



**UNITED  
NATIONS**



**Framework Convention  
on Climate Change**

Distr.  
GENERAL

FCCC/SBSTA/2002/INF.19  
30 September 2002

ENGLISH ONLY

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE  
Seventeenth session  
New Delhi, 23–29 October 2002  
Item 4 (b) of the provisional agenda

**METHODOLOGICAL ISSUES**

**GUIDELINES UNDER ARTICLES 5, 7 AND 8 OF THE KYOTO PROTOCOL**

**Proposal for case studies to simulate the calculation of adjustments under  
Article 5, paragraph 2, of the Kyoto Protocol**

**Note by the secretariat**

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## I. INTRODUCTION

### A. Mandate

1. The Conference of the Parties (COP), by its decision 21/CP.7, requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to complete technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol, building upon its draft decision on adjustments and the outcome of the process described in paragraph 2 below, for consideration by the COP at its ninth session, with a view to recommending, at that session, such technical guidance for adoption by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP) at its first session (FCCC/CP/2001/13/Add.3, para. 3). The SBSTA, at its sixteenth session, decided to aim to complete the technical guidance at its eighteenth session, and to forward it for consideration by the COP at its ninth session, in accordance with decision 21/CP.7 (FCCC/SBSTA/2002/6, para. 24 (k)).

2. By the same decision, the COP requested the secretariat to organize a workshop before, and possibly one or more workshops after, the sixteenth session of the SBSTA, on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol. The first workshop was held in Athens, Greece, from 3 to 5 April 2002. It elaborated draft technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (hereinafter referred to as draft technical guidance) for consideration by the SBSTA at its sixteenth session. The report of the first workshop, including the draft technical guidance, is contained in document FCCC/SBSTA/2002/INF.5.

3. The SBSTA, at its sixteenth session, requested the secretariat to draw up, for consideration at its seventeenth session, a proposal for the development of case studies for simulating the calculation of adjustments using the methods contained in the draft technical guidance. The results of these case studies should be communicated to Parties by 15 February 2003. Further, the SBSTA invited Parties to submit, by 15 March 2003, their views on the draft technical guidance, taking into account the results of the case studies.

4. Also at its sixteenth session, the SBSTA requested the secretariat to organize a second workshop, in accordance with the mandate of decision 21/CP.7, in April 2003. The aim of the second workshop would be to assess the results of the case studies, taking into account any information submitted by Parties, and to refine the draft technical guidance with a view to ensuring consistent application of adjustments by the different expert review teams.

### B. Scope of the note

5. This paper contains a proposal for the development of case studies for simulating the calculation of adjustments using the methods contained in the draft technical guidance and real inventory data submitted by Parties. It outlines an approach for selecting the cases, and describes how the simulated adjustments would be calculated by applying the methods contained in the draft technical guidance.

6. The proposal in this paper does not include any example calculations of simulated adjustments; these will be prepared for, and presented at, the second workshop referred to in paragraph 4 above.

7. The suggested approach and procedures for simulating the calculation of adjustments in this paper may not cover all possibilities. Other options may exist and could be identified by experts and Parties prior to and during the second workshop on this matter or subsequently by the SBSTA.

### C. Possible action by the SBSTA

8. The SBSTA may wish to take note of the information contained in this paper. The SBSTA may also wish to endorse or modify, as appropriate, the secretariat's proposal for the development of case

studies for simulating the calculation of adjustments. In so doing, the SBSTA may take into consideration that the case studies would be completed prior to the workshop referred to in paragraph 4 above, so that the results from the case studies could be further assessed by experts taking into account any views and work undertaken by Parties on this matter. The results of the workshop would be made available to Parties at the eighteenth session of the SBSTA with the aim of refining the draft technical guidance, as appropriate.

## **II. APPROACH**

### **A. Background**

9. In developing this proposal, the secretariat took into account the common view expressed at the first workshop on this matter, and reflected in the draft technical guidance (see FCCC/SBSTA/2002/INF.5, para. 19), that adjustments are likely to be applied on an exceptional basis and are likely to have a temporary character. According to the provisions in the guidelines for review under Article 8 of the Kyoto Protocol, Parties may, up until the end of the commitment period, provide a revised estimate for part of its inventory to which an adjustment was previously applied for a year of the commitment period (paras. 81 and 82 of those guidelines). In addition, expert review teams will have only a short time to calculate adjustments (see para. 75 of those guidelines).

