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# OVERVIEW OF THE IPCC GUIDELINES

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This document is one volume of the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

The series consists of three books:

- THE GREENHOUSE GAS INVENTORY REPORTING INSTRUCTIONS
- THE GREENHOUSE GAS INVENTORY WORKBOOK
- THE GREENHOUSE GAS INVENTORY REFERENCE MANUAL

These books together provide the range of information needed to plan, carry out and report results of a national inventory using the IPCC system.

The *Reporting Instructions* (Volume 1) provides step-by-step directions for assembling, documenting and transmitting completed national inventory data consistently, regardless of the method used to produce the estimates. These instructions are intended for all users of the *IPCC Guidelines* and provide the primary means of ensuring that all reports are consistent and comparable.

The *Workbook* (Volume 2) contains suggestions about planning and getting started on a national inventory for participants who do not have a national inventory available already and are not experienced in producing such inventories. It also contains step-by-step instructions for calculating emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halocarbons (HFCs, PFCs), sulphur hexafluoride (SF<sub>6</sub>), ozone and aerosol precursors, from six major emission source categories. It is intended to help experts in as many countries as possible to start developing inventories and become active participants in the inventories programme.

The *Reference Manual* (Volume 3) provides a compendium of information on methods for estimation of emissions for a broader range of greenhouse gases and a complete list of source types for each. It summarises a range of possible methods for many source types. It also provides summaries of the scientific basis for the inventory methods recommended and gives extensive references to the technical literature. It is intended to help participants at all levels of experience to understand the processes which cause greenhouse gas emissions and removals to occur and the estimation methods used in compiling inventories.

## Contents of the IPCC Guidelines

All three volumes begin with the following sections:

- Acknowledgements
- Preface
- Overview of the IPCC Guidelines

The contents of each volume are as follows:

### **Volume 1: Greenhouse Gas Inventory Reporting Instructions**

- Introduction to the Reporting Instructions
- Chapter 1: Understanding the Common Reporting Framework
- Chapter 2: Reporting the National Inventory
- Tables: Sectoral Report Tables
- Summary Report Tables
- Overview Table
- Annex 1: Managing Uncertainties
- Annex 2: IPCC and CORINAIR Source Categories
- Glossary

