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EMISSION INVENTORY REVIEW AND DATA QUALITY ASSURANCE

Note prepared by the Chairman of the Steering Body of EMEP
in consultation with the secretariat

Introduction

1. High-quality emission data are essential for assessing compliance with emission reduction targets, as well as for the development of air pollution abatement measures. In accordance with the work-plan of the Convention, the Task Force on Emission Inventories and Projections will work with Parties to improve the quality, consistency and completeness of emission reporting with a focus on validation and good practice and will develop, in cooperation with the EMEP centres, the European Environment Agency (EEA) and the European Commission's Joint Research Centre (JRC) an emission inventory programme (ECE/EB.AIR/79/Add.2, annex XII, item 2.1).

Documents prepared under the auspices or at the request of the Executive Body for the Convention on Long-range Transboundary Air Pollution for GENERAL circulation should be considered provisional unless APPROVED by the Executive Body.

2. A workshop on validation and evaluation of air emission inventories held on 14-16 October 2002 in Gothenburg (Sweden) confirmed the need for high-quality emission inventories, and recommended the establishment of an inventory improvement programme (EB.AIR/GE.1/2003/5). At its twenty-seventh session, the Steering Body took note of the conclusions of the workshop and invited its Task Force on Emission Inventories and Projections to consider them, draw up proposals for procedures to improve emission inventories, and report these to it at its twenty-eighth session (EB.AIR/GE.1/2003/2, para. 42 (f)) in 2004.

3. At its twelfth meeting, held on 22-24 September 2003 in Warsaw, the Task Force adopted the report of the workshop and proposed to establish an inventory improvement programme, to be guided by an expert panel on review. It agreed, moreover, to further develop review procedures and mechanisms and to submit these to the Steering Body at its twenty-ninth session in 2005 (EB.AIR/GE.1/2004/9, paras. 6 (c) and (d)).

4. At the twenty-first session of the Executive Body, delegates identified the need to consider the quality of emission data reporting and requested a paper for submission to the Working Group on Strategies and Review. The Executive Body requested the Chairman of the EMEP Steering Body to produce, in collaboration with the EMEP Bureau and the secretariat, a note on emission data reporting, identifying quality assurance issues and proposals for improving data quality (ECE/EB.AIR/79, para. 48 (i)).

5. This note presents the aims and objectives of an inventory improvement programme under the Task Force aimed at addressing data quality assurance issues and improving data quality. It identifies review procedures and outputs, and proposes a timetable for reviews. The information below draws upon discussions at the twelfth meeting of the Task Force, the deliberations of a meeting of an expert panel on review convened by the Task Force on 5-6 February 2004 in Copenhagen and discussions on review by a team of experts of the Task Force.

I. INVENTORY IMPROVEMENT PROGRAMME UNDER THE TASK FORCE

A. Aims and objectives

6. According to the Emission Reporting Guidelines,^{1/} national emission inventories should be transparent, consistent, comparable, complete and accurate. The overall aim of the emission inventory improvement programme is to ensure that all national emission inventories are of high quality and fulfil these criteria.

^{1/} The Guidelines on Estimating and Reporting Emission Data (formerly EB.AIR/GE.1/2002/7 and Corr. 1) were published in the Air Pollution Studies series, No. 15, a United Nations Sales Publication (ECE/EB.AIR/80), Sales No. E.03.II.E.44, ISBN 92-1-116861-9; ISSN 1014-4625).

7. In implementing a programme for inventory improvement, the Task Force proposes to involve its national experts, the EMEP centres, the European Environment Information and Observation Network (EIONET), EEA and its European Topic Centre on Air and Climate Change (ETC/ACC) and JRC. It also aims to achieve a common approach to inventory improvement for the Convention, the United Nations Framework Convention on Climate Change, and the European Commission's Clean Air for Europe (CAFE) programme and reporting under the National Emissions Ceilings (NEC) Directive.

