

# IPCC GUIDELINES, METHODS, AND APPROACHES TO DATA COLLECTION

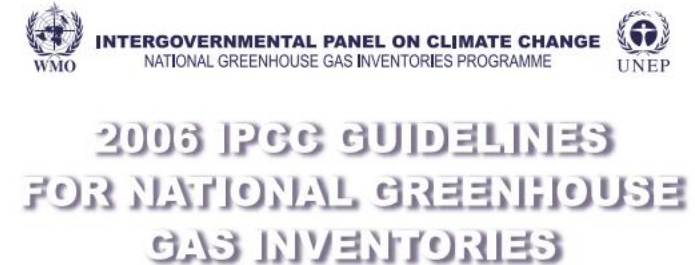
April/May 2024

U.S. Environmental Protection Agency



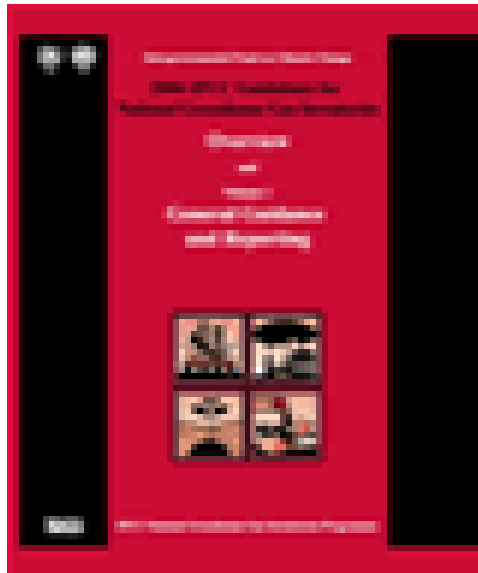
# 2006 IPCC GUIDELINES

- Provide methodologies for estimating national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases
- Developed through intergovernmental process with experts across the globe
- Reflected an evolutionary approach to ensure continuity, allowing for incorporation of experiences with existing guidelines and new scientific information
  - Follows and extends previous guidance, e.g., Revised 1996 Guidelines and 2000 Good Practice Guidance and 2003 Good Practice Guidance for LULUCF (see overview chapter to 2006 IPCC GL)
- Primer for Inventory Compilers: [https://www.ipcc-nggip.iges.or.jp/support/Primer\\_2006GLs.pdf](https://www.ipcc-nggip.iges.or.jp/support/Primer_2006GLs.pdf)



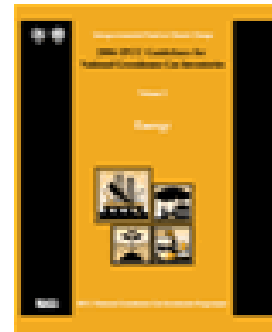
# 2006 IPCC GUIDELINES: COVERAGE

## Volume 1 - General Guidance and Reporting



Very helpful for new compilers

## Volumes 1-5 – Sectoral Guidance



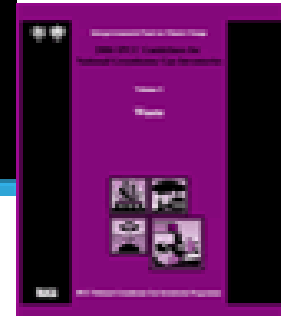
ENERGY



IPPU



AFOLU



WASTE

*Chapter annexes in all volumes may contain additional information/applied examples*

# VOLUME 1: GENERAL GUIDANCE AND REPORTING

Volume 1 Chapters	Description
<b>1 - Introduction</b>	Good introduction for new compilers, covers concept, guidelines' structure, inventory compilation steps and inventory quality indicators
<b>2- Approaches to Data Collection</b>	Reviews how to collect data, including existing and new data and considerations for identifying suitable data sources. Includes template for using expert judgement as data source. Includes some case studies as well.
<b>3- Uncertainties</b>	Reviews objectives of assessing uncertainties, causes of uncertainties and outlines approaches to assess uncertainties (error propagation, monte carlo) and also includes reporting good practices
<b>4- Methodological Choice and Identification of Key Categories</b>	Reviews purpose of key category analysis and outlines quantitative and qualitative approaches to identify key categories
<b>5 - Time Series Consistency</b>	Reviews circumstances impacting time series consistency, outlines splicing techniques to address data gaps and incorporate newer data. Includes case studies as well
<b>6- QA/QC and Verification</b>	Outlines purposes and definitions of QC, QA, and Verification and respective procedures. Also outlines elements of a QA/QC plan
<b>7 - Precursors and Indirect Emissions</b>	Reviews approaches for compiling these estimates
<b>8 - Reporting Guidance and Tables</b>	This guidance is secondary to MPGs, including common reporting tables

