From science to policy: how can research community contribute to the reporting and verification needs under the Paris Agreement?

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Key issues

- The Paris Agreement has set a new transparency framework **applicable to all**
- The research community will play a key role in the post-2020 UNFCCC framework in **support to developing countries**
- GHG inventories must follow a rigid set of rules established by the UNFCCC and IPCC that countries need to follow
- Full understanding of the set of rules are key for the research community to effectively contribute to the process
- The research and reporting communities should facilitate estimates comparability

Pre-2020 UNFCCC reporting obligations

All Parties:

Common but differentiated responsibilities and respective capabilities

Annex I Parties

-**Commitments:** reduce their GHG emission, provide financial support and technology transfer to developing countries.
-**GHG Inventory (mandatory):** yearly emission from 1990 on the basis of 2006 IPCC Guidelines – Decision 24/CP.19 → every year

Non- Annex I Parties

-**Absence of commitments**
-**Biennial Update Report (BUR)** – Decision 2/CP.17 → every 2 yrs
-**GHG inventory:** based on 1996 IPCC Guidelines (or a never versions) → every 4 yrs

Least developed countries (LDCs) and Small Island Developing States (SIDS)

Can submit their GHG Inventory (GHGI) at their own discretion

Independent annual reviews – Decision 2/CP.17 for UNFCCC and IPCC guidelines and guidance compliance

Differentiated system between developed and developing countries

Paris Agreement transparency framework

All Parties:

Common objective

Each party

Least developed countries (LDCs) and Small Island Developing States (SIDS)

-Nationally Determined Contribution (NDC) – Paris Agreement Art. 3 and 4 → every 5 years from 2020

-Biennial Transparency Report (BTR) according the Modality, Procedures and Guidelines (MPGs) of the Decision 18/CMA.1→ every two years from 2024

Can submit their NDC and BTR on their own discretion

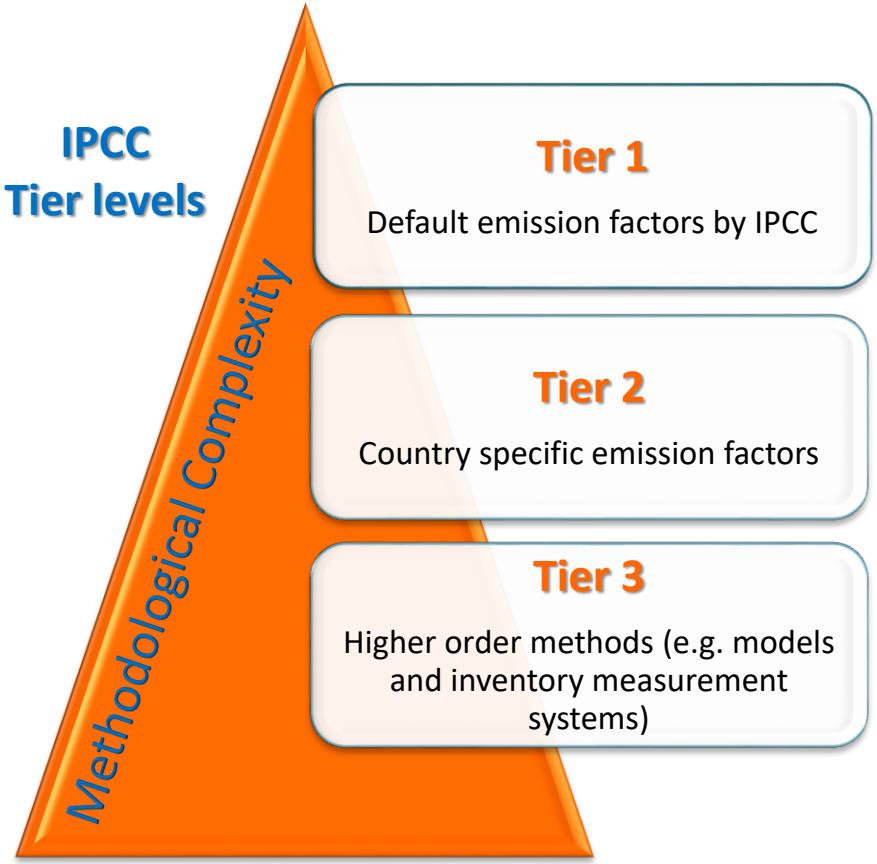
Review process of the BRT

Decision 18/CMA.1 for controlling the consistency of the information reported in the national inventory report and the information necessary to track progress made in implementing and achieving NDC

