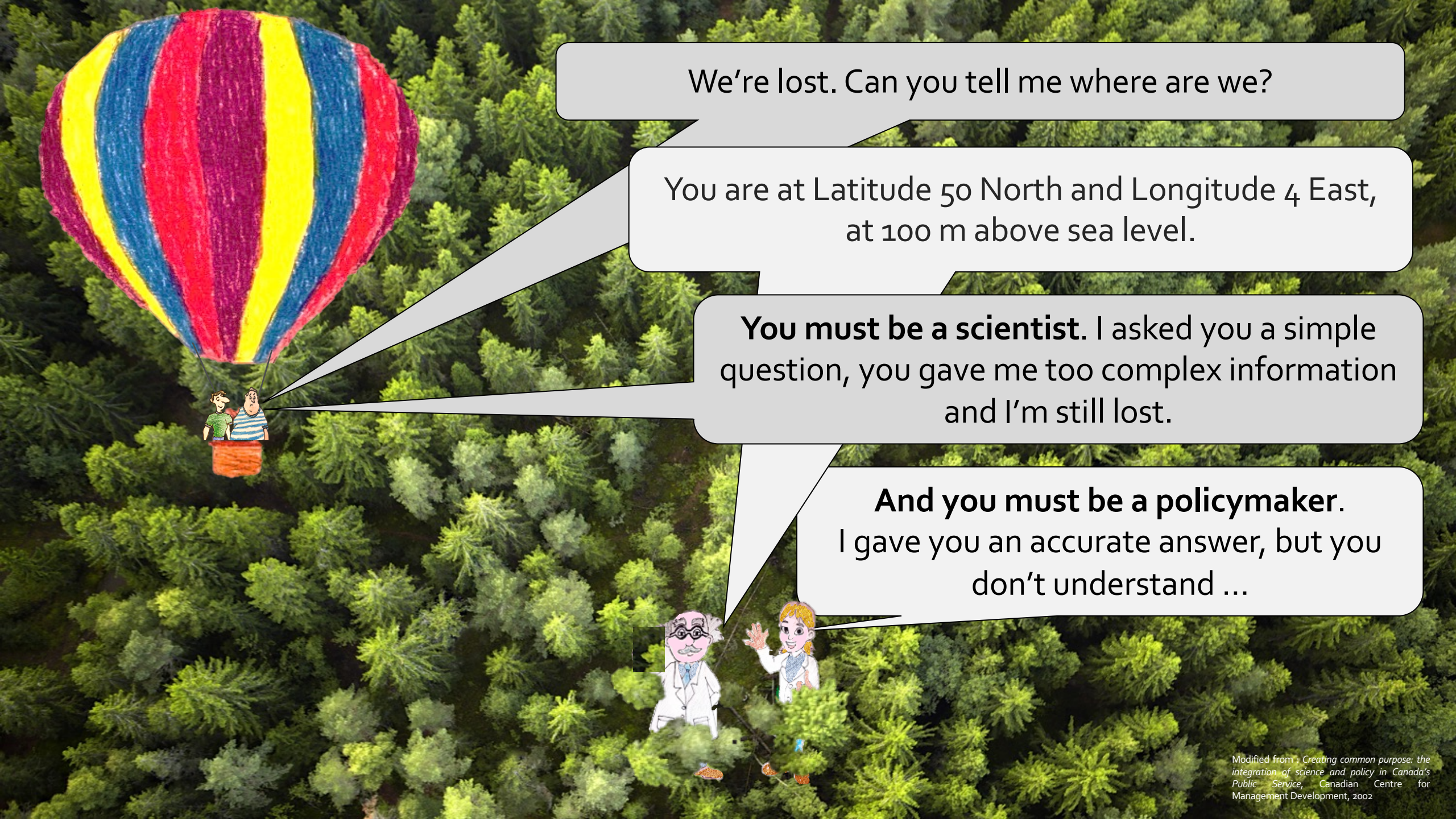
Accounting, inventari e bilanci di gas serra

