



# 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories

UN Climate Change Conference

5 December 2019

Madrid, Spain

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ipcc

INTERGOVERNMENTAL PANEL ON climate change



# National GHG inventories scope

# GHG emissions/removals occur from a variety of sources/sinks



# What are national GHG Inventories?

- Anthropogenic GHG Emissions and Removals
- National, Annual, Time series of estimates

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO <sub>2</sub> <sup>(1)</sup>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Unspecified mix of HFCs and PFCs	NF <sub>3</sub>	Total
	CO <sub>2</sub> equivalent (kt)								
<b>Total (net emissions)<sup>(1)</sup></b>	1245764.48	36099.86	22667.43	31776.63	3280.06	2165.76		1360.96	1343115.17
<b>1. Energy</b>	1250301.61	2484.74	6712.35						1259498.70
A. Fuel combustion (sectoral approach)	1249822.05	1667.77	6712.26						1258202.08
1. Energy industries	566643.99	293.16	2631.43						569568.59
2. Manufacturing industries and construction	338129.90	493.13	1854.26						340477.29
3. Transport	215803.65	169.55	1974.04						217947.24
4. Other sectors	129244.52	711.93	252.52						130208.96
5. Other	NO	NO	NO						NO
B. Fugitive emissions from fuels	479.56	816.97	0.09						1296.62
1. Solid fuels	0.49	533.12	NO,NE						533.61
2. Oil and natural gas	479.07	283.85	0.09						763.01
C. CO <sub>2</sub> transport and storage	NE,NO								NE,NO
<b>2. Industrial processes and product use</b>	46551.39	46.38	1748.15	31776.63	3280.06	2165.76		1360.96	86929.33
A. Mineral industry	35111.89								35111.89
B. Chemical industry	4757.48	28.13	1389.13	147.44	110.80	92.80		1229.80	7755.57
C. Metal industry	6300.60	18.26	NO	1.29	9.59	159.60			6489.34
D. Non-energy products from fuels and solvent use	299.09	NO	NO						299.09
E. Electronic Industry				111.61	1631.36	351.31		131.16	2225.44
F. Product uses as ODS substitutes				31516.29	1517.95				33034.24
G. Other product manufacture and use			359.02		10.36	1562.06			1931.44
H. Other	82.33	NO	NO						82.33
<b>3. Agriculture</b>	531.74	27958.38	11040.64						39530.76
A. Enteric fermentation		7400.57							7400.57
B. Manure management		2411.31	4543.48						6954.79
C. Rice cultivation		18077.30							18077.30
D. Agricultural soils		NO	6475.78						6475.78
E. Prescribed burning of savannas		NO	NO						NO
F. Field burning of agricultural residues		69.20	21.39						90.59
G. Liming	369.97								369.97
H. Urea application	161.77								161.77
I. Other carbon-containing fertilizers	NO								NO
J. Other		NO	NO						NO
<b>4. Land use, land-use change and forestry<sup>(1)</sup></b>	-64926.94	57.79	209.36						-64659.80
A. Forest land	-68162.38	3.99	132.34						-68026.05
B. Cropland	3651.84	51.57	26.13						3729.54

# Why do we need GHG inventory guidelines?

- The world is committed to reducing net GHG emissions to tackle climate change.
- We cannot reduce what we cannot measure. We need to know how many net GHG emissions we are producing and what are the activities producing them.
- The IPCC inventory guidelines enable all countries to estimate level and trends of GHG emissions and removals across the entire territory using agreed methods, taking into account the activities from which those source. This is what GHG inventories do.

# IPCC Inventory Guidelines and UNFCCC

New Supplementary Guidance in 2013



+

Currently, Non Annex I Parties use these under the UNFCCC.

Non-Annex I Parties are encouraged to use GPGs.

