Intergovernmental Panel on Climate Change

Greenhouse Gas Inventory Software for the Workbook

Instruction Manual

Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

Acknowledgements

In 1996, the Intergovernmental Panel on Climate Change (IPCC) accepted the *Revised 1996 Guidelines for National Greenhouse Inventories* and recommended that they were 'ready for use by Parties to the United Nations Framework Convention on Climate Change...' (Mexico City, 11-13 September 1996). The *Revised Guidelines* were later adopted by the Subsidiary Body for Scientific and Technological Advice (Geneva, 16-18 December 1996) and by the Conference of the Parties (Kyoto, 1-10 December 1997) under the United Nations Framework Convention on Climate Change.

Recognising that the *Revised Guidelines* are widely used by Parties to compile their national greenhouse gas inventories, the IPCC requested that the software for the *Workbook* be prepared. This package contains the manual and diskettes for that software. It must be used as a supplement to the *Workbook* and does not replace it in anyway. Even if Parties use their own methodology, the software is still a valuable tool for generating emission estimates. Such estimates can be used by countries to compare with their own national estimates. These comparisons are recommended in the *Revised Guidelines* (Overview, *Workbook*) for self-verification. The Reference Approach, a default method for estimating CO_2 emissions from energy, is especially helpful for this purpose. Carbon dioxide emissions from this sector constitute the largest share of greenhouse gas emissions in most countries.

This software package was prepared by the IPCC Unit for Greenhouse Gas Inventories under Working Group I of the IPCC, in collaboration with the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA). For this, we especially thank the staff of the IPCC Unit, Bo Lim, Pierre Boileau, and Yamil Bonduki, as well as Karen Tréanton and Jeroen Meijer of the IEA. We also thank Jozef Skakala for programming support and Karim Courty for developing the spreadsheets. Geoff Salway (U.K.), Katarina Mareckova (Slovak Republic) and Isabelle Mamaty (Congo) provided comments during the beta testing of the software. Editing assistance was provided by Audrey Glynn-Garnier, Ann Johnston, Sharon Michel and Amy Emmert.

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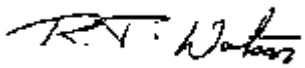
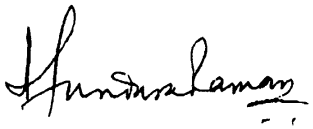


Dr. Robert Watson
Chairman of the IPCC



Dr. N. Sundararaman
Secretary of the IPCC

Contents

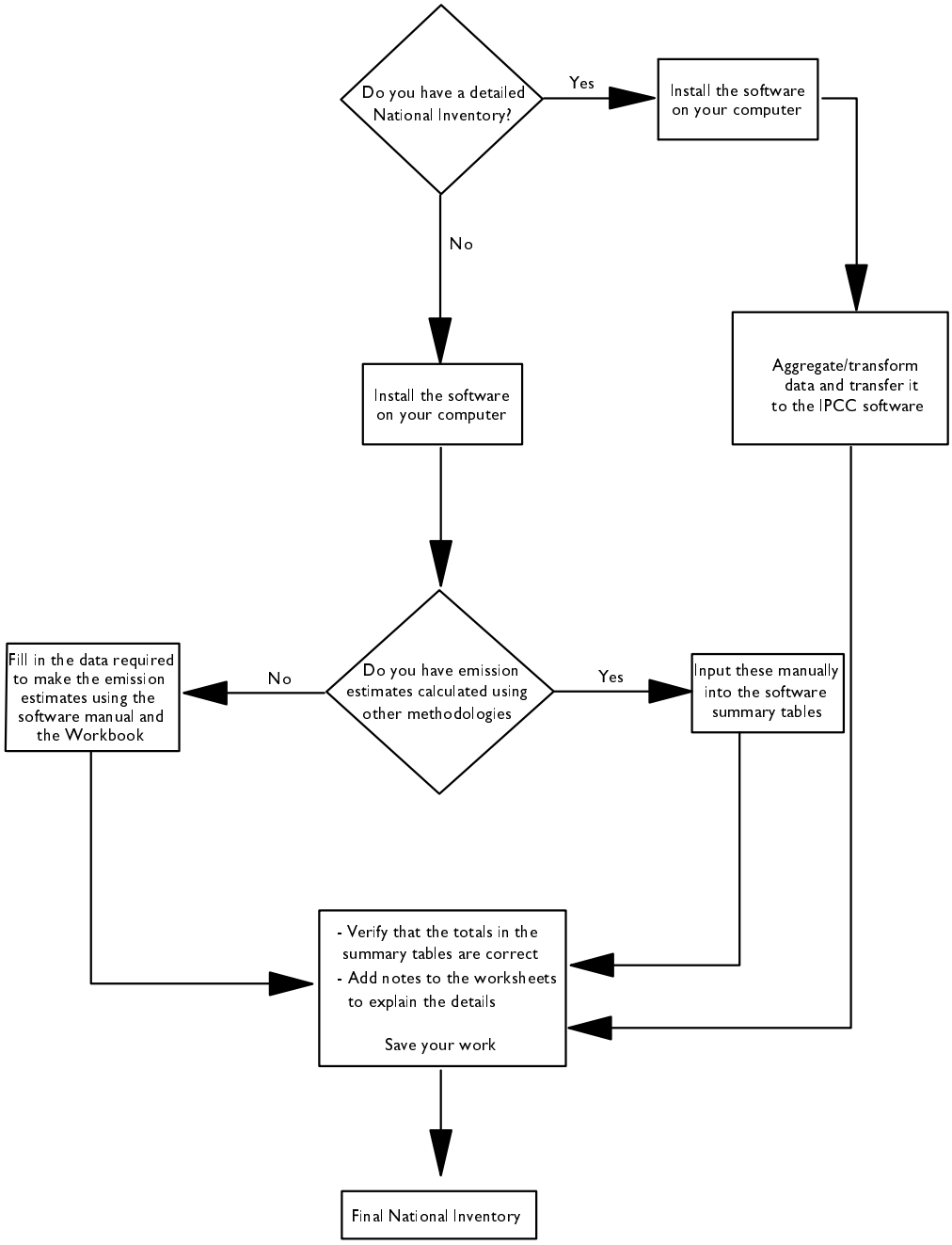
Attention!

