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**Steering Body to the Cooperative Programme for  
Monitoring and Evaluation of the Long-range  
Transmission of Air Pollutants in Europe**

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Item 6 (c) of the provisional agenda

**Progress in activities in 2013 and future work: emissions**

**Present state of emission data and stage 3 in-depth reviews****Report by the Centre on Emission Inventories and Projections***Summary*

The present report was prepared by the Centre on Emission Inventories and Projections (CEIP) in line with its mandate under the 2012–2013 workplan of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/109/Add.2, item 2.1), to “review reported national emission data”, to “provide technical and secretariat support to the stage 3 review process” including coordination of the process, to “provide overviews of emission data reported by Parties to the Protocols” and to “consider further technical improvements to the CEIP data system aimed at providing consistent information in a timely and transparent manner”.

The report reflects progress in emissions reporting under the Convention in the 2013 reporting round. It summarizes the main conclusions of the annual review of emission data carried out under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transboundary Transmission of Air Pollutants in Europe (EMEP), and presents the outcome of the stage 3 in-depth reviews of national inventories in 2013 and the plans for 2014 to 2017.

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## Introduction

1. The present report reflects progress in emission reporting under the Convention on Long-range Transboundary Air Pollution in the 2013 reporting round (2011 emission data, including resubmissions for previous years, activity data and projections, as well as gridded and large point source data). It summarizes the main conclusions of the annual review of emission data carried out under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transboundary Transmission of Air Pollutants in Europe (EMEP)<sup>1</sup> in line with the 2012–2013 workplan of the Convention (ECE/EB.AIR/109/Add.2, item 2.1). Furthermore, this report presents the outcome of the stage 3 in-depth reviews of national inventories in 2013 and the plans for 2014 to 2017.

## I. Present state of emission data

2. In 2013, Parties<sup>2</sup> were invited to submit data directly to CEIP or, alternatively, to post their data on the European Environment Agency (EEA) central data repository and to inform the United Nations Economic Commission for Europe (ECE) secretariat about the contents of the data submission by means of a notification form. Most Parties that submitted data also provided the secretariat with the notification form (with the exception of Lithuania, Luxembourg, the Republic of Moldova, Portugal and Ukraine). An up-to-date overview of the data submitted by Parties during the 2013 reporting round is available from the CEIP website.<sup>3</sup> In addition, the latest version of officially reported emission data can be accessed online.<sup>4</sup> The status of emission reporting as of 11 June 2013 is presented in a table in an annex to this document.

3. All inventories submitted by Parties have been tested via RepDab<sup>5</sup> and imported into the central CEIP database. The Guidelines for Reporting Emission Data under the Convention on Long-range Transboundary Air Pollution (Reporting Guidelines) (ECE/EB.AIR/97) and the Methods and Procedures for the Technical Review of Air Pollutant Emission Inventories Reported under the Convention and its Protocols (Methods and Procedures for Review) (EB.AIR/GE.1/2007/16) contain background information on the reporting requirements, deadlines and procedures.

4. *Review of inventories:* All data submitted to CEIP have been reviewed. The technical review of inventories is carried out in three stages.<sup>6</sup> Stage 1 is an initial check of submissions for timeliness and completeness. Stage 2 is a synthesis and assessment of all national submissions with respect to consistency and comparability of data with recommendations for data quality improvement. Stage 3 is an in-depth review of selected inventories by pollutant, country and sector, as discussed below. At each stage of review, Parties have the opportunity to clarify issues and to provide additional information. The main objective of the review is to assist countries in improving their data for the next

<sup>1</sup> This work is carried out in cooperation with the European Environment Agency and its European Topic Centre on Air and Climate Change Mitigation.

<sup>2</sup> Unless otherwise noted, Parties in this report means Parties to the Convention.

<sup>3</sup> <http://www.ceip.at/status-of-reporting/2013-submissions>.

<sup>4</sup> <http://www.ceip.at/webdab-emission-database/officially-reported-emission-data>.