GPG2000  
(non-LULUCF)

GPG2003  
(LULUCF)



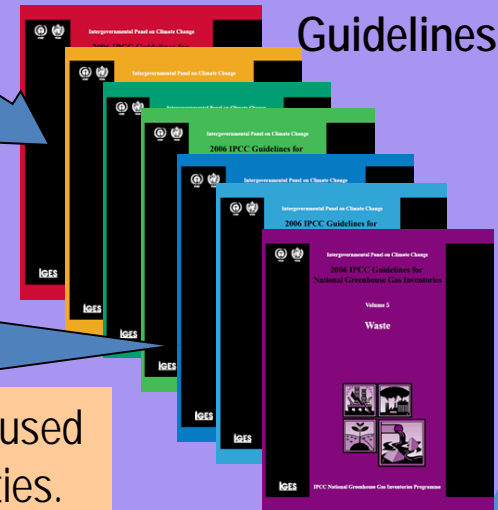
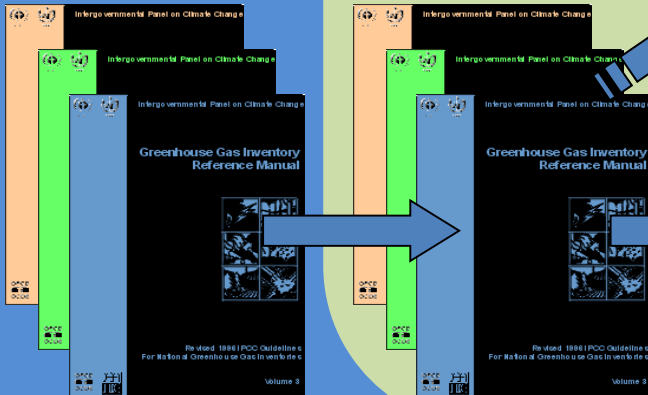
Annex I Parties must use from 2015

All Parties will use under the Paris Agreement

2006 IPCC Guidelines

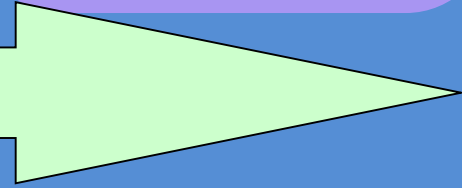
1995 IPCC Guidelines

Revised 1996 IPCC Guidelines



Actually, 2006 Guidelines are being used by more and more Non-Annex I Parties.

Revision/Update by the IPCC





# Paris Agreement and National GHG Inventory

- 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 needs to be enhanced**.
- To that end, it is essential that all the Parties produce and report **high-quality and reliable national GHG inventories** (national emission data).
- Paris Agreement Article 13, 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...



Source: IISD/ENB

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

Provides an updated and sound scientific basis to support *good practices* for the preparation and continuous improvement of national greenhouse gas inventories.



# 2019 Refinement to the 2006 IPCC Guidelines

- 2006 IPCC Guidelines – 13 years ago!!
- The 2006 IPCC Guidelines continue to provide a technically sound methodological basis for preparing national greenhouse gas inventories.
- The 2019 Refinement **updates**, **supplements** and **elaborates** those where the authors identified gaps or out-of-date science.
- The 2019 Refinement is to be used in conjunction with the 2006 IPCC Guidelines.

# IPCC procedures for producing the 2019 Refinement



## Scoping

The outline is drafted and developed by experts nominated by governments and observer organizations



## Approval of Outline

The Panel then approves the outline



## Nomination of authors

Governments and observer organizations nominate experts as authors

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



## Final draft report and SPM

Authors prepare final drafts of the report and SPM which are sent to governments



## Government review of final draft SPM

Governments review the final draft SPM in preparation for its approval



## Approval & acceptance of report

Working Group/Panel approves SPMs and accepts reports



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Peer reviewed and internationally available scientific technical and socio-economic literature, manuscripts made available for IPCC review and selected non-peer reviewed literature produced by other relevant institutions including industry



## Publication of report



# 2019 Refinement to the 2006 IPCC Guidelines

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

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

# Structure of 2019 Refinement

- The same structure as that of the *2006 IPCC Guidelines* so as to make it easier for inventory compilers to use the *2019 Refinement* with the *2006 IPCC Guidelines*.
- Comprising an Overview Chapter and five volumes:
  - Vol.1: General Guidance and Reporting (GGR)
  - Vol.2: Energy
  - Vol.3: Industrial Processes and Product Use (IPPU)
  - Vol.4: Agriculture, Forestry and Other Land Use (AFOLU)
  - Vol.5: Waste
- Glossary is also included.

