

## Methods and Data Documentation



**Africa Regional Workshop on the Building of Sustainable National Greenhouse Gas Inventory Management Systems, and the Use of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories**

**Maseru, Lesotho**

**14-18 March 2016**



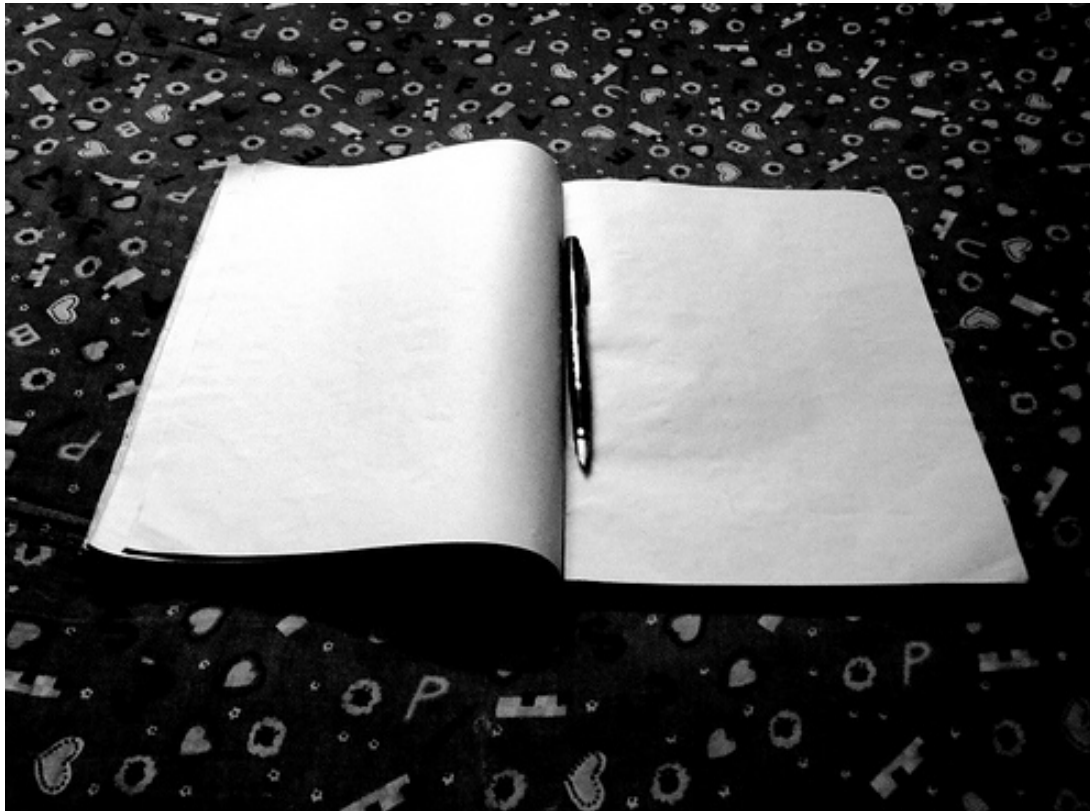
**Mr. Dominique Revet, MDA, UNFCCC (DRevet@unfccc.int)**



## Question:

*In the process of preparing your inventory, reviewing past materials, has it been difficult to:*

- determine the methodology used to develop an estimate?*
- find where an emission factor or activity data originated?*
- track down equations used to develop emission estimates?*



The extent to which you document methodologies and data is the starting point for future inventories!!

It's a simple step with HUGE implications!!

We've learned that documenting our work to save time and increases transparency.

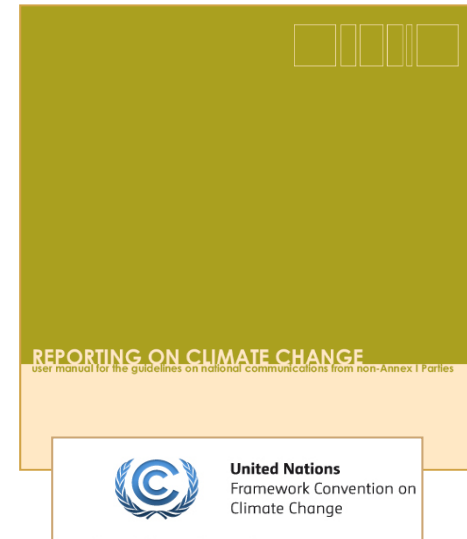




## National GHG Inventories – Section B. Reporting

### Sources of information

Paragraph 21: Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol, including a brief explanation of the sources of emission factors and activity data. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks which are not part of the IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, emission factors and activity data used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.



