Introduction to 2006 IPCC Guidelines

Latin American Workshop on National GHG Inventories Systems

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Emission Inventories

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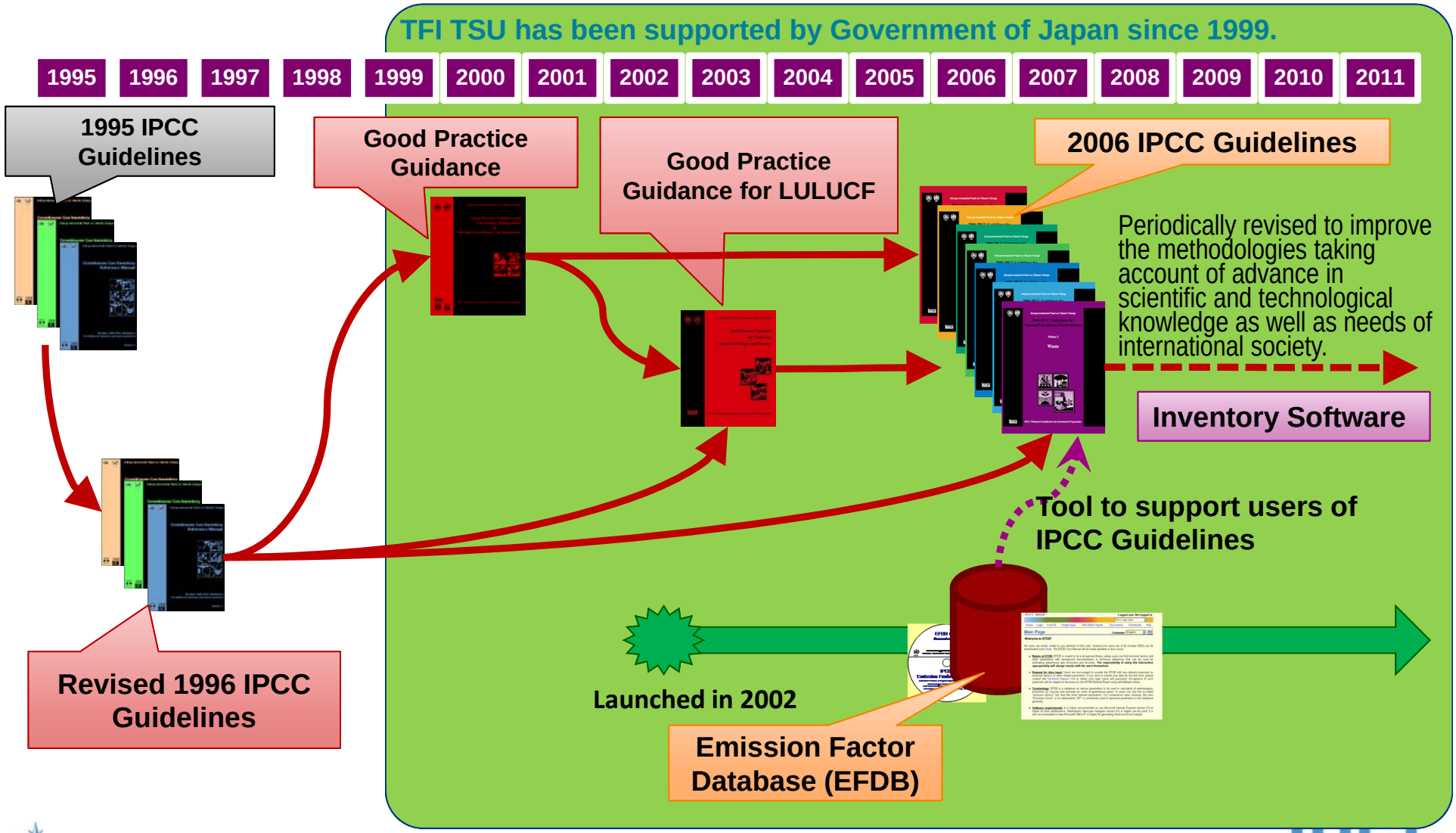
Emission Inventories

- In order to control climate change we need limit emissions of greenhouse gases
  - To control emissions they must be measured
  - Any international agreement to limit or reduce emissions needs an agreed method to measure emissions
- However, national emissions and removals cannot be directly measured.
- Emission Inventories are estimates of national greenhouse gas emissions and removals
  - The TFI produces guidelines on compiling these estimates in a standardised way to ensure consistency and comparability between parties.

Guidelines

- The IPCC Guidelines are intended to be used by all parties to the UNFCCC
  - They provide default data and methods
  - They focus resources where they will do most good
  - They allow the use of more sophisticated methods if countries wish to use them and they are consistent with the guidelines
- Use of the IPCC guidelines in mandatory for annex I parties (developed countries) and recommended for other countries.
- Until now the Revised 1996 Guidelines have been used, for estimates for 2013 onwards the 2006 Guidelines should be used by annex I parties

Evolution of IPCC Guidelines



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2006 IPCC Guidelines for National Greenhouse Gas Inventories

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

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Estimates should be credible

- Estimates need to be credible, as well as consistent and comparable between countries
- The concept of “Good Practice” has been defined in order to
  - reduce uncertainties as far as practical
  - improve the reliability of he results through Quality Assurance and Quality Control
  - ensure consistency and comparability
  - improve credibility through documentation and reporting - transparency

Credibility Requires:

Transparency	• The numbers and their derivation can be clearly understood • Provides credibility that numbers estimated correctly
Completeness	• All sources and sinks within the national territory should be covered
Consistency	• Numbers consistent within inventory over time so time series is good estimate of trend
Comparability	• Different parties use similar methods • Numbers can be compared between countries
Accuracy	• Numbers should be unbiased, not over- or under-estimates • As far as practical with limited resources

