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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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EMISSIONS

THE PRESENT STATE OF EMISSION DATA

Report by the EMEP Meteorological Synthesizing Centre-West

1. This report reflects progress in emission reporting under the Convention in the 2007 reporting round (2005 emission data, including 5-yearly reporting of gridded and large point source data, projections and activity data) and summarizes the main conclusions of the annual review of emission data carried out under EMEP in accordance with the methods and procedures adopted by the Steering Body at its twenty-ninth session (EB.AIR/GE.1/2005/7, annex III) and in line with the workplan (item 2.1) approved by the Executive Body at its twenty-fourth session (ECE/EB.AIR/89).
2. The report focuses on preliminary review results, improvements made since the first trial review in 2003, and future challenges in improving the quality of emissions data reported under GE.07-23087

the Convention. The official reported emission data are made available on the EMEP website in June each year (<http://webdab.emep.int/>).

3. The annual review 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 seen by Parties as valuable for the improvement of their national emission inventories. In 2008, the review, currently consisting of stages 1 and 2, is foreseen to be extended with a third, centralized, review stage, to assist the Parties further in improving the quality of their emission data.

4. In addition, within the revision of the Emission Reporting Guidelines and the updating and restructuring of the EMEP/CORINAIR Guidebook, the review has contributed to flagging issues to be improved, notably: strengthening the reporting requirements for Informative Inventory Reports (IIRs), harmonizing reporting with the emission reporting under the European Union National Emission Ceilings (EU NEC) Directive; and extending the Nomenclature for Reporting (NFR) sectors to accommodate reporting of persistent organic pollutants (POPs), heavy metals, particulate matter (PM) and non-methane volatile organic compounds (NMVOCs).

I. THE 2006 ROUND OF EMISSION REPORTING

5. The volume of officially reported data has increased by more than a factor of 900 between 1992 (the first reporting year recorded in the EMEP database) and 2007. In particular, the number of emission data sets (national total, sector, large point source, gridded total, gridded sector and projections) rose exponentially from 2000 onwards. In addition, the number of sectors reported increased by a factor 10 when reporting NFR sectors replaced reporting according to the Selected Nomenclature for Air Pollution (SNAP) source categories. The reporting of activity data has increased by a factor of 3 since 2003. The increase in data quantity has been important for the work of the Convention, but it also requires more resources to assess fully the quality of the reported data.

6. A total of 28 Parties to the Convention reported emission data by the due date of 15 February 2007, representing an increase of one Party compared with 2006. The number of Parties recently rose from 49 to 51 (Albania acceded in December 2005, and Serbia and Montenegro became two separate Parties in 2006). The above figures indicate that 55% of Parties reported their submissions on time. Between 16 February and 15 June 2007, a further 10 Parties submitted data, increasing the number of submissions to 75%. This is an increase of three Parties compared with last year, representing the highest number of submissions in the history of the Convention.

7. The availability of gridded sector data (2005 emissions) used for EMEP modelling improved considerably compared to last year (2000 emissions reported up to 2006). There were

reports of gridded sector data from 17 Parties for main pollutants (12 in 2006), from 16 Parties for PM (7 in 2006), from 15 Parties for heavy metals (10 in 2006) and from 11 Parties for priority POPs (8 in 2006). Reporting of particulate matter fractions (PM₁₀ and PM_{2.5}) increased to the level of the main pollutants, which was encouraging, as it indicated that the Parties had noted the importance of PM emissions in the Convention's work. Overall, however, the reporting, in particular of POPs, still needs further improvement.

8. Thirty-five Parties reported their 2005 available data for the review of the main pollutants. In addition, Azerbaijan reported selected sector data, Luxembourg reported 2004 data only and Greece reported its data too late for consideration. The corresponding figures for reporting PM, priority heavy metals and POPs were 28 (with Malta reporting PM_{2.5} and Romania reporting PM₁₀), 32 and 28.

9. As for the previous year, only 15 Parties (29%) reported complete time series of the main pollutants in NFR format for 1990–2005, which is the period relevant for the review of the Gothenburg Protocol. Reporting of PM began in 2000, and 19 Parties this year reported the full time series of 2000 – 2005. Out of those, 11 Parties also reported figures back to 1990.

10. The number of IIRs submitted by Parties increased from last year by two to 19 (50% of those reporting) in 2007.

II. PRELIMINARY RESULTS OF THE 2007 REVIEW

11. Selected review results for 2007 are presented below. The Task Force on Emission Inventories and Projections considered the review tests at its eighteenth meeting (ECE/EB.AIR/GE.1/2007/7), indicating that some of the tests, particularly the cross-pollutant tests, need to be revised or substituted in the future. The review team communicated actively with the Parties designated experts, both through bilateral contacts (22 of 38 national emission experts or 58% of those reporting had discussions with the EMEP Meteorological Synthesizing Centre-West (MSC-West) during the review) and through the country-specific review reports, which were issued three months after the submission of data (all Parties). The findings presented below will be communicated to the designated experts for further discussion when replies to the questions presented in the country-specific review reports are received (one month was allowed for replies).