It is advisable that Parties describe as precisely as possible the sources of information (activity data and emission factors) and methodologies used, especially for country-specific sources and/or sinks which are not part of the IPCC Guidelines. This contributes to the clarity of the information and helps the reader to understand what was done and how it was done. It is important for Parties to identify the data gaps and to make the link with further improvement to be achieved through capacity-building in order to facilitate further requests for financial and technical assistance.





**Introduction to  
Methods and Data  
Documentation**



**The Template  
Workbook**



**What to Include in  
Documentation**



**The U.S. System**



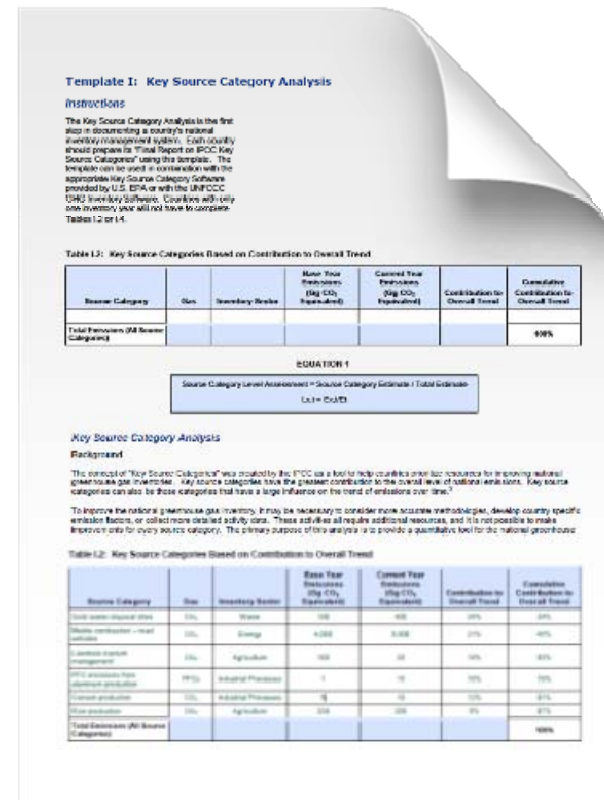
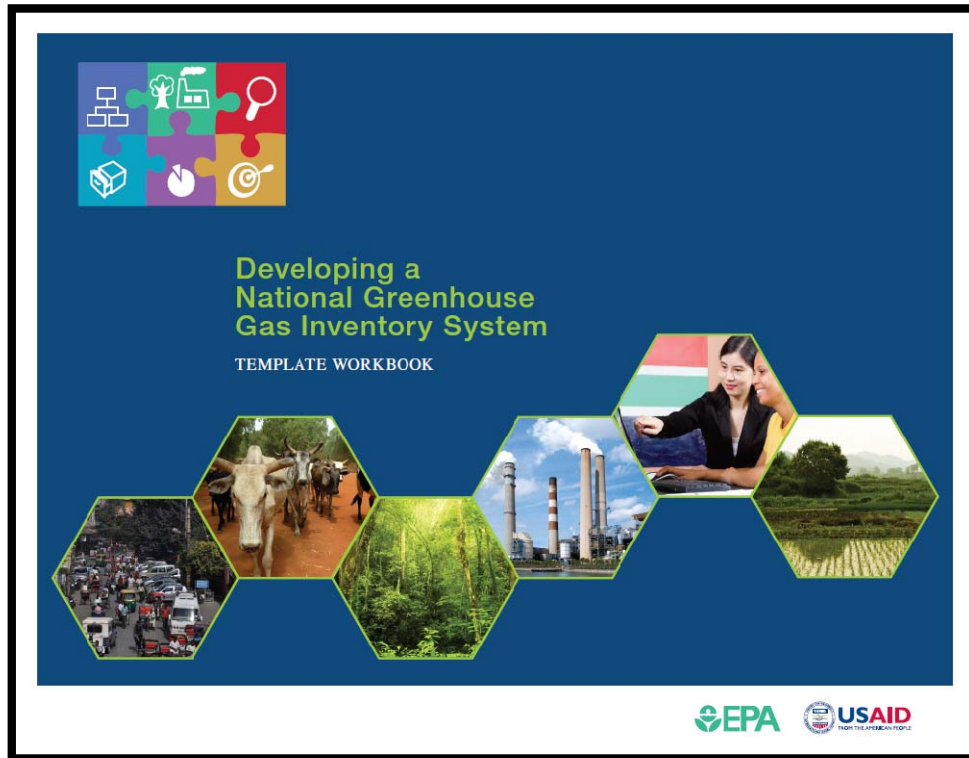