National Greenhouse Gas Inventories

The IPCC Guidelines in Practice

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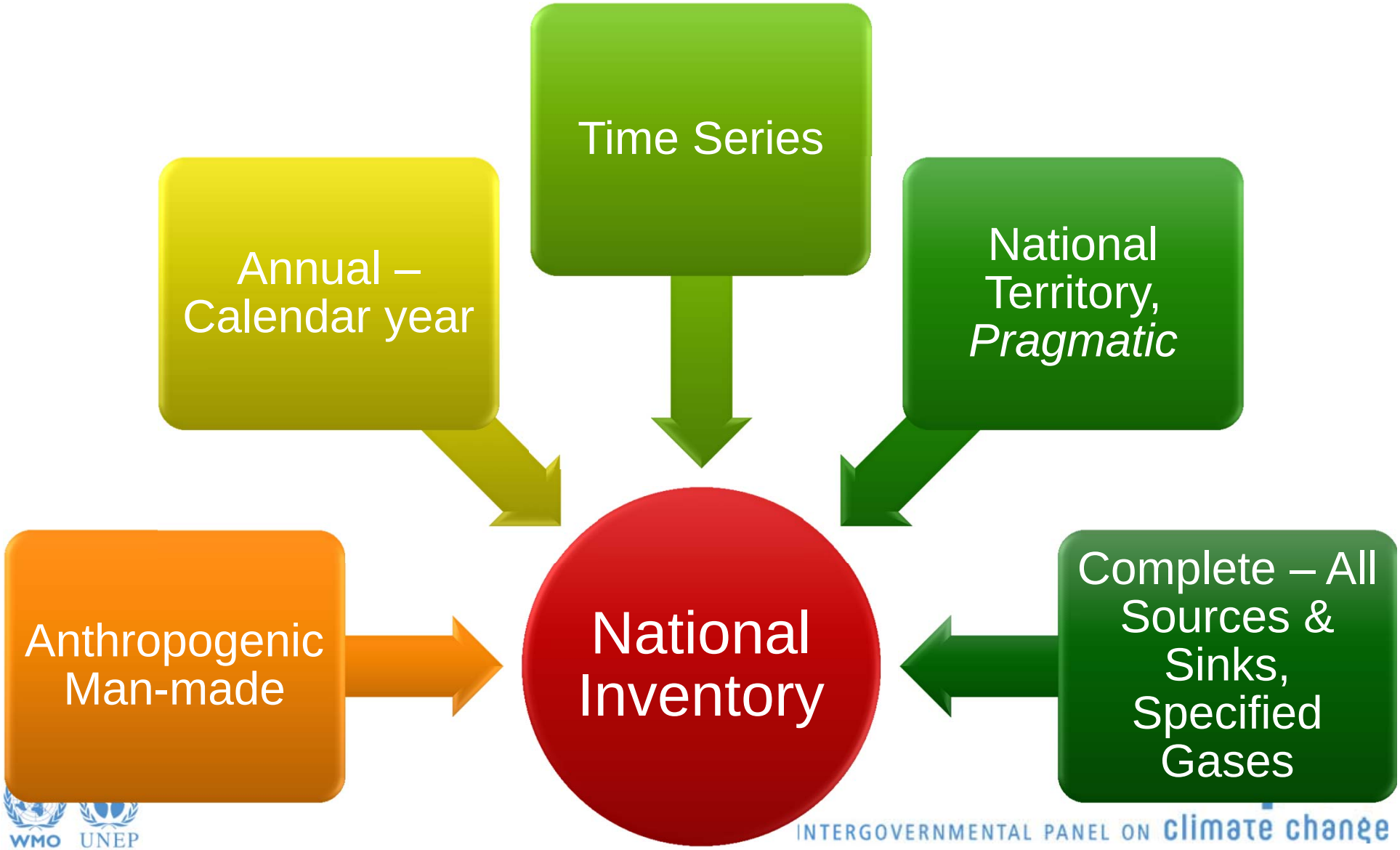
National GHG Inventories