Enhanced Transparency Framework (ETF)

Common global reporting obligation with some flexibilities

GHG inventories approaches and principles



Scope: anthropogenic emissions and removals

GHG: CO_2; N_2O; CH_4; PFCs; HCFs; SF_6; NF_3

Scale: Country level; annual basis

Sectors:

1. Energy;
2. Industrial Processes and Product Use (IPPU);
3. Agriculture;
4. Land-use, Land-use change and Forestry (LULUCF);
5. Waste/Wastewater

Emissions categories within sectors can be grouped while it is not possible to group between sectors.

IPCC reporting principles (TCCCA)

- *Transparent*: fully documented
- *Complete*: i.e. estimates are reported for all relevant categories of sources and sinks, gases, and relevant geographic areas.
- *Consistent*: throughout time series
- *Comparable*: among national inventories
- *Accurate*: i.e., no over- nor under-estimates

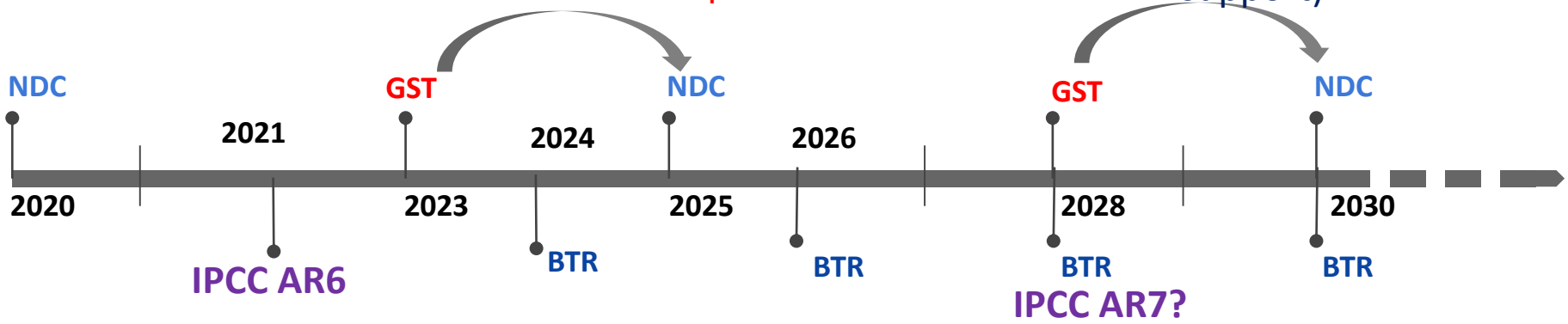
Global Stocktake (GST) process

GST is the main tool for the assessment of the achievement of the global targets of the Paris Agreement

NDC
Focus on Mitigation, Adaptation on voluntary basis (every 5 years)

GST
Assess the collective progress against long term targets (every 5 years) – Mitigation, Adaptation and Means of Implementation

BTR
GHG inventories - Track progress of NDC implementation (mitigation and financial support)