# VOLUME 1: GENERAL GUIDANCE AND REPORTING

Volume 1 Chapters	Description
<b>1 - Introduction</b>	Good introduction for new compilers, covers concept, guidelines' structure, inventory compilation steps and inventory quality indicators
<b>2- Approaches to Data Collection</b>	Reviews how to collect data, including existing and new data and considerations for identifying suitable data sources. Includes template for using expert judgement as data source. Includes some case studies as well.
<b>3- Uncertainties</b>	Reviews objectives of assessing uncertainties, causes of uncertainties and outlines approaches to assess uncertainties (error propagation, monte carlo) and also includes reporting good practices
<b>4- Methodological Choice and Identification of Key Categories</b>	Reviews purpose of key category analysis and outlines quantitative and qualitative approaches to identify key categories
<b>5 - Time Series Consistency</b>	Reviews circumstances impacting time series consistency, outlines splicing techniques to address data gaps and incorporate newer data. Includes case studies as well
<b>6- QA/QC and Verification</b>	Outlines purposes and definitions of QC, QA, and Verification and respective procedures. Also outlines elements of a QA/QC plan
<b>7 - Precursors and Indirect Emissions</b>	Reviews approaches for compiling these estimates
<b>8 - Reporting Guidance and Tables</b>	This guidance is secondary to MPGs, including common reporting tables

# METHODOLOGICAL CONCEPTS

## Good Practice

Practices that reduce uncertainties as far as practicable (introduced in earlier guidance). For example, it is good practice to compare country-specific emissions factors with default factors, etc.

## Tiers

A tier represents a level of methodological complexity, e.g. Tier 1 is the basic method (AD\*EF), Tier 2 intermediate and Tier 3 is usually most demanding in terms of complexity and data requirements. Tiers 2 and 3 are sometimes referred to as higher tier methods and are generally considered to be more accurate.

## Default data

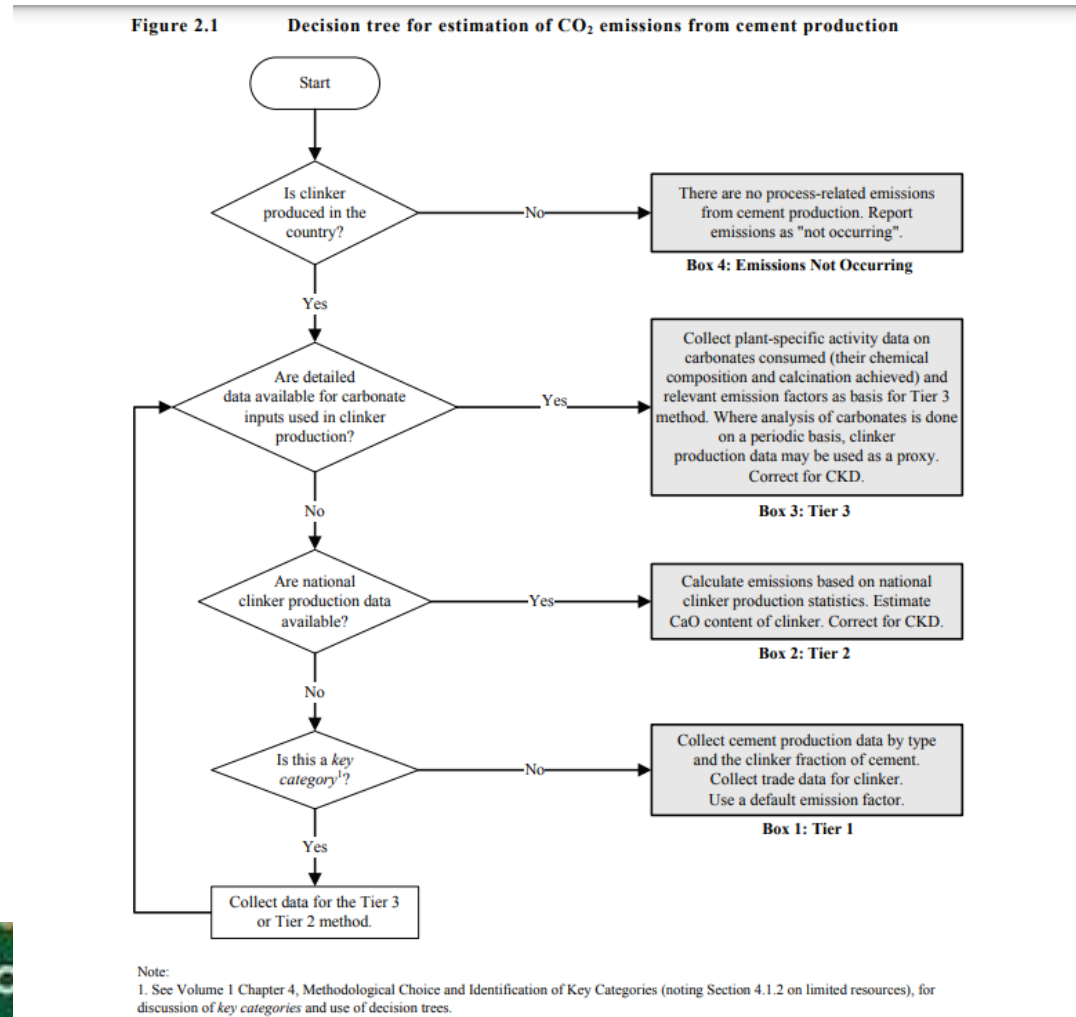
Tier 1 methods for all categories are designed to use readily available national or international statistics in combination with the provided default emission factors and additional parameters that are provided, and therefore should be feasible for all countries

