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METHODOLOGICAL ISSUES

Characteristics of national systems and issues relating to adjustments referred to in Article 5 of the Kyoto Protocol

Submissions from Parties

Note by the secretariat

1. At its tenth session, the Subsidiary Body for Scientific and Technological Advice (SBSTA) considered the work programme on methodological issues related to Articles 5, 7 and 8 of the Kyoto Protocol.

2. The SBSTA decided to consider the characteristics of national systems and issues relating to adjustments, referred to Article 5 of the Kyoto Protocol, at its eleventh session. It requested Parties to provide views on these items by 15 August 1999, for compilation into a miscellaneous document (FCCC/SBSTA/1999/6, para. 34 (c)).

3. The secretariat has received four such submissions from Parties. In accordance with the procedure for miscellaneous documents, these submission are attached and are reproduced in the language in which they were received and without formal editing.[1]

[1] In order to make these submissions available on electronic systems, including the World Wide Web, these contributions have been electronically imported, scanned and/or retyped. The secretariat has made every effort to ensure the correct reproduction of the texts submitted.

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PAPER NO. 1: AUSTRALIA

VIEWS OF THE CHARACTERISTICS OF NATIONAL SYSTEMS AND ISSUES RELATING TO ADJUSTMENTS

National systems

The aim of national systems, identified under Article 5.1 of the Protocol, is to enable the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol.

National systems under Article 5.1 of the Protocol will play an important part in the collection, processing, communication and storage of inventory data, as well as ensuring confidence in the quality of such data. They will contribute to confidence in the Protocol, as well as forming a critical element of the compliance system. Guidelines adopted for national systems should be adequate to ensure these outcomes while also being sensitive to national circumstances. The guidelines should also recognise practical implementation considerations in good practice measurement of emissions and sinks.

Australian experience

Australia's first greenhouse gas inventory was published in 1994. Since then Australia has prepared inventories annually. The preparation of the inventory is oversighted by the National Greenhouse Gas Inventory Committee, an expert committee which is comprised of Commonwealth, State and Territory, and expert representatives. The Inventory Committee has overseen the preparation of two versions of inventory methodology workbooks, with updates, which build upon the IPCC inventory guidelines. These workbooks were initially prepared by consultants and then underwent expert review, before being approved by the Inventory Committee for publication. Annual data collection, compilation and reporting for the inventory is initially undertaken by consultants, with the results presented to the Inventory Committee for approval and publication.

In recent times, Australia has been focussing particularly upon improving emissions estimates in relation to the land use change and forestry sector. Considerable resources are being invested into a National Carbon Accounting System (NCAS). The NCAS has several aims:

- to provide a sound database of Australia's land based sources and sinks of greenhouse gases, in CO_2 equivalents, for 1990 and for the commitment period;
- to develop the tools necessary to account for changes in land based sources and sinks, and for scenario planning and modelling;
- to provide a basis for addressing sequestration issues in the context of emissions trading.

Characteristics of national systems

Australia's experience in the preparation of successive annual inventories, and in planning the NCAS, has made it clear that guidelines for national systems need to incorporate the capacity for national systems to evolve. We do not believe that guidelines for national systems either can or should be overly prescriptive about the details of what should constitute a particular national system. Guidelines will therefore need to have the following characteristics:

- be appropriate reflections of the provisions of Articles 5 and 7 of the Kyoto Protocol;

- be flexible enough to suit individual country needs
  - to enable Parties' national systems to reflect their national circumstances
  - whilst still robust enough to support compliance with the Protocol

- be able to be progressively modified
  - for example, after new guidelines for national communications are adopted by the COP, as well as other methodological work such as identified in document FCCC/SB/1999/2 proceeds
  - after being trialed and examined by an Article 8 review process

The following specific elements might be included in guidelines for national systems:

- institutional arrangements for inventory preparation (eg, responsibilities for collection of data; integration with national and entity-level inventory systems; relationship of registries to national systems; national enforcement powers and procedures);

- quality assurance/quality control procedures for the selection of methods, and in data identification, collection, processing, communication and storage. This aspect of guidelines might draw upon the work of the IPCC on inventory good practices;

- links between national systems and emissions trading systems;

- links with the transfer or acquisition of parts of assigned amounts.

Parties' national systems would be subject to the 'thorough and comprehensive technical assessment' provided for under Article 8.3.

Timing of adoption of guidelines

The Protocol requires that national systems be in place one year prior to the start of the first commitment period. At SBSTA 12, the IPCC will likely make available information on good practices in inventory management and uncertainty carried out by the IPCC Inventories Programme. Australia notes that this program of work is likely to continue for the next several years. The secretariat, in document FCCC/SB/1999/2, recommends that Parties aim for adoption of the guidelines for national systems by COP 6.