12. Timeliness: The timeliness of the data submission was not satisfactory. This hampered review of emission data for inclusion in the EMEP database and the Convention's assessments 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 limited time to evaluate the EMEP

inventory prior to reporting to the EMEP Steering Body. MSC-West has aimed to complete the EMEP database, to the extent possible, this year, prior to an expected transfer of responsibilities for the emission work from 2008. Nine out of 10 late submissions were successfully included, but data from Greece, submitted on 1 June, could not be.

13. Format: Most Parties reported their emissions in the requested NFR formats, but about 50% of the submissions have altered the reporting templates; this led to a need for manually editing the submissions prior to loading data onto the database. This work was resource demanding and could lead to errors. Parties' designated experts are urged to check the format using the interactive data-checking tool (REPDAB) before submission. Croatia (2004 emissions reported in hard copy on 1 May 2007) and Luxembourg were the only Parties reporting according to SNAP.

14. Initial quality assurance/quality control (QA/QC): Many Parties did use REPDAB as a tool to check their submissions before sending them to the secretariat. All Parties that reported according to correct reporting templates had used REPDAB (50% of those reporting). Parties' designated experts are recommended to make use of this easy and rapid initial quality control of their emission data prior to its submission.

15. Review of non-gridded emissions:

(a) Inventory comparison: Generally, few countries reported differences greater than 5% between the EU NEC and Convention emission totals. The preliminary results indicate, however, two potential problems to be addressed in more detail. On the one hand, some countries reported the same SO₂, NO_x, NMVOC and NH₃ national totals to the European Commission (for the NEC Directive) and to EMEP. This means that for the NEC Directive inventory, maritime traffic and aircraft emissions (landing and take off cycle/cruise) are not treated in line with article 4 in the NEC Directive. On the other hand, some differences between the reported data seem too large to be attributed to differences in the reporting guidelines. In addition, differences sometimes occur for pollutants not affected by such differences in the requirements (e.g NH₃).

(b) Inventory comparison: For Belgium, Bulgaria, Estonia and Lithuania, there were differences greater than 10% between the emission data reported to the Convention and that reported to the United Nations Framework Convention on Climate Change.

(c) Emission factor outliers: Implied emission factor outliers were found for Denmark, Germany, Spain, Finland and France.

(d) Recalculations showing greater than $\pm 10\%$ for SO₂, NO_x, NMVOC, NH₃, PM_{2.5}, PM₁₀ (only data reported in NFR format for both 2006 and 2007 are considered): Thirteen countries had recalculated some of their emissions data with results more than $\pm 10\%$ different from their 2006 reporting. France, Portugal and Sweden had recalculated the 1990 Gothenburg Protocol base year. France and Portugal increased their NMVOC emissions in 2007 reporting with respect to 2006, while Sweden decreased its emissions for the base year. Over the whole time series, most countries recalculated their PM emissions and many of them their NMVOC emissions. Sweden recalculated its SO₂ emissions, Latvia and Lithuania their NO_x emissions, and Malta, Hungary and Portugal their NH₃ emissions. It is interesting to note that re-calculations are often not made for data before 1990 and not for whole time series, but rather for single years or a small fraction of the series. This suggests that the resulting time series might no longer be consistent, or that errors have been detected and corrected. Careful reading of IIRs, replies to the country-specific review reports, and in-depth analysis of the emission trends is needed to solve this issue for each case.

(e) Completeness/Consistency/Replacements: Incomplete and/or inconsistent 2005 emission data for the main pollutants were found for six countries for SO₂, NO_x and NH₃, for eight countries for PM_{2.5} and PM₁₀, and for nine countries for NMVOC. These were partly, or fully, replaced by MSC-W estimates (see EMEP/MSW Report 1/2007). The highest number of incomplete/inconsistent submissions (nine countries for NMVOC) concerned Azerbaijan, Belarus, the Czech Republic, Lithuania, Romania, the Russian Federation, Slovakia, The former Yugoslav Republic of Macedonia and Ukraine. The problems related mainly to a lack of consistent time series and an absence of emissions reporting in the agriculture sector. In addition to the replacements, MSC-West estimates were needed to complete the EMEP inventory for Parties that did not submit data as requested. In summary, more than 38% of the emissions held in the EMEP inventory consist of non-official 2005 data.

16. Review of gridded data: The data were reviewed by means of six review tests as described in the EMEP Emission data review (Note 1/2007). Corrections and clarifications were needed in 14 cases of the 18 Parties reporting gridded sector data. In the absence of a reply from Ukraine to the request for correction of data, officially reported emissions for the country could not be included this year. Despite of the improvement in both quantity and quality of gridded sector data for SO₂, NO_x, NMVOC and NH₃, only 38% of the Parties included in EMEP's modelling for the review of the Gothenburg Protocol, reported data which passed the review. Based on feedback received from Parties' designated experts on the REPDAB test on grid boundaries, MSC-W updated the mask of gridded emissions for each country (http://www.emep.int/grid/emep50official_country_grid_fraction.txt). These updates were, in general, small. In order to fully avoid discrepancies between country and EMEP borders in the

future, there might be a need to further harmonize the EMEP map mask with national or European Environmental Agency information.

17. Informative Inventory Reports: The increase in submission of IIRs is positive, but the reports differ substantially in structure and content, making it time-consuming, if not impossible, for the review team of experts to find the necessary information. Therefore, it will be important to include a template for reporting of IIRs in the revised Emission Reporting Guidelines.