### **Volume 2: Greenhouse Gas Inventory Workbook**

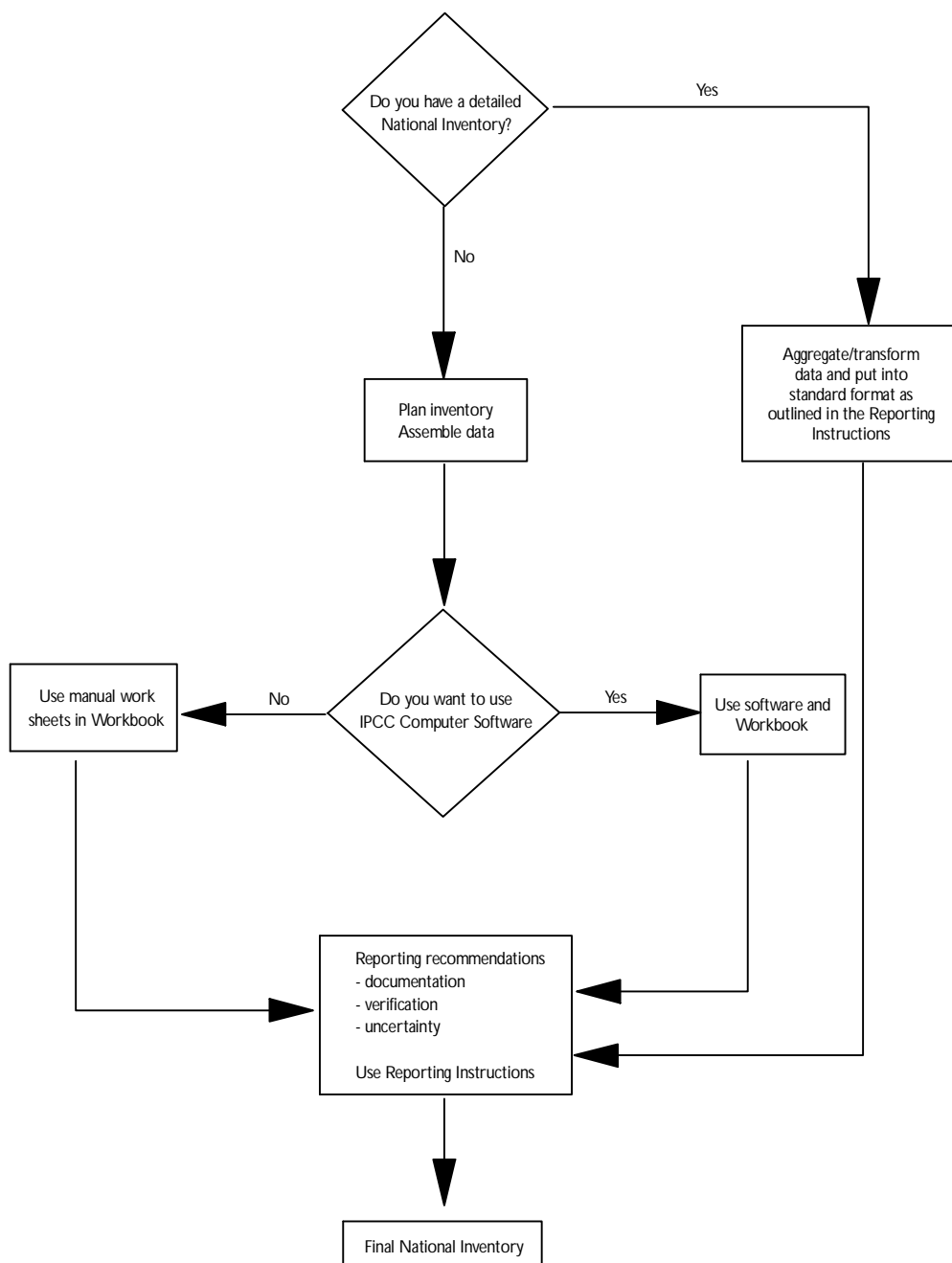
- Introduction to the Workbook
- Module 1: Energy
- Module 2: Industrial Processes
- Module 3: Solvent and Other Product Use
- Module 4: Agriculture
- Module 5: Land-Use Change and Forestry
- Module 6: Waste

### **Volume 3: Greenhouse Gas Inventory Reference Manual**

- Introduction to the Reference Manual
- Chapter 1: Energy
- Chapter 2: Industrial Processes
- Chapter 3: Solvent and Other Product Use
- Chapter 4: Agriculture
- Chapter 5: Land-Use Change & Forestry
- Chapter 6: Waste

## Before you start...

This diagram explains the stages needed to make a national inventory which meets IPCC standards.



The flow diagram above illustrates how the different types of users (working at different levels of inventory detail) can use the various volumes of the *Guidelines*. You should recognise that reality is more complex than this simple explanatory chart. Many countries may have some parts of the inventory complete at a high level of detail but may only be getting started on other parts. It is quite likely that some users will need to do several iterations of the thinking process reflected in the diagram with regard to different parts of their inventory.

The stages outlined in the flow diagram are:

### Question 1

#### Do you have a detailed national inventory?

##### Answer: Yes

If your country already has a complete national inventory, you should transform the data it contains into a form suitable for use by IPCC. This means transforming it into a standard format. In order to do this, use Volume 1 of the *IPCC Guidelines, Reporting Instructions*. This gives details of the way in which data should be reported and documented.

##### Answer: No

You should start to plan your inventory and assemble the data you will need to complete the Worksheets in this book. Refer to the *Getting Started* section of the *Workbook*.

### Question 2

#### Do you want to use the IPCC computer software?

##### Answer: Yes

If you want to use the IPCC software, you will still follow the instructions included in the *Workbook* to assemble the data you have collected into an inventory (see margin box). You will use the software instead of the printed worksheets to enter data.

##### Answer: No

If you do not use the IPCC software, use the *Workbook* and the Worksheets it contains to assemble the data you have collected into an inventory.