This manual should be used with the *Workbook* from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

This IPCC software should be used with the commercial spreadsheet application Excel, version 5 or a later version.

1. Before you start...

This diagram explains how to use the IPCC software to make a national inventory.



2. Introduction

This software will help you prepare national inventories of greenhouse gases (GHG) and is based on the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. It contains worksheets from the *Greenhouse Gas Inventory Workbook (Workbook)* and the reporting tables from the *Reporting Instructions*.

The IPCC software is based on the commercial spreadsheet application Microsoft Excel. **You must have Excel 5 or a later version installed on your computer to be able to run this software**. The software has a custom menu system to help you move through the worksheets and the reporting tables. Furthermore, many of the formulas for calculating the emission estimates have been included in the worksheets.

WARNING: You should be cautioned that, if the base worksheets are modified, it is your responsibility to ensure that all formulas, calculations and links between tables are correct.

The software is protected to make sure that the formulas and tables cannot be modified accidentally. The protection function can be disabled, however, to allow for more flexibility. Please see the section 'Disabling the Protection', later in this manual, for instructions on how and when you may want to disable the protection.

3. How to use this manual

This manual describes the main functions of the IPCC software and will only give instructions on how the software works. It does not give an explanation of the methodologies for estimating GHG emissions.

NOTE: When using this software you should always use the *Workbook* to understand how the emission estimates are calculated.

You will see that **bold text** is used throughout the manual to draw your attention to important points. The terms click, double-click and right-click are used often in the manual. They mean the following:

- **click -** means to click the left mouse button on the screen object which is indicated.
- **double-click -** means to click the left mouse button twice on the screen object. The two clicks should be made very quickly. Usually this action will open or close a window, activate a function, or finish a task.
- **right-click -** means to click on the right button of your mouse. This action often will open a special menu or provide help for an action.

A **dialogue box** is a box which asks you a question that you must answer by either clicking on a button or filling in some information.

When you are asked to select a **menu item** this means you should select an option near the top left corner of the screen. These options include names like **File, Edit,** and **CO2 Combustion**. You may be asked to select several of these menu items in a row; this will be indicated by separating them with a >, (greater than sign). For example, to select the File menu item followed by the Close menu item, this will be indicated by **File > Close**.

You will see special remarks indicated by a **NOTE** in a box beside the main text.

4. Installing the software

The software is provided on two diskettes inside this manual, or as a set of two downloadable files from the Internet. Follow the instructions given below to install the software on your computer.

4.1 If you are using Windows 3.1

- To install the software from the diskettes, put diskette 1 into your diskette drive and select **File > Run** from the Program Manager, then type **A:\setup** in the dialogue box. Follow the instructions on the screen until the installation is complete.
- To install the software using the files downloaded from the Internet, simply download the two files (ipccsw1.exe and setup.bat) into an empty directory (usually C:\temp) and then run the setup.bat file. To run the setup.bat file select **File > Run** from the Program Manager, then type **C:\temp\setup.bat** in the dialogue box. If you have chosen a directory other than C:\temp, please type that directory path instead, followed by setup.bat. Follow the instructions on the screen until the installation is complete.

