Task Force on National Greenhouse Gas Inventories

Introduction to 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Expert Meeting: Application of 2006 IPCC Guidelines to Other Areas

1-3 July 2014

Sofia, Bulgaria

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Technical Support Unit, IPCC TFI

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Evolution of the IPCC Guidelines for National Greenhouse Gas (GHG) Inventories

Currently, all the Parties use these under the UNFCCC and the Kyoto Protocol.

Annex I Parties must use from 2015

Annex I Parties shall use GPG. Non-Annex I Parties are encouraged to use GPG.

GPG2000 (non-LULUCF)

GPG2003 (LULUCF)

2006 IPCC Guidelines

1995 IPCC Guidelines

Revised 1996 IPCC Guidelines
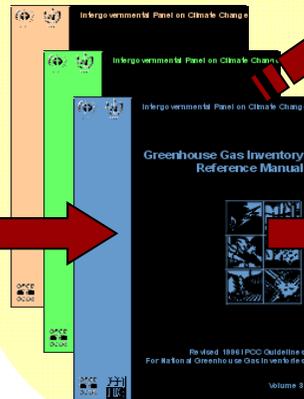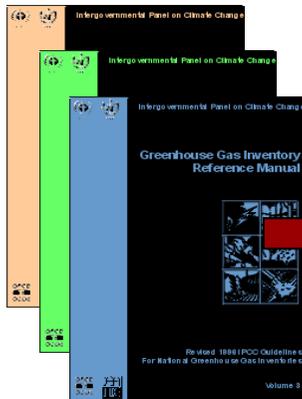
Revision/Update by the IPCC

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Basic Method

$$E = EF \cdot AD$$

Where:

E   = Emission or removals

EF = Emission Factor (a coefficient that quantifies the emissions or removals of a gas per unit activity)

AD = Activity Data (data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time)