8. The main objectives of the inventory improvement programme will be to:

- (a) Develop and apply methods for evaluating the quality of reported emissions data and projections;
- (b) Identify problems, including those of quality assurance, related to reporting and propose solutions;
- (c) Facilitate the reviewing and reporting of emissions by Parties by developing common guidance and providing common evaluation tools;
- (d) Harmonize methods for calculating emissions data, including projections, by developing and updating information in the EMEP/CORINAIR Atmospheric Emission Inventory Guidebook;
- (e) Harmonize reporting requirements with other international bodies, identifying inconsistencies and proposing solutions;
- (f) Ensure the availability and transparency of emission data reported through the further development and updating of web-based databases, such as WEBDAB, available on the EMEP homepage (www.emep.int);
- (g) Evaluate the feasibility of relevant databases, e.g. an emission factor database for combustion and industrial emission sources as proposed by JRC;
- (h) Seek collaboration with the scientific community to reduce uncertainties in emission factors;
- (i) Promote scientific workshops on priority issues and training programmes targeted towards countries with economies in transition.

B. Methods of work

9. The Task Force proposes to invite national experts to take part in the expert panel on review to guide the process of reviewing emission data including their quality. Membership of the panel will be open to experts from all Parties to the Convention. The work of the panel will as far as possible also take due account of the quality assessment requirements of the European Union with regard to, for example, its National Emissions Ceilings (NEC) Directive. The expert panel on review was established by the Task Force at its twelfth meeting and is led by experts from Sweden and EEA. The panel will provide information to the Task Force, which will be responsible for reporting to the EMEP Steering Body.

10. It is proposed that the main tasks of the expert panel on review will be to:

- (a) Propose to the Task Force procedures for reviewing inventories;
- (b) Take account of review processes under other conventions in order to improve reviews under the Convention;
- (c) Facilitate the sharing of experiences on quality assessment, quality control and inventory improvement among national experts;
- (d) Establish contacts with experts from other bodies working on relevant issues and encourage the scientific community to support activities on verification, projections and quality assessment;
- (e) Propose to the Task Force a standard format and harmonized definitions for the national informative inventory report that is submitted by Parties in accordance with paragraph 38 of the Emission Reporting Guidelines; and
- (f) Guide, evaluate and follow up the periodic review work to be carried out by a team of experts (see below) and propose solutions to the Task Force on common problems in reporting emission data. Based on the results of the review, the expert panel will propose recommendations for action to the Task Force for further improvement in emission inventories.

11. To provide detailed review information for consideration by the Task Force, a review team of experts, made up of representatives and, as appropriate, from the Meteorological Synthesizing Centres West and East (MSC-W and MSC-E), the Centre for Integrated Assessment Modelling (CIAM), ETC/ACC, JRC, the secretariat and national experts appointed by the Task Force, will

test and implement methodologies for review, carry out bilateral consultations with national experts and make proposals for further improving data quality. The technical reviews will be carried out annually, in close cooperation with national experts, and a draft report submitted for consideration by the Task Force.

12. It is proposed that the main tasks of the team of experts shall be to:

(a) Develop, evaluate and implement review methods and procedures, with guidance and approval from the Task Force;

(b) Review annual submissions under the Convention and submit a draft report of the results to the Task Force. MSC-W, working in collaboration with the team of experts, will be responsible for preparing country-specific reports with questions to Parties on potential problems identified in their submissions. These reports will be distributed via the Internet. MSC-W will be responsible for compiling and analysing feedback from experts regarding the review questions;

(c) Collaborate with expert panels to assess the results of reviews and common problems and report on these issues to the Task Force;

(d) Assess the effects of the review process on emission inventory improvement, identify problems and bottlenecks in the reporting process and propose solutions to the Task Force for the following reporting round.

13. Initial work on a pilot review programme has been supported by EEA through ETC/ACC and by MSC-W. This support will need to be continued if an annual review process is to be established. Additional resources and funding would be required to meet the objectives of the inventory improvement programme. The Steering Body may wish to consider possible options for proposals to the Executive Body for financing this work.