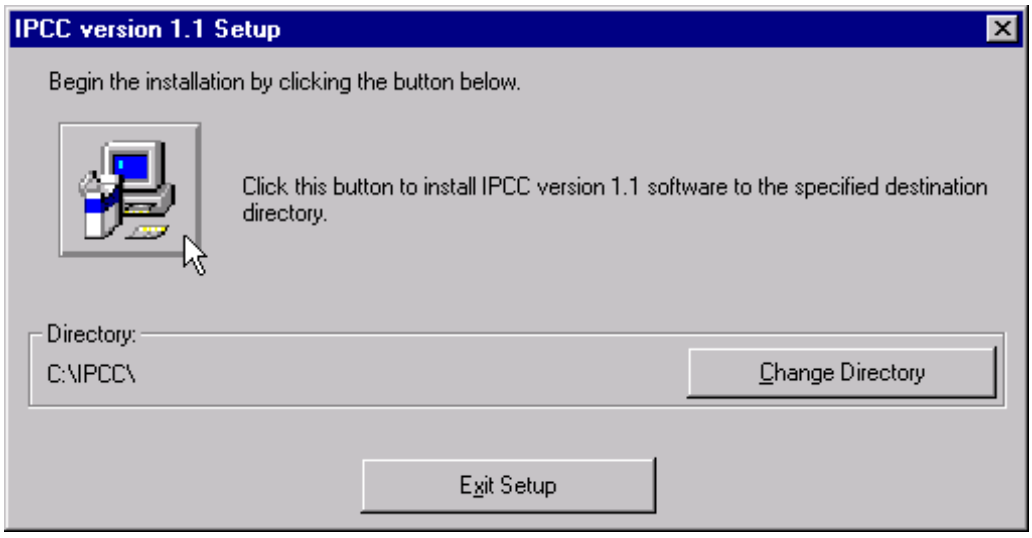
4.2 If you are using Windows 95 or NT

- To install the software from the diskettes, simply put diskette 1 into your diskette drive and select **Start > Run** from the Start Menu bar, then type **A:\setup** in the dialogue box. Follow the instructions on the screen until the installation is complete.
- To install the software using the files downloaded from the Internet, download the two files (ipccsw1.exe and setup.bat) into an empty directory (usually C:\temp) and then run the setup.bat file. To run the setup.bat file select **Start > Run** from the Start Menu bar, then type **C:\temp\setup.bat** in the dialogue box. If you have chosen a directory other than C:\temp, please type that directory path instead, followed by setup.bat. Follow the instructions on the screen until the installation is complete.

NOTE: Selecting a different default directory to install the software may result in unexpected errors.

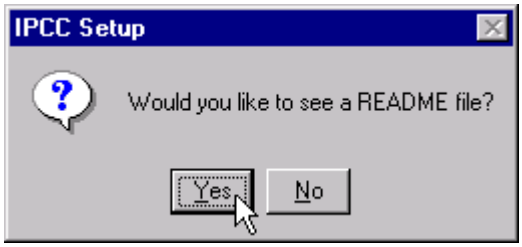
During the installation you will be asked to specify a directory where the program should be installed. Click on the button with the computer icon and the program will be installed in the default directory, C:\IPCC, as shown in Figure 1.

Figure 1: Setup dialogue box



At the end of the installation, a dialogue box will ask if you would like to see a **README** file (Figure 2). This file contains important information on the operation of the software and some frequently asked questions. You should read it by clicking **Yes**.

Figure 2: README file dialogue box



After reading the README file, you will find an **IPCC Software icon** in the Program Manager of Windows 3.1 or on the Start Menu > Programs selection of the Start Menu Bar in Windows 95 or NT.

5. Getting started

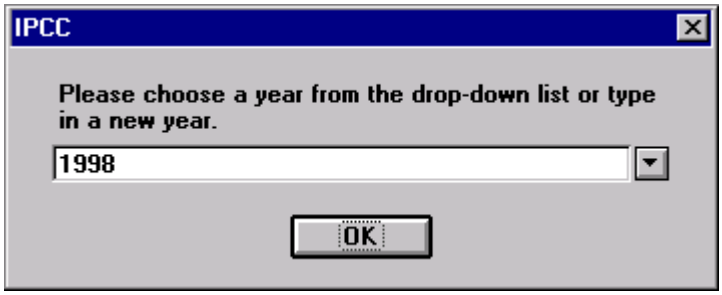
Before starting the software, be sure that Excel 5 or a later version is correctly installed on your computer. Double-click the IPCC software icon to start the software or double-click on the Start.xls file in File Manager or Windows Explorer.

WARNING: You should not start the software by double-clicking on the Overview.xls sheet from File Manager or Explorer.

NOTE: If you are using Excel 95 or later, you will be asked to 'enable macros' when you first open the software. The macro functions are not enabled by default in these versions of Excel.

Excel will then automatically open and you will be presented with a dialogue box requesting the year of your inventory (Figure 3). Select a year from the drop-down list or type in a new year (4 digits).

Figure 3: Enter year dialogue box



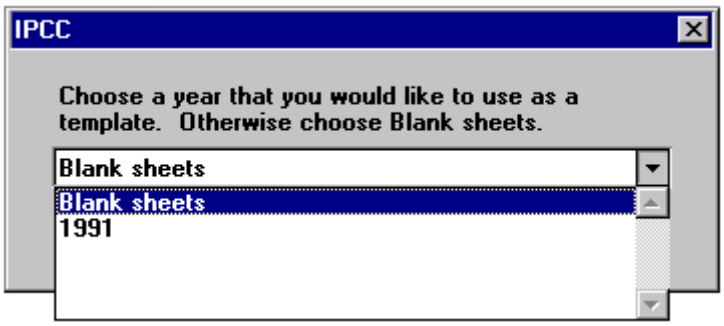
If no inventory exists for this year, you will be prompted with a dialogue box (Figure 4) asking whether you would like to construct an inventory for that year. Select **Yes** to start your inventory. If you choose **No** the software will close.

Figure 4: New year dialogue box

NOTE: If you have used a different software to prepare your inventory, you will have to transfer the data manually from that software to this one. There is no tool for transferring data automatically to this software.