Three Methodological Tiers

Tier 3: **Higher order methods**

Detailed modeling and/or inventory measurement systems

Data at a greater resolution

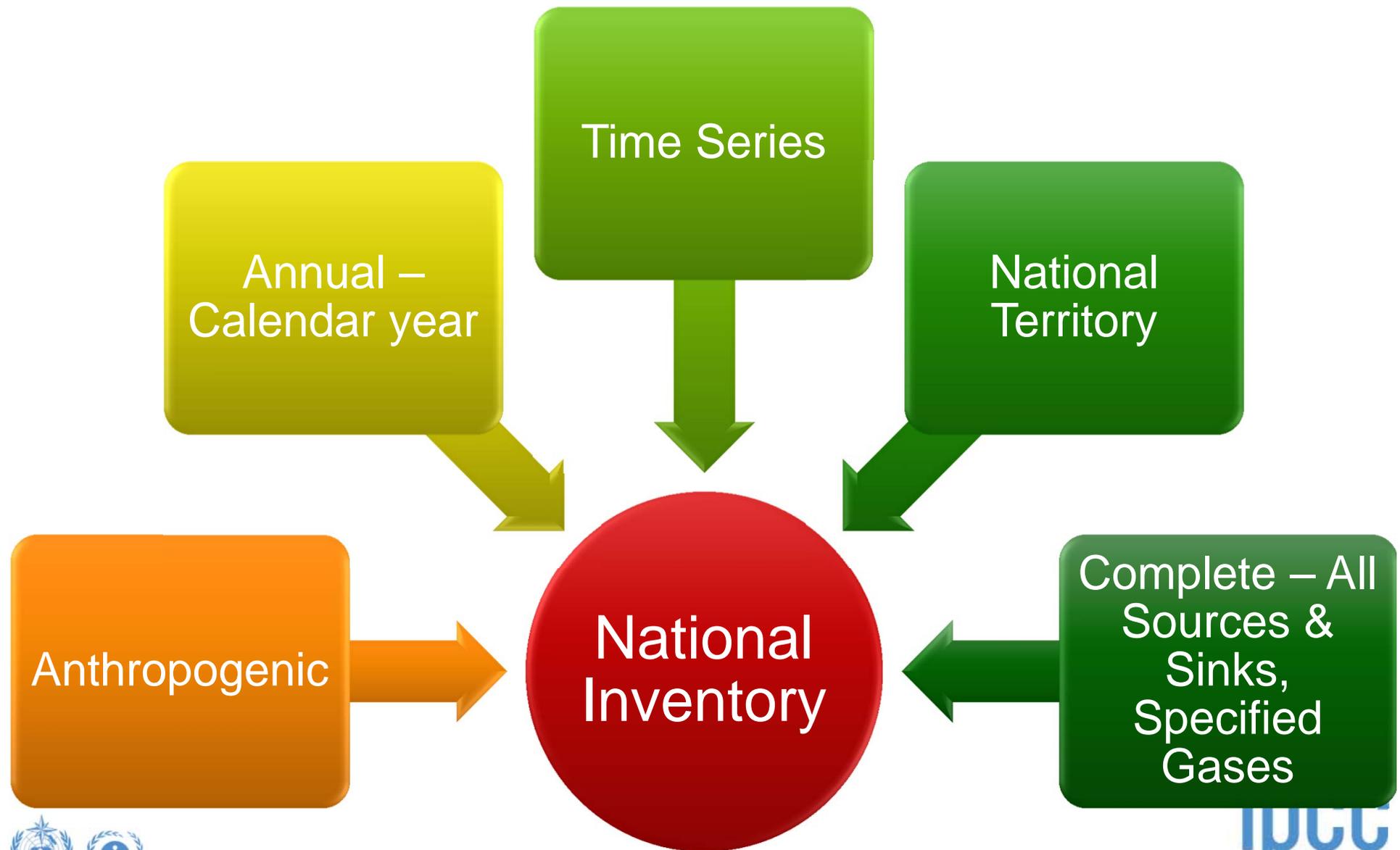**Tier 2**: **A more accurate approach**

Based on Tier 1 with country or region-specific values for the general defaults, greater stratification

More disaggregated activity data

Tier 1 : **Simple first order approach**

Default values of the parameters from the IPCC guidelines

Spatially coarse default data based on globally available data

National GHG Inventories

Main Sources

Carbon Dioxide (CO_2)
- Fuel Combustion
- Deforestation

Methane (CH_4)
- Oil and Gas Leakage
- Livestock

Nitrous Oxide (N_2O)
- Industrial Sources
- Fertiliser Use

Fluorinated gases (HFC, PFC, SF_6)
- Industrial Processes
- Refrigeration and Fire Extinguishers

Major Improvements

- **Four sectors**: *Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU), Waste*
  - In the 2006 IPCC Guidelines source/sink categories have been restructured to reduce possibilities for double counting or omissions
    - ✓ Agriculture + LULUCF → **AFOLU**
    - ✓ Industrial Processes + Solvent Use → **IPPU**
- Have improved methods and default data
  - The "potential emissions" approaches replaced with methods of estimation of actual annual emissions
- Guidance is given on more sources and sinks
  - Cover more greenhouse gases (GHG) and methods
- Integrate *Good Practice Guidance (GPG)*
  - Updated and expanded guidance (e.g. data collection)
- Require similar resources

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Estimation of Actual Annual Emissions

- In the *Revised 1996 Guidelines* and *GPG* for a few sources, the simplest methodology estimates a "potential emission" rather than the actual annual emission

  - This "potential emission" assumes all the emissions from an activity occur in the current year, ignoring the fact they will occur over many years (e.g. methane emissions from waste in landfills occur over decades as the decay processes take place).