Documenting methods and data will help the inventory team:

- Train new team members
- Reproduce inventory estimates in the future
- In peer reviews (responding to government, expert, or public inquiry)
- Build confidence in climate policy
- Instill transparency
- Builds sustainability in the inventory system
- Satisfies documentation requirements in IPCC Guidelines





- Based on inventory systems developed in concert with other countries
- Each template becomes a chapter of the National Inventory System Report
- Each template provides documentation of critical building blocks





- Documents critical information, facilitates review
- Can be included in National Communications
- Accommodates varying levels of national capacity
- Creates transparency and improves credibility
- **Provides a clear starting point for future inventories**
- **Builds a sustainable national system**
- **Improves inventory quality over time**





## The Six Templates of the Template Workbook

Institutional Arrangements



Methods and Data Documentation



Description of QA/QC Procedures



Description of Archiving System



Key Category Analysis



National Inventory Improvement Plan



*Methods and Data Documentation*





### In the **Methods and Data Documentation (MDD)** template:



- Document source/sink category information
- Identify method choice and provide descriptions
- List activity data and emission factors
- List uncertainty estimates (optional)
- Include future improvements

### Help the inventory team:



- Assist inventory teams in documenting, reporting and archiving methodologies, datasets, and assumptions
- Easily reproduce and review estimates
- Increase transparency
- Respond to inquiries
- Supplement National Communications



## Template 2: Methods and Data Documentation



### Methods and Data Documentation (MDD)

#### 2.1. Category Information

- STEP 1: Provide information about each category, including the sector it belongs to, a description of the category, and details about emissions and removals from this category in your country including which GHGs are emitted. A standard description from existing documents is sufficient to describe the category. Descriptions of relevant categories can also be documented in Step 6.*

*In the Country Detail field, describe the importance of emissions/removals in your country from the category. Provide the contribution to total net emissions and the historical context for emissions/removals in your country from this category (e.g., relative importance and trends).*
- Copy and paste tables below as necessary to provide detailed information for each key category, or alternatively, save each greenhouse gas category as a separate file.*

Tables 2.1 through 2.X below includes the relevant information about categories, including descriptions of each category as it pertains to [country].

Table 2.1: Category Information

Sector	
Category	
Key Category? [Yes or No]	
Category Description/Definition	<i>(Can pull description from IPCC GL)</i>
Country Detail	

Table 2.X: Category Information

Sector	
Category	





## 2.2. Method Choice and Description

- *STEP 2: Provide information about the method used to estimate emissions/removals from each category. List the equation used and the reference (e.g., 1996 IPCC Guidelines), equation page number, etc. for the equation. Describe the reason(s) that this methodology was chosen. If completing this template for key categories in the current inventory cycle, describe the methods likely to be used.*
- *Copy and paste as many of the below tables as necessary to provide the detailed information for each category, or alternatively, save each category as a separate file.*

Table 2.2 through Table 2.X describes the methodology used to calculate greenhouse gas emissions and removals from [category name], including the equation used, its reference, and why this methodology was chosen.