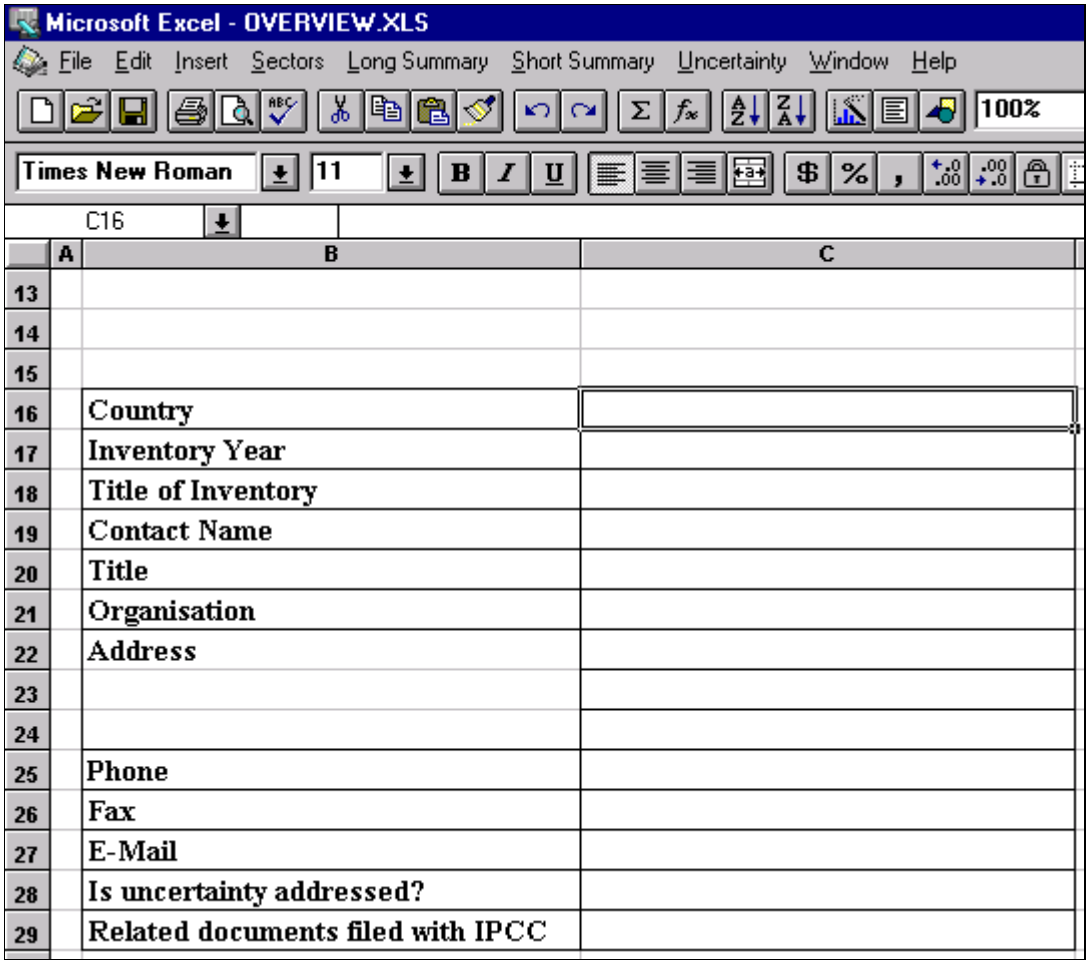
You will then be asked to select a year to use as a template (Figure 5). From the drop-down list, you can select a year which already contains inventory data or you can select a set of blank sheets. If you would like to use the format and data from a previous year's inventory as a starting point, select a year from the list. If you would like to start with a blank set of worksheets, select **Blank sheets** from the list.

Figure 5: Select a year dialogue box



After choosing a template, the software will open. Excel will load a file called **Overview.xls.** This file contains the reporting tables from the *Reporting Instructions (Volume 1, IPCC Guidelines)* and will be open at all times when you are running the software. This is to make sure that all the calculations are updated as you work.

Figure 6: Overview.xls main screen



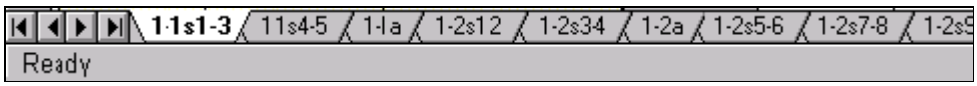
You will see that the standard Excel menu system is replaced by a special menu system which you can use to move around the tables and make all your inventory calculations.

- The **Sectors** menu option will allow you to open other files to perform the *Workbook* calculations for the 'Energy,' 'Industrial Processes,' 'Agriculture,' 'Land-use Change/Forestry' and 'Waste' sectors. These files are called 'Module1.xls,' 'Module2.xls,' 'Module4.xls,' 'Module5.xls' and 'Module6.xls,' respectively. There are no calculations to be made for the Solvents and Other Product Use sector, since there is no *Workbook* methodology for this sector.

- The **Long Summary** menu option contains three choices which will show you the summary table 7A, sheets 1, 2 and 3 of the *Reporting Instructions*.
- The **Short Summary > Show** menu option will show summary table 7B of the *Reporting Instructions*.
- The **Uncertainty** menu option will show you summary table 8A, sheets 1, 2 and 3 of the *Reporting Instructions*.
- The **File, Edit, Insert, Window** and **Help** menus are standard Excel menus that can be used to open and close files, modify the worksheets, change from one worksheet to another and obtain help within the Excel programme. There are currently no Help items for the IPCC software itself contained within the online Help system.

You will find that each worksheet in the software has its own custom menu system which will help you move through the various areas requiring data input. You can also click on the Tabs at the bottom of the window to move from one worksheet to another (Figure 7).

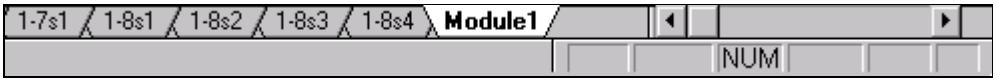
Figure 7: Worksheet tabs from the energy sector file



The tabs are labelled using the same format as the *Workbook* and *Reporting Instructions*. In the example above, 1-1s1-3 indicates this is worksheet 1-1 of the *Workbook* and contains sheets 1 to 3 of that worksheet. For all the Sector worksheets (Energy, Industrial Processes, Agriculture, Land-use Change and Forestry, Waste) the Tabs are labelled with the number of the worksheet and the number of the sheet within that worksheet.