Australia considers that the development of guidelines for national systems is a high priority, but given that information from the IPCC on good practices in inventory management and uncertainties will only be received at SBSTA 12, the aim of adopting guidelines for national systems at COP 6 may be too ambitious. Rather, Australia would wish to have time to consider the implications of the IPCC's work and incorporate its results into the development of guidelines for national systems. We also note that this work currently excludes the land use change and forestry sector, which is being developed under a separate stream of work following the release of the IPCC Special Report on land-use, land-use change and forestry due May 2000. Given that Parties will also need to consider the implications of this work, this provides a further reason for reconsidering whether guidelines for national systems could be adopted at COP 6.

Status of guidelines for national systems

In common with guidelines to be adopted for other aspects of the Protocol (eg inventories), Australia notes that the status of 'guidelines' will need to be clarified (see further Australia's submission on compliance, dated 3 March 1999, in document FCCC/SB/1999/MISC.4).

Adjustments

Under Article 5.2 of the Protocol, methodologies for estimating anthropogenic emissions by sources and removals by sinks shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by COP 3 (ie the revised 1996 IPCC inventory guidelines). However Article 5.2 also states that where such methodologies are not used, appropriate adjustments shall be applied according to methodologies agreed upon by COP/MOP 1. The final sentence of Article 5.2 states that any revisions to such adjustments shall not apply until after the first commitment period.

In Australia's view, the reference to 'adjustments' in Article 5.2 is an element of the Protocol's compliance system. It refers to situations where the revised 1996 IPCC inventory methodologies have not been used, and requires that in this situation methodologies agreed by COP/MOP 1 be applied. 'Adjustments' that some Parties might seek to apply under Article 5.2 include temperature and electricity exchange adjustments, which alter emissions data that has previously been calculated using the revised 1996 IPCC inventory guidelines (see eg FCCC/SBSTA/1997/9).[1]

[1] Australia notes that the secretariat has 'adjusted' inventory numbers for Parties by reallocating sources between sectors. However as this has no overall net effect on a Party's emission estimates, it is not relevant in this context. See for example document FCCC/SSTA/1999/INF.2.

Australia believes that temperature and electricity exchange adjustments are not suitable for the COP/MOP 1 to agree upon as suitable adjustments under Article 5.2, for the following reasons:

- Temperature and electricity exchange adjustments were not part of the agreement reached at Kyoto for differentiated levels of commitment in limiting emissions. To include them now as part of the formula for estimating emissions would amount to a renegotiation of targets.

- Temperature and electricity exchange adjustments result in less, rather than more, accurate estimates of emissions for any particular year. They may be useful for tracing the effect of policies and measures, but they are not suitable for measuring compliance with Article 3 commitments.

- The five year commitment period agreed at Kyoto was intended to smooth out annual climatic or economic variations which could affect the capacity of a Party to meet its target. To apply temperature or electricity exchange adjustments would be to duplicate such an averaging process for the commitment period.

- The revised 1996 IPCC guidelines advise that averaging be used to estimate emissions from several sectors, and the application of temperature or electricity exchange adjustments to the energy sector is outside these guidelines.

- The COP and its subsidiary bodies have made a number of decisions over several years which reinforce that, while Parties may choose to submit adjusted data, they must submit unadjusted data:

    - 9/CP.2, para 12 of Annex I: "If Parties carry out any adjustments to inventory data, for example for climate variations or trade patterns in electricity, these adjustments should be reported in a transparent manner, with clear indications of the method followed. Both adjusted and unadjusted data should be provided." This data should also be reported in mass units without adjustments.

    - Report of SBSTA 4, para 53: "The SBSTA stressed the necessity of reporting inventories in mass units without adjustments according to paragraph 12 of the annex to decision 9/CP.2. Adjustments are regarded as important information in relation to the monitoring of emission trends and the performance of policies and measures, and should be reported separately." SBSTA-7 endorsed these conclusions (FCCC/SBSTA/1997/14), as well as reinforcing that inventory data should be reported in mass units without adjustments

    - The inventory experts workshop held in Bonn in December 1998 endorsed these conclusions, and recommended that the wording of the current guidelines should be revised according to the relevant conclusions of the SBSTA (FCCC/SBSTA/1999/INF.1, para 34)

- The current draft of the common reporting format tables makes the same point (FCCC/SB/1999/INF.1).

There is thus a consistent requirement to report unadjusted data should a Party take the option of reporting adjusted data.

Adjustments under Article 5.2 should not be confused with the recalculation of previously submitted inventory data. Recalculations may result from improved data or methods, and are intended to improve the accuracy, consistency and completeness of emissions estimates. They fall fully within the scope of the 1996 revised IPCC guidelines, as well as the draft revised guidelines for the preparation of the inventories section of national communications (FCCC/SB/1999/1, para 20). Australia has previously submitted its views on the recalculation of emissions in the base year, and of previously submitted data (FCCC/SB/1999/MISC.5/Add.1). Australia considers that both sorts of recalculations should be possible up to a point to be decided in the context of compliance with the Protocol.

