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**EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE
TRANSBOUNDARY AIR POLLUTION**

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

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PROGRESS IN ACTIVITIES IN 2009 AND FUTURE WORK

EMISSIONS

PRESENT STATE OF EMISSION DATA

Report by the Centre on Emission Inventories and Projections¹

1. This report reflects progress in emission reporting under the Convention in the 2009 reporting round (2007 emission data, including five-yearly reporting of gridded and large point source data not previously reported). 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) in line with item 2.1 of the 2009 workplan of the Convention (ECE/EB.AIR/96/Add.2) and in compliance with the methods and procedures for the technical review of emission inventories² approved by

¹ The Centre on Emission Inventories and Projections (CEIP) of EMEP was established by the Executive Body at its twenty-fifth session and began operating on 15 January 2008.

² Methods and procedures for the technical review of air pollutant emission inventories reported under the Convention and its protocols (ECE/EB.AIR/GE.1/2007/16).

the Executive Body at its twenty-fifth session (ECE/EB.AIR/91, para. 27 (m)). The annex to the present report contains a summary of the main reporting requirements and the review process under the Convention.

2. This report was prepared by the EMEP Centre on Emission Inventories and Projections (CEIP) established by Austria's Federal Environment Agency (Umweltbundesamt-Vienna)³ <http://www.emep-emissions.at/>. CEIP compiles inventories submitted by Parties, performs initial checks, communicates findings to the individual Parties and makes reported data publicly available.

3. An up-to-date overview of the data submitted by Parties during the 2009 reporting round is available at: <http://www.ceip.at/emission-data-webdab/submissions-under-clrtap/2009-submissions/>. In addition, since 15 June 2009 the officially reported emission data can be accessed on-line at: <http://www.ceip.at/emission-data-webdab/emission-as-reported-by-parties/>.

4. CEIP also prepared data sets of the main pollutants (sulphur dioxide (SO₂), nitrogen oxide (NO_x), carbon monoxide (CO), non-methane volatile organic compounds (NMVOCs), ammonia (NH₃), particulate matter (PM)-coarse and PM_{2.5}) for modellers based on the gridding system developed by the Meteorological Synthesizing Centre-West (MSC-W). Furthermore, it prepared gridded data for three heavy metals (mercury (Hg), lead (Pb) and cadmium (Cd))⁴. Gap-filled and gridded 2007 emission data for modellers were distributed to all EMEP centres (by 16 April 2009) and will be publicly accessible in September 2009 at: <http://www.ceip.at/emission-data-webdab/emissions-used-in-emep-models/>.

5. The review team communicated actively with the Parties' designated experts during the 2009 review process. The findings of stage 1 reviews were communicated to the national designated experts through the country-specific "status reports" by 15 March 2009. Countries were given two weeks to react to the draft reports. The findings from the stage 2 review were included in "synthesis and assessment reports" (S&A reports), which were issued by 26 May 2009. After that date, countries were invited to provide their comments and/or re-submissions within four weeks. The main objective of these reports was to assist countries in improving their data for the next reporting round. An overview of the review stage 1 and 2 findings will be

³ Established in January 2008 in line with the decision taken by the Executive Body at its twenty-fifth session (ECE/EB.AIR/91, para 27 (f)). CEIP builds on the current emission-related work within EMEP.

⁴ CEIP wishes to note that gridding and gap filling of heavy metals and persistent organic pollutants (POPs) was not part of the CEIP responsibilities in the 2009 workplan nor had these activities been carried out by MSC-West in previous years. However, as CEIP understands the need for improving the quality of the heavy metals data available, it prepared data sets of the main heavy metals. Regarding the future work, CEIP stresses that regular gridding and gap-filling of POPs and heavy metals cannot be covered within the budget that is currently available to CEIP.

summarized in CEIP and EEA Technical Review Report 2009 to be made available on the EMEP website (www.emep.int).