At the end of each set of Tabs there is a Tab labelled Module1. This Tab contains the programming code for creating the custom menu system and **should not be modified in any way** (Figure 8).

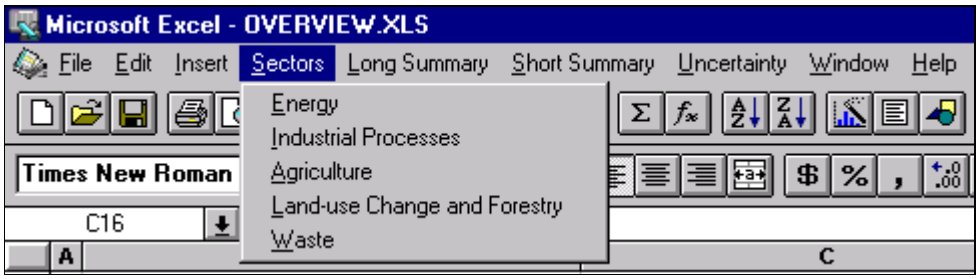
Figure 8: The Module tab



6. Completing your inventory

To start constructing your inventory, begin by filling in the country name, year and contact information into the table you see in Figure 6. Then click on **Sectors** at the top and select the sector you will work with (e.g. 'Energy,' 'Industrial Processes,' 'Agriculture,' etc.) (Figure 9). A new file will be opened when you select a sector. This file contains the worksheets from the *Workbook* for that particular sector.

Figure 9: Selecting a sector to work on



After choosing the sector you wish to work on and the file has been opened, use the instructions in the *Workbook* to fill in the required information for making the emission estimates. The *Workbook* contains detailed explanations on how the calculations should be made.

NOTE: You must use the *Workbook* when filling in the worksheets in these files.

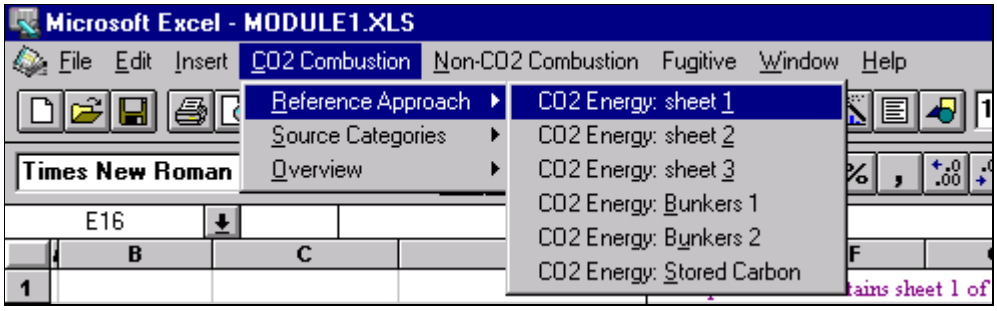
After you fill in the information for that sector you should save the changes by selecting **File > Save**. Then you will need to move to the next sector. To do this, click on **Window** and select Overview.xls from the menu. This will take you back to the main menu. Click on **Sectors** again and choose a new sector. Follow the same procedure for all the sectors. The following sections will describe the sector worksheets in more detail.

7. The Sector Worksheets

7.1 Energy (Module1.xls)

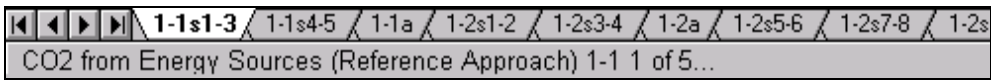
You can open this file by selecting **Sectors > Energy** from the **Overview.xls** menu. This file will help you calculate your emissions from the energy sector using the methods in the *Workbook*. The custom menu for this file will help you move through the various methods for the energy sector (Figure 10).

Figure 10: The Energy sector main menu



You will also notice that the status bar at the bottom of the window contains a short sentence to give you some description of the function of the menu item (Figure 11).

Figure 11: The hint at the bottom of the window

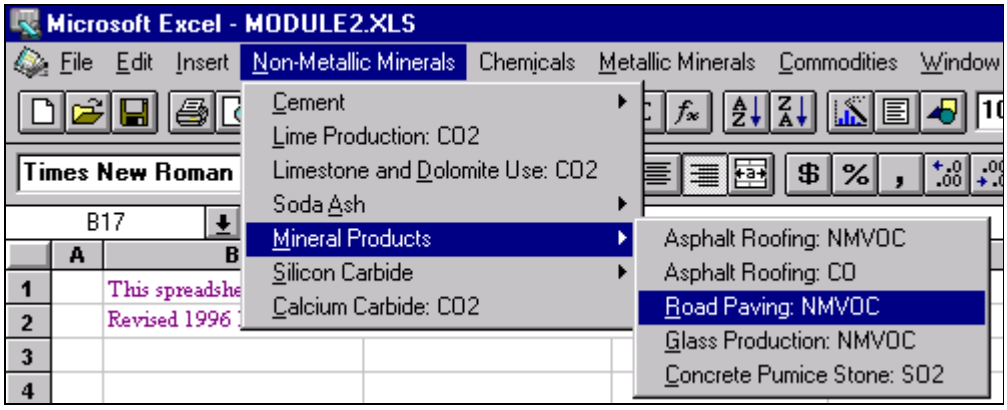


The energy sector file contains methods for estimating CO_2 emissions using the Reference Approach and the Detailed Sectoral Approach. If you only use the Reference Approach for calculating CO_2 emissions from fuel combustion, the totals will only appear in Table 7B of the summary tables (Overview.xls). No total will be provided in Table 7A, since this table provides sectoral details which can only be obtained by using the Detailed Sectoral Approach.