PAPER NO. 2: NORWAY

WORK PROGRAMME ON METHODOLOGICAL ISSUES RELATED TO ARTICLES 5,7 AND 8 OF THE KYOTO PROTOCOL

With reference to document FCCC/SBSTA/1999/L.3 and FCCC/SB/1999/2, Norway would hereby submit views on characteristics of national systems and issues related to adjustments, referred to in Article 5 of the Kyoto Protocol. This submission is limited to cluster A/1 and A/2 in the work programme in document FCCC/SB/1999/2.

This document presents a short description of the Norwegian inventory system. On the basis of our national system we seek to sum up our experiences so far and suggest possible basic elements for national systems under the Kyoto Protocol. The suggestions would also entail improvements to our national system as it is today. We also present some views regarding adjustments as response to new information and improved methodology. Further, a reference to our experience with comparing IPCC default methodology with a national methodology is given.

We note that the Kyoto mechanisms (Articles 6, 12 and 17) may imply additional requirements to the national inventory systems, which is not covered in this submission.

1. The current Norwegian GHG inventory system

Norway has a long tradition in developing national inventories and methodologies for these systems. The first Norwegian inventories of SO_2 and NO_x emissions were made in 1983. NMVOC emissions were first estimated in 1987 and NH_3 emissions in 1991. Development of a complete national greenhouse gas (GHG) inventory system for Norway started in 1987 as the problem of climate change received increased focus. Methods were then already developed for other pollutants and purposes. Further developments of these first estimates have often been driven by the need to evaluate the effect of reduction measures. Since then methodologies for other greenhouse gases have been developed gradually, first for methane and nitrous oxide, later for SF_6, PFCs and HFCs.

The Norwegian emission inventory is mostly based on internationally recommended methodologies. IPCC and Corinair/ EEA/ UNECE (IPCC 1996, EEA 1996) have developed guidelines for emission estimation of all main emission sources. However, specific national estimation methodologies are used when they illustrate Norwegian conditions better.

The emissions of CO_2, CH_4, N_2O, HFCs and for the precursors CO, NO_X, NMVOC and SO_2 are estimated in collaboration between Statistics Norway (SN – Norway's central agency for collection and production of statistical information) and Norwegian Pollution Control Authority (SFT – the agency under the Ministry of Environment responsible for ia. producing technical information). SFT contributes emission factors from all sources and measured emission data from large industrial plants. SN is responsible for activity data (e.g. on energy use), emission models and calculations. The Norwegian national inventory model covers all the recognised important sources for the emissions of all the above mentioned components. The industrial emissions are fairly well covered by measurements or by use of national

emission factors. Emissions of SF_6, PFCs and HFCs are calculated separately and not included in the national inventory model.

The first preliminary estimates of national emissions are made a few months after the end of the inventory year, based on the previous year's estimate and available new and relevant statistics. An update of the preliminary estimate is made about one year after the end of the inventory year. A final estimate that also includes the emissions in municipalities is given one year later. The uncertainty of the early emissions is rather low on an aggregated level, while it increases when the estimates are split up in sectors and sources. However, all final estimates are updated whenever methodologies and emission factors are revised in order to obtain consistent time series.

1.1 Experience with existing national systems in preparing national GHG inventories

The development of national systems will continue when new requirements and commitments appear. Our experience so far has shown us the importance of having a continuous process. An emission inventory could always be subject to improvements, and in this respect would never be 'final'. When better data becomes available, emissions are updated for all years so that consistent time series are maintained. To obtain improved scientific knowledge and statistical data is a continuous process. Such knowledge improves the emission factors, methodologies and in some cases also activity data, and thereby reduces the uncertainties of the inventories.

Statistics Norway (SN) in cooporation with SFT performed an evaluation of uncertainty in the Norwegian GHG inventory last year (SFT 1999:01[1]). In the study, the uncertainties of each component of the national GHG inventory, concerning emissions factors, activity data and direct measurements of emissions, were systematically reviewed. We consider making such an analysis of great importance in the development of a better national system.

On the basis of the existing Norwegian national inventory system, we would underline the importance of several basic elements to be included under the Kyoto protocol such as:

- A stable and close co-operation between the authorities and a neutral statistical institution
- annual emission estimations
- integrated multipollutant emission methodology
- inclusion of verification and quality control measures,
- keeping a good documentation system/database
- a system for adjustments/recalculations.

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[1] SFT report 99:01: Evaluation of uncertainty in the Norwegian emission inventory

2 Basic elements needed to be included in the national systems under the Kyoto Protocol

2.1 Ensuring a neutral and predictable system

Development of a GHG inventory requires arrangements to collect, process, communicate and store GHG inventory data. Credibility and independence between the involved parties is important to ensure a stable and predictable national system.

A single, politically independent statistical institution which is responsible for the operative part of the estimation work, appears to us as an important element of a national system. There are several reasons for this. A statistical institution will have access to databases and routines for updating activity data and emission factors. It will also have interest in increasing the scientific knowledge to point out potential improvements in the methods. Long experience in treating confidential data is important for the ability to collect data. Many countries, including Norway, have statistical bureaus with long tradition as the main producer of official statistics, that could serve this function.