### **B. Proposed approach for selecting simulated cases**

10. The secretariat will identify potential cases in inventories of Annex I Parties that provide opportunities for simulating the calculation of adjustments. These simulations will be of a purely technical nature. The use of real information from Parties' inventories will facilitate the assessment of methods used in case studies, including the background information used. It should be noted that the selection of a Party's inventory for inclusion in the case studies does not imply any assessment of the quality of the inventory.

11. To identify potential cases for the case studies the secretariat will first screen the individual review reports of inventories submitted in 2000 and 2001.<sup>1</sup> The use of complete reports implies that the Party under review will have had an opportunity to provide comments on the issues raised by the expert review team, and the comments will have been taken into account in the final review report. If several reviews were undertaken, only one report per country will be considered, giving preference to the in-country review report. For centralized and desk review reports, the most appropriate report will be selected.

12. If this screening does not provide sufficient cases to allow the testing of all methods recommended in the draft technical guidance, the secretariat will also consider GHG inventory submissions from Annex I Parties that have not been subject to an individual review, including inventories submitted in 2002.

13. Where possible, the secretariat will strive to compare the results obtained through the adjustment methods with real estimates provided by the Party. This will indicate the extent to which the adjusted estimates differ from real estimates calculated by Parties, and whether these adjusted estimates could be considered conservative.

14. In selecting areas of the inventory that could be used for simulating the calculation of an adjustment, preference would be given to the following:

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<sup>1</sup> The 2000 inventory submissions of the following Parties were subject to an individual review: Australia, Canada, Hungary, Japan, Netherlands, New Zealand, United Kingdom and United States of America. The 2001 inventories were reviewed for the following Parties: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, European Community, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Luxembourg, Norway, Portugal, Slovakia, Spain, Sweden and Switzerland.

(a) Missing estimates and use of inappropriate activity data, emission factors or methodologies that are not in accordance with the IPCC Guidelines as elaborated by the IPCC good practice guidance (problems listed in table 1 of the draft technical guidance (see also table 2 of this paper));

(b) Problems identified in the review reports that, according to the report, could lead to underestimation of emissions in the latest inventory year or of the trend, or to an overestimation of the base year emissions.

15. In addition, inventory problems related to lack of transparency (e.g. due to lack of an NIR, calculation sheets or other background documentation; insufficient level of detail in descriptions of methods/models used) would be included in the case studies because according to the draft technical guidance these could also trigger an adjustment if this lack of transparency precludes the expert review team from assessing whether the GHG emission estimate is an underestimation in a given year of the commitment period or an overestimation in the base year. The methods recommended for these types of problems would, however, be identical to those for the type of problems listed in paragraph 14 (a) above.

16. Some limitations might be encountered in identifying cases that could be used for calculating an adjustment. For example, the current reviews are undertaken under the Convention rather than under the Kyoto Protocol and do not focus on inventory problems that could lead to an underestimation of emissions in a given inventory year or an overestimation in the base year. Although the review reports identify a number of methodological problems, they may not lead to an adjustment.<sup>2</sup> Such inventory problems include: weaknesses in the institutional arrangements, in the archiving system, in verification of data and QA/QC procedures and some reporting problems, such as insufficient disaggregation of estimates, inconsistent use of notation keys, and transcription errors.

17. Table 1 below provides examples that could serve as cases to simulate the calculation of adjustments in different sectors of the IPCC guidelines for national greenhouse gas inventories.