7.2 Industrial Processes (Module2.xls)

You can open this file by selecting **Sector > Industrial Processes** from the **Overview.xls** menu. This file will help you calculate emissions from the 'Industrial Processes' sector using the methods contained in the *Workbook*. The custom menu for this file will help you move through the worksheets of the 'Industrial Processes' sector (Figure 12).

Figure 12: The Industrial Processes main menu



7.3 Agriculture (Module4.xls)

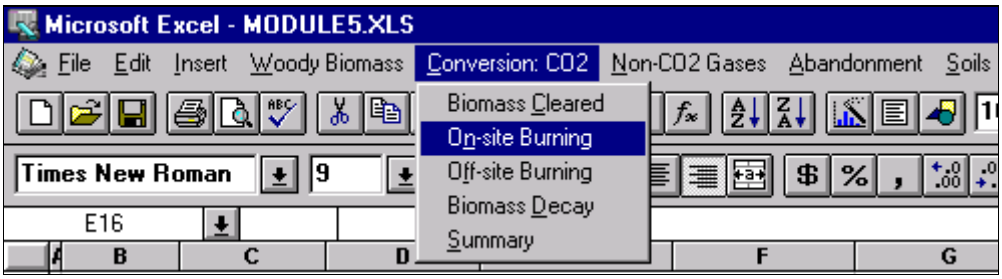
You can open this file by selecting **Sectors > Agriculture** from the **Overview.xls** menu. The custom menu in this worksheet will help you calculate your emissions from Agriculture using the methods in the *Workbook*. You can move around the worksheets by using the custom menu system (Figure 13).

Figure 13: The Agriculture main menu

7.4 Land-use Change and Forestry (Module5.xls)

You can access this file by selecting **Sectors > Land-use Change and Forestry** from the **Overview.xls** menu. This file will help you calculate your emissions from land-use change and forestry using the methods in the *Workbook*. The custom menu system will help you move through the various worksheets (Figure 14).

Figure 14: The Land-use Change and Forestry main menu



This file contains a slight modification of the methodology for estimating carbon emissions or removals by soils. Worksheet 5-5s1 and 5-5A have been extended so that many different land-use management systems can be included in the calculation. You will notice that the top table in worksheet 5-5s1 sums the results of all the tables below it. To make the calculations correctly, follow these steps.

Step 1 Defining land-use management systems

In worksheet 5-5s1, you should enter the name of each land-use management system in the upper left cell of each calculation table under the main table (e.g. cell B29, B35, B41 etc.). These names will also appear in worksheet 5-5A, since some of the land may be agriculturally impacted. You may be limited by data availability and need to estimate the areas covered by each type of land-use.

NOTE: At the end of the calculation the land areas for t-20 years and t should match. If they do match, the message CORRECT: Land Areas Match will appear in cell G1. If they do not match, the message ERROR: Land Areas Do Not Match will appear in cell G1.

Step 2 Calculating soil carbon from agriculturally impacted lands

If the land is agriculturally impacted, use the corresponding table in sheet 5-5A to calculate the soil carbon from that type of agricultural practice (scroll down to where the name of the land-use system is). The amount of soil carbon (column G) will be automatically transferred to the corresponding table in 5-5s1. You should then enter in the land areas for t-20 years and t in columns D and E of worksheet 5-5s1. The net change in soil carbon over the 20 years will then be calculated in column H.

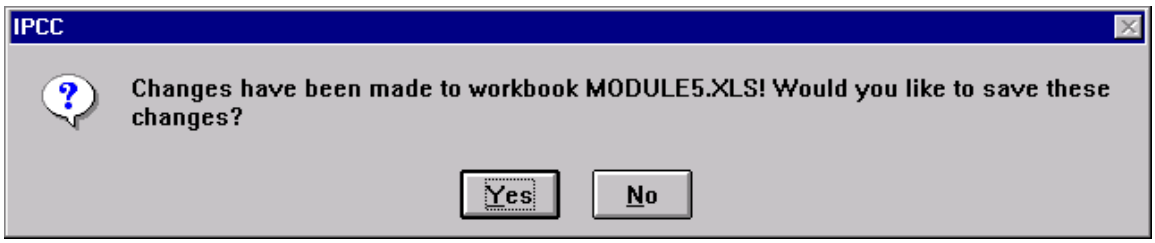
NOTE: Some of the tables within the sector sheets will be filled in automatically. This is because the results for these tables are simply calculations using numbers in other worksheets.

Step 3 Calculating soil carbon from non-agriculturally impacted lands

If the land is not agriculturally impacted, simply put the quantity of soil carbon per hectare in column C (this writes over the formula contained in that cell). Then enter the land areas for t- 20 years and t. The net change in soil carbon for this land-use management system will then be calculated in column H. Once all land-use management systems have been entered in the tables, the totals for land area and net carbon change will appear in the top table.

