

2019 Refinement IPCC Guidelines for national GHG inventories

10TH EU ETS COMPLIANCE CONFERENCE

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IPCC Inventory Guidelines and reporting of Greenhouse Gas Inventories

- The IPCC inventory guidelines are the basis for reporting of GHG inventories by both Annex I and non-Annex I Parties under the Convention:
 - Annex I Parties are required to use the 2006 IPCC Guidelines
 - Non-Annex I Parties are required to use the Revised 1996 IPCC Guidelines and encouraged to use the Good Practice Guidance
 - Annex I Parties to the Kyoto Protocol are required to use the IPCC guidance to prepare the supplementary information on LULUCF (KP Supplement)
- Article 13: Transparency Framework is the heart of the Paris Agreement
 - In order to build mutual trust and confidence among the Parties and to promote effective implementation of the Paris Agreement, a transparency framework for action needed to be enhanced
 - It is essential that all the Parties produce and report high quality and reliable national GHG inventories

paragraph 7: – Each Party shall regularly provide ...: (a) A national inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases, prepared using good practice methodologies accepted by the Intergovernmental Panel on Climate Change and...

2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

- The Katowice climate package includes guiding principles for the modalities, procedures and guidelines (MPG) of the enhanced transparency framework under the Paris Agreement
- [Annex decision 18/CMA.1](#), paras 20 and 21
Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement

Each Party:

- Shall use the 2006 IPCC Guidelines
- Shall use any subsequent version or refinement of the IPCC guidelines agreed upon by the CMA (Conference of the Parties serving as the meeting of the Parties to the Paris Agreement)
- Is encouraged to use the 2013 Supplement: Wetlands
- Should make every effort to use a recommended method (tier level) for key categories in accordance with the IPCC guidelines

2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

- In October 2016, the IPCC decided to prepare a new Methodology Report “2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories”
- The specific categories to be refined were selected through a technical assessment carried out in 2015 and 2016 and a subsequent scoping meeting in August 2016. The IPCC, in October 2016, adopted a table of contents (Decision IPCC/XLIV-5)
- The 2019 Refinement covers all IPCC inventory sectors but refinements are included for only those categories where the science was considered to have sufficiently advanced since 2006 or where new or additional guidance was required
- 2019 Refinement was adopted/accepted by the IPCC at its 49th Session in May 2019 (Decision IPCC-XLIX-9)

2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

1st Lead Author Meeting (LAM1)	7-9 & 12-14 Jun 2017
2nd Lead Author Meeting (LAM2)	25-28 Sep 2017
First Order Draft (FOD) Expert Review	4 Dec 2017 – 11 Feb 2018
3rd Lead Author Meeting (LAM3)	10-13 Apr 2018
Literature cut-off date*	25 Jun 2018
Second Order Draft (SOD) Government/Expert Review	2 Jul – 9 Sep 2018
4th Lead Author Meeting (LAM4)	Week of 22-27 Oct 2018
Final Draft Government (FDG) Review	28 Jan – 24 Mar 2019
IPCC Panel Adoption/Acceptance	May 2019

Prepared by over 280 scientists and experts

Participated by authors from 47 countries

More than 10,000 review comments from governments and experts were considered by authors

2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

The structure of the 2019 Refinement is the same as that of the 2006 IPCC Guidelines. The Refinement does not replace the 2006 IPCC Guidelines, but should be used in conjunction with the 2006 IPCC Guidelines and, where indicated, with the Wetlands Supplement

Overview

Five volumes

- Volume 1: General Guidance and Reporting
- Volume 2: Energy
- Volume 3: Industrial Processes and Product Use (IPPU)
- Volume 4: Agriculture, Forestry and Other Land Use (AFOLU)
- Volume 5: Waste

Glossary

2019 Refinement

RELATIONSHIP WITH 2006 IPCC GUIDELINES

Types of refinement from inventory compilers' perspective

Update	Inventory compilers should use the chapter/section/subsection in the 2019 Refinement instead of the corresponding chapter/section/subsection in the 2006 IPCC Guidelines
New Guidance	Recognizing that there is no guidance in the 2006 IPCC Guidelines, inventory compilers should use the chapter/section/subsection in the 2019 Refinement.
No Refinement	Inventory compilers should use the corresponding chapter/section/subsection in the 2006 IPCC Guidelines, because no refinement has been made in that chapter/section/subsection
Removed	There were few cases where guidance/sections were removed because they were no longer relevant