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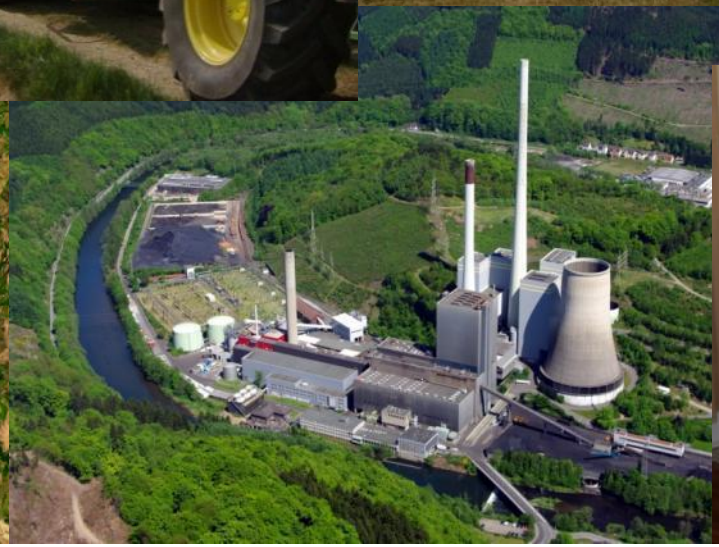
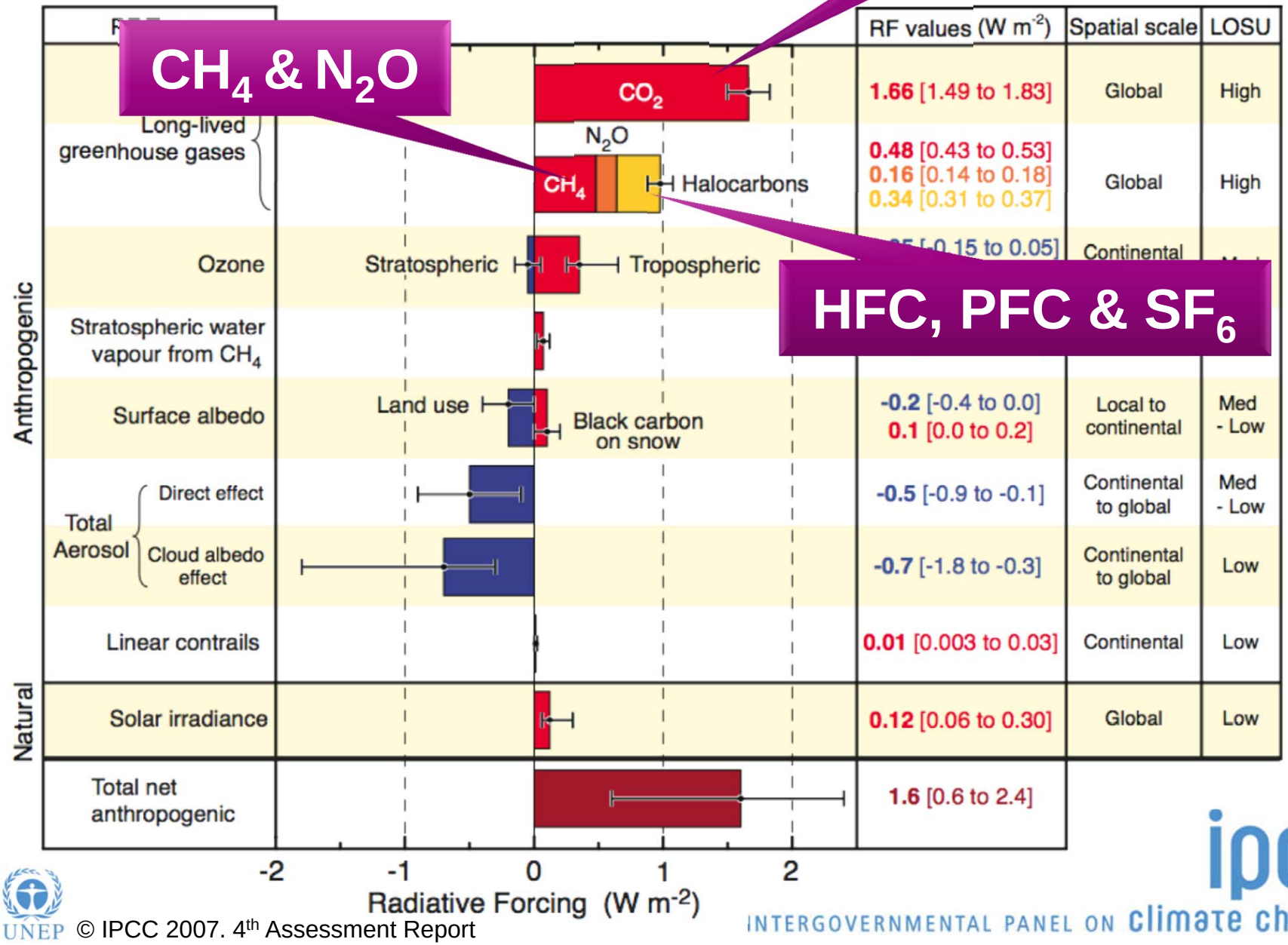


Greenhouse Gases



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"New" gases in 2006 Guidelines
– Sources Identified in 2006 Guidelines