Giacomo Grassi,
Joint Research Centre, European Commission

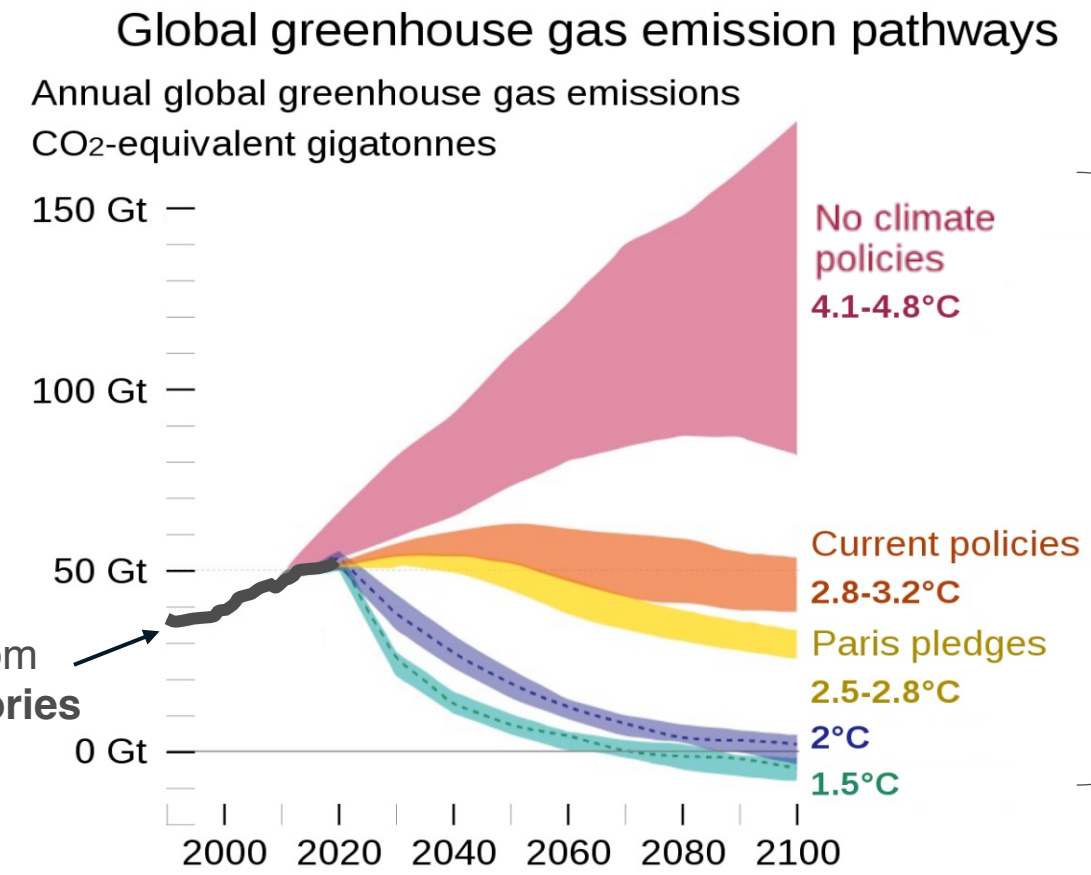
ICOS, Roma, 27 Settembre 2022



Modified from : *Creating common purpose: the integration of science and policy in Canada's Public Service*, Canadian Centre for Management Development, 2002

THE GLOBAL CONTEXT

Paris Agreement: holding global warming to well-below 2°C requires reaching a balance between GHG anthropogenic emissions and removals in the 2nd half of the century



Historical emissions from **National GHG Inventories**

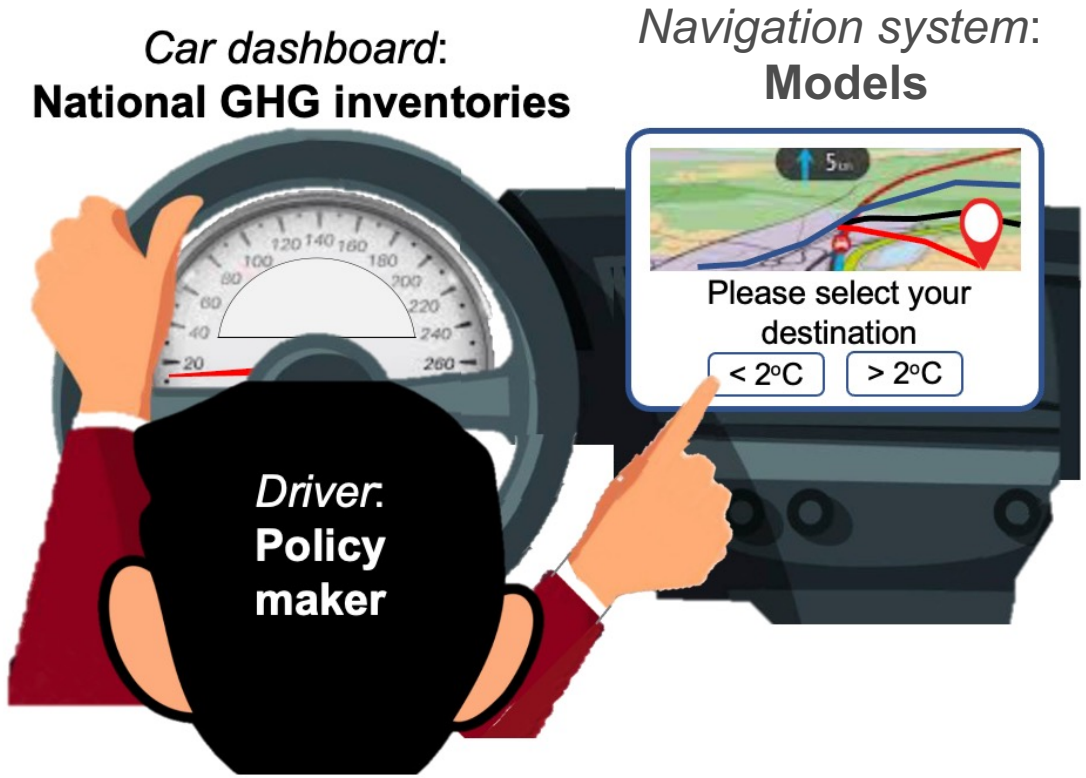
Emissions pathways from **Integrated Assessment Models** (**IAMs**)