## Key Categories

Emission/removal categories prioritized for improvements because they are significant because they influence the level and trend of emissions



# METHODOLOGICAL DECISION TREES



# CATEGORY GUIDANCE - STRUCTURE

Most category guidance are structured similarly across volumes as outlined below:

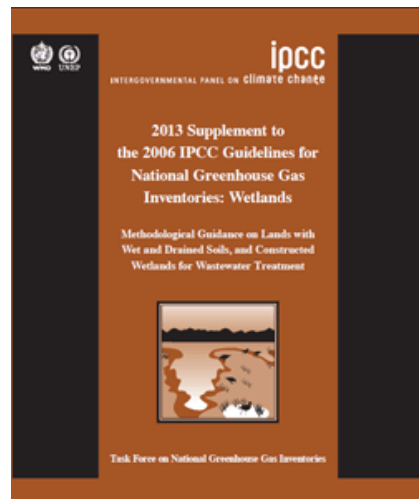
- Overview/Description of Source/Removal
- Methodological issues (includes decision trees)
  - Choice of method
  - Choice of emission factors
  - Choice of activity data
  - Developing a consistent time series
  - Completeness (guidance focuses on covering all activity with GHG impact, but also in terms of geographic scope, i.e., also territories or insular areas)
- Uncertainty
- QA/QC, Reporting and Documentation, will vary across volumes but are useful and should be reviewed

*Note good practices across sections*





# SUPPLEMENTS AND REFINEMENTS



The *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement)* extends the content of the *2006 IPCC Guidelines* by filling gaps in coverage and providing updated information reflecting scientific advances, including updating emission factors. It covers inland organic soils and wetlands on mineral soils, coastal wetlands including mangrove forests, tidal marshes and seagrass meadows and constructed wetlands for wastewater treatment. The coverage of the *2006 IPCC Guidelines* on wetlands was restricted to peatlands drained and managed for peat extraction, conversion to flooded lands, and limited guidance for drained organic soils.

Encouraged

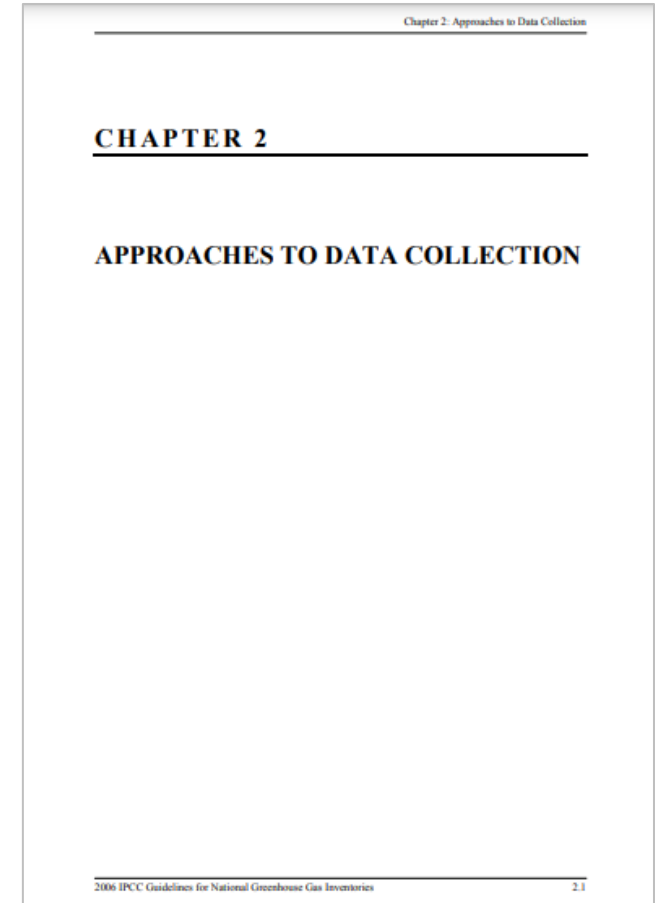


The 2019 Refinement does not revise the *2006 IPCC Guidelines*, but **updates, supplements and/or elaborates the 2006 IPCC Guidelines** where gaps or out-of-date science have been identified. It does not replace the *2006 IPCC Guidelines*, but **should be used in conjunction with the 2006 IPCC Guidelines and, where indicated, with the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement)**.