Sources only in IPPU Sector

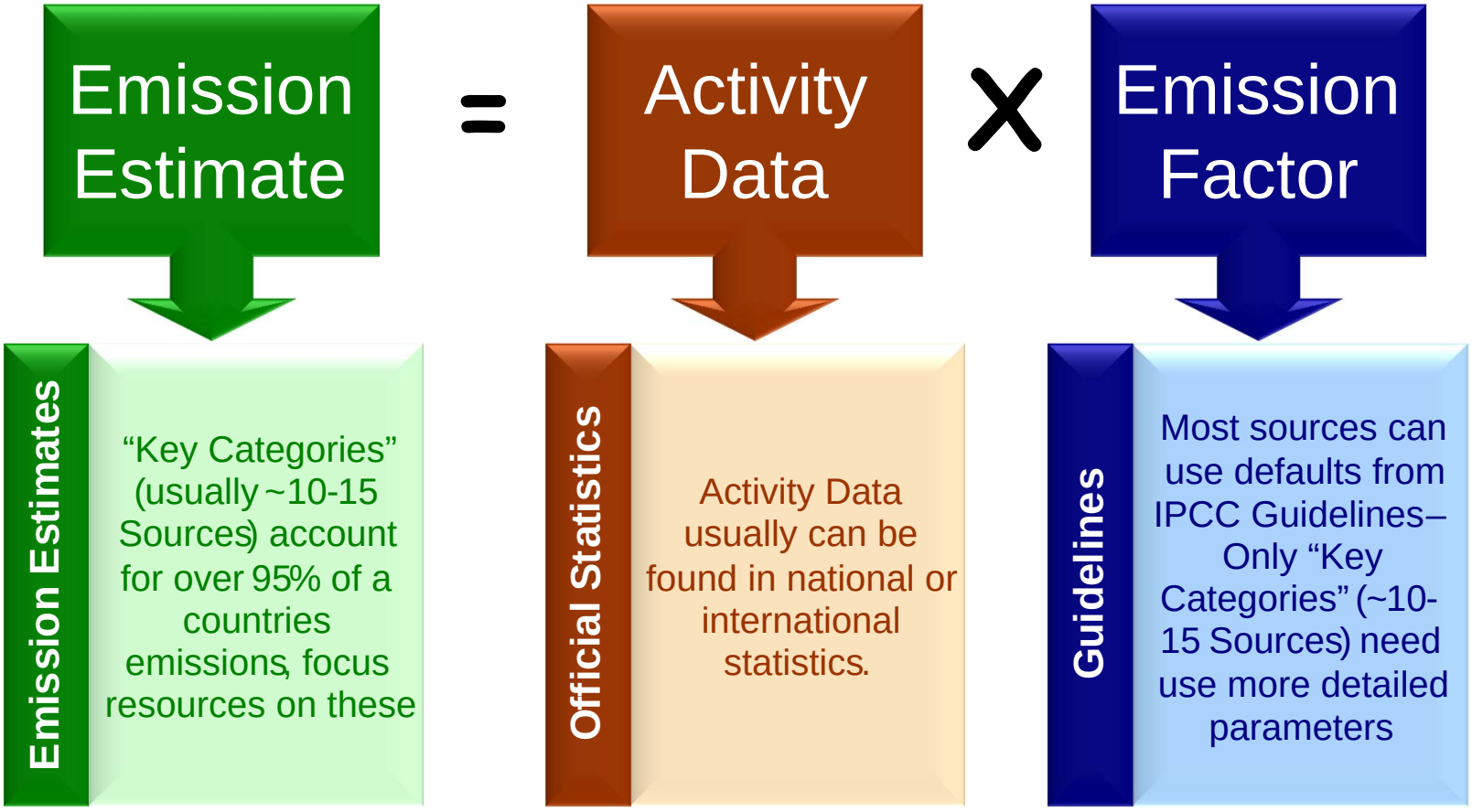
By-product & fugitive emissions

	Electronics Industries	Magnesium production	Halogenated Compounds Production	GWP in TAR	GWP in AR4
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, $CHCl_3$			✓	✓	
C_7F_{16} , CH_2Cl_2, CH_3Cl			✓	✓	✓
$C_3F_7C(O)C_2F_5$		✓	✓		
C_4F_6, C_5F_8, c-C_4F_8O	✓		✓		

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

Basic Method



E.g. Calculating Emissions of CO_2

- Often simple calculations can be used. For example:
  - CO_2 from combustion comes for the carbon in the fuel
  - In efficient combustion nearly all (>>99%) of the carbon in the coal is converted into CO_2.

C emitted as CO_2
Also SO_2, NO_x etc.

Incomplete combustion leads to
CO, PM, CH_4, NMVOC etc.

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Fuel Combustion Example

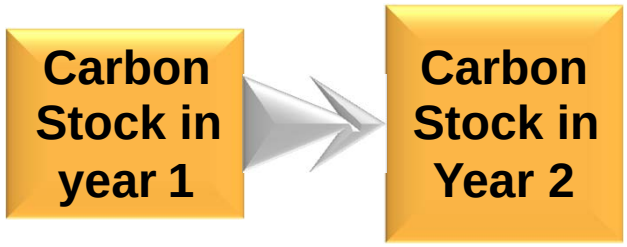
- Emissions from fuel use, E (kTonne).
  - Fuel Burnt (GJ) (= Activity data) , A
  - Emission Factor, EF
    - Amount of carbon in fuel (Gg/GJ), C
    - Fraction carbon oxidised, U
    - $\frac{44}{12}$ Converts Carbon to CO_2 (= 3.667)

$$EF = \left[C \times U \times \frac{44}{12} \right]$$

$$Emission = EF \times A$$

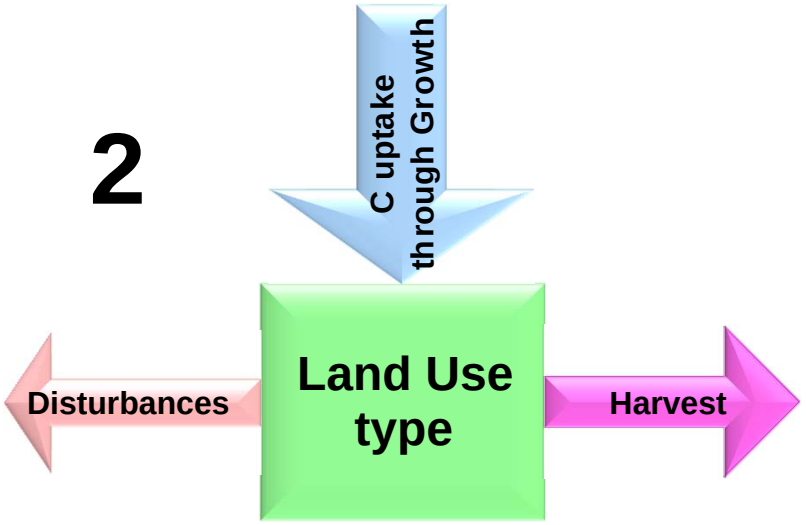
Land Use:
Estimating Carbon Stock Changes