<sup>5</sup> The RepDab tool is also available from the CEIP website at <http://www.ceip.at/check-your-inventory-repdab>.

<sup>6</sup> Background information on the technical review process is described in ECE/EB.AIR/GE.1/2009/8.

reporting round. The process is seen by Parties as valuable (according to feedback provided to CEIP during meetings of the Task Force on Emission Inventories and Projections).

5. The findings of the stage 1 review were communicated to the national designated experts through the country-specific status reports by 26 March 2013. The findings from the stage 2 review were included in synthesis and assessment reports, which were issued by 22 May 2013. Countries were invited to provide comments and/or resubmissions within four weeks after 15 February 2013. An overview of the findings for the stage 1 and 2 reviews is summarized in the CEIP and EEA *Technical Review Report 2013*, to be made available on the CEIP website.

6. *Timeliness*: Forty-five of the fifty-one Parties to the Convention submitted inventories before 18 June 2013. Thirty-four Parties reported emission data by the due date of 15 February 2013. Fifteen Parties resubmitted data.

7. In order to further improve the atmospheric monitoring and modelling under the Convention, it is important that complete emission inventories are submitted by countries from which data are currently lacking or insufficient — i.e., Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Kazakhstan, Kyrgyzstan, Montenegro and the Russian Federation.<sup>7</sup> Among these countries only the Russian Federation has ratified some of the Convention's protocols.

8. *Completeness/pollutants*: Forty-five Parties to the Convention submitted inventories, but not all submissions contained information on all the gases required by the Reporting Guidelines. All forty-five Parties reported their 2011 data on main pollutants. Cadmium, mercury and lead emissions were provided by 39 Parties, additional heavy metals by 34, particulate matter (PM) by 41 and priority persistent organic pollutants (POPs) by 40 Parties. Activity data were reported by 35 Parties.

9. *Completeness/time series*: A number of Parties to the Convention that submitted data in the 2013 reporting round did not provide complete time series, in line with the current reporting requirements. Complete time series of the main pollutants in nomenclature for reporting (NFR) format for the years 1990–2011 were reported by 29 Parties. Nine Parties to protocols (Austria, Canada, Denmark, Finland, France, Italy, Slovenia, Switzerland and the United Kingdom of Great Britain and Northern Ireland) submitted in addition 1980–1989 time series. Twenty-six Parties provided complete time series (1990–2011) of the main heavy metals. Thirty Parties reported requested time series of PM (2000–2011). Twenty-seven Parties provided full time series (at least 1990–2011) of POPs. Six Parties submitted only 2011 data. Trend tables with national total emissions can be downloaded from the CEIP website.<sup>8</sup>

10. *Projections*: In 2013, emission projections were submitted by 20 Parties, of which 12 also provided data for 2030.

11. *Documentation*: 87 per cent of Parties reporting inventories also reported informative inventory reports (IIRs) in 2013. The consistency, transparency and comparability of IIRs is steadily improving, but there are still reports which do not follow the template and it is time-consuming, and sometimes impossible, to find the necessary

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<sup>7</sup> See also the graph showing Parties' timeliness in reporting to the Convention in 2013, available from [http://www.ceip.at/fileadmin/inhalte/emep/pdf/2013/Reporting\\_2013\\_Timeliness.pdf](http://www.ceip.at/fileadmin/inhalte/emep/pdf/2013/Reporting_2013_Timeliness.pdf).

<sup>8</sup> <http://www.ceip.at/status-of-reporting/2013-submissions>.

information. Therefore, Parties are urged to use the recommended structure for reporting, i.e., the reporting templates in annex VI to the Reporting Guidelines.<sup>9</sup>

12. *Format:* In 2013, Parties further improved the consistency of their reporting formats and all but one used the NFR09 tables. All experts designated by Parties are recommended to use RepDab to check their emission data prior to its submission.