I. STATUS OF REPORTING IN 2009

6. In 2009, Parties were invited to submit data directly to CEIP or alternatively to post their data on the central data repository (CDR) of the European Environment Agency (EEA) and to inform the United Nations Economic Commission for Europe (UNECE) secretariat about the contents of the data submission by means of a notification form. Most Parties to the protocols that submitted data also provided the secretariat with the notification form (with the exception of Croatia and Ukraine).

7. Timeliness. Thirty-seven Parties to the protocols that have reporting obligations under the Convention submitted inventories before 25 May 2009. Twenty-five reported emission data by the due date of 15 February 2009, which represents a decrease of four Parties as compared with the 2008 reporting round. Nineteen Parties resubmitted data. No data were provided by three Parties to the Protocols; Iceland, Liechtenstein and Republic of Moldova. In addition, the following five Parties to the Convention that are not yet Parties to the protocols reported data: Azerbaijan, Georgia, Kyrgyzstan, Poland and the former Yugoslav Republic of Macedonia (without notifying the secretariat of the contents of their submission).

8. The above figures indicate that 51 per cent of Parties to the Convention reported on time, and that a further 16 Parties submitted data before 25 May 2009, increasing the number of submissions to 82 per cent. This is again an increase as compared to last year, representing the highest number of submissions in the history of the Convention.

9. In order to further improve the atmospheric monitoring and modelling under the Convention, it would be important that emission inventories were also received from Parties to the Convention that have not yet formal reporting requirements under the protocols, and in particular from those countries for which data are currently lacking or insufficient (Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Kazakhstan, Montenegro, San Marino and Turkey). This would be of benefit to the countries themselves in terms of helping them to improve their national emission inventories through the review process.

10. Completeness – pollutants. Forty-two Parties (36 in 2008) to the Convention submitted inventories, but not all submissions contained all pollutants. Forty countries (38 in 2008, 35 in 2007) reported their 2007 data of the main pollutants, cadmium, mercury and lead emissions were provided by 34 countries, additional heavy metals by 29 (28 in 2008), PM by 33 (31 in 2008) and priority persistent organic pollutants (POPs) by 32 (31 in 2008) countries. Activity

data were reported only by 16 countries, i.e. from 38 per cent of countries providing emission data.

11. Completeness- time series. A number of Parties to the Convention that submitted data in the 2009 reporting round did not provide complete time series in line with the current reporting requirements: 12 Parties submitted only 2007 data. Complete time series of the main pollutants in the nomenclature for reporting (NFR) format for 1990–2007, which is the period relevant for the review of the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), were reported by 20 Parties to that Protocol. Twenty-two Parties to the Protocol on Heavy Metals also provided complete time series (1990-2006) of the main heavy metals. Twenty-two Parties reported requested time series of PM (2000–2007). Nineteen Parties provided full time series (at least 1990-2007) of POPs.

12. Projections. In 2009, twenty Parties (18 Parties in 2008) submitted emission projections, out of which only 12 Parties (13 in 2008) submitted data for 2020 and 3 Parties provided projections for 2030.

13. Documentation. The number (25) of informative inventory reports (IIRs) submitted remains the same as in 2008, i.e. 60 per cent of those reporting inventories also reported IIRs in 2009. However, as the reports differ substantially in structure and content, it is time-consuming—and sometimes impossible – to find the necessary information in them. Therefore, Parties are urged to use the template for the recommended structure of IIRs as contained in annex VI to the revised *Emission Reporting Guidelines* (ECE/EB.AIR/97)⁵. In addition, in a number of cases Parties submitted IIRs in their national languages and without providing an English summary. To increase transparency in reporting, it is essential that the key information on the inventories, including reasons for recalculations, new (closed) large emission sources, explanation of trends and the implementation of country specific methods/data be summarized in English.

14. Format. In 2009, Parties reported in a mixture of old (NFR02) and new (NFR08, flat files) formats. Most Parties reported their emissions in one of the NFR formats, but some of the submissions had altered the reporting templates. This generated the need to manually edit the submissions prior to loading data into the database and, in some cases it was also necessary to convert the old NFR to the new ones (NFR08) prior to analysing the data. This work was demanding in terms of resource and may have introduced possible errors. All Parties' designated

⁵ The Guidelines for reporting emission data under the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/97) approved by the Executive Body at its twenty-sixth session in 2008, as well as the annexes to the Guidelines, are available on the CEIP website (www.ceip.at).

experts are recommended to report in standard formats and to make use of the electronic data checking tool, REPDAB⁶, to check their emission data prior to the submission of the inventory.