1



Difference between carbon stocks gives emission/removal

2



Emission/removal from sum losses and gains

Approach assumes the emission = total stock changes

IPCC Land Classification

Forest land

- All woody vegetation according to national definitions

Cropland

- Crops including rice and agro-forestry not included above

Grassland

- All rangelands and pastures not included above

Settlements

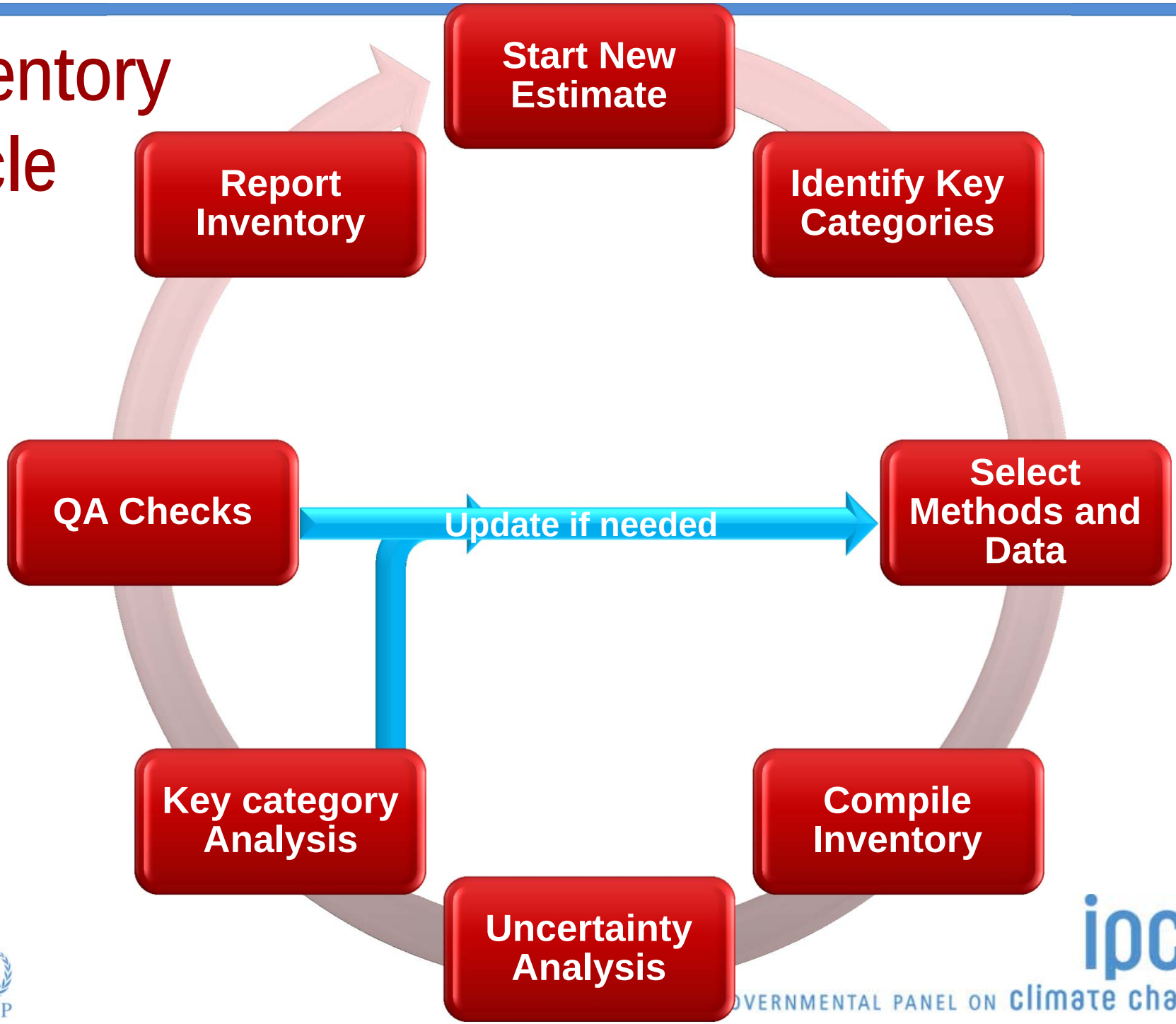
Wetlands

- Wetlands not included above (peat use and flooded lands)