**Table 1. Problems identified in review reports**

| Sector                               | Problem  |
|--------------------------------------|--|
| Energy: domestic aviation and marine | Difficulties in the allocation of domestic and international aviation and marine that could lead to underestimating the trend in domestic emissions.   |
| Energy: fugitive emissions           | Missing emission estimate: Petroleum refining (1.B.2.a.iv) was reported as “not estimated”. The entire oil and natural gas sector (CH <sub>4</sub> ) is a key source for the country.  |
| Industrial processes                 | Missing emission estimate: SF <sub>6</sub> used in aluminium and magnesium foundries was reported as “not estimated”.  |
| Agriculture: enteric fermentation    | Possibly inappropriate (outdated) emission factor: CH <sub>4</sub> emission factor is kept constant over the years and does not take into account changes in certain parameters (e.g. milk fat content) since the emission factor was developed, which could result in an increase of the emission rate. |
| Waste: solid waste                   | Activity data: The model used is fed by assumptions (e.g. regarding gas capture efficiency and policies for municipal solid waste (MSW) reduction), which are not supported by factual data.   |

<sup>2</sup> The application of adjustments to inventory problems is guided by the operative paragraphs 3–11 of the draft decision -/CMP.1 (*Good practice guidance and adjustments under Article 5, paragraph 2*). The relevance of an inventory problem for an adjustment is further described in the draft technical guidance on adjustments (FCCC/SBSTA/2002/INF.5, paras. 8–17 and table 1).

18. Based on the inventory problems identified, the secretariat would:

(a) Ensure that all IPCC sectors included in the draft technical guidance are covered, giving priority to those sources that most likely are key sources for the majority of the Parties, by providing two to three test cases per sector;

(b) Strive to use all recommended methods in the draft technical guidance (see table 2 to this paper) giving priority to the sectoral guidance;<sup>3</sup>

(c) For each test case, try to apply all recommended methods for arriving at a conservative estimate (see FCCC/SBSTA/2002/INF.5, paras. 20–21), taking into account the recommendation for conservative estimates in the sectoral guidance.

**Table 2. Summary of the main reasons and available methods for adjustments<sup>4</sup>**

| Methods   | Not prepared in accordance with the IPCC guidelines as elaborated by the IPCC good practice guidance |  |                             |                      |   |
|---|--|--|-----------------------------|----------------------|---|
|   | Missing estimate <sup>a</sup>  | Emission factor or other parameter inappropriate | Activity data inappropriate | Method inappropriate | Allocation to inappropriate source category |
| A. Interpolation of emission estimates or parameters  | X  | X  | X                           |                      |   |
| B. Extrapolation of emission estimates or parameters  | X  | X  | X                           |                      |   |
| C. Extrapolation of emissions using drivers or surrogate data   | X  |  |                             |                      |   |
| D. Application of data from international databases   |  | X  | X                           |                      |   |
| E. Application of IPCC default values   |  | X  |                             |                      |   |
| F. Application of an average parameter for a cluster of countries   |  | X  |                             |                      |   |
| G. Application of IPCC tier 1 and/or default methods  | X  |  |                             | X                    |   |
| H. Estimated emission using an average emission rate for a cluster of Annex I Parties and a country-specific driver | X  | X  |                             | X                    |   |
| I. Linkages of emissions between gases or source categories   | X  |  |                             | X                    |   |
| J. Reallocation of the emissions to the correct source category   |  |  |                             |                      | X   |

<sup>a</sup> The same methods apply to lack of full geographic coverage.

19. The reason for covering all recommended methods for conservative estimates is not to compare all the different methods, but rather to evaluate whether specific methods can be applied to “real” cases.

<sup>3</sup> All methods included in the draft technical guidance for adjustments would be tested, but not all methods would be covered in each IPCC sector. Depending on the sector, only some methods are applicable for making an adjustment; these methods are specified in the sectoral guidance.

<sup>4</sup> Table 1 of the draft technical guidance is reproduced here to illustrate the recommended methods that the secretariat would strive to use in the case studies (this table corresponds to table 1 of document FCCC/SBSTA/2002/INF.5).

This does not imply that future expert review teams will have to follow all the methods; given the restrictions in time during the adjustment procedure it might be sufficient that expert review teams only apply those specific methods that, according to the technical guidance, are considered most appropriate to give conservative estimates.

20. The cases for simulating the calculation of adjustments will be presented according to the procedure outlined in section III below, which covers the provisions in paragraphs 83 (c)(i)–(vi) of the guidelines for review under Article 8 of the Kyoto Protocol (see FCCC/CP/2001/13/Add.3). In addition, the time needed to calculate and document each adjustment would be recorded.