15. Consistency of trends. Implied emission factor (IEF) tests, which highlight dips and jumps in inventories, are prized by all Parties. However, these tests can only be performed for countries that submit sectoral data in NFR tables as well as inventories in the Common Reporting Format (CRF) tables under the United Nations Framework Convention on Climate Change (source of activity data). Reviewers checked IEFs for key categories of main pollutants and PM. Outliers were identified in all the inventories checked. The findings were included in the country-specific synthesis and assessment reports (stage 2).

16. Recalculations. Recalculations greater than ± 10 percent for SO₂, NO_x, NMVOCs, NH₃, PM_{2.5} and PM₁₀ were highlighted in the S&A reports (stage 2). Only the data reported in NFR format for both 2008 and 2009 could be considered. Twenty-five countries had recalculated emission data for entire time series in 2009. In addition, Portugal submitted recalculated data for 2006 and Croatia for 1990 and 2006. It was interesting to note that re-calculations were consistently not made for the whole time series, but rather for a single year or for a small fraction of the series. This suggests that the resulting time series in a number of countries might no longer be consistent, or that errors have been detected and corrected. In-depth analysis of the emission trends (e.g. through a stage 3 review) would be needed to solve this issue case by case.

17. Emissions per capita/emissions per gross domestic product (GDP). These indicators were calculated for all Parties that submitted national total emissions of main pollutants and PM by using the information on populations and GDP available at the Eurostat database. The results, presented in form of graphs and tables, were made available to all Parties and EMEP centres. Outliers could indicate differences in national economies, but might also show inconsistencies of trends or inconsistencies between Parties. This type of information provides reviewers with an indicator of potential problems when checking national inventories during the stage 3 reviews.

18. Gridded data. Gridded data are part of the five-year reporting obligation and as such were not officially due in 2009. Nevertheless, five Parties (Denmark, Finland, Greece, Slovakia and Spain submitted gridded data. Finland and Spain submitted gridded sectoral data in the new GNFR (gridding NFR) sectors (Finland for 2007 and Spain for 1990–2007), which can not be used for the gridding at present. Denmark reported gridded sectoral data for 2005. Greece and Slovakia reported gridded national totals (Greece for 2000 and 2005 and Slovakia for 1990, 1995, 2000 and 2005). These data were checked with respect to their format, internal consistency

⁶ REPDAB is available at the CEIP website (<http://www.ceip.at/reporting-instructions/repdab/>).

and completeness. The format of the provided data had to be corrected in one case to enable importing of data to the database.

19. Large point source data. Large point source (LPS) submissions are also part of the five-year reporting obligation. Five Parties (Estonia, Finland, Monaco, Spain, and the former Yugoslav Republic of Macedonia) reported LPS data in 2009 on a voluntary basis. Estonia, Finland and Spain submitted LPS data already in the new GNFR sectors. Spain reported LPS data for the years 1990–2007, Estonia, Finland, Monaco and the former Yugoslav Republic of Macedonia only for 2007. LPS data were also checked with respect to their format and had to be corrected in two cases to enable the import of data into the database. Reporting of consistent and complete LPS data will be important for the next gridding of emission.

II. CONCLUSIONS

20. Timeliness. In 2009, the timeliness of the data submission was not satisfactory. This hampered the review of emission data included in the EMEP database as well as the assessments under the Convention for the year in question. Furthermore, with the late submissions, the review team had less time to analyse the review results and the EMEP centres had only a limited possibility to evaluate the EMEP inventory prior to reporting about it to the EMEP Steering Body. CEIP completed the EMEP database to the extent that this was possible, including all the late submissions that were received until 25 May 2009. In addition to this, CEIP imported the late submissions of 2006 data from the Russian Federation into the database.