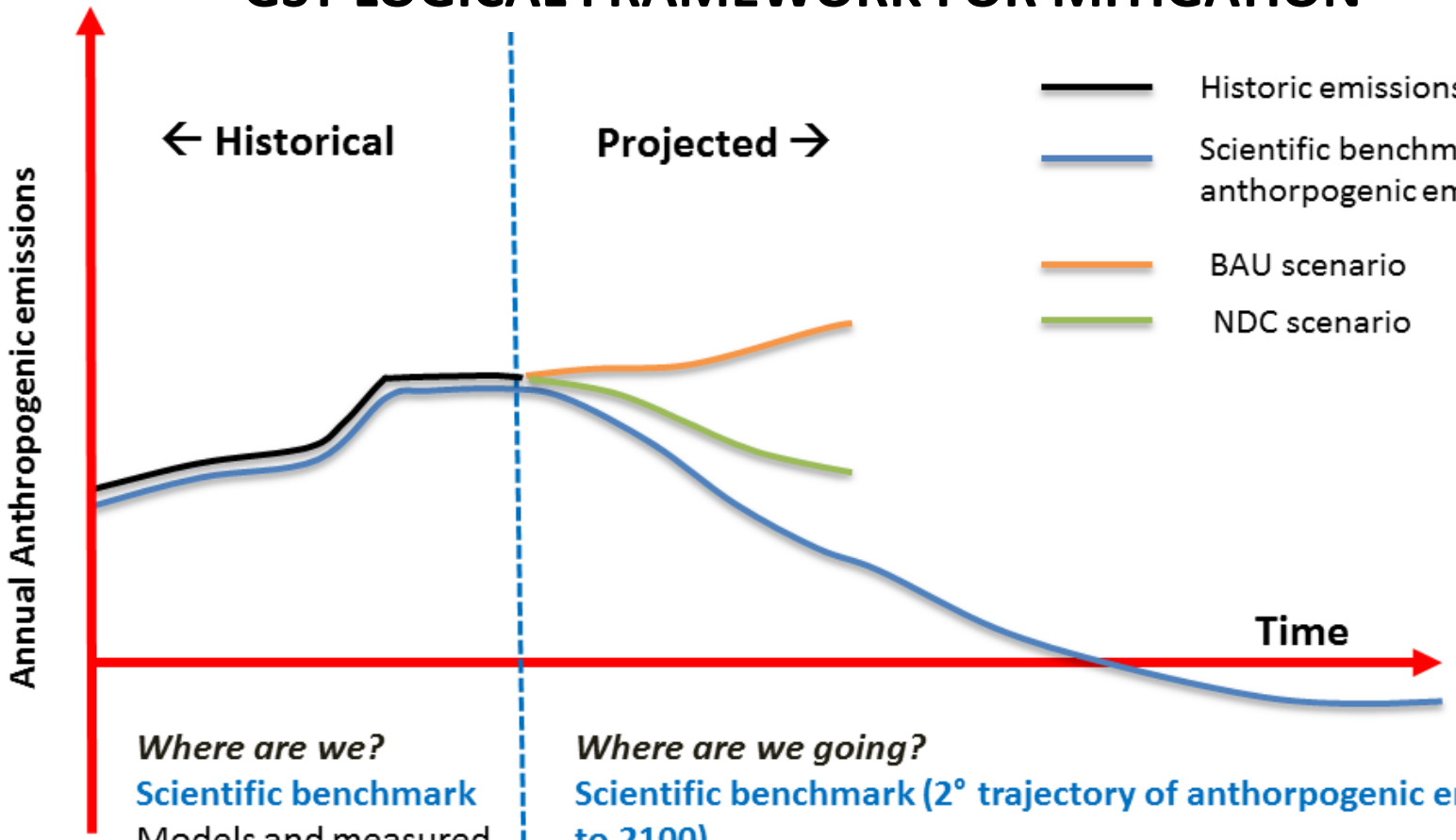
- Two main sources of data of GST:
  - globally aggregated data from the NGHGI reports 13.7(a)) of the PA
  - best available science (art 14.1) such as IPCC.
- This will require comparability between these two data sources!

Global Stocktake (GST) timeline and inputs

Timeline	Inputs	Outputs
Nov 2021 •GST preparation: Guiding questions by SBs Chairs •Secr. starts compiling information for technical assessment	• Reports and communications from Parties (e.g. BTR and GHG Inventories); • Latest reports of the IPCC; • Reports of the subsidiary bodies and relevant constituted bodies and forums and other institutional arrangements under the Paris Agreement and the Convention; • Synthesis reports by the secretariat produced during the first steps of the GST process; • Relevant reports from United Nation agencies and other organizations supportive of the UNFCCC process (e.g. UNEP gap report); • Voluntary submissions from Parties; • Relevant reports from regional groups and institutions; • Submissions from non-Party stakeholders and UNFCCC observer organizations (thus potentially including research institutions)	***Synthesis Reports by the UNFCCC Secretariat (on mitigation, adaptatpion and finance)***
June 2022 • **Info collection and preparation** by SBs (**Phase 1**) • Call for inputs		
Sept 2022 •*Deadline for inputs to be provided*		
Dec 2022 •**Technical assessment** (**Phase 2**)→ Technical dialog		***Summary report and overarching factual synthesis***
June 2023 •*Cut off date for any further info collection*		
Nov 2023 • **Consideration of Outputs by Parties** (**Phase 3**) • High level events • Identification of opportunities and challenges	• Summary report of Phase 2	***Summary of key political messages***

Source: UNFCCC Decision 19/CMA.1

GST LOGICAL FRAMEWORK FOR MITIGATION



Where are we?