KEY CONCEPTS UNCHANGED FROM 2006 IPCC GUIDELINES

- Relevant but not prescriptive with respect to the reporting of national inventories under international agreements, and the use of reported information under these agreements
- Provides methods for estimating emissions for each gas in mass units. No specific metrics (e.g., GWP values) is recommended to calculate emission estimates in CO₂ equivalent units
- Structured so that any country, regardless of experience or resources, should be able to produce reliable estimates of their emissions and removals

Overview

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Volume 1 - General Guidance and Reporting

TO GUIDE INVENTORY COMPILERS OF ENERGY, IPPU, AFOLU AND WASTE SECTORS ON:

- National GHG Inventory arrangements and management tools
- Data collection and adapting for inventory use
- Uncertainty assessment
- Methodological choice and identification of key categories
- Ensuring a consistent timeseries
- QA/QC and verification of emission estimates
- Use and reporting of models
- Calculation of emissions of precursors of GHGs and indirect emissions
- Reporting of emissions and removals in standard tabular format: Tables facilitate consistency among countries, categories, gases and years. They are not intended to prescribe specific reporting formats under the UNFCCC

Volume 1 - General Guidance and Reporting

Chapter 1 “Introduction to National GHG Inventories”

- New guidance on implementation of a national inventory management system, including: Examples of institutional arrangements structuring, roles and capabilities of actors and stakeholders, data flows and suggested contents of Data Supply Agreements
- Description of inventory management tools such as work plans, improvement plans, data management systems and quality systems with illustrative examples

•Chapter 2 “Approaches to data collection”

- New guidance for the development of country specific emission factors, including: Examples of main emission factors and sensitive parameters
- Potential sources of EFs
- New guidance on the integration of emissions reported from facilities into national GHG inventories, including: Designing facility-reporting programmes for inventory use (e.g. quality goals and reporting requirements for facility data)

Volume 1 - General Guidance and Reporting

Use of Facility Data in Inventories

Uses of Facility Data not Originally Designed for Inventory Application

Facility data should be assessed on the basis of the following:

- Transparency of the calculation and measurement methods used by the facility
- Methods used are in line with IPCC methodologies
- QA/QC activities undertaken and level of uncertainty associated with the data
- Representativeness of the data for the category
- Consistency with national level data (e.g., for combustion emissions: How does the data compare with national energy dataset? For production activities: Is the sample size adequate compared with the number of national production facilities in the IPCC category?)

When the sectoral coverage of the category to be estimated is known to be complete, data collected from facilities in the context of different directives and legislation, e.g. emissions trading schemes, can be incorporated into the national inventory

Integrating facility-reported data into inventory is optional and should only be considered if the information improves the quality of the inventory and better reflects national circumstances

Volume 1 - General Guidance and Reporting

Use of Facility Data in Inventories

Uses of Facility Data not Originally Designed for Inventory Application

When a category is not completely covered by facility data

- Industries provide the required information only if they exceed specific thresholds
- Basic data such as fuel consumptions may be not supplied and production data are not always split by product but reported as an overall figure

The inventory compiler may use these data as a check and can communicate with industries to obtain the additional information necessary to carry out sectoral emission estimates

Or data may be used:

- To derive country-specific emission factors
- To compare with inventory's emission estimates, emission factors and activity data
- To replace missing data, with the assumption that that reported data is a good representative of the whole population (so the average emission rate of the facility type or industry applies to any missing data within the appropriate context)

Volume 1 - General Guidance and Reporting

Box 2.3 (New)

FACILITY DATA CONSIDERATION AND USE

Additional resources for research purposes are available to inventory compilers when considering the use of facility data. These resources, which discuss reporting design considerations, QA/QC checks, implementation and direct usage of facility data, can help compilers in gaining knowledge and assessing how best to use their data.

It is *good practice* to use the following references as starting point:

IPCC (2011). Use of Models and Facility-Level Data in Greenhouse Gas Inventories (Report of IPCC Expert Meeting on Use of Models and Measurements in Greenhouse Gas Inventories 9-11 August 2010, Sydney, Australia). eds: Eggleston H.S., Srivastava N., Tanabe K., Bassansuren J., Fukuda M., Pub. IGES, Japan 2011.