Other Lands

- Includes bare soil, rock, ice and lands not included above

Inventory Cycle



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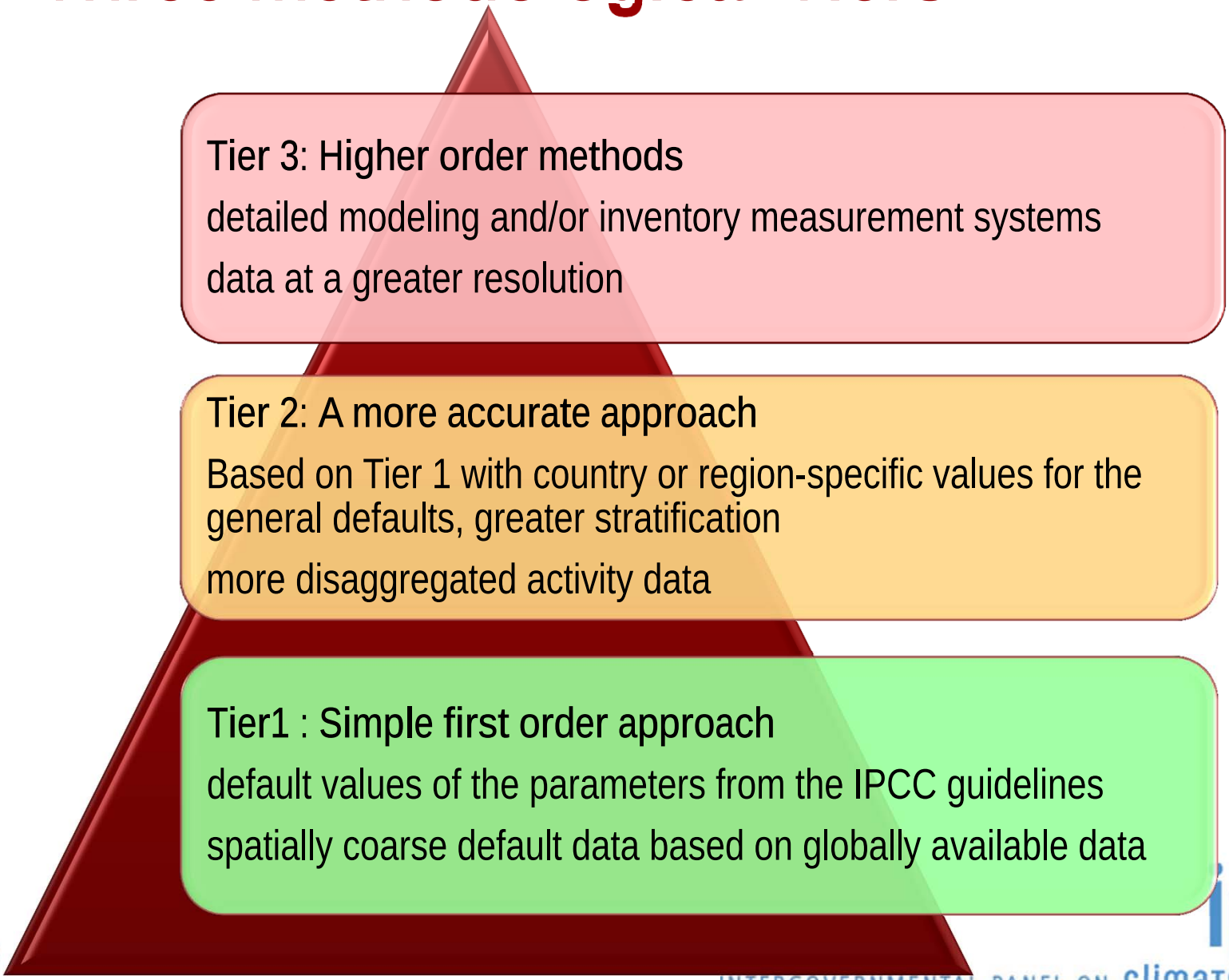
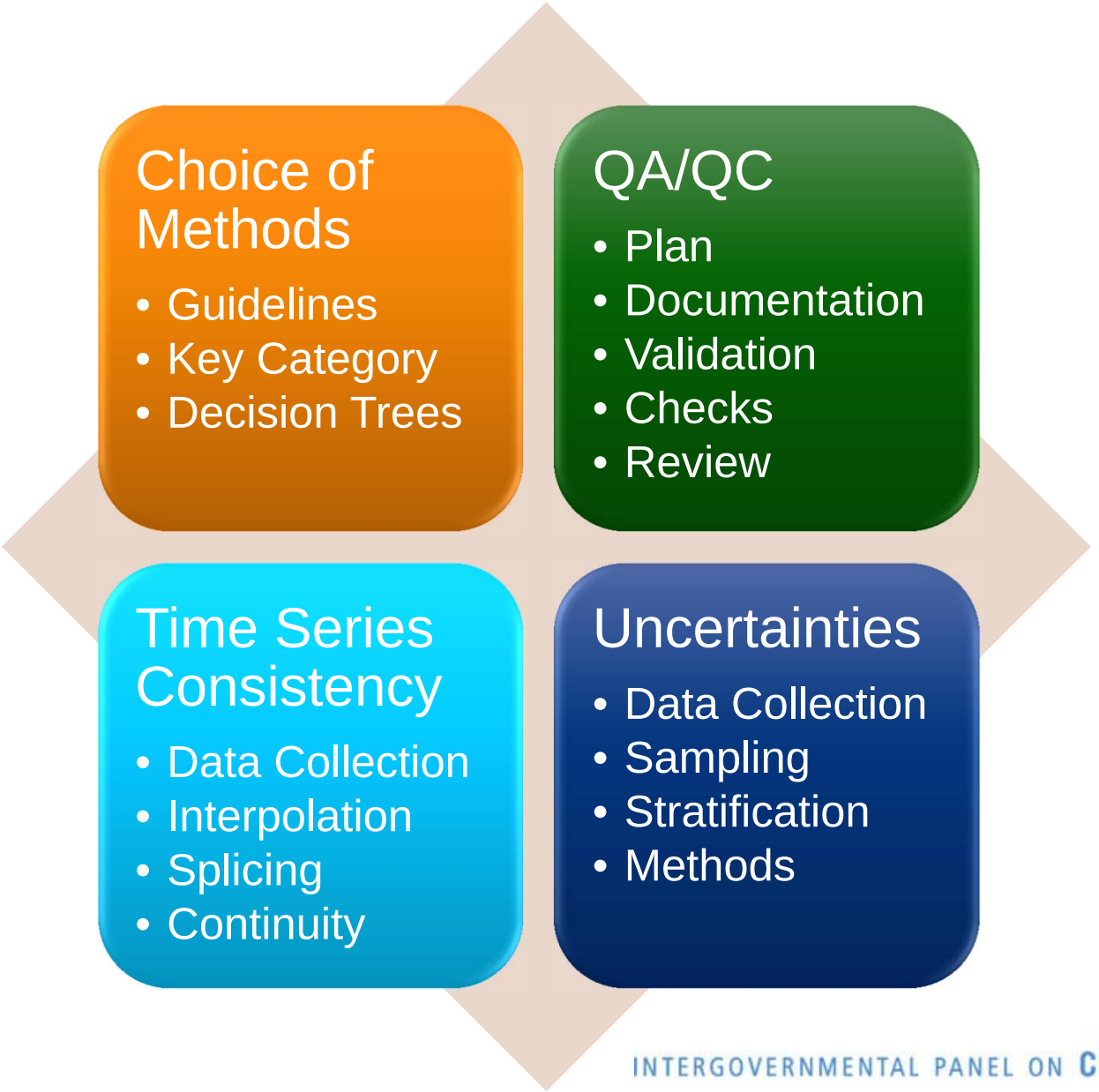
Data Collection – a Key Activity