Table 2.2: Methodology for [category name]

<b>Equation</b> (Describe variables for method used.)	
<b>Reference</b>	
<b>Describe How and Why this Method Was Chosen</b>	



## Examples from a Completed MDD Template:

**Table 2.1: Category Information**

<b>Sector</b>	Energy
<b>Category</b>	Stationary Combustion
<b>Key Category?</b>	Yes
<b>Category Description/Definition</b>	Emissions from stationary combustion are specified for a number of societal and economic activities, defined within the IPCC sector 1A, Fuel Combustion Activities. Emissions from the combustion of fossil fuels for energy include the gases CO <sub>2</sub> , CH <sub>4</sub> and N <sub>2</sub> O and comprise the vast majority of energy-related emissions, with CO <sub>2</sub> being the primary gas emitted in the United States..
<b>Country Detail</b>	The direct combustion of fuels by stationary sources in the electricity generation, industrial, commercial, and residential sectors represent the greatest share of U.S. greenhouse gas emissions. 2010 emissions from stationary combustion was 28.9 Tg CO <sub>2</sub> Eq, an increase of 9.2 Tg CO <sub>2</sub> Eq (46.9 percent) from 1990. CH <sub>4</sub> and N <sub>2</sub> O emissions from stationary combustion made up .4 percent of the United States Greenhouse Gas Emissions in 2010.

**Table 2.2: Methodology for Stationary Combustion, Wood Consumption**

<b>Equation</b> (Describe variables for method used.)	CH <sub>4</sub> and N <sub>2</sub> O emissions from stationary combustion were estimated by multiplying <b>wood consumption data</b> by <b>emission factors</b> (utilizing a Tier 1 methodology).
<b>Reference</b>	For the CH <sub>4</sub> and N <sub>2</sub> O estimates, wood consumption data for the United States was obtained from EIA's Annual Energy Review (EIA 2011a). Tier 1 default emission factors for these three end-use sectors were provided by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006).
<b>Describe How and Why this Method Was Chosen</b>	The tier 1 method was chosen due to lack of country-specific emission factors.







## Method Choice

Equation, reference, justification for selecting method



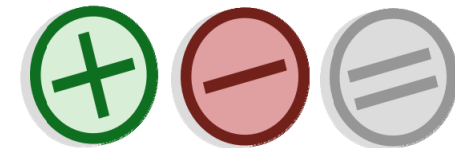
## Activity Data

Type of activity data, values, units, year (s) of data, references, QA/QC procedures performed on data



## Emission Factors

Sources/references, values, used reasoning for emission factor choice, spreadsheets, models, justification for factor



## Uncertainty (optional)

Category, relative lower and upper bound, and lower and upper emission estimate

**Document All Methods and Data by Inventory Year for Easy Retrieval**



## Clarifying Documentation, Archiving, and Reporting

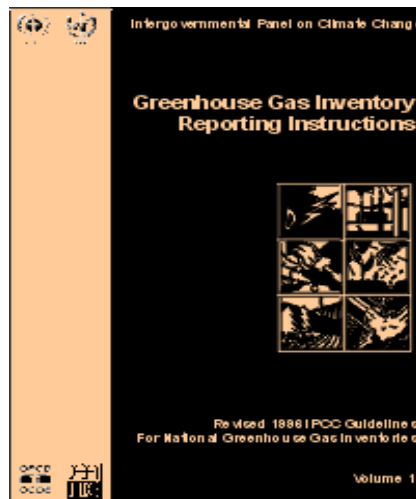
<b>Documentation</b>	Information provided that is necessary to ensure transparency
<b>Archiving</b>	Information saved for internal and future use
<b>Reporting</b>	Information submitted to UNFCCC



## Revised 1996 IPCC Guidelines

INTROD.2

*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reporting Instructions*



### STEP 4 DOCUMENTATION

Prepare text to accompany the inventory which should:

- describe any differences from IPCC source/sink category structure;
- describe any differences from IPCC default methods for the estimation of greenhouse gases and precursors;
- clearly describe the estimation methods, as well as major assumptions that may not have been captured in the worksheets, for all greenhouse gases contained in the inventory;
- provide complete references to all data sources used to construct the inventory;
- highlight any new or interesting data sources, references or research findings used to construct the inventory;
- describe any significant changes in emission factors and other assumptions from those used in previous inventories that have been submitted.

You are also invited to report any difficulties you faced in developing and reporting the inventory (e.g. lack of data, lack of resources etc.).



# IPCC Good Practice Guidance

## Chapter 2: Energy

### 2.2.2 Reporting and documentation

It is *good practice* to document and archive all information required to produce the national emissions inventory estimates as outlined in Section 8.10.1 of Chapter 8, Quality Assurance and Quality Control.

It is not practical to include all documentation in the national inventory report. However, the inventory should include summaries of methods used and references to source data such that the reported emissions estimates are transparent and the steps in their calculation may be retraced.

