the ERT commends the Party on this and encourages the Party to continue with this in the near future.

127. The ERT has noted that the notation key “NE” has been used many times in the waste sector. For most of these no EFs are available in the 2009 Guidebook, but some “NE” notation keys have been used where emissions are expected. An example is provided in the sub-sector section below.

Consistency including recalculation and time series:

128. Moldova did not provide an IIR with information on recalculations.

Comparability:

129. Moldova did not provide an IIR with information on methods.

Accuracy and uncertainties:

130. Moldova did not provide an IIR with information on QA/QC and uncertainty.

Improvement:

131. Moldova did not provide an IIR with information on planned improvements.

Sub-sector Specific Recommendations.

Category issue 1: 6 C a Clinical waste incineration

132. For Sub-Sector 6Ca activity data and an EF for TSP (from the 2009 Guidebook) are available. However, TSP is reported as “NE” for 6Ca. The ERT recommends that the Republic of Moldova report emissions in the NFR tables if both activity data and EFs are available. This will avoid any underestimation of the emissions.

LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW

During the review week, Moldova did not respond to any of the questions provided by the ERT. The ERT asked the following questions:

- Energy questions Q1 - 3
- Transport questions Q1 - 8
- Solvents questions Q1 - 9
- Agriculture questions Q1
- Waste questions Q1 - 4

Moldova did not provide any feedback to the S3 Review report as well.