13. *Emissions per capita and emissions per gross domestic product (GDP):* These indicators<sup>10</sup> were calculated for all Parties that submitted total national emissions of main pollutants, PM, heavy metals and POPs by using information on population and GDP available from the World Bank database. The results are presented in the form of graphs and tables,<sup>11</sup> which were made available to all Parties and EMEP centres. This type of information provides reviewers with an indicator of potential problems when checking national inventories during stage 3 reviews.

14. *Access to the information:* Detailed information on timeliness, completeness, consistency, transparency, recalculations, key category analyses and inventory comparisons are published in individual country reports (stage 1 and 2) on the CEIP website.<sup>12</sup> In addition, in cooperation with EEA CEIP is producing an annual inventory overview covering the results of the stage 1 and 2 reviews in a technical report, *Inventory review 2013*.

15. *Implementation:* CEIP provides detailed information on an annual basis to the Implementation Committee on how the Parties to the Convention protocols fulfil their reporting obligations. CEIP assessed the reporting/non-reporting emissions for base year and actual year of Parties to the individual protocols and provided the corresponding overview tables to the secretariat.

16. *Gridded data and large point source (LPS) data:* Gridded data are part of the quinquennial reporting obligation, and were not officially due in 2013. Nevertheless, 10 Parties submitted gridded data and seven Parties submitted LPS data. These data were checked with respect to their format, internal consistency and completeness.

17. *Gridded data for modellers:* CEIP prepared data sets of the main pollutants (sulphur dioxide (SO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs), ammonia (NH<sub>3</sub>), coarse PM (PM<sub>coarse</sub>) and fine PM (PM<sub>2.5</sub>)) for modellers based on the gridding system developed by the Meteorological Synthesizing Centre-West. Furthermore, CEIP prepared gridded<sup>13</sup> data for three heavy metals (mercury, lead and cadmium) and POPs such as dioxin, hexachlorobenzene and benzo(a)pyrene. Gap-filled and gridded 2011 emission data were distributed to the modellers by 15 April 2013 and have been publicly accessible since 20 June 2013 on the CEIP website.<sup>14</sup>

<sup>9</sup> In particular, according to the Reporting Guidelines, Parties should submit IIRs in one of the official ECE languages (English, French and Russian). The reporting templates are available from the CEIP website at <http://www.ceip.at/reporting-instructions/annexes-to-the-reporting-guidelines>.

<sup>10</sup> Inclusion of these tests was recommended by the Task Force expert panel on review.

<sup>11</sup> This information is available from [http://www.ceip.at/fileadmin/inhalte/emep/xls/2013/Emissions\\_per\\_Capita\\_and\\_GDP\\_2013.xls](http://www.ceip.at/fileadmin/inhalte/emep/xls/2013/Emissions_per_Capita_and_GDP_2013.xls).

<sup>12</sup> <http://www.ceip.at/review-results/review-results-2013>.

<sup>13</sup> Gridding and gap-filling of heavy metals and POPs was performed only on the national total level.

<sup>14</sup> <http://www.ceip.at/webdab-emission-database/emissions-as-used-in-emep-models>.

18. *New gridding system:* To improve the quality of environmental assessment, it was agreed<sup>15</sup> that models should use gridded emissions in higher resolution (0.1° x 0.1°) in geographical coordinates and a more detailed sector split (gridded and LPS data; gridded NFR (GNFR) categories). This will increase the volume of processed data by one order of magnitude. CEIP started with the implementation of the new gridding system in 2013, but considering the complexity of the work this process will require more than one year.

## **II. Stage 3 in-depth reviews**

19. The stage 3 review is an in-depth review of inventories from selected Parties by pollutant, country and sector. The purpose is to support Parties in compiling and submitting high-quality inventories, and to increase confidence in the data used for air pollution modelling. The aim is to conduct a stage 3 review for every Party<sup>16</sup> at least once in every five-year period. This objective requires an in-depth review of about 10 Parties every year. Resources are required from the expert review teams (ERTs), the reviewed Parties and CEIP. CEIP is coordinating the whole process.

20. As defined in the Methods and Procedures for Review, submission of NFR tables and an informative inventory report is a prerequisite for a Party to be included in the stage 3 in-depth review.