Once you have completed your calculations in a sector, you can close any of the worksheets by selecting **File > Close** or double-clicking on the workbook icon in the upper left corner, just underneath the Excel icon. If you have made changes to the file you will be asked if you would like to save the changes (Figure 15).

Figure 15: Save the changes dialogue box

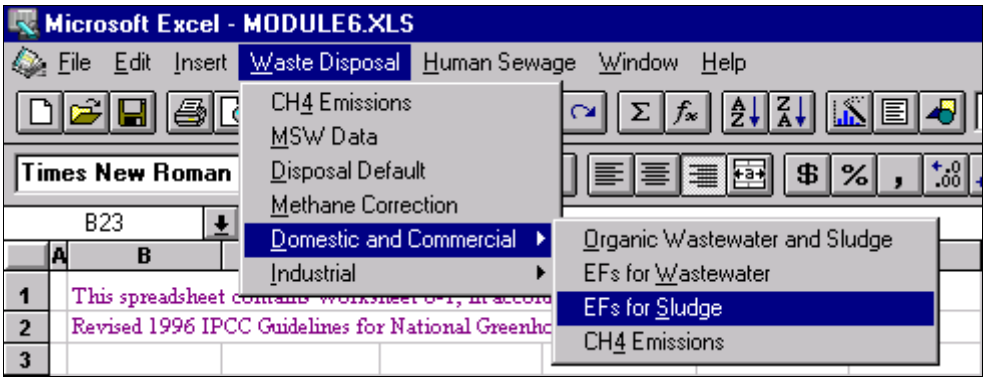


Select **Yes** to save your changes.

7.5 Waste (Module6.xls)

You can access this file by selecting **Sectors > Waste** from the **Overview.xls** menu. This file will help you calculate your emissions from waste using the methods in the *Workbook*. The custom menu will help you move around the various worksheets (Figure 16).

Figure 16: The Waste sector main menu



8. The Sectoral and Summary Tables

While you are completing the sector worksheets, the sectoral and summary tables in Overview.xls will be filled automatically. However, if you have calculations for a sector or source which is not included in the *Workbook*, you will have to enter this value manually into Overview.xls. Also, if you have made a calculation using your own method, you will have to enter the results into Overview.xls. You should also provide a description of the type of data contained in the **Other** sector whenever you report an estimate in this sector (e.g. the sectors and activities which are included). Finally, Tables 8A 1, 2 and 3 will have to be filled in manually.

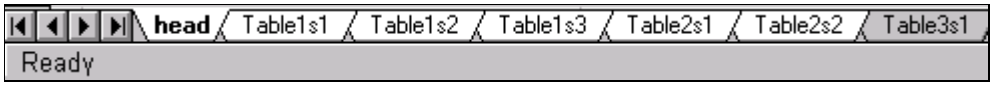
Once your inventory is completed, please make sure that all summary tables have been filled in, either by the methodologies provided in the worksheets or by filling

the results in by hand. Where you cannot make an emission estimate, because data is lacking or there is no methodology, put NA (not available) in the summary tables. If there are no emissions from a particular source in your country, put NO (not occurring) in that space in the summary tables. When you have finished all your data input, verify that the totals are correct.

9. Printing the worksheets

To print individual worksheets, click on the printer icon on the Excel toolbar. If you would like to print more than one worksheet at once, select the Tab of the first sheet you wish to print and then, while holding down the Shift key, select the last sheet you wish to print (Figure 17). Once the sheets are selected simply click on the printer icon as before.

Figure 17: Selecting more than one worksheet



If you would like to print all the worksheets in a file, select **File > Print** from the menu and then click on **Entire Workbook** in the **Print What** box. This will also print the software code for creating the custom menu system. Unfortunately this is a limitation of the Excel printing functions and cannot be avoided.

NOTE: These worksheets have been formatted to print correctly on an HP Laserjet III or IV. If you are using a different type of printer (such as an Epson Stylus), you may need to modify the column widths of the spreadsheets to make them print correctly.

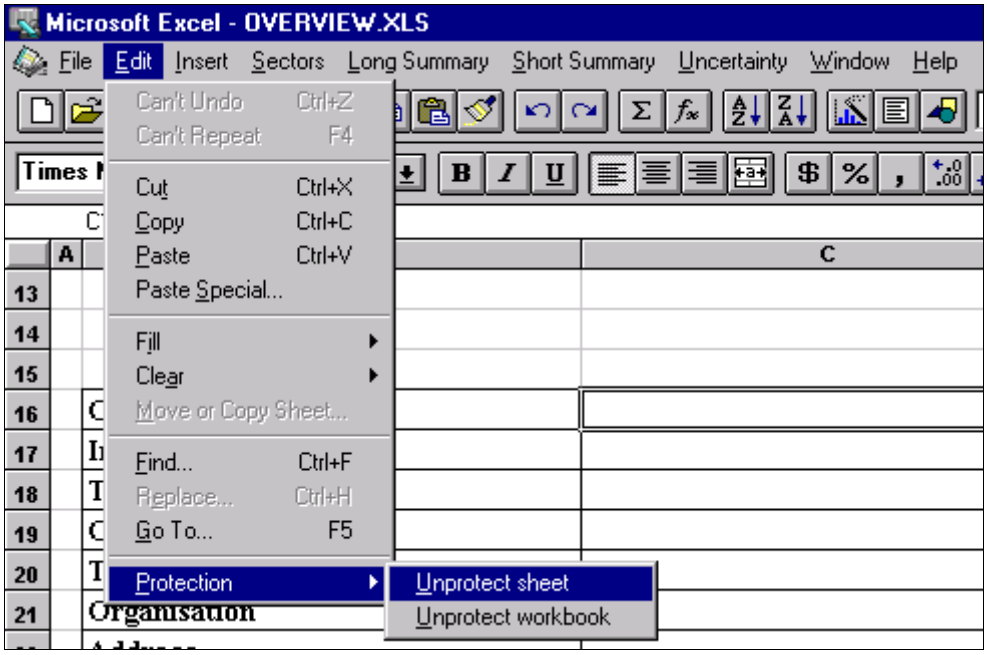
You may want to make some of the columns wider so your values print correctly. The section on **Disabling the protection** tells you how to remove the protection so that you can make a column wider.