Collecting Activity Data	• Socio-Economic Statistics • Remote Sensing
Emission Factors	• Small sources use IPCC defaults • Large source need country data
Considerations	• Time Series Consistency • Uncertainty Assessment
Plant Specific Data	• Measurements • Models

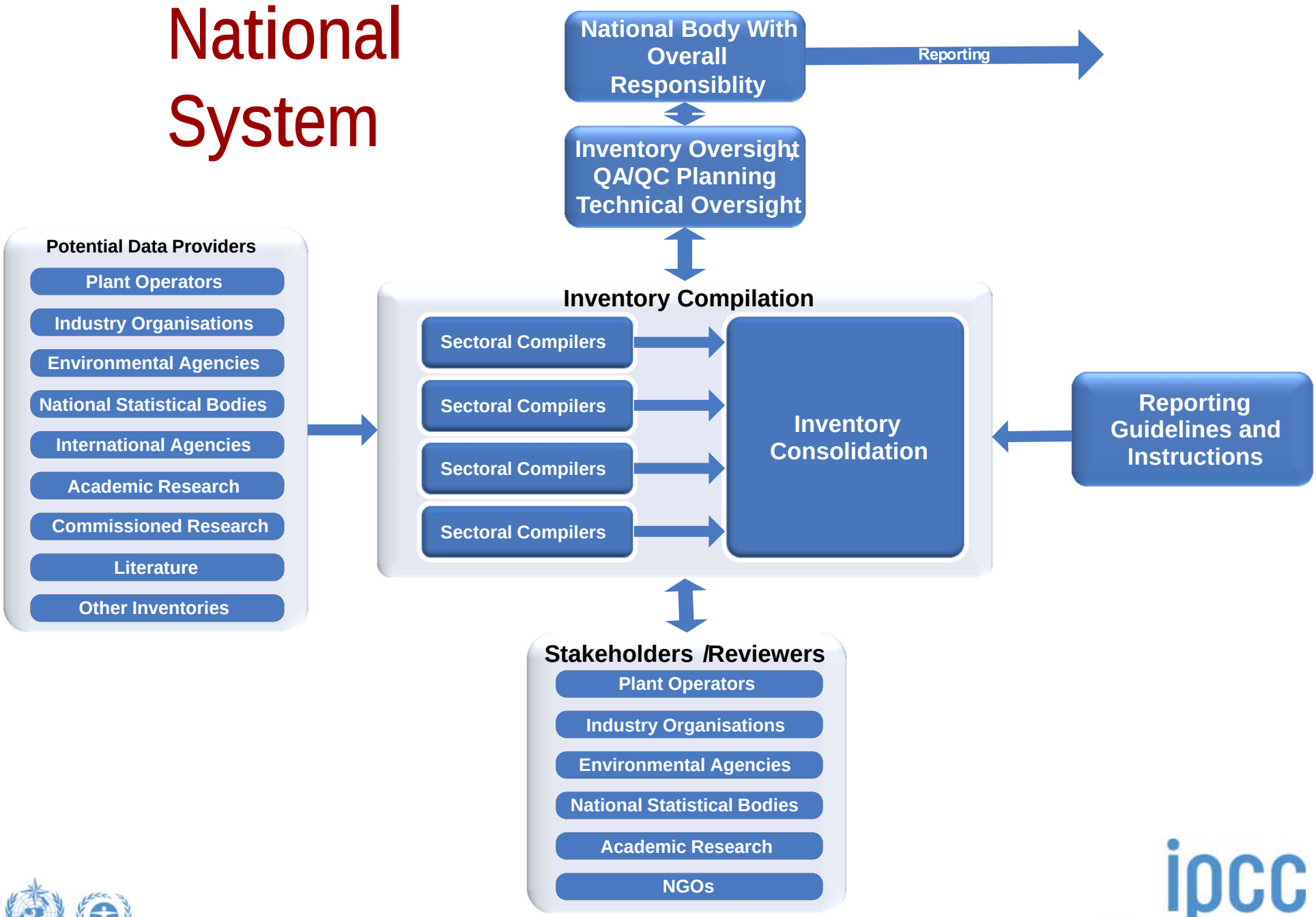
Three methodological Tiers



Good Practice



National System



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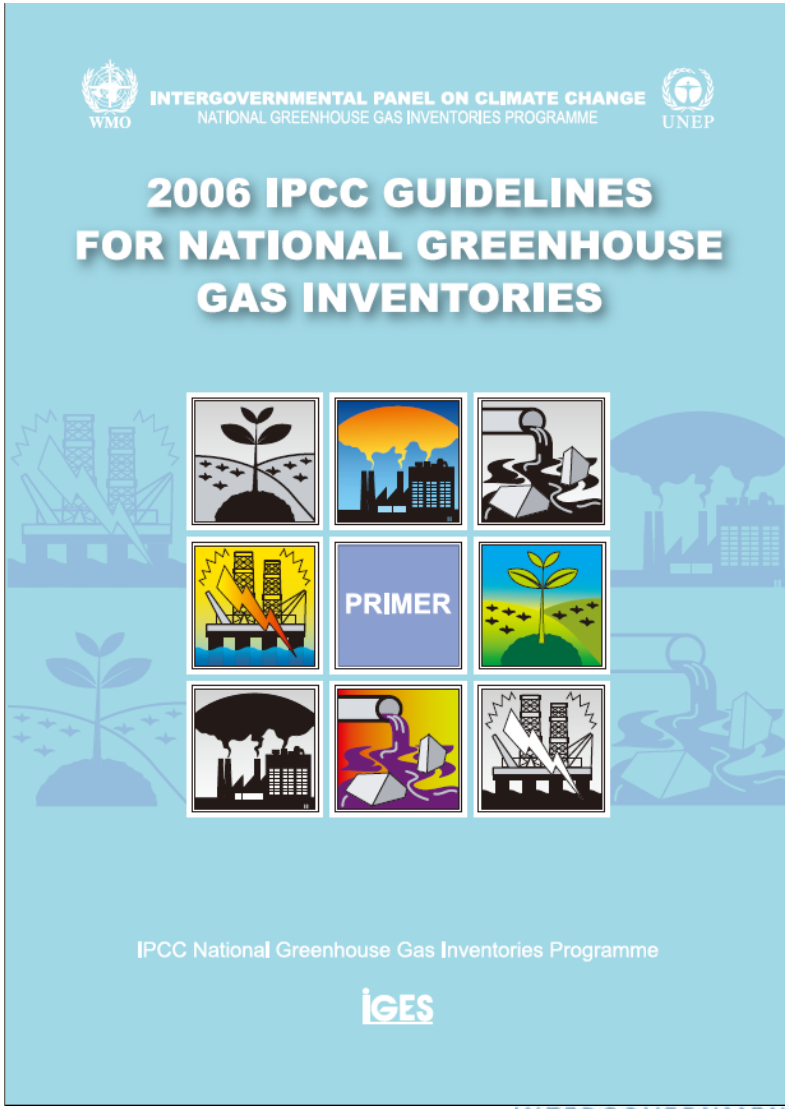
Summary