21. Parties shall nominate review experts to the EMEP roster and provide sufficient resources to enable them participation in the process. So far, only 20 Parties (Austria, Czech Republic, Denmark, Estonia, European Union (EU), Finland, France, Germany, Greece, Italy, Ireland, Kazakhstan, Latvia, Norway, Netherlands, Sweden, Serbia, Switzerland, the former Yugoslav Republic of Macedonia and United Kingdom) accepted the invitation from the Convention secretariat to nominate expert reviewers for the ERT. These Parties nominated a total of 64 inventory experts to the roster. The nominated experts are suitably qualified to review all emission sectors and general inventory issues (good practice, uncertainties, quality assurance/quality control, etc.). It is estimated that members of the ERT dedicate around 10–15 days to their task, which includes preparation, participation in the week-long review meeting and follow-up activities, including finalizing the country review reports.

### **A. 2008–2012 stage 3 in-depth reviews**

22. The first cycle of in depth reviews was completed. Forty-four Parties have been reviewed in total (all of which submitted relevant data) and the results have been published on the CEIP website. Reviewers identified areas for improvements in all checked inventories. The countries had the opportunity to provide comments before the reports were published. The feedback during the Task Force on Emission Inventories and Projections meetings indicate that inventory compilers consider the current review system as useful and recommend that it continue.

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<sup>15</sup> Executive Body decision 2012/13 on changing of the EMEP grid projection, spatial resolution and domain (see ECE/EB.AIR/113/Add.1).

<sup>16</sup> Participation of the United States of America and Canada in the inventory in-depth review process is to be discussed.

23. For the 2012 stage 3 in-depth review, 18 experts from 13 Parties (three each from the EU and France, two from the United Kingdom and one each from Austria, Estonia, Finland, Ireland, Germany, Greece, Latvia, the Netherlands, Norway and Sweden) in two ERTs<sup>17</sup> reviewed the inventories of 10 selected Parties. Both prior to and during the 2012 stage 3 in-depth review meeting, the ERTs identified a number of questions that were communicated to Parties. All 10 country review reports were then completed and published on the CEIP website.<sup>18</sup>

## B. 2013–2017 stage 3 in-depth reviews

24. A long-term plan for stage 3 reviews for the next five years has been prepared by CEIP in cooperation with Implementation Committee and the Task Force on Emission Inventories and Projections (see table below).

<i>Year</i>	<i>Country</i>
2013	Bulgaria, France, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Romania and Sweden
2014	Belgium, Greece, Cyprus, Denmark, Finland, Hungary, Ireland, Republic of Moldova, Russian Federation and Spain
2015	Armenia, Azerbaijan, Belarus, Czech Republic, Germany, Kazakhstan, Netherlands, Slovakia, Slovenia and Ukraine
2016	Bosnia and Herzegovina, Croatia, Estonia, Kyrgyzstan, Luxembourg, former Yugoslav Republic of Macedonia, Serbia, Switzerland, Turkey and United Kingdom
2017	Austria, Albania, European Union, Georgia, Liechtenstein, Iceland, Malta, Monaco and Montenegro

25. The 2013 stage 3 in-depth review took place from 17 to 21 June 2013 at EEA headquarters in Copenhagen. Ten Parties (Bulgaria, France, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Romania and Sweden) were reviewed. Seventeen experts from 14 Parties (two each from Austria, Denmark and Germany and one each from the EU, Estonia, Finland, France, Ireland, Kazakhstan, Latvia, the Netherlands, Norway, Sweden and the United Kingdom) accepted the invitation to the centralized review in 2013.

## III. Conclusions

### A. Status of reporting

26. *Timeliness:* In 2013, the same number of Parties as in the 2012 reporting round (45) submitted their inventories.

<sup>17</sup> One expert review team can review up to five Parties.

<sup>18</sup> <http://www.ceip.at/review-results/review-results-2013>.