May use

# DATA COLLECTION

- Inventories use a range of data sources (e.g., national statistics, industry/trade statistics, literature, facility-level data, state-level statistics, etc.)
- “Chapter 2: Approach to Data Collection” contains general guidance on data collection for activity data and emission factors, including cross-references to additional guidance (i.e., screening data, addressing data gaps, expert judgement, generating new data, developing emission factors, etc. )
- Focus on the collection of data needed to improve estimates of key categories which are the largest, have the greatest potential to change, or have the greatest uncertainty.
- Communication with data suppliers is important for continuity in data supply, QC, etc.
  - Document what you learn about data as a record
- International data may be available where gaps exist
  - Activity data: FAOSTAT, IEA, UN Statistics, etc.
  - Emission factors: IPCC Emission Factor Database, etc.



# SCREENING DATA

- Scope of data/data definition
- How is data collected (e.g., voluntary, regulatory, census, survey, etc.)
  - Missing data procedures
- Coverage/completeness of data (source/geographic)
- Time horizon (e.g., calendar year, etc.)
- Available historical data?
- QA/QC procedures prior to publication

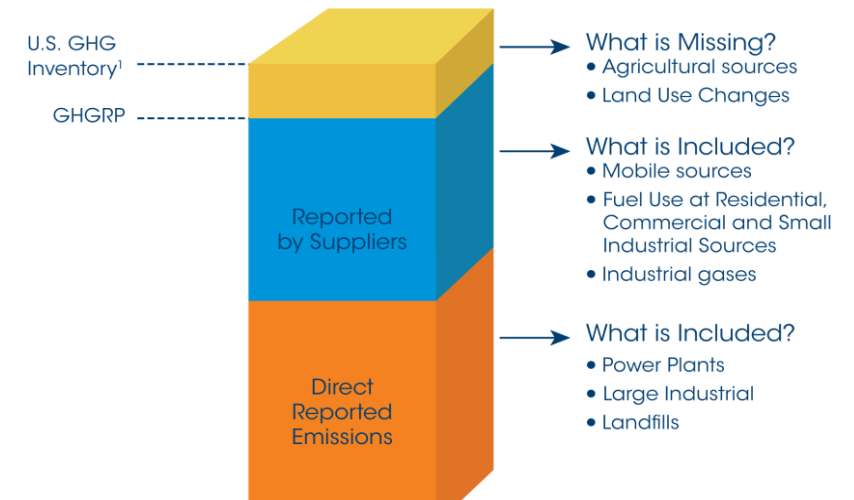
Information above may be in data publication, but sometimes less clear and requires outreach and iteration with data supplier to improve understanding over time.



# EPA GHG DATA: U.S. GHG INVENTORY (GHG INVENTORY) AND GHG REPORTING PROGRAM (GHGRP)

- **Inventory of U.S. Greenhouse Gas Emissions and Sinks (GHG Inventory)**, the U.S. official GHG Inventory submission to UNFCCC, tracks total annual U.S. emissions across all sectors of the economy, using mostly national-level data
- **GHGRP** collects detailed emissions data from large greenhouse gas emitting facilities in the United States, as directed by the Clean Air Act (data collection started in 2010)
  - GHGRP covers most, but not all, U.S. GHG sources and sinks (i.e., GHGRP does not include agriculture, land use, and small sources)
- GHGRP is a key resource for improvements and additional QA/QC (i.e., emissions information, activity data, data to derive country-specific/region specific/technology-specific EFs, compare reported data with other available information)

## GHGRP Covers the Majority of U.S. GHG Emissions



Task	Inventory of U.S. GHG Emission and Sinks	Greenhouse Gas Reporting Program
Find total U.S. emissions and sinks	✓	
Review trend data for the past 20+ years	✓	
Browse a map to find the largest emitters in your area		✓
Compare facility emissions across an industrial sector		✓
Find state-level data	Totals for sources/sinks ✓	Reported ✓

# DISCUSS EXISTING INVENTORY ARRANGEMENTS

- How is data currently requested?
  - Some downloadable from government websites
- Where is raw data obtained from data providers?
- Is it working? Where are there challenges?
- Consider near-term and long-term improvements
  - Literature reviews
  - Potential to improve data disaggregation in existing surveys/census where needed?