- International agreements to limit emissions of greenhouse gases need accurate, consistent, comparable and credible estimates
  - Following the IPCC guidelines gives such estimates
- Good Practice Guidance provides transparency and ensures estimates are as accurate and credible as possible
- IPCC Guidelines focus effort on those areas of the inventory that are most significant
- Default methods and data are provided so all countries can use the guidelines, whatever their resources

Primer to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories



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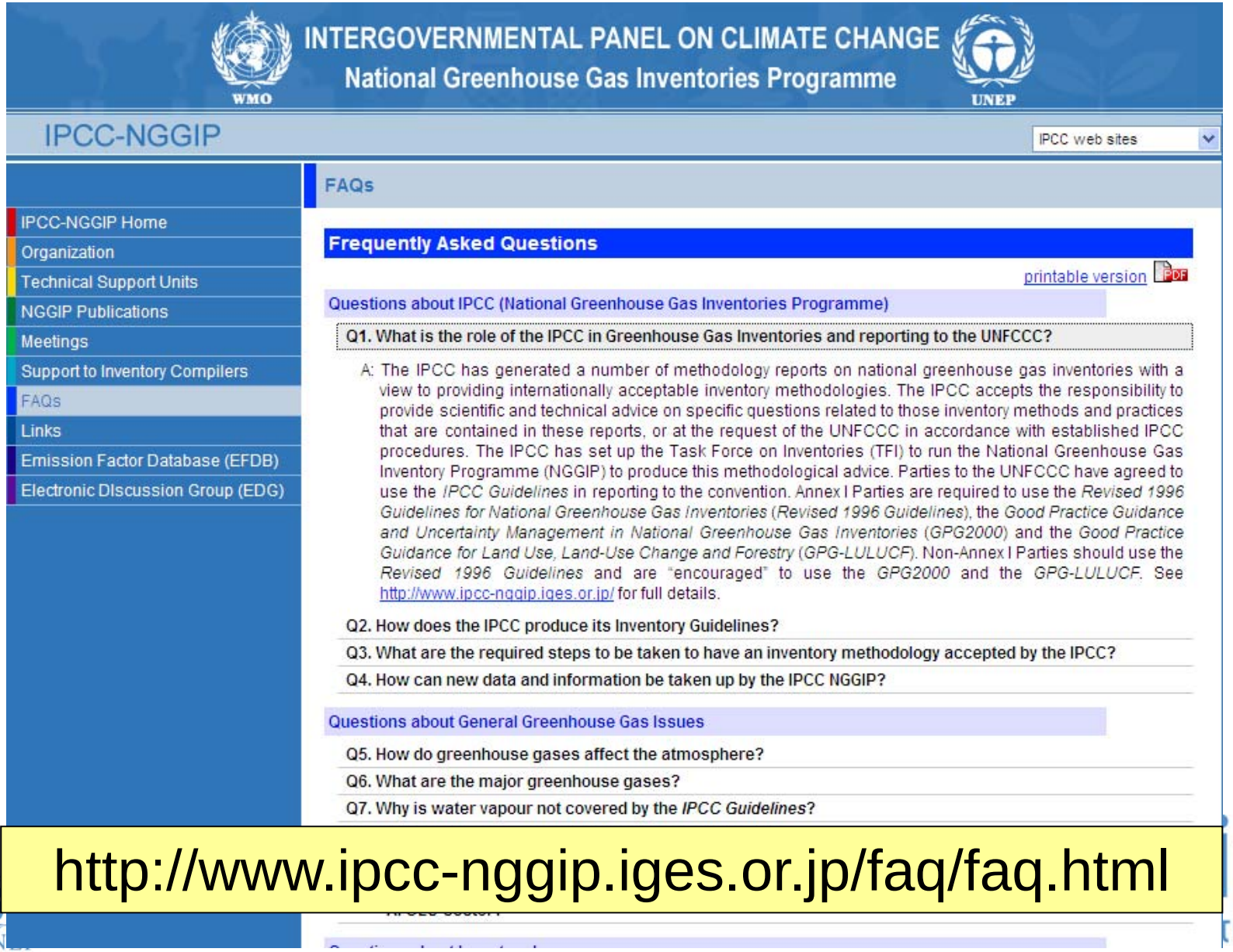
If you have any questions – see FAQs



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

Thank you

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