The current IPCC reporting format (spreadsheet tables, aggregate tables) provides a balance between the transparency requirement and the level of effort that is realistically achievable by the inventory agency. *Good practice* involves some additional effort to fulfil the transparency requirements completely. In particular, if Tier 2

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## 2.1 CO<sub>2</sub> EMISSIONS FROM STATIONARY COMBUSTION

### 2.1.2 Reporting and documentation

Some examples of specific documentation and reporting which are relevant to this source category are provided below:

- The sources of the energy data used and observations on the completeness of the data set;
- The sources of the calorific values and the date they were last revised;
- The sources of emission factors and oxidation factors, the date of the last revision and any verification of the accuracy. If a carbon storage correction has been made, documentation should include the sources of the factor and how the figures for fuel deliveries have been obtained.





## 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 1 General Guidance and Reporting

### 8.4 OTHER REPORTING

In addition to reporting tables listed in Section 8.3, it is *good practice* to report tabular information on recalculations (see Table 5.2 in Chapter 5, Time Series Consistency, of this Volume).

Additional documentation is needed to ensure the transparency of inventories as part of an inventory report document. An inventory report should clearly explain the assumptions and methodologies used to facilitate replication and assessment of the inventory by users and third parties. Transparency can be ensured through following the guidance on documentation of each category described in the sectoral Volumes 2-5, and for Tier 1 methods by completing the worksheets. Countries using higher tier methods should provide additional documentation in addition to, or instead of the worksheets. Such explanatory information should include cross-references to the tables.

The documentation should include a description of the basis for methodological choice, emission factors, activity data and other estimation parameters, including appropriate references and documentation of expert judgements. The inventory report should also include information on the implementation of a QA/QC plan, verification, splicing of methodologies, recalculations and uncertainty assessment as well as other qualitative information relative to data collection, uncertainty, identification of *key categories* and recalculation mentioned in the correspondent documentation section of the sectoral volumes.





## 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Energy

### 2.5.1 Reporting and Documentation

It is *good practice* to document and archive all information required to produce the national emissions inventory estimates, as outlined in Chapter 8 of Volume 1. It is not practical to include all documentation in the inventory report. However, the inventory should include summaries of methods used and references to data sources such that the reported emissions estimates are transparent and steps in their calculation can be retraced. Some examples of specific documentation and reporting that are relevant to stationary combustion sources are discussed below.

For all tiers, it is *good practice* to provide the sources of the energy data used and observations on the completeness of the data set. Most energy statistics are not considered confidential. If inventory compilers do not report disaggregated data due to confidentiality concerns, it is *good practice* to explain the reasons for these concerns, and to report the data in a more aggregated form.

The current IPCC reporting format (spreadsheet tables, aggregate tables) tries to provide a balance between the requirement of transparency and the level of effort that is realistically achievable by most inventory compilers. *Good practice* involves some additional effort to fulfil the transparency requirements completely. In particular, if Tier 3 is used, additional tables showing the activity data that are directly associated with the emission factors should be prepared.

For country-specific CO<sub>2</sub> emission factors, it is *good practice* to provide the sources of the calorific values, carbon content and oxidation factors (whether the default factor of 100 percent is used or a different value depending on circumstances). For country- and technology-specific non-CO<sub>2</sub> greenhouse gas estimates, it may be necessary to cite different references or documents. It is *good practice* to provide citations for these references, particularly if they describe new methodological developments or emission factors for particular technologies or national circumstances. For all country- and technology-specific emission factors, it is *good practice* to provide the date of the last revision and any verification of the accuracy.





# National Inventory Schedule





## Methods and Data Documentation Summary

- Need to balance transparency with resources and priorities (focus on *key categories*)
- Improve transparency of documentation
- Ensure estimates are reproducible
  - Would an external expert be able to reproduce your country's GHG inventory estimates with the data and documentation you provide?
- Include documentation in National Communication Report
- Prepare a separate inventory report and archives with additional documentation



## Question:

*After hearing documentation described, what systems do you have to document data?*

*How does your current documentation system handle:*

- *Methodology selection?*
- *Activity data selection?*
- *Emission factor selection?*

*Do you have lessons learned from previous inventories?*

*What could be improved and what systems might work best for your country? Can the template be adapted to your system?*

Thank you !



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FROM THE AMERICAN PEOPLE