- In the *2006 IPCC Guidelines*, simple default methods estimate emissions when they occur, thus removing the need for potential emissions

- The removal of potential emission estimates also allows the emission reductions of abatement techniques to be properly estimated and ensures that the Tier 1 methods are compatible with higher tier methods

New Guidance in 2006 IPCC Guidelines

Fuel Combustion

CO_2 -Transport and Storage

Urea-based Catalysts (Road Transport)

Fugitive Emissions from Fuels

Abandoned Underground Mines

Mineral Industry

Glass Production

Ceramics

Non Metallurgical Magnesia Production

Chemical Industry

Caprolactam, Glyoxal & Glyoxylic Acid

Titanium Dioxide Production

Petrochemical and Carbon Black Production

Metal Industry

Lead Production

Zinc Production

Electronics Industries

Integrated Circuit or Semiconductor

TFT Flat Panel Display

Photovoltaics

Heat Transfer Fluid

Other Product Manufacture and Use

Electrical Equipment

Military Applications

Accelerators

Medical Applications

Propellant for Pressure and Aerosol Products

Substitutes for Ozone Depleting Substances

Land Use

Complete, consistent treatment of fires

Settlements remaining Settlements

Some wetlands categories

Urea Application

Indirect N_2O Emissions from Manure

Harvested Wood Products

Waste

Open Burning of Waste

Biological Treatment of Solid Waste

Other

Indirect N_2O Emissions from the Atmospheric

Deposition of N (excluding agriculture)

"New" gases in 2006 IPCC Guidelines

	All Sectors	Industrial Processes	Electronics Industries	Magnesium production	Halogenated Compounds Production	GWP in AR4
CO_2, CH_4, N_2O	✓	✓				✓
HFC, PFC, SF_6		✓				✓
nitrogen trifluoride (NF_3)			✓		✓	✓
trifluoromethyl sulphur pentafluoride (SF_5CF_3)					✓	✓
halogenated ethers (e.g. $C_4F_9OC_2H_5$, $CHF_2OCF_2OC_2F_4OCHF_2$, $CHF_2OCF_2OCHF_2$)			✓		✓	✓
CF_3I, CH_2Br_2, $CHCl_3$					✓	
CH_2Cl_2, CH_3Cl					✓	✓
$C_3F_7C(O)C_2F_5$				✓	✓	
C_4F_6, C_5F_8, c-C_4F_8O			✓		✓	

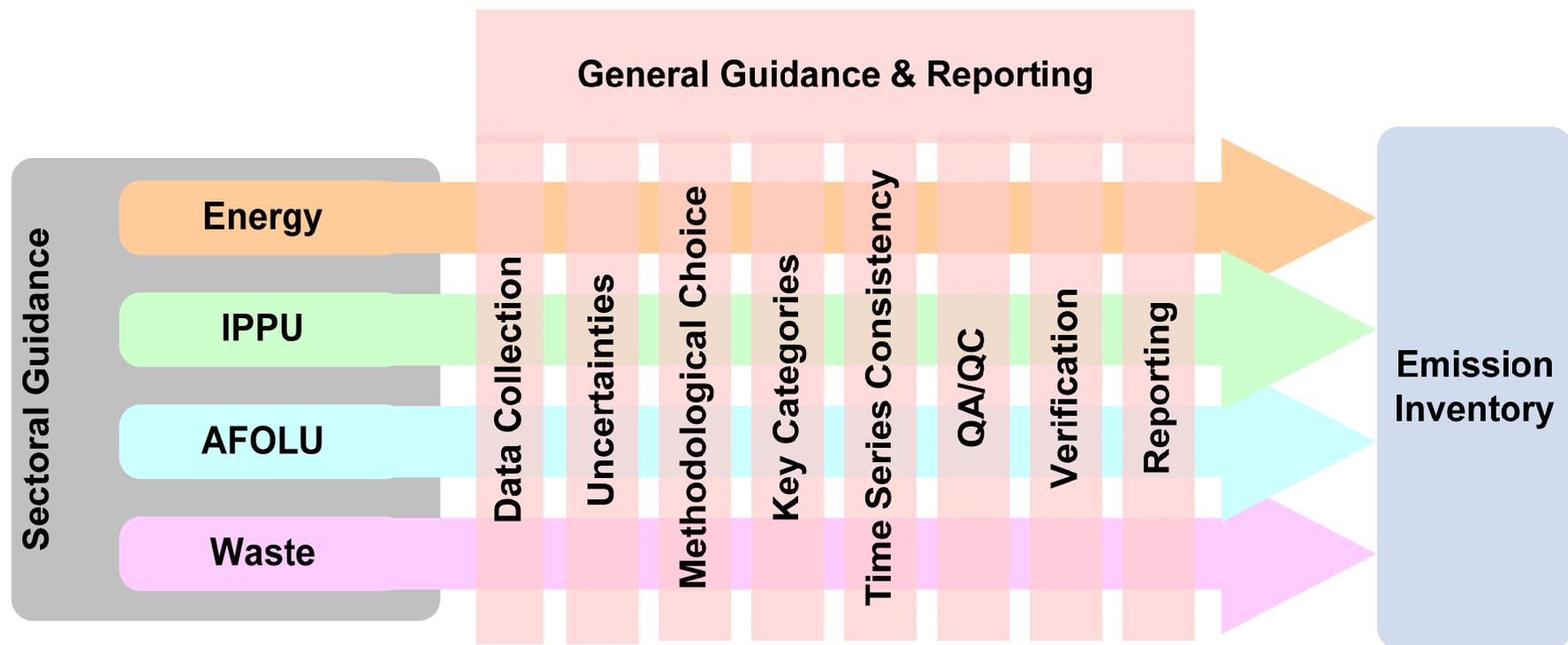"New" gases only from these sub-categories