Scientific benchmark

Models and measured data

Country data: reports and communications from Parties (including Biennial Transparency Reports and GHG Inventories)

Where are we going?

Scientific benchmark (2° trajectory of anthorpogenic emissions up to 2100)

Models recent IPCC reports, UN related agencies Reports and other relevant inputs

NDC scenario: trend based on the NDC targets

BAU scenario: trend of emissions according to the BTR and the real achievement of the NDC (in case of general underachievement of the NDC targets)

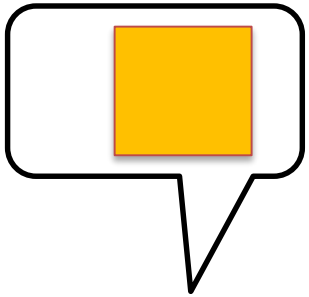
Source: Perugini et al 2020 Submitted

Needs of consistency between datasets

GHG inventories by countries vs IPCC AR

Do they speak the same language?

GHGI: Internationally agreed methods (reporting GLs and IPCC GLs) for the estimation of **national anthropogenic GHG**, with a **consistent time-series data**



IPCC Assessment Reports focuses on assessing the **state of the science on the global carbon budget** using globally applied data, definitions and modelling methods

Examples of Comparability issues

- **System Boundaries**

- Methodology
- differences

- Emission attribution

- Terminology

- Spatial Scale

GHGI -> Country level (Bottom up approach)

IPCC AR -> From Global (Top down approach)to local level

- Temporal scale

GHGI -> Annual

IPCC AR -> Variable (generally more refined)

Examples of Comparability issues

- System Boundaries

- **Methodology**
- **differences**

GHGI -> Wide use of **Emission factors**

IPCC AR -> [for inversion models] inversions of athmosferic GHG centrartion gradients in combination with more process based flux models

- Emission attribution

- Terminology

Examples of Comparability issues

- System Boundaries
- Methodology differences
- **Emission**
- **attribution**
- Terminology

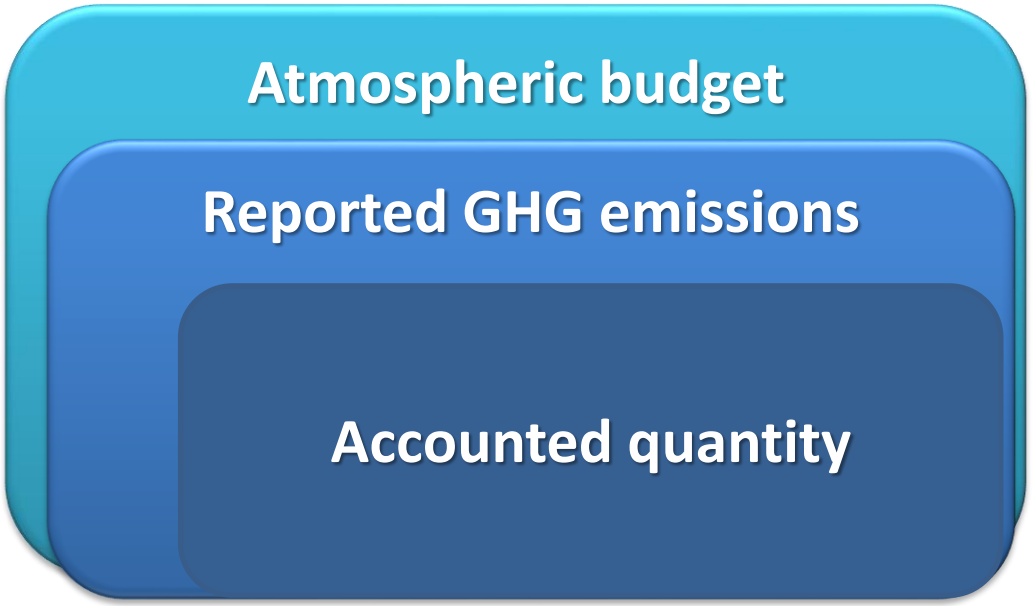
Source sector attribution is a key requisite in the GHG inventory.