Another strength in using a statistical institution is the share of responsibility between different institutions. A close co-operation between the governmental bodies on one side and a neutral statistical institution on the other side has proven to be useful for us.

It is of high importance that the needs of both the statistical and policyoriented institutions are taken care of, and that the system can be utilised when assessing planned and/or implemented policies and measures.

2.2 Annual estimations of GHG inventories

A national inventory system should be based on annual estimations of the greenhouse gases. Such a system would increase the ability for internal control of methodology, emission factors and activity data and hence increase the accuracy of the national emission inventory. Making an annual emission inventory will both serve as input to the review process and to future projections. An annual GHG inventory system would also enable detection of variations in the emission level.

Countries should also be encouraged to establish an inventory system that makes it possible to provide preliminary estimates of national emissions few months after the end of the inventory year. Normally countries would not be able to estimate their national emissions before one year after, due to statistical routines. Hence preliminary estimates would give countries an early warning of e.g. developments in the greenhouse gas emission, which would be useful in relation to the countries' efforts to comply with their commitments under the Kyoto Protocol. A system of preliminary estimates would also increase the countries' ability for internal control and verification.

2.3 A national system should be a broad multipollutant inventory programme

A national system should not be limited to greenhouse gases, but also cover other relevant air pollutants in a common inventory system, for instance pollutants covered by the Convention on Long-range Transboundary Air Pollution (e.g. SO_2, NO_x, NMVOC and NH_3), as well as carbonmonoxide (CO), particle matter and heavy metals.

A multi-pollutant assessment will include important components that are linked together. It will also be a more effective way of estimating different emissions. Several annual estimations, including in a multipollutant emission programme, will increase the control because the production of several estimates can be used as a cross-checking control measure.

2.4 Establish a reliable system for adjustments and recalculations

Parties will from time to time have good reasons to change their methodologies and earlier submitted estimates, due to new and better knowledge. Such adjustments and recalculations based on new methodology would normally increase the accuracy of the GHG emission inventory. It is important that countries establish a reliable national system for these adjustments and recalculations.

When a country has a national system where all data are complete and recorded systematically, adjustments and recalculations are easier to carry out. This requires, however, a good documentation system. Keeping a documentation system will increase the completeness and transparency of a national inventory system.

2.5 Internal and external verification system

A national system under the Kyoto Protocol must include verification and control measures which allows external control of other Parties. This will improve the transparency and credibility of the system. In addition to an external verification system, a national internal system is needed. By letting a neutral third part verify the national GHG inventory, the Parties will increase their credibility and the confidence in the system.

2.6 Good routines for technical documentation of inventories

A national system is dependent on good routines for documentation to enable the inventories to be complete and updated. Describing all sources for all data used in the inventories and explaining the methods for estimation will increase the ability for insight and transparency. Description of choices and simplifications will also improve a national inventory system.

2.7 Managing uncertainties

A national system with high credibility must be able to identify and quantify the uncertainties in the inventory. Identification of the level and sources for the uncertainty will increase the accuracy of an inventory.

Uncertainty is an important aspect of inventory quality. Among the sources of uncertainty in the emission estimates are sampling errors, poor representation of the actual emissions through the emission factors and/or activity data, and gross errors. Making an emission inventory is a laborious process that takes place in several steps, and each step could add separate types of uncertainties.

The procedure of annual estimates as well as several updates for each year give a number of opportunities to detect gross errors. Each new estimate is compared to the provisional estimate as well as to the new estimate for the previous year. Any changes must be explained, and in this way gross errors may be detected.

The activity data are often statistical data. Official statistical data go through a systematic revision process. Such processes are either manual or, more and more frequently, computerised. Revision significantly reduces the amount of errors in the statistics used as input to the inventory. Finally, where alternative methodologies are available, emission estimates are often made by both methods and then compared. Such comparisons may point out errors and potential improvements in the methods, and they also indicate the level of uncertainty. Evaluating methodologies and emission factors relative to national conditions will in general reduce the uncertainty of the inventory.

3. Methodologies for the application of adjustments under Art. 5.2.

The methods of estimation of all gases in Norway are in line with existing IPCC guidelines for reporting national greenhouse gas emissions. However, national specific estimation methodologies have been used when they reflect Norwegian conditions better.

Parties will from time to time have good reasons to change their methodologies and earlier submitted estimates. Adjustments or recalculations imply that a formerly reported estimate from a source category (one or all pollutants) is replaced by an estimate based on other methods and/or data. Recalculations may influence both the level and trend estimates.

There are two aspects of changing the methodology. Good practice would be to demonstrate that the changed methodology is an improvement as required by SBSTA, and would also be to change methodology whenever a significant improvement is possible to achieve. We note that in some cases bias may be introduced because a country could be better off not changing the methodology; changing could make it "harder" to achieve its commitment. That implies that good practice rules are needed both for when the methodology *could* be changed as well as when it *should* be changed.