21. Format. Parties' designated experts are urged to use standard NFR tables (NFR09 format 2010 onwards) for reporting and to check the format using the interactive data-checking tool (REPDAB) prior to submitting the data.

22. Completeness of emissions. The volume of officially reported data has increased by two orders of magnitude between 1992 (the first reporting year recorded in the EMEP database) and 2000. In addition, the number of sectors reported increased by a factor of 10 when reporting the NFR sectors replaced reporting according to the selected nomenclature for air pollution (SNAP) source categories. The increase in data quantity has been beneficial for the work of the Convention, but at the same time more resources are needed to compile the data and to assess the quality of the reported data. In spite of the improvements in reporting, the emission information reported by Parties still covers less than 50 per cent of the extended EMEP area.

23. Gridded data. Independently from the reporting year, out of the 48 countries which are part of the extended EMEP area, only 15 reported sectoral gridded data for 2000 (5.4 per cent of the extended EMEP grid area) and 19 countries reported sectoral gridded data for 2005 (5.5 per

cent of the extended EMEP grid area). Out of these countries, Switzerland and Ukraine did not report gridded sectoral data for POPs and Cyprus did not report gridded sectoral data for PM (Cyprus and Ukraine reported only data for 2005).

24. LPS data. Independently from the reporting year, out of the 48 countries which are part of the extended EMEP area, only 17 reported LPS data for 2000 and only 14 reported LPS data for 2005. Reporting of good-quality LPS information will be critical for the development of the next proxy data for gridding, which is planned for 2012. Parties are encouraged to take the necessary steps to be able to report consistent and complete LPS data from 2011 onwards.

25. CEIP particularly appreciated the efforts to compile and to submit emission information by Kyrgyzstan, Azerbaijan and Georgia that have fairly recently acceded to the Convention and that are not yet Parties to the protocols with reporting obligations. However, these emissions are not complete nor reported in standard templates. The EMEP Steering Body should consider supporting Parties in Eastern Europe, Caucasus and Central Asia, with a view to assisting their designated emission experts with the reporting of more complex data in standard formats.

Annex**SUMMARY OF THE EMISSION REPORTING REQUIREMENTS AND THE REVIEW PROCESS UNDER THE CONVENTION**

1. Each Party shall report emissions annually in accordance with the deadlines set forth in paragraph 29 (a) of the Emission Reporting Guidelines (ECE/EB.AIR/97). Emission reports shall include national emissions as well as activity data for the substances and sectors identified in table IV.1 of annex IV to the Guidelines for the years indicated. Parties should complete the tables at the requested level of aggregation. Where values for individual NFR categories or aggregated NFR categories are not available, the notation keys described in section II.C of annex I to the Reporting Guidelines should be used. Parties should provide explanatory information in Informative Inventory Report (IIR).
2. Parties are requested to provide information on the main pollutants (nitrogen oxides (NO_x), carbon monoxide (CO), non-methane volatile organic compounds (NMVOC), sulphur oxides (SO_x) and ammonia (NH₃), heavy metals (HMs), particulate matter (PMs), persistent organic pollutants (POPs) and activity data.
3. Parties to the Gothenburg Protocol should report their latest available projections at least every five years, and provide any updated projections annually by 15 February, for the years 2010, 2015, 2020, 2030 and 2050. Parties to the Convention that are not Parties to the Protocol are also strongly encouraged to provide this information.
4. The review process of emission data has been developed on the basis of feedback from Parties and from the Task Force on Emission Inventories and Projection and is considered by Parties as valuable for the improvement of their national emission inventories. At each stage of the review, Parties have the opportunity to clarify issues and to provide additional information. The technical review of inventories is carried out in three stages, as follows:
 - (a) Stage 1: An initial check of submissions for timeliness and completeness;
 - (b) Stage 2: A synthesis and assessment of all national submissions with respect to consistency and comparability of data with recommendations for data quality improvement;
 - (c) Stage 3: In-depth reviews of selected inventories, by pollutant, country and sector.In 2009 ten Parties are reviewed. (The centralised review meeting is scheduled to take place during the weeks 22-26, in June in Copenhagen.