Each sector comprises individual categories (e.g. Fuel combustion) and sub-categories (e.g. transport)

Emissions categories within sectors can be grouped while it is not possible to group between sectors.

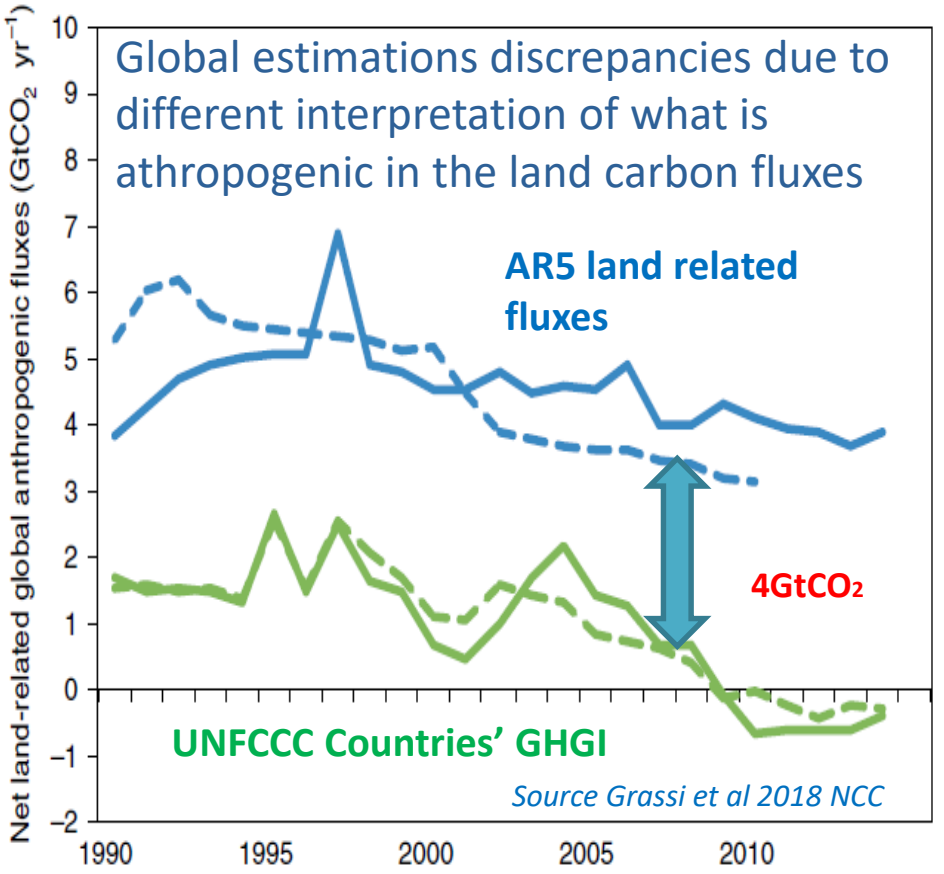
Terminology

- System Boundaries
- Methodology differences
- Emission attribution
- **Terminology**



- **Reporting** refers to the presentation of estimates in the tables or other standard formats used to transmit inventory information (Parties' annual emissions)
- **Accounting** refers to the way the reported information is used to assess the achievement of mitigation target/s set out in the NDC (e.g. reduced emissions against '90 levels)