As a result of the Kyoto Protocol further development of the Norwegian inventory has been initiated. Norway has just established a revised methodology for estimating emissions of methane from waste. The methodology for estimating CO_2-emissions from industrial processes and PFC from aluminium industries and actual emissions of HFCs from refrigeration, foam blowing, air condition etc, are currently also being revised. Refining the methods for estimation of greenhouse gas emissions in these areas is an ongoing process and will be our main priority for further development of the IPCC guidelines as well.

The establishment of routines for application of adjustments is important to ensure the representativeness of the emissions. We must expect that the extent to which Parties use national methodologies and technologies will increase in the coming years e.g. due to the implementation of various measures and technologies in fulfilling the national commitments under the Kyoto-Protocol.

4. IPCC default methodology compared to a national inventory model

The development of representative, complete and transparent national emission inventories comparable between countries, including all relevant sources and sinks, is important for the success of the FCCC. We believe that the 1996 Inventory Guideline with its tiered approach (optional methods at different levels of complexity with corresponding need for detailed national data) has proven to be a valuable tool when reporting GHG emissions to FCCC. The principle, with several optional tiers, including well-documented national methodologies, should remain the basis for reporting framework.

At its eighth session the Subsidiary Body for Scientific and Technological Advice (SBSTA) requested Annex I Parties to report their complete GHG inventory for 1996 by using their national methodologies and current default methodologies of the IPCC Guidelines. The objective was to compare emission calculations of CO_2, CH_4 and NO_2 based on the IPCC default methodology vs. a national inventory model.

Norway chose to include emissions estimated for the years 1990 to 1996 and not only for 1996, as requested by SBSTA. This gave us an unique opportunity to make comparison both in trend and systematically deviation between the methods. By doing this, we wanted to see whether the differences from one single year to another also were reflected in the trends. The result was a report given to UNFCCC in August 1998, which we note with appreciation has been utilised in FCCC/SBSTA/1999/INF.2.[2]

Based on our report we experienced the following: comparing the emissions calculated with a national methodology with the results of IPCC sectoral default methodology could be a useful exercise. However, since this normally is a very time consuming and costly exercise, such comparison should probably be limited to major changes in methodologies.

With reference to document FCCC/SBSTA/1999/L.5, we welcome the draft decisions regarding verification in guidelines for preparation of national communications. Based on these draft decisions Parties should compare their national estimates of carbon dioxide emissions from fuel combustion with those obtained using the IPCC Reference approach and report them annually.

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[2] SFT report 98:06: Emissions of greenhouse gases in Norway estimated by the default IPCC methodologies and the Norwegian national inventory model.

We wish however to underline the potential of differences between the use of national methodologies and the Reference approach if emissions factors are not adjusted. The Reference approach is a top-down approach and include emissions of CO_2 from energy sources and not other pollutants. As long as important sources are not included, the estimates could give a significantly different emission level.

By using own national emission factors regarding the methodology, which are accepted by IPCC, this problem can be solved.

PAPER NO. 3: SWITZERLAND

ISSUES RELATED TO ARTICLE 5 OF THE KYOTO PROTOCOL

In response to the invitation to Parties by SBSTA 10 to submit comments on issues related to the characteristics of the national systems and issues related to adjustments, referred to in Article 5 of the Kyoto Protocol, Switzerland presents the following views.

1. The main purpose of national systems should be to build confidence in the data submitted by Parties to demonstrate compliance with commitments under Article 3. Complying with the guidelines that will be adopted by the first COP/MOP for the national systems should be part of the compliance regime.

2. Among other elements, the guidelines for the national system should provide for:

- criteria for national enforcement systems to comply with the relevant guidelines, including institutional arrangements to monitor emissions by sources and removal by sinks
- reference to any guidelines, decisions and other guidance adopted by the COP or the COP/MOP related to the establishment, verfication, documentation and accessibility of national greenhouse gas inventory data, in particular the proposed guidelines for the preparation of national communications by Parties included in Annex I to the Convention (document FCCC/SBSTA/1999/L.5)
- criteria for the establishment and treatment of data related to the mechanisms of the Kyoto Protocol as well as emissions and removals related to its Articles 3.3 and 3.4

3. Although Article 5 of the Kyoto Protocol provides that the national system in Annex I Parties should be in place by 2007, we think that Annex I Parties should aim at putting in place their national systems as soon as possible. They should, i.a., be the basis on which Annex I Parties (i) demonstrate progress in achieving their commitments by the year 2005 and (ii) report on emissions credits obtained through CDM projects since 2000.