10. Disabling the protection

You will notice as you work with the software that you will not be able to enter data into some cells. Those which contain formulas or information which should not be changed have been protected to prevent mistakes from being made. However, GHG inventory requirements are not the same in all countries and therefore this protection can be disabled to allow the user to modify the format and contents of the worksheets. **Before disabling the Protection on the worksheets, you should be very familiar with the functions and capabilities of Excel. If you do decide to disable the Protection, you are responsible for making sure that all the formulas in the worksheets still produce the correct result.**

The Protection function is located at the bottom of the Edit menu item (Figure **18**). If you select **Unprotect Sheet** you will disable the protection on the current sheet. If you select **Unprotect Workbook**, you will disable the protection on the entire Excel workbook (the file you are working in).

Figure 18: Locating the Protection function



10.1 Why disable the Protection on a worksheet?

You might want to disable the protection to make some modifications to the worksheet:

- increase or decrease the width of a column;
- add colour to a cell, or change a formula;
- add a row or column to the worksheet, perhaps to add a sector or fuel type.

To make a column wider, once you have disabled the protection on a worksheet, simply place your mouse over the line separating two column headers. The mouse icon will change to a two headed arrow. Then click and drag the column to make it wider.

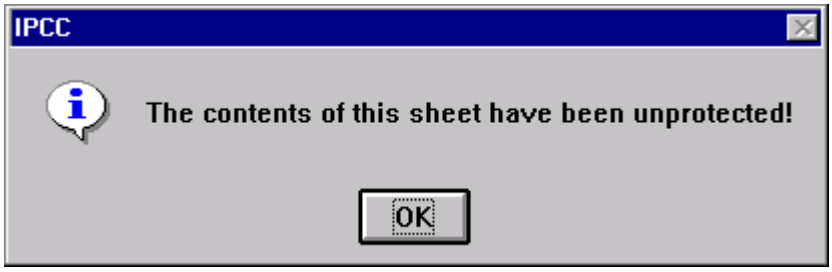
10.2 Why disable the Protection on a workbook?

You might want to disable the protection to make some modifications to the workbook:

- add or delete worksheets from the workbook;
- copy or move worksheets from one workbook to another.

When you select **Unprotect sheet** or **Unprotect workbook** you will get a dialogue box which confirms the action (Figure 19).

Figure 19: Confirmation dialogue box



After you have made your modifications, you may wish to reprotect the worksheet or workbook. To do this you simply have to select the 'Protection' menu item again and you will get another confirmation dialogue box which will say that the worksheet or workbook has been protected. **We strongly recommend that you reprotect your worksheets or workbook after you have finished making your modifications. This will prevent unwanted errors.**

11. Software notes

The software works with Excel version 5.0c or later versions. Earlier versions are not supported and indeed, the software does not work correctly in version 5.0a. The software has been tested with Excel 97 and appears to function correctly but it has not been tested under a Macintosh environment.

TO RECEIVE THE UPDATES OF THE
IPCC SOFTWARE FOR NATIONAL
GREENHOUSE GAS INVENTORIES

The development of the *IPCC Software for National Greenhouse Gas Inventories* is an ongoing process and the first phase has now been completed. The *Software* will need to be updated periodically as better data and scientific understanding lead to better estimation methods. For this reason, the *Software* have been designed in a spreadsheet format which can be easily modified. If you wish to receive information concerning future updates, please fill in and return the coupon below, by mail or fax. This will result in your registration as a *Software* user and you will be notified of subsequent updates.
Please send any change of address to: IPCC WGI Technical Support Unit, Hadley Centre, Meteorological Office, London Road, Bracknell, RG12 2SY, United Kingdom.

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Fax: (44 1344) 856912

Please send me information concerning future updates of the *IPCC Software for National Greenhouse Gas Inventories*.
(Please write in CAPITAL LETTERS)

Company name:.....
For the attention of:.....
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Address:.....
.....
City and post code:.....
Country:.....

E-mail:..... Tel: ..... Fax: .....

Date:..... Signature:.....

Annex I

Software Contents

The two disks should contain the following program files:

Manual.do_	Ole2disp.dl_	Stdole.tl_
Module1.xl_	Ole2nls.dl_	Stkit416.dl_
Module2.xl_	Ole2prox.dl_	Storage.dll
Module4.xl_	Overview.xl_	Storage.dl2
Module5.xl_	Readme.tx_	Typelib.dl_
Module6.xl_	Scp.dl_	Vaen21.ol_
Oc25.dl_	Setup.exe	Vb40016.dl_
Ole2.dl_	Setup.lst	Vshare.38_
Ole2.re_	Setup1.ex_	Compobj.dl_
Oleconv.dl_	Start.xl_	Ctl3dv2.dl_