27. *Completeness*: The completeness of information on the main pollutants, main heavy metals and PM emissions is reasonable for the European region, but information provided to EMEP/CEIP covers less than 50 per cent of the extended EMEP area. The persisting problem with data completeness and quality could be not resolved. ECE/EMEP should consider options to ensure improved reporting of emission data in the near future in the countries of Eastern Europe, the Caucasus, Central Asia and the Balkans.

28. CEIP appreciates the efforts made by new Parties (Georgia, Serbia and Turkey) to submit emission information to the Convention.<sup>19</sup> At the same time, countries such as Kazakhstan and the Asian part of the Russian Federation have not reported emission data to EMEP within the last five years and Albania, Azerbaijan, Bosnia and Herzegovina, Montenegro and the Russian Federation did not report data in 2013. Increased support to emission experts in the region will assist designated emission experts with reporting of more complex data in the EMEP standard formats.

29. *Gridded data and LPS*: Information reported to EMEP/CEIP on gridded and LPS data is rather limited in spite of the fact that such information is in many cases available at the country<sup>20</sup> level. Ten Parties submitted gridded data and seven submitted LPS data in 2013. With this addition, the total number of countries which submitted 2010 gridded sectoral data increased to 24 and corresponds to 47% of all Parties.

30. Parties are invited to improve completeness of LPS reporting, as complete and consistent information submitted to CEIP will be critical for the quality of emission distribution in a new gridding system.

## B. Stage 3 in-depth reviews

31. Parties clearly recognize the value of the review process in terms of improving the quality of their national inventories, but difficulties are regularly encountered when EMEP requests complete inventory data and relevant explanatory information.

32. A persisting key constraint for the stage 3 in-depth review is the limited number of nominations to the roster of review experts. The number of experts increased compared with 2008, but a pool of 64 experts is still not sufficient for a sustainable review process. Each year some of these experts cannot accept the invitation due to technical reasons or unavailable resources. The number of experts on the roster will have to be increased for the stage 3 in-depth review to be completed annually in full scope. EMEP may wish to consider how best to financially support<sup>21</sup> participation of experts from the countries of Eastern Europe, the Caucasus and Central Asia and the Balkans in the review process.

<sup>19</sup> It should be noted, however, that information provided by these countries is generally not complete and often the format does not correspond to the templates provided by EMEP Reporting Guidelines.

<sup>20</sup> E.g., information on facilities reported by countries under the European Pollutant Release and Transfer Register (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32006R0166:EN:NOT>) or the EU Integrated Pollution Prevention and Control and Large Combustion Plant Directives (see, respectively, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31996L0061:EN:NOT> and <http://eur-lex.europa.eu/LexUriServ/site/en/consleg/2001/L/02001L0080-20011127-en.pdf>).

<sup>21</sup> From 2010 to 2012, EEA covered travel costs of seven experts (from Kazakhstan, the Czech Republic, Estonia, Latvia and Greece) and two trainees (from Serbia and Macedonia) to enable their participation in stage 3 reviews.

### **C. Gridding of emissions 2013 onwards**

33. Currently, a new gridding system is under development (higher resolution, geographic coordinate system and the use of GNFR sectors). Considering the complexity of the process, implementation will definitely take more than one year. EMEP may wish to consider allocating additional resources to cover this important activity.

34. EMEP may also wish to consider establishing cooperation with North African and Asian countries on the voluntary exchange of emission data with a view to obtaining input data for models in these areas (from 30°N northward within the new domain borders of 30°N–82°N and 30°W–90°E).