II. ELEMENTS FOR FUTURE WORK IN 2004/2005

14. Some of the following items are being carried out during 2004 as part of the inventory improvement programme, the remainder are proposed for 2005:

(a) The implementation and evaluation of the annual inventory review process, including the assessment of data quality and proposals for improving data quality, according to an agreed time schedule;

(b) The development of a standard format for national informative inventory report to be submitted by the Parties as specified in paragraph 38 of the Emission Reporting Guidelines; and

(c) The organization of a scientific workshop on particulate matter emission inventories and a training workshop on quality assessment procedures, to be organized by JRC.

These elements are described in more detail below.

A. Annual inventory review schedule and outputs

15. Based on the experience of two trial reviews carried out in 2003 and 2004, annual inventory review procedures, a schedule and outputs are proposed below for further discussion at the meeting of the Task Force in October.

16. Review process. The annual inventory reviews will begin with the recording of annual emission data submitted by Parties to the secretariat (submissions are due before 15 February). As at present, the secretariat will register the reporting for compliance purposes, verifying completeness and communicating with the reporting experts to acknowledge receipt, and to verify the content and format of each submission. Data will then be forwarded to the review team of experts that will carry out a two-level review in accordance with the methodology agreed by the Task Force.

17. Level I review. The first tier of the review process will be a *general review* of data. This will include automatic consistency and completeness tests indicating “dips”, “jumps” and “gaps” in data sets. The review team of experts will assess data submissions, and tests will be performed using REPDAB as well as other automated methods. It is proposed that, in the future, Parties’ experts will use REPDAB before submitting data, in order to verify formatting, consistency and completeness. If required, REPDAB may be further developed to facilitate this process.

18. Level II review. The second tier of the review process is an *extended review*, involving a comparison of implied emission factors and activity data and the compilation of a key source analysis for individual Parties. Comparisons may also be made with emission data reported under other obligations, e.g. NEC Directive and the United Nations Framework Convention on Climate Change. Preparatory work for the level II review will be carried out by the review team of experts and reported to the Task Force.

19. Consultations with Parties. Following the level I and level II reviews, MSC-W, in consultation with the other members of the review team of experts, will prepare country-specific review documents identifying potential inventory problems and distribute them to the officially designated emission expert of the relevant Party (through a password-protected Internet site, using REPDAB). These country-specific review documents will raise questions regarding potential inconsistencies or discrepancies. Experts will be invited to give explanations for the potential discrepancies and, if necessary, to submit data. The results of these country-specific consultations will be reported to the Task Force, which will evaluate the results of the review process and report its conclusions and recommendations to the Steering Body.

20. Technical review report. Following consultations with Parties' experts, the review team of experts will prepare a draft technical review report, with recommendations, for consideration by the Task Force. The draft report will identify problems, including bottlenecks and issues of quality assurance, that need to be addressed in order to improve reporting and data quality. It will assess the effects of the review process on overall inventory improvement, and make proposals for improvements for the next reporting round. The Task Force will consider the draft report as a basis for evaluating the review process and for reporting to the EMEP Steering Body.

21. Reporting of emission data to the EMEP Steering Body and the Executive Body. For some years summarized national emissions data have been reported by MSC-W to the EMEP Steering Body as an official document; this document has been drawn to the attention of Parties at sessions of the Executive Body. The process has ensured transparency of data submitted, and has provided Parties with a means of checking the data recorded. Since all data are now available through the Internet, it is proposed that the official document on emissions reporting should no longer include data tables but address more substantive issues regarding reporting, including information on the emissions review process, whilst drawing attention to the availability of the data on the EMEP web site. MSC-W will invite members of the expert panel on review to assist with reporting on the emission inventory review process, taking into account conclusions from the Task Force and its expert panel on review.