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Good Practice Guidance

- *Good practice* is a set of procedures intended to ensure that greenhouse inventories are *accurate in the sense that they are systematically* **neither** *over- nor underestimates so far as can be judged, and that uncertainties are reduced so far as is possible*.

- Good practice inventories are *transparent, complete, consistent, comparable and accurate (TCCCA)*

- The IPCC Guidelines provide good practice guidance for developing accurate inventory estimates and NOT conservative estimates (e.g., CDM projects make use of the idea of conservative estimates in many cases)

- Conservativeness is a way of ensuring that when completeness or accuracy of estimates cannot be achieved, emissions or removals should not be underestimated or overestimated respectively, or at least the risk of underestimation/overestimation should be minimized

Good Practice Guidance (GPG) and Methodologies

- The *2006 IPCC Guidelines* refined *good practice* ensuring it is applied uniformly across the entire inventory with sectoral guidance

General Guidance & Reporting

Sectoral Guidance

Energy
IPPU
AFOLU
Waste

Data Collection
Uncertainties
Methodological Choice
Key Categories
Time Series Consistency
QA/QC
Verification
Reporting

Emission Inventory

New Supplements to the 2006 IPCC Guidelines

- The TFI has developed two additional methodology reports in response to the invitations from UNFCCC
    - 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (*Wetlands Supplement*)
        - To fill gaps in the coverage of wetlands and organic soils in the *2006 IPCC Guidelines*
    - 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (*KP Supplement*)
        - To update and augment the existing Chapter 4 of the *GPG- LULUCF*
- The *Wetlands Supplement* and *KP Supplement* were adopted/accepted by the IPCC Plenary at its 37th Session (IPCC 37) in Batumi, Georgia, 14-18 October 2013 and published on 28 February 2014

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

IPCC Inventory Software

- Implements the *2006 IPCC Guidelines*, but it can also be used for reporting under the *Revised 1996 IPCC* Guidelines
  - Countries can use the improved methods and updated default data
  - Output in Non-Annex I National Communications format

- Database based and stand-alone software

- The latest version was released on 28 November 2013

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

- Can be used for the whole inventory or individual categories

- Includes Uncertainty & Key Category Analyses and aids QA/QC

Summary

- The same basic methodological approaches are used from the *Revised 1996 Guidelines*, through *GPG 2000* & *GPG LULUCF* to *2006 IPCC Guidelines*

- The *2006 IPCC Guidelines* maintain, with improvements, the methods of earlier guidelines and integrate *GPG*

- Improved guidance in some areas, more and improved default data

  – Additional sources covered

  – Wider coverage of gases

  – All estimates are now of actual annual emissions

  – Categories simplified and clarified in some areas

Thank you

Guidelines in all UN languages can be downloaded from
http://www.ipcc-nggip.iges.or.jp

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