## Annex

Status of emission reporting as of 11 June 2013<sup>a</sup>

<i>Party</i>	<i>Submission– Date</i>	<i>Resubmission– Date</i>	<i>NFR– template</i>	<i>Other– format</i>	<i>IIR– 2013</i>	<i>Gridded data</i>	<i>LPS emissions</i>
Albania	–	–	–	–	–	–	–
Armenia	15.03.2013	–	–	x	–	–	–
Austria	15.02.2013	–	2009-1	–	x	–	–
Azerbaijan	–	–	–	–	–	–	–
Belarus	22.02.2013	18.03.2013	2009-1	x	x	–	–
Belgium	15.02.2013	12.04.2013	2009-1	–	x	–	–
Bosnia and Herzegovina	–	–	–	–	–	–	–
Bulgaria	15.02.2013	–	2009-1	–	x	–	–
Canada	14.02.2013	–	2009-1	x	–	–	–
Croatia	14.02.2013	–	2009-1	–	x	–	–
Cyprus	12.02.2013	–	2009-1	–	x	2011	2011
Czech Republic	07.02.2013	–	2009-1	–	–	–	–
Denmark	13.02.2013	–	2009-1	–	x	–	–
Estonia	14.02.2013	–	2009-1	–	x	–	–
European Union	26.04.2013	31.05.2013	2009-1	x	x	–	–
Finland	15.02.2013	01.03.2013	2009-1	–	x	2011	2011
France	14.02.2013	14.03.2013	2009-1	–	x	2010	2010
Georgia	19.03.2013	–	2009-1	x	–	–	–
Germany	12.02.2013	–	2009-1	–	x	–	–
Greece	18.02.2013	–	2009-1	–	–	–	–
Hungary	07.03.2013	–	2009-1	–	x	–	–
Iceland	15.03.2013	–	2009-1	–	x	1990, 1995, 2000, 2005, 2010	–
Ireland	14.02.2013	28.03.2013	2009-1	–	x	–	–
Italy	29.04.2013	–	2008-1	–	x	–	–
Kazakhstan	–	–	–	–	–	–	–
Kyrgyzstan	15.03.2013	03.04.2013	2009-1	–	–	–	–
Latvia	14.02.2013	15.03.2013	2009-1	–	x	–	–
Liechtenstein	13.02.2013	–	2004-1	–	x	–	–
Lithuania	13.02.2013	–	2009-1	–	x	2010	2010
Luxembourg	19.03.2013	–	2009-1	–	–	–	–
Former Yugoslav	08.02.2013	–	2009-1	–	–	–	2011

<sup>a</sup> Although not a Party to the Convention, on 15 February 2013 Kosovo (United Nations administered region, Security Council resolution 1244 (1999)) submitted its emission data using the 2009-1 NFR template.

<i>Party</i>	<i>Submission– Date</i>	<i>Resubmission– Date</i>	<i>NFR– template</i>	<i>Other– format</i>	<i>IIR– 2013</i>	<i>Gridded data</i>	<i>LPS emissions</i>
Republic of Macedonia							
Malta	14.02.2013	–	2009-1	–	x	–	–
Monaco	20.03.2013	–	2009-1	–	x	–	–
Montenegro	–	–	–	–	–	–	–
Netherlands	15.02.2013	–	2009-1	–	x	–	–
Norway	13.02.2013	18.03.2013	2009-1	–	x	–	–
Poland	15.02.2013	15.03.2013	2009-1	–	x	2000, 2010	–
Portugal	14.02.2013	11.06.2013	2009-1	–	x	–	–
Republic of Moldova	14.02.2013	–	2009-1	–	–	–	–
Romania	15.02.2013	–	2009-1	–	x	–	–
Russian Federation	–	–	–	–	–	–	–
Serbia	12.02.2013	–	2009-1	–	x	–	–
Slovakia	15.02.2013	15.03.2013	2009-1	–	x	2010	–
Slovenia	11.02.2013	–	2009-1	–	x	–	–
Spain	14.02.2013	–	2009-1	x	x	1990–2011	1990– 2011
Sweden	20.12.2012	29.01.2013	2009-1	–	x	–	–
Switzerland	14.02.2013	15.03.2013	2009-1	–	x	1990, 1995, 2000, 2005, 2010	–
Turkey	15.02.2013	–	2009-1	–	x	–	–
Ukraine	15.02.2013	–	2009-1	–	–	–	–
United Kingdom	15.02.2013	–	2009-1	–	x	2010	2010
United States of America	15.02.2013	31.05.2013	2009-1	–	x	–	–