##### Finally...

Inventory data should be returned to IPCC in the form recommended in the *Reporting Instructions*. It is important that, where you have used a methodology other than the IPCC Default Methodology, it is properly documented. This will ensure that national inventories can be aggregated and compared in a systematic way in order to produce a coherent regional and global picture.

## General Notes on the Guidelines

### Scope:

- The IPCC *Guidelines* are designed to estimate and report on national inventories of anthropogenic greenhouse gas emissions and removals.

#### AVAILABILITY/USE OF COMPUTER SOFTWARE

IPCC computer software is available with the IPCC Guidelines. The software includes the same simple default methods as presented in the *Workbook* and the Sectoral and Summary Tables for reporting inventories, as presented in the *Reporting Instructions*. It is available in English only.

This version of the software is being produced in Excel 5.0.

If you would like to receive a copy of the software, send a letter or fax to:

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In general terms “anthropogenic” refers to greenhouse gas emissions and removals that are a direct result of human activities or are the result of natural processes that have been affected by human activities. Users may include any human-induced emissions and removals in their inventory as long as they can be clearly documented and quantified.

- National inventories should include greenhouse gas emissions and removals taking place within national (including administered) territories and offshore areas over which the country has jurisdiction. There are, however, four qualifications of this principle in the *Guidelines*:
  - (a) Emissions based upon fuel sold to ships or aircraft engaged in **international** transport should not be included in national totals but reported separately.
  - (b) Emissions from road vehicles should be attributed to the country where the fuel is loaded into the vehicle. The error in national emissions introduced in the case of road transport is expected to be small.
  - (c) Emissions from the combustion or decay of wood and wood products are assumed to take place in the country in which the wood was harvested and within a year of harvesting. This is because it has been determined that the most workable approach to estimating CO<sub>2</sub> emissions and removals from forests is to account for changes in stocks of standing biomass in forests and other locations. The simple assumption is that wood removed from stocks releases CO<sub>2</sub> emissions in the year and in the country where the wood was removed. While the IPCC method allows for accounting of exports and carbon stored in products, it does not yet provide a methodology, which is a priority for future work.
  - (d) In line with the principle of national emissions, the IPCC methodology accounts for the bulk of greenhouse gas emissions related to fuel combustion in the country in which those emissions are released. The IPCC methodology for carbon stored in non-fuel products manufactured from fuels as raw materials takes into account emissions released from those products during their use or destruction. Emissions are attributed to the country where the conversion to non-energy products takes place, even when the products are traded internationally. This is believed to be a relatively small net error, but it is also a priority for future work.

#### **Data Quality and Time Frame:**

- The data available to estimate anthropogenic greenhouse gas emissions resulting from fuel combustion are generally of a better quality than the data available to estimate greenhouse gas emissions and removals in the areas of agriculture and land use change/forestry. Accordingly, while the IPCC *Guidelines* request an emission figure for a single year in most source/sink sectors, three-year averages (with the base year in the middle) are preferred in the areas of agriculture and land use change/forestry. In addition, the IPCC *Guidelines* recognise that greenhouse gas emissions and removals in the area of land use change/forestry can occur over an extended period of time once the activity has been completed. For example, when estimating emissions

from the abandonment of forests and grasslands, users are requested to estimate emissions related to two time periods of previous activity: (a) 0 - 20 years ago, and (b) 20 - 100 years ago.

### **Default Method:**

- The IPCC *Guidelines* contain "default" methodologies for the estimation of greenhouse gas emissions and removals. Users are encouraged to go beyond these minimum default methods where possible, and report the results.

The IPCC *Guidelines* also include a number of "default" assumptions and data for use in the estimation of greenhouse gas emissions and removals. This default information is included primarily to provide users with a starting point from which they can develop their own national assumptions and data. Indeed, national assumptions and data are always preferred because the default assumptions and data may not always be appropriate for specific national contexts.

In general, therefore, default assumptions and data should be used only when national assumptions and data are not available. Section 2 of the Introduction to the IPCC Greenhouse Gas Inventory *Workbook* provides information on the quality of the default data available in different greenhouse gas source/sink categories. When it is indicated that the data available are of low quality, users should recognise that the default data do not provide a basis for the development of a definitive inventory of that source/sink category.