PAPER NO. 4: UNITED STATES OF AMERICA

U.S. VIEWS ON ARTICLE 5: NATIONAL SYSTEMS AND ADJUSTMENTS

National Systems for Greenhouse Gas Estimation

The US views national systems under Article 5.1 as the foundation for the preparation and reporting of high-quality greenhouse gas emission inventories. Whereas the IPCC 'good practice' methodologies will provide guidance for the preparation of inventories for specific gases and sources, national systems should provide a broader framework for the development and maintenance of inventories overall. This guidance should cover the basic institutional functions and processes necessary for the development of a reliable national inventory - from planning, through preparation, to maintenance of the inventory and related documentation over time.

Because Annex B Parties vary greatly in their approach to inventory development, it is essential that the guidance for national systems allow for flexible adaptation to national circumstances. Thus national systems would be required for all Parties, but would not be standardized across Parties. Rather, we envision that the guidance for national systems would specify common elements that are necessary to produce a high-quality inventory, regardless of the particular approach or methodology used.

As with the other Kyoto Protocol obligations pertaining to quantitative commitments, Annex B Parties would be required to report on their national systems for GHG estimation in their submission under Article 7.2. Parties' implementation of national systems would be reviewed under Article 8.

The attached annex provides our preliminary views on specific elements that should be included in requirements for national systems. We will elaborate more fully on these elements in future discussions.

Required Elements of National Systems

Institutional Functions

Centralized Responsibility: Designation of a lead entity responsible for the overall inventory.

***Collaborating organizations*:** Designation of other organizations which contribute to the preparation and/or maintenance of the inventory;

Trained inventory staff: Procedures (e.g. training or certification) to ensure that individuals involved in the preparation or maintenance of the inventory have relevant technical competence.

Regulatory Framework: Legal authority to ensure the collection and dissemination of all necessary data for the preparation of greenhouse gas inventories.

Inventory Processes

Inventory Planning: A documented plan for the development, preparation and maintenance of emissions inventories.

Inventory development: Procedures to identify all GHG Sources and significant sources; Procedures to select methodologies and data sources.

Inventory preparation:
Data Collection: (frequency, sources, procedures)
Estimation procedures (best practice)
Documentation of all data, sources and methodologies
QA/QC procedures (e.g. validation, verification and peer review)

Inventory Maintenance
Archiving of all data, inventory estimates and documentation
Transfer and compilation of data (frequency, electronic transfer and data management)

U.S. Views on Adjustments under Article 5.2

The provision of high-quality greenhouse gas inventories will be essential for verification of Parties' attainment of assigned amounts. The development of rigorous inventory measurement and reporting requirements under Article 5 will help to ensure that inventories meet this goal. However, if an inventory fails to meet the IPCC methodological requirements as elaborated by good practice, Parties' may not have sufficient confidence in the quality of its emission estimates to verify compliance.

In such a situation, two options exist. For severe inventory problems, the case should be forwarded to a non-compliance procedure. For less-severe problems, the adjustment procedure under Article 5.2 could be applied as an alternative to invoking the non-compliance procedure. Specifically, in some cases, the reported estimates could be replaced with conservative estimates ("adjusted") for problem section(s) so as to improve confidence that the overall inventory was not under-estimated. The "adjusted estimate" would be used for the official accounting of the Party's emissions and assigned amount and as the basis for determining the Party's compliance with its assigned amount. Since 'adjustments' would only be applied with the consent of the Party concerned, the adjustment procedure would facilitate Party efforts to remain in compliance.

The remainder of this paper elaborates U.S. views on how the adjustment procedures could work in the context of the annual inventory review process. It also identifies technical areas where more analysis is needed. An attached flow-chart highlights the steps involved.

Inventory Review

Under the Kyoto Protocol, review of inventories will occur annually. Although the details remain to be elaborated, we expect that expert teams will operate in accordance with predetermined procedures, and apply specific technical criteria in evaluating inventories. For the purpose of applying adjustments pursuant to Article 5.2, the technical criteria should cover completeness, and transparency, as well as appropriate selection and use of data and methodologies in conformity with the IPCC methodologies, as elaborated by "good practice". If a review teams determines that an inventory has been prepared and submitted in conformance with 'good practice', then that inventory will be deemed acceptable for assessing compliance and no further steps would be required. However, several types of problems could be identified by the review process, which would indicate that inventory has not been prepared in conformance with good practice, and which would decrease confidence in the quality of an inventory. These include:

- Omission of sources and/or sectors;
- Omission of required documentation;
- Use of inappropriate emission factors or activity level data; or
- Use of a questionable measurement/estimation methodology.

Resolving Inventory Problems

If a problem is identified, then a process should be followed which first gives the Party a chance to resolve the issue. If the problem is not resolved appropriately by the Party, then the provisions of Article 5.2 should be applied. If the Party and the review team cannot reach agreement on the outcome, then the issue should be referred to the non-compliance body as a "question of implementation." These steps are described in more detail below.