# General features

## Emissions factors and other parameters updated because

- refined estimates (*more and better data available to calculate averages*)
- technological/environmental changes

## Clarification of guidance through

- Additional examples
- Clearer reasoning
- Additional information on good practice
- Additional excel-based tools

# General Guidance

## New guidance on

- Implementation of a national inventory management system  
*(institutional arrangements structuring, roles and capabilities of actors and stakeholders, data flows and suggested contents of Data Supply Agreements, work plans, improvement plans, data management systems, quality system)*
- Development of country specific emission factors
- Integration into NGHGI of emissions reported from facilities
- Non-linear interpolation
- Use and reporting of models



# General Guidance

## Updated guidance on

- Data Collection
- Comparison with atmospheric measurements
- Indirect CO<sub>2</sub> inputs to the atmosphere

## Clarification on

- uncertainty calculation (*uncertainty in the mean vs in the individual; Stepwise use of Monte-Carlo analysis; Tier 1 Uncertainty calculation tool*)
- key category analysis

# Energy

## Additional guidance on

- Fugitive CO<sub>2</sub> emissions from underground and surface mines
- Fugitive emissions from oil and natural gas systems including unconventional oil and gas

## New guidance on

- Fugitive emissions from fuel transformation (*charcoal and biochar production, coke production and gasification transformation processes - coal to liquids and gas to liquids*)

# Industrial Processes and Product Use

## **New guidance on**

- Production of: Hydrogen, Rare Earth Metals, Alumina
- Water-proofing of electronic circuit boards

## **Updated guidance on**

- Production of: Nitric acid, Fluorochemical, Iron & Steel, Aluminium
- Electronic industry
- Refrigeration and air conditioning

Worksheet for Tier 2 calculation: refrigerants *(MS Excel)*

# Agriculture, Forestry and Other Land Use

## New guidance on

- Disaggregation of Natural Disturbances causing inter-annual variability
- Tier 3 models (*multiple variable inference across space and time*)
- SOC Tier 2 method for agricultural mineral soils
- Biochar application to soils
- Flooded land ( $CO_2$ ,  $CH_4$ )
- Enteric fermentation of goats
- $N_{\text{intake}}$ ,  $N_{\text{retention}}$  and  $N_{\text{ex}}$  for swine and poultry
- Biomass maps and Allometry
- Calculation of MCF (*MS Excel*)

## Updated guidance on

- Enteric fermentation Tier 2 (*DMI for cattle*)
- HWP

# Waste

## Updated guidance on

- New types of managed solid waste disposal sites
- CH<sub>4</sub> and N<sub>2</sub>O emissions from gasification and pyrolysis of waste
- CH<sub>4</sub> and N<sub>2</sub>O emissions from wastewater

## New guidance on

- N<sub>2</sub>O emissions from industrial wastewater

# 2019 Refinement and Paris Agreement

- “Katowice Climate Package” was adopted by the UNFCCC COP24/CMA1 in December 2018 to operationalize the Paris Agreement. It stipulates:
  - Each Party shall use the *2006 IPCC Guidelines*, and shall use *any subsequent version or refinement of the IPCC guidelines* agreed upon by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA).



Source: IISD/ENB

The 2019 Refinement is nothing but this “subsequent version or refinement of the IPCC Guidelines”!!





Home IPCC

**IPCC-TFI Home**

Organization

Publications

Emission Factor Database (EFDB)

Inventory Software

Meetings

FAQs

Links

Electronic Discussion Group (EDG)



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IPCC honoured with the  
2007 Nobel Peace Prize

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988. Its main objective was to assess scientific, technical and socio-economic information relevant to the understanding of human induced climate change, potential impacts of climate change and options for mitigation and adaptation. The IPCC has completed four assessment reports, developed methodology guidelines for national greenhouse gas inventories, special reports and technical papers. For more information on the IPCC, its activities and publications, please see the [IPCC homepage](#).

The IPCC National Greenhouse Gas Inventories Programme was managed from 1991 by the IPCC WG I in close collaboration with the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) until its transfer to the IPCC's Task Force on National Greenhouse Gas Inventories (TFI) based in Japan in 1999.

[ [More](#) ]

## 2019 Refinement **New!**

"[2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories](#)" is available.

## Publications



- [2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories](#)
- [2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands](#)
- [2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol](#)
- [2006 IPCC Guidelines for National Greenhouse Gas Inventories](#)
- [Good Practice Guidance for Land Use, Land-Use Change and Forestry](#)

# Thank you!

For the 2019 Refinement, please visit:

<http://www.ipcc-nggip.iges.or.jp/>