WRI (2014) Working Paper - Exploring Linkages Between National and Corporate/Facility Greenhouse Gas Inventories, World Resources Institute. N. Singh, T. Damassa, S. Alarcon-Diaz, M. Soto. March 2014.

Compilers may also learn from the experiences of other countries with facility reporting programmes. Examples are the USA, Australia and European countries, which all have integrated facility data into their national GHG inventories. These countries' national inventory entities all have information on facility reporting requirements and systems.

Volume 1 - General Guidance and Reporting

Chapter 3 “Uncertainties”

- Updated guidance on uncertainty by providing more default values, calculation examples
- Clarification on key requirements for use of Approach 1 for combining uncertainties and Application of Approach 1
- Stepwise example demonstrating the use of Approach 2 uncertainty assessment (Monte-Carlo analysis)
- Excel-based addendum to Chapter 3: Tier 1 Uncertainty calculation tool

Chapter 4 “Methodological Choice and Identification of Key Categories”

- Updated guidance on Key category analysis, including: Treatment of disaggregation of categories, Simplification of equation on trend assessment (Approach 1)

Volume 1 - General Guidance and Reporting

Chapter 5 “Time series consistency”

- Elaborated guidance on time series consistency, including: Information on how to ensure time series consistency when using facility level data and different data sources
- Linear and non-linear interpolation method
- Examples of surrogate data by sector

Chapter 6 “QA/QC and Verification”

- Comparison of GHG emission estimates with atmospheric measurements: elaboration to reflect the state of science for atmospheric measurements and their application to improving national greenhouse gas inventories
- Verification* refers to the collection of activities and procedures conducted during the planning and development, or after completion of an inventory that can help to establish its reliability. Verification refers specifically to those methods that are external to the inventory and apply independent data, including comparisons with inventory estimates made by other bodies or through alternative methods. It is important to distinguish verification, as defined by the IPCC guidelines, from the term verification used in carbon markets, which is synonymous with an independent audit

All methodological updates are in the fugitive emissions categories. No methodological updates were made for stationary combustion, mobile combustion

Chapter 4. Fugitive Emissions

4.1 Fugitive emissions from mining, processing, storage and transportation of coal - CH₄ and CO₂

- Guidance on emissions from exploration and CO₂ emissions (Underground coal mines, Surface coal mining)
- New section on abandoned surface coal mines

4.2 Fugitive emissions from oil and natural gas systems

- Update of EFs. Additional guidance for unconventional oil and gas production and abandoned wells

4.3 Fugitive emissions from Fuel transformation [New]

- Methods for fugitive emissions from charcoal production, biochar production, coke production, (including flaring), gasification transformation processes (coal to liquids, and gas to liquids)

Volume 3 - Industrial Processes and Product Use

New categories and new gases
More manufacturing sectors

Chapter 3

Nitric acid production

- Update of N₂O emission factors for various types of technologies used for Nitric Acid production: - single-/duo-low-/medium-/high-pressure plants - with or without abatement

Fluorochemical production

- Improved guidance on GHG emissions from production of fluorinated compounds (other than HFC-23 emissions from HCFC-22 production)

Hydrogen production [New]

- New category for stand-alone facilities which produce only Hydrogen as a main product

Volume 3 - Industrial Processes and Product Use

TABLE 3.3 (UPDATED)
DEFAULT FACTORS FOR NITRIC ACID PRODUCTION

Production Process	N₂O Emission Factor (relating to 100 percent pure acid)
Old (pre-1975) plants* (all processes)	10-19 kg N ₂ O/tonne nitric acid ^a
Single low pressure plants	5 kg N ₂ O/tonne nitric acid ±10%
Single medium pressure plants	8 kg N ₂ O/tonne nitric acid ±20% ^b
Single high pressure plants	9 kg N ₂ O/tonne nitric acid ±40%
Single pressure plants with abatement technology**	2.5 kg N ₂ O/tonne nitric acid ±10% ^b
Dual Pressure (M/H)	9 kg N ₂ O/tonne nitric acid ±30% ^b
Dual Pressure (M/H) with abatement technology	2.5 kg N ₂ O/tonne nitric acid ±20% ^b
Dual Pressure (L/M)	7 kg N ₂ O/tonne nitric acid ±20% ^b
Dual Pressure (L/M) with abatement technology	1.5 kg N ₂ O/tonne nitric acid ±10% ^b
<p>Notes:</p> <p>* Old (pre-1975) plants means that the EF is to be used for the technology that was installed before 1975 and that are still operating.</p> <p>** Applies to all single pressure plants using all levels of N₂O abatement measures (primary, secondary, tertiary and quaternary). These abatement measures include all levels of abatement such as process-integrated abatement technologies, tailgas N₂O destruction and non-selective catalytic reduction (NSCR, a NO_x abatement technology that can also be managed to abate N₂O).</p> <p>Source:</p> <p>^a Based on IPCC, 2000; EC, 2007; and the tests from CDM projects presented in USEPA, 2010.</p> <p>^b Based on information from EC, 2007; EC, 2009; 2017 Annex I Party GHG Inventory Submissions; Joint Implementation projects and Clean Development Mechanism projects availables at the UNFCCC web-site.</p>	

