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

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2019 Refinement

Produced as one of the major IPCC products during its AR6 cycle

280 — Prepared by over 280 scientists and experts

47 — Participated by authors from 47 countries

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

2019 Refinement was adopted/accepted by the IPCC at its 49th Session in May 2019 in Kyoto, Japan (Decision IPCC-XLIX-9)

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2019 Refinement

Provides an **updated and sound scientific basis** for supporting the **preparation and continuous improvement** of national greenhouse gas (GHG) inventories

Updates, supplements and **elaborates** the *2006 IPCC Guidelines* where the authors identified gaps or out-of-date science

It should be used **in conjunction with** the *2006 IPCC Guidelines*

Parties may use on a **voluntary basis** (UNFCCC Decision 5/CMA.3)

Coverage and structure

- **Coverage:** The 2019 Refinement ensures that the Guidelines are up-to-date with the latest science.

- **Structure:** Same as that of the *2006 IPCC Guidelines* to make it easier for inventory compilers to use the *2019 Refinement* in conjunction with the *2006 IPCC Guidelines*

  ➢ Overview Chapter

  ➢ Volume 1: General Guidance and Reporting

  ➢ Volume 2: Energy

  ➢ Volume 3: Industrial Processes and Product Use

  ➢ Volume 4: Agriculture, Forestry and Other Land Use

  ➢ Volume 5: Waste

Coverage and structure

- It also contains

  - Annexes including mapping tables

    - The mapping tables in each volume provide a road map for relating sections, equations, tables, figures and boxes in the *2019 Refinement to the 2006 IPCC Guidelines.*

Tables

Table Title	Type of Refinement	2006 IPCC Guidelines Table Number	2019 Refinement Table Number
Generic elements of a measurement programme	U	2.1	2.1
Main parameters that effect emissions and removals	NG	-	2.1a
Potential sources of emission factors	U	2.2	2.2
Standard measurement methods for exhaust gas	U	2.3	2.3
Quality goals for facility data	NG	-	2.4
Potential facility GHG reporting requirements	NG	-	2.5

Figures

Figure Title	Type of Refinement	2006 IPCC Guidelines Figure Number	2019 Refinement Figure Number
Steps in data collection	NG	-	2.0a
Outline of data collection steps and decisions	NG	-	2.0b
Process for including data in the EFDB	U	2.1	2.1
Illustration of how to integrate FRD into national activity dataset	NG	-	2.2
Sample decision tree for integration of FRD	NG	-	2.3

  - Appendices

    - Technical information as basis for future methodological development

  - Excel based tools/examples

Relationship with 2006 IPCC Guidelines

Type	Explanation
Update (U)	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 (NG)	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 (NR)	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 (R)	There were few cases where guidance/sections were removed because they were no longer relevant.

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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 CO_2 equivalent units.

Structured so that any country, regardless of experience or resources, should be able to produce reliable estimates of their emissions and removals.

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Volume 1: General Guidance and Reporting

- **New guidance**: e.g., national GHG inventory arrangements; GHG inventory management tools (e.g., workplans, improvement plans, data management systems etc.); non-linear trend analysis; use of facility data in inventories; use and reporting of models

- **Updated/elaborated guidance**: e.g., approaches to data collection (e.g., development of country-specific EFs); uncertainties (e.g., series of examples are provided); identification of key categories (e.g., simplification of the equation to calculate the trend assessment); time series consistency (e.g., how to deal with time series consistency in some particular cases); QA/QC and verification (e.g., comparison with atmospheric measurements); precursors and indirect emissions (e.g., detailed methodological guidance on treatment of CO_2 inputs to the atmosphere from emissions of carbon-containing compounds)

- IPCC tool for uncertainty analysis Approach 1 (Excel-based)

Volume 2: Energy

- **New guidance**: Fugitive emissions from fuel transformation including solid to solid transformation (charcoal and biochar production; coke production) and gasification transformation (coal to liquids and gas to liquids)

- **Updated/elaborated guidance:** e.g., fugitive emissions from underground and surface mines; fugitive emissions from oil and natural gas systems

- **Updated and new default data**: e.g., abandoned surface and underground mines; figitive emissions from oil and natural gas systems; fuel transformation

- Clarification of terminologies used in fugitive emissions from oil and natural gas systems (Annex 4A.3)

Volume 3: Industrial Processes and Product Use

- **New guidance:** e.g., hydrogen production; rare earths production; alumina production; water-proofing of electronic circuit boards

- **Updated/elaborated guidance:** e.g., nitric acid production; fluorochemical production; iron & steel production; aluminium production; electronic industry emissions; refrigeration and air conditioning

- **Updated and new default data:** e.g., nitric acid production; iron and steel production; alumina production; rare earths production

- Excel-based Tier 2 calculation example for refrigeration and air conditioning

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Volume 4: Agriculture, Forestry and Other Land Use

- **New guidance:** e.g., Tier 2 estimation of carbon (C) stock change of mineral soils associated with biochar amendments; disaggregation of GHG emissions and removals associated with natural disturbances causing inter-annual variability (optional approach); Tier 2 steady-state method for cropland mineral soil organic C stock change; CH_4 emissions from *Flooded Land*; approach to developing indicative estimates of anthropogenic component of total emissions from *Flooded Land* (optional approach)

- **Updated/elaborated guidance:** e.g., land representation; application of Tier 3 models; clarification on the approaches for HWP

- **Updated and new default data:** e.g., CH_4 emissions from *Flooded Land;* disaggregated (high and low productivity systems) EFs for enteric fermentation; direct and indirect N_2O emissions from managed soils; baseline EFs for CH_4 emissions from rice cultivation stratified by region

- Excel-based tools: Tier 2 steady-state soil carbon method spreadsheet; MCF calculations example spreadsheet for manure management

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Volume 5: Waste

- **New guidance:** N_2O emissions from industrial wastewater

- **Updated/elaborated guidance:** e.g., solid waste disposal (choice of EFs and parameters); incineration and open burning of waste (thermal technologies: pyrolysis, gasification and plasma); emissions from wastewater treatment and discharge

- **Updated and new default data:** e.g., waste generation and composition data; MCF for solid waste disposal sites, EFs for gasification and pyrolysis of waste, parameters of domestic and industrial sludge; EFs for domestic and industrial wastewater treatment and discharge

- Updated IPCC Waste Model for estimation of CH_4 emissions from solid waste disposal sites (Excel-based)

Thank you

https://www.ipcc-nggip.iges.or.jp/index.html

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