- Many of the categories of greenhouse gas emissions and removals can be estimated only with large ranges of uncertainty. Quite naturally, some national experts have developed methods which are designed to produce ranges of estimates rather than point estimates for highly uncertain categories. The IPCC *Guidelines*, however, require that users provide a single point estimate for each gas and emissions/removal category. This is simply to make the task of compilation, comparison and evaluation of national reports manageable. Users are encouraged to provide uncertainty ranges or other statements of confidence or quality along with the point estimates. The procedures for reporting uncertainty information are discussed in the *Greenhouse Gas Inventory Reporting Instructions*.

### **Double Counting of Emissions:**

The methods proposed for the estimation of emissions sometimes simplify the inventory construction in order to use data which are more readily available than those needed for a detailed and more precise approach. In certain cases this may cause or increase the risk of double counting emissions. There are two areas where this may occur in the *Guidelines*.

- 1) All countries preparing CO<sub>2</sub> inventories using the IPCC *Guidelines* are asked to estimate the emissions from fuel combustion using the IPCC Reference Approach either as the primary means of preparing the inventory or as a verification stage following the preparation of an inventory using national methods. The Reference Approach is a simple procedure which demands relatively little data and lends itself to wide-spread application as a "common denominator".

The Reference Approach provides an upper bound to CO<sub>2</sub> emissions inferred from the country's supply of fossil fuels by identifying the carbon content, subtracting from it the carbon stored in non-energy products and products made from fuels used as raw material, adjusting for carbon which remains unburnt and multiplying by 44/12. It is an upper bound<sup>1</sup> because some of the carbon will be emitted in forms other than CO<sub>2</sub>, in part because fuel combustion is not always complete but also because fuels may leak or evaporate. Consequently the CO<sub>2</sub> emissions figure obtained from the Reference Approach will include carbon emitted as CH<sub>4</sub>, CO or NMVOC. At the same time the *Guidelines* encourage countries to estimate separate inventories for these gases and when this is done these gases are reported twice, in their emitted form and as CO<sub>2</sub>. It is in this sense that they are "double counted".

Use of the Reference Approach carries with it two consequences which should be carefully noted.

Because the Reference Approach uses fossil fuel supply statistics as a basis for determining the carbon supply

- Not all carbon based emissions from fossil fuel are reported twice. The Reference Approach CO<sub>2</sub> estimate will not include emissions from combustion or release of fossil fuels for which the corresponding quantities (activity data) are not included in national production or import figures. Notable examples of activities which lead to emissions not included are the venting of natural gases from coal mining and handling and oil and gas production. Emissions from the flaring of natural gases are also excluded. As a result, when emissions from these activities are included in the relevant inventories using the fugitive emissions methodologies recommended in the *Guidelines* no "double counting" occurs.
- CO<sub>2</sub> emissions from biomass used as fuels are excluded from the total CO<sub>2</sub> emissions figure. The restriction of the Reference Approach to fossil fuels results from the sustainable nature of biofuels. The CO<sub>2</sub> emissions are, however, reported for information purposes. Note that non-CO<sub>2</sub> emissions from biofuels are included in their respective inventories.

2) Double counting may also occur when *calculated* emissions from the manufacture of products from fuels used as raw materials or from the use of fuels for their physical properties (e.g. lubricants) include emissions produced from the later destruction of these products. The double count will be with any separate reporting within the Waste module of the *Guidelines* of emissions from destruction.

3) When a national CO<sub>2</sub> inventory is constructed from emissions estimated for each source category using emission factors derived from measurements on combustion plant, care should be taken to include the CO<sub>2</sub> equivalent of other fossil carbon based emissions from the source

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<sup>1</sup> In practice, because of inaccuracies in the supply statistics and/or emission factors, CO<sub>2</sub> estimates from the Reference Approach may be less than those obtained by summing all CO<sub>2</sub> emissions from the combustion of fuel.

category. In this manner, the resulting total CO<sub>2</sub> emissions can be compared with the result of the CO<sub>2</sub> Reference Approach as part of the inventory verification stage. If, however, CO<sub>2</sub> emission factors, derived from the carbon content of the fuel, are used then no addition of the CO<sub>2</sub> equivalent of carbon gases is required.