References newly cited in the 2019 Refinement

- European Commission (EC). (2009) Methodology for the free allocation of emission allowances in the EU ETS post 2012 Sector report for the chemical industry, November 2009. Report by: Ecofys, Fraunhofer Institute for Systems and Innovation Research, and Öko-Institut.
- European Commission (EC). (2007) Reference Document on BAT (Best Available Techniques) for the Manufacture of Large Volume Inorganic Chemicals (Ammonia, Acids and Fertilizers)", August 2007
- European Fertilizer Manufacturers' Association (EFMA). (2000) Best Available Techniques (BAT) for Pollution Prevention and Control in the European Fertilizer Industry, Booklet No. 2 of 8: Production of Nitric Acid, Brussels, Belgium.

Volume 3 - Industrial Processes and Product Use

Chapter 4

Iron and Steel

Clarified guidance on demarcation between Energy and IPPU – all emissions from Coke Production emissions are in Energy

Primary aluminium production - PFCs (CF₄ and C₂F₆)

Taken into account a new phenomena on the low-voltage anode effects (LVAE) added to previously known the high-voltage anode effect (HVAE)

Alumina production [New]

Estimation through the Bayer-Sinter and Nepheline processes

Rare Earths elements [New]

Rare Earths Production is an electrolytic process similar to Aluminium Production

Chapter 6

Electronics Industry

New guidance on Tier 2 methods to account for technological changes, new guidance for the sub-sector microelectrical mechanical systems (MEMS)

Volume 3 - Industrial Processes and Product Use

Chapter 7

Refrigeration and air conditioning

Updated information regarding emission factors for refrigerants (HFCs)

An example MS Excel worksheet was produced to facilitate estimations for Tier 2

Chapter 8

Use of SF₆ and PFCs in Textile Industry and for Water-proofing of electronic circuit boards [New]

Other Product Manufacture and Use Water-proofing of electronic circuit boards

Fluorinated compounds are used to waterproof electronic circuits (by gas-phase reaction in a plasma)

Volume 4 - Agriculture, Forestry and Other Land Use

Provision of New Guidance

- Use of Remote Sensing (RS) data (satellite data) and products in assessing changes in land areas and land use changes over time;
- Methods for estimating the influence of inter-annual variability on GHG emissions and removals. A generic approach to report the disaggregated contribution of natural disturbances to the emissions and removals on managed lands is provided, along with country-specific examples
- Development of a new higher method for mineral soils in croplands
- Estimation of emissions/removals for flooded lands;
- Estimation of carbon stock change from biochar amendments to mineral soils;
- Treatment of the relationship between productivity and emissions, focusing on the ability to differentiate between commercial/industrial production systems and local/subsistence systems for livestock categories

Volume 5 - Waste

Refinements are made in the following areas:

- Updated and elaborated guidance (e.g., new types of managed solid waste disposal sites; CH₄ and N₂O emissions from gasification and pyrolysis of waste; CH₄ and N₂O emissions from wastewater)
- New guidance (e.g., N₂O emissions from industrial wastewater)
- New and updated default data (e.g., waste generation and composition; parameters of domestic and industrial sludge; CH₄ and N₂O emissions from domestic and industrial wastewater treatment and discharge)

Conclusions

Most important concept

Improvement of transparency in the reporting process

Quality of the data

The best pathway towards implementing the 2019 Refinement has to be defined by the Governments in the UNFCCC negotiations

Thank you