Step 1: Party Opportunity to Correct

If a problem is identified, then the next step would be to provide the Party with an opportunity to correct the problem within a specified timeframe. Ideally the concerned Party would correct the problem independently through recalculation and resubmission. However, some Parties may have difficulty correcting the problems and may seek outside assistance. In such cases, we would recommend that the Party be provided access to technical advice to promote development of the best possible estimate. Possible sources of technical advice could include the review team, other Parties, or the multilateral consultative process.

If the review team determines that the re-submission has corrected the problem, then no further action is necessary. In this case, the Party's resubmitted inventory would be used to assess compliance with its assigned amount. However, if the Party fails to resubmit, or the re-submission does not correct the problem, then the process would continue.

At this stage, consideration of the severity of a particular inventory problem is warranted. For problems that are not considered severe, the adjustment procedure would provide the Party with the opportunity to accept an independent estimate, and avoid a potential non-compliance procedure. However, some problems may be so severe that integrity of the entire inventory is compromised. These cases would not be appropriate for adjustments and should instead be forwarded directly to the non-compliance procedure. The non-compliance procedure could still request an adjusted estimate for the problem section, but this would not be handled through the review process. Further analysis is needed to establish specific criteria to determine which inventory problems are considered 'adjustable' and which are not.

Step 2: Technical Estimation

For 'adjustable' problems, a conservative technical estimation of the problem section of the inventory would be developed. This estimate would be developed by an independent body pursuant to Article 5.2. Since the adjustment procedure would occur as part of the inventory review process, the expert review team could be responsible for providing the technical estimate. However, the use of contractors or outside experts such as the IPCC Inventory Technical Support Unit might also be explored.

Guidance for independent estimation methodologies should be developed and the conditions for their application clearly defined in advance to ensure that the procedure is objective and consistent. The methodology used for technical estimation would be dependent on the nature of the particular problem, the availability of necessary data, and the time and resources required to produce the estimate. In general, simplified methodologies are preferable, given data limitations and need for the adjustment procedure to operate efficiently and cost-effectively.

Our preliminary thoughts on possible methods to adjust emission estimates are summarized below. These methods need further consideration in terms of their overall feasibility and their applicability to various types of inventory problems.

- **Recalculation Based on Source Activity Data**: Emissions for problem sources could be recalculated by using available data and default emission factors. This approach could be resource intensive, and hence would probably only be appropriate for the most important emission sources, such as CO_2 from fossil fuel combustion.

- **Indexing Based on Party's Baseline Emissions**: Emissions could be estimated by indexing the Party's baseline emissions using an appropriate growth factor. Consideration should be given to the conditions under which such an approach might apply and what growth factors would be appropriate.

- **Indexing Based on Annex B Norms**: Adjusted emissions could be determined based on Annex B averages (e.g. emissions/capita or emissions/hectare) for various source categories. Under this method, emissions would be estimated by applying the relevant Annex B emission rate to the relevant emission driver (i.e. population, acres, or commodity production). Consideration needs to be given to the applicability of this approach, the appropriateness of Annex B emission rates, and the relevant drivers for various sources.

In determining methods for adjusting inventory estimates, it is essential to protect the interest of other Parties in ensuring that inventories are not underestimated. To satisfy this objective, the adjusted estimates should be "conservative" or upwardly biased. This will increase confidence that real emissions are below the adjusted value, and provide added incentive for the use of 'good practice' at the national level.

A conservative estimate could be achieved by a) selecting methodologies that produce a conservative estimate or b) multiplying a central-point estimate by a factor greater than one. The magnitude of the inflating factor would be pre-determined and set at an appropriate level to ensure confidence that the adjusted estimate does not underestimate true emissions.

Step 3: Application of Adjustment

Once the appropriate emissions estimate have been calculated, the Party may choose to accept or dispute the adjustment. If the Party accepts the adjustment, then the adjusted estimate would be used in accounting for the Party's cumulative emissions and in ascertaining compliance with assigned amounts. If the Party is later able to retroactively self-correct the

problem (e.g. through recalculation) during the commitment period, the 'adjustment' could be removed and replaced by the self-corrected estimate. This is consistent with the objective of promoting good practice at the national level.

If the Party disputes the adjustment for any reason the case would be referred to the non-compliance procedure for resolution. The non-compliance procedure would have access to all relevant information in making its determination – e.g. Party's inventory and documentation, review teams documentation, and recommended technical estimate. The non-compliance procedure would have the option of a) finding for the Party and accepting the Party's original estimate, b) finding for the review team and applying the suggested inventory adjustment, or c) developing a compromise approach.