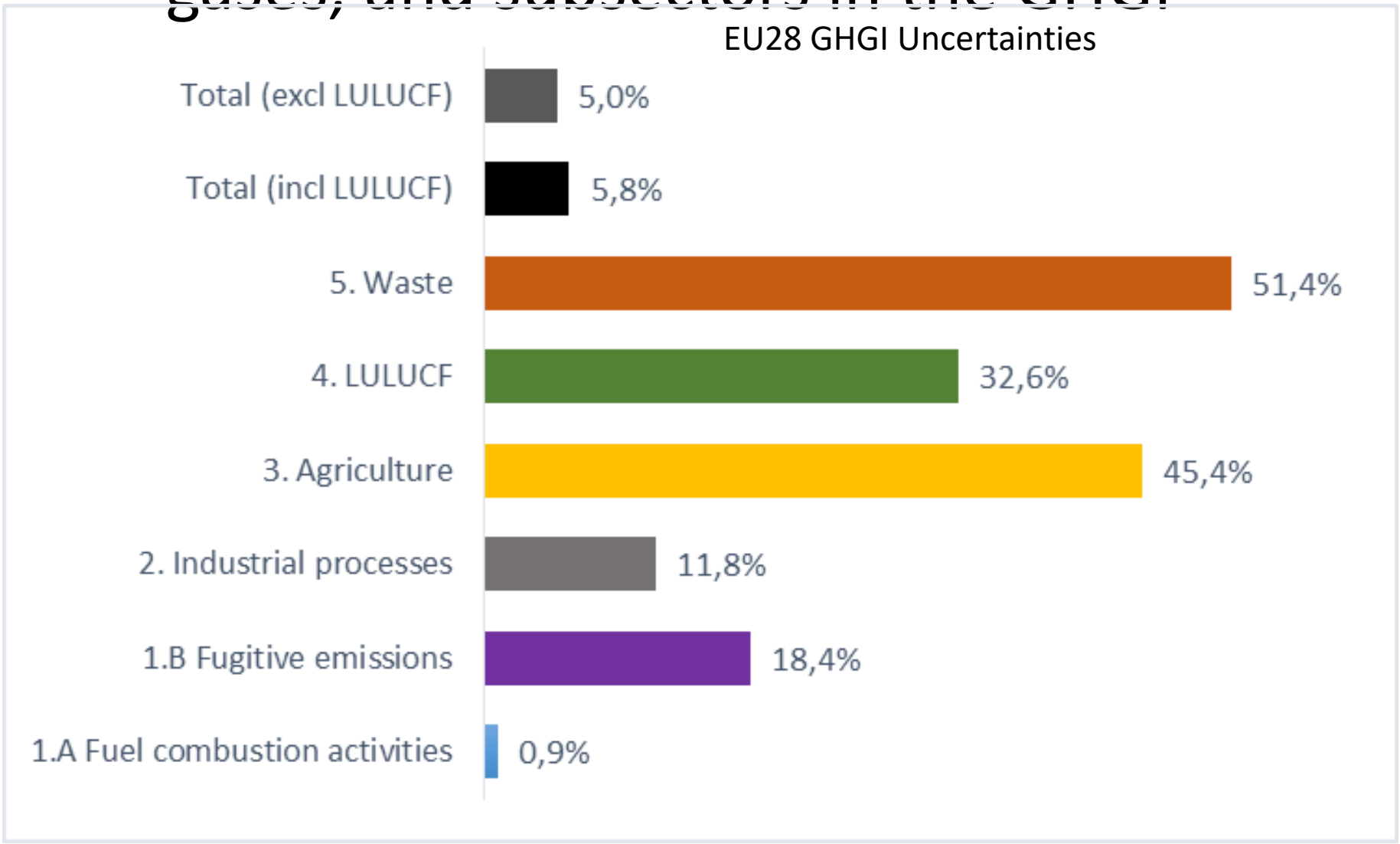
- System Boundaries
- Methodology differen
- Emission attribution
- **Terminology**



LULUCF sector the most affected:
Complexity in GHG pathways
Difficulties to differentiate anthropogenic sources/sinks
Methodological complexity

According to Gasser and Ciais (2013) and Pongratz et al. (2014), terminology is a key factor to understand differences in the estimates of net GHG emissions due to LULUCF under a global point of view.

Special focus on most uncertain sectors, gases, and subsectors in the GHGI



Source: EU NIR 2019

How can science efficiently contribute?

- **Improve the GHG inventories estimations and verification and inputs to GST**
- Need of full understanding **terms, rules, procedures and guidelines** for relevant inputs
- Emerging challenges for **developing countries**
- The **uncertainty** level reduction is an important issue to be considered for future GHG inventories improvements
- **Inventory data can offer a good source of data** for modellers to develop tools and methods that can be then used in the GHG inventory.
- **Close collaboration with inventory agencies** would improve mutual understanding

Thanks

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