### C. Expected results

21. It is expected that the assessment of the results of the case studies will help to answer the following questions:

(a) Are the methods and instructions for conservative estimates precise enough to avoid different interpretations by different expert review teams? Are all sectors and source categories sufficiently covered in the draft technical guidance? Which parts of the draft technical guidance on adjustments need further refinements in these regards?

(b) How much time would be needed for calculating and documenting an adjustment and how many persons should ideally be involved in an adjustment procedure? What types of information will experts need access to in order to perform specific adjustment methods?

(c) How would an expert review team assess, prior to the calculation of the adjustment, whether an inventory problem results in an underestimation of emissions or of the trend, or in an overestimation of the base year emissions, taking into account time-series consistency?

### III. PROCEDURE TO BE USED TO CALCULATE AND DOCUMENT EACH SIMULATED ADJUSTMENT CASE<sup>5</sup>

#### 1. *The original estimate*

22. The original emission estimate or notation key of the source or sub-source for the given year/years will be indicated. Emission factor (or implied emission factor) and/or activity data values, if available and relevant for the adjustment, will also be provided. Where possible, the percentage contribution to the national total or trend will be indicated.

#### 2. *The underlying problem*

23. The underlying problem used for simulating the calculation of an adjustment will be described, including the following information, as appropriate:

(a) Reference of the review report including quotation of the relevant textual parts that describe the identified problem;

(b) Relevant information provided by the Party with regard to the identified problem (e.g. in the NIR or in its response to the review report).

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<sup>5</sup> This procedure has been elaborated solely for the purpose of this paper and for undertaking the simulated case studies. It does not imply that future expert review teams have to follow the same procedure when they have to undertake an adjustment.

### *3. The rationale for the adjustment*

24. Explanation of why an adjustment is considered necessary will be given. Where relevant, this explanation should include the reason why the methodology, emission factor or activity data used were considered to be inappropriate. The explanation should focus on why the identified problem could result in an underestimation of emissions in a given year (or overestimation in the base year). Given that the review reports under the trial period did not consider whether an identified problem could potentially be adjustable, the secretariat would try to explain why the selected case could be relevant for an adjustment. Other information that would justify the calculation of an adjustment would be included, such as:

- (a) Whether the source itself or the source category is a key source, including whether the national circumstances indicate the relevance of a given source for the inventory, as appropriate;
- (b) Whether international data sources provide evidence that a given source exists in a given country;
- (c) Importance of that source in other countries with similar national circumstances, e.g. number of Parties that report the source in question or for which that source is a key source.

### *4. Assumptions, data and methodology used to calculate the adjustment in a conservative manner*

25. For each possible method for a given problem according to the sector-specific guidance, the following information will be provided. Where relevant, these data and their references would be summarized in a table:

- (a) Necessary data, such as statistics from international data sources,
- (b) Possible values of default emission factors or other parameters (applicable range) from different sources;
- (c) Implied emission factor ranges reported by other Parties;
- (d) Uncertainty data.

26. All methods recommended for the given type of problem will be tested, taking into account that for some methods a range of input values may be needed. Where possible, the use of different methods and a range of input parameters will allow a "possible range" of results to be obtained, to which the rules for ensuring that the estimate is conservative (see para. 20 of the technical guidance) will be applied. The results will be presented in a table or a graph to allow comparison between the different options.

### *5. The adjusted estimate and its magnitude*

27. The adjusted emission estimate for the source category will be provided (in Gg) for the relevant year(s). The percentage contribution of the adjusted estimate to the national total expressed in CO<sub>2</sub> equivalent for the inventory year in question would also be given and, where possible, compared to the value and contribution to the national total prior to the adjustment.

28. Depending on availability of data, the adjusted estimate would be compared to real estimates provided by the Party. For example, if a country has undertaken improvements with regard to the identified problem since its 2000/2001 inventory submission, the revised estimate reported in the 2002 submission could be compared to the calculated, adjusted estimate.

29. A description of how the final adjusted estimate is considered to be conservative would be provided.