22. Task Force meetings. It has been the practice in recent years for the Task Force to meet in the autumn, following the Steering Body meeting. While this has been timely for processing and analysing emission inventories, it has created difficulties for reporting on the latest reporting round to the Steering Body. In the future it is proposed that a meeting should also be held in late spring to discuss the review process and issues of data quality so that these can be reported to the Steering Body at its session in September.

B. National inventory reports (NIRs)

23. According to paragraph 38 of the Emission Reporting Guidelines, Parties are encouraged to submit, no later than three months after submitting their emission data report, an informative inventory report, hereinafter “national inventory report”, containing descriptions of methodologies and assumptions used in each sector, references on emission factors and activity data, as well as the rationale for their selection; information on expected improvements in methodologies and the basis for recalculations and information on uncertainties and quality assurance/quality control procedures implemented. The availability of a national inventory report is essential in order to develop the review procedures beyond level I and level II. To help Parties in their submission of national inventory reports, and to improve the quality of information reported, the Task Force will consider, at its next meeting, a standardized format for the reports.

24. As a minimum, the report should cover a description of national circumstances (institutional arrangements and a short description of the inventory preparation process), a description of completeness (missing sources and explanations of notation keys), a key source analysis, information on recalculations and changes in methodologies since the previous submission and a description of whether calculations of emissions from mobile sources were made on the basis of fuel consumed or fuel sold. A more elaborated version of the report could provide the kinds of information reported in the national inventory report submitted under the United Nations Framework Convention on Climate Change, supplemented by methodological information on pollutants reported under the Convention.

C. Scientific workshops and training programmes

25. Scientific workshops and training programmes are an important way to facilitate the exchange of information on emissions reporting and inventory improvement, and these are particularly useful to countries with economies in transition. Preceding the thirteenth meeting of the Task Force, to be held 19-20 October 2004 in Italy, a one-day scientific workshop will be held on 18 October 2004. The workshop will be devoted to emission inventories of particulate matter. Following the Task Force’s meeting, a training programme on quality assurance and quality control of emission inventories will be held on 21 October 2004 in Ispra (Italy). JRC will organize both the scientific workshop and the training programme.

III. PROPOSALS FOR CONSIDERATION BY THE EMEP STEERING BODY AND THE WORKING GROUP ON STRATEGIES AND REVIEW

26. The review procedures proposed here are still under development and will only identify

potential inventory problems. In order to further review the quality of inventories, there is a need to conduct reviews, including an assessment of emission factors, activity data, methods used and an examination of documentation. As part of the inventory improvement programme, the Task Force and its expert panel on review will, in 2005, initiate discussions on options for methods, possible responsibilities and resource requirements for more in-depth reviews of inventories. This proposed evaluation of in-depth reviews of emission inventories has been included in the 2005 EMEP work plan.

27. The EMEP Steering Body and the Working Group on Strategies and Review are invited to consider the following proposals for appropriate action:

(a) Recognize the importance of developing a thorough and well-defined inventory improvement programme that identifies quality assurance issues and that leads to improved data quality;

(b) Agree that the Task Force on Emission Inventories and Projections should have overall responsibility for the programme. It should convene, as necessary, teams of experts to provide advice for its deliberations. It should report progress and make recommendations to the EMEP Steering Body;

(c) Take note of the proposed elements for the work-plan and the detailed information on procedures, a schedule and outputs;

(d) Encourage Parties to prepare national inventory reports, in accordance with paragraph 38 of the Emission Reporting Guidelines and in line with a standard format to be developed by the Task Force;

(e) Note the added value of having an inventory review process that may be applied to emission data reported both under the Convention and as required by the EU National Emissions Ceilings Directive;

(f) Note the need for additional resources to ensure proper implementation of the review procedures in the long term;

(g) Invite the Task Force on Emission Inventories and Projections to develop further its proposals for systematic and periodic reviews to evaluate data quality through the examination of documentation and by comparison with other sources of information and report progress to the Steering Body at its twenty-ninth session in 2005.