Treatment of Base Year Inventory

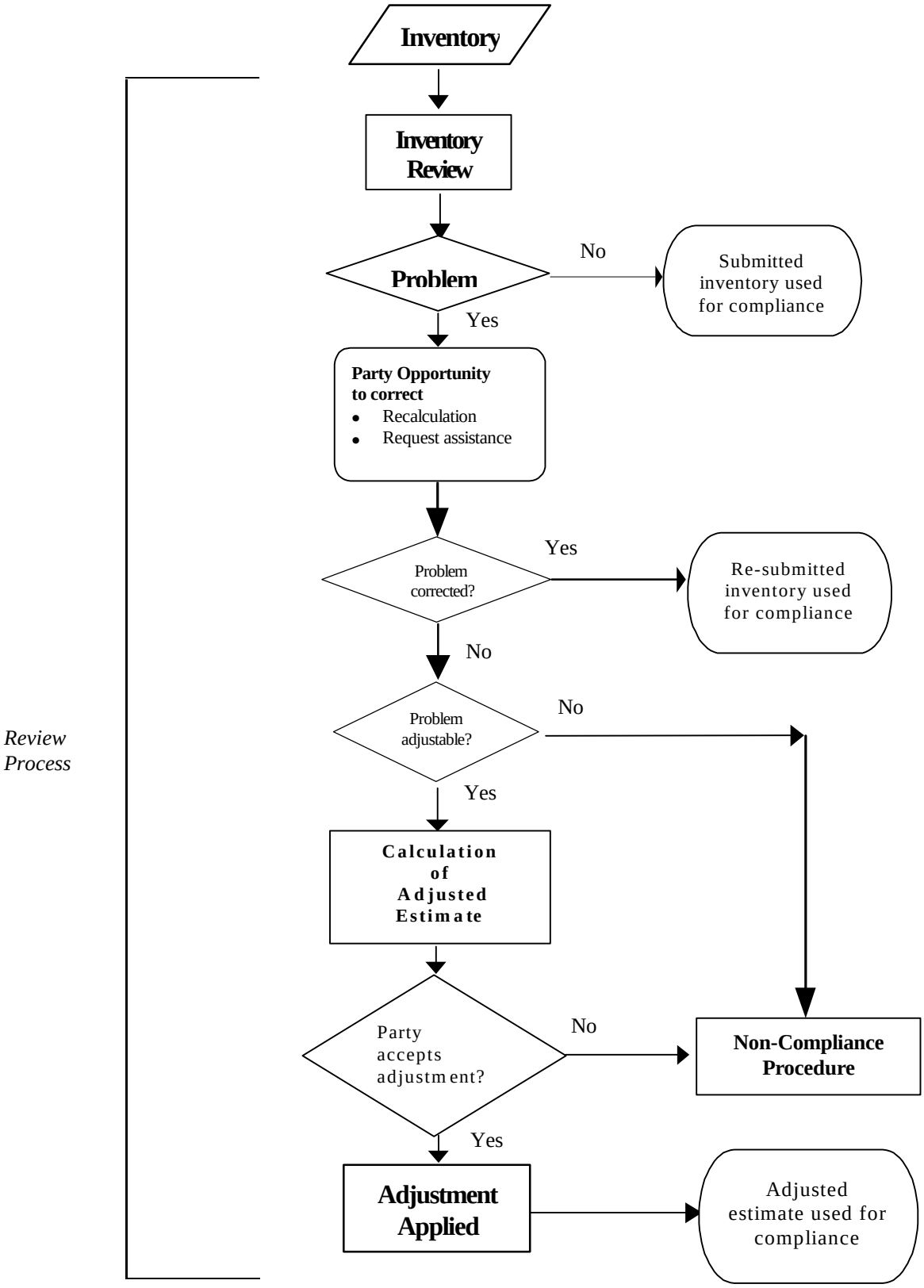
A modified version of the adjustment procedure described above could also be appropriate for problems with the baseyear inventory. A process for ensuring the quality and acceptability of the base year inventory – which will be used to establish the assigned amount – is essential and should be determined. Clearly the base year inventory will need to be carefully reviewed. Just as with a commitment period inventory, steps would need to be taken to ensure that the base year inventory was of high quality and did not systematically over- or under-estimate emissions.

In our view, the Parties need to develop a clear process for establishing the base year inventory. This process needs to be completed before the beginning of the first budget period so as to establish the assigned amounts of each Party. One possibility is that a requirement to submit a base year inventory consistent with the requirements of Articles 5 and 7 could be built into Article 5.1 as part of the requirement to establish and demonstrate the existence of a national system for preparing inventories. The Parties could then take a decision to review the base year inventories following the requirements of Article 8. In order to ensure ample time for the review and final completion of the inventories, it would probably be necessary for final base year inventories to be submitted as early as possible.

A modified version of the adjustment procedure described above could also be appropriate for problems with the baseyear inventory. In such a situation, it may appropriate to apply a deflator (i.e. a value less than one) to the independent inventory estimate. Alternatively, parts of the inventory that do not meet the IPCC methodological requirements could be replaced by a zero (i.e. not included) in the baseyear emissions total. However, these parts of the inventory would be counted for compliance purposes during the commitment period.

In closing, we believe that our proposed adjustment process would be an effective way to resolve many inventory problems during the commitment period. However, additional thought is needed regarding the possible use of the adjustment procedure during the 'true-up' period envisaged for the end of the commitment period.

Adjustment Procedure



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