After COP26, focus is shifting from
let's pledge emission reductions to
let's implement and track the pledges

- **Country GHG inventories** are key to design, implement and check policies
- **Independent data and models** are key to bring confidence on country data, outline mitigation scenarios and assessing progress toward 2°C

- Increasing attention to Land Use, Land-Use Change and Forestry (**LULUCF**)

Inventories and models



National GHG inventories provide key information for climate policy and for assessing compliance toward the Paris Agreement, like the car dashboard for the driver.

Models check the historical emissions and describe the future pathways to reach specific temperatures, like the navigation system indicates the position and provides routes to specific destinations.

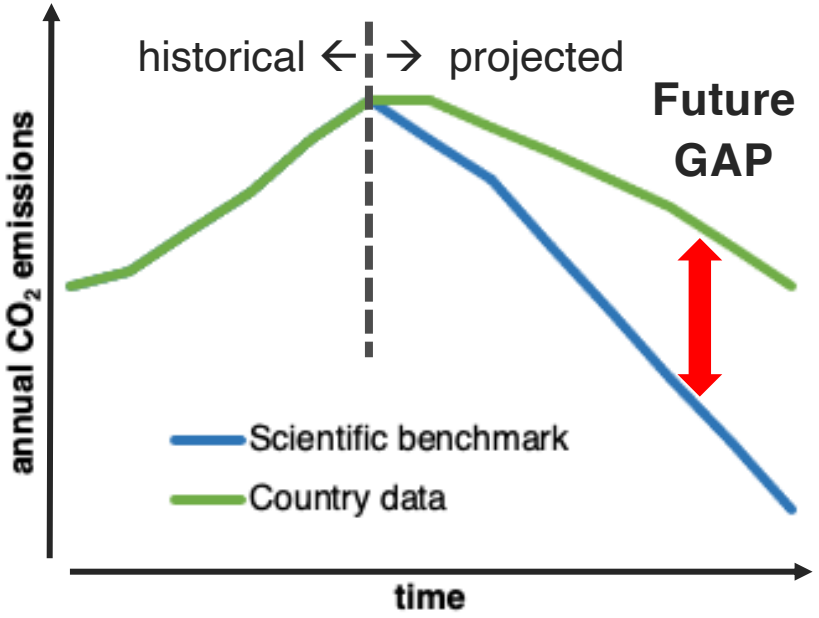
(by Giacomo Grassi)

European Commission

The Global Stocktake every 5 years assesses the collective progress towards the < 2°C target "in the light of the best available science"

Inputs: a) Aggregated countries' GHG data
b) IPCC and other scientific data

→ compared to assess the future "gap" → Increased climate ambition

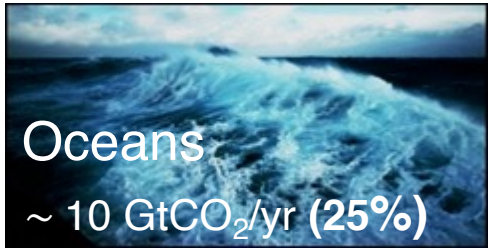


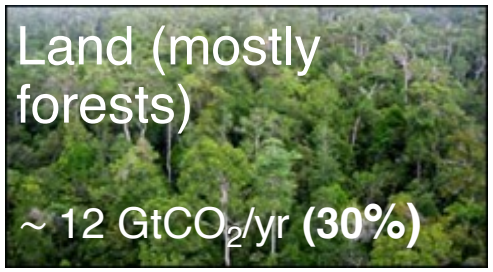
Why LULUCF is so important: the Global Carbon Budget

~ 35 $GtCO_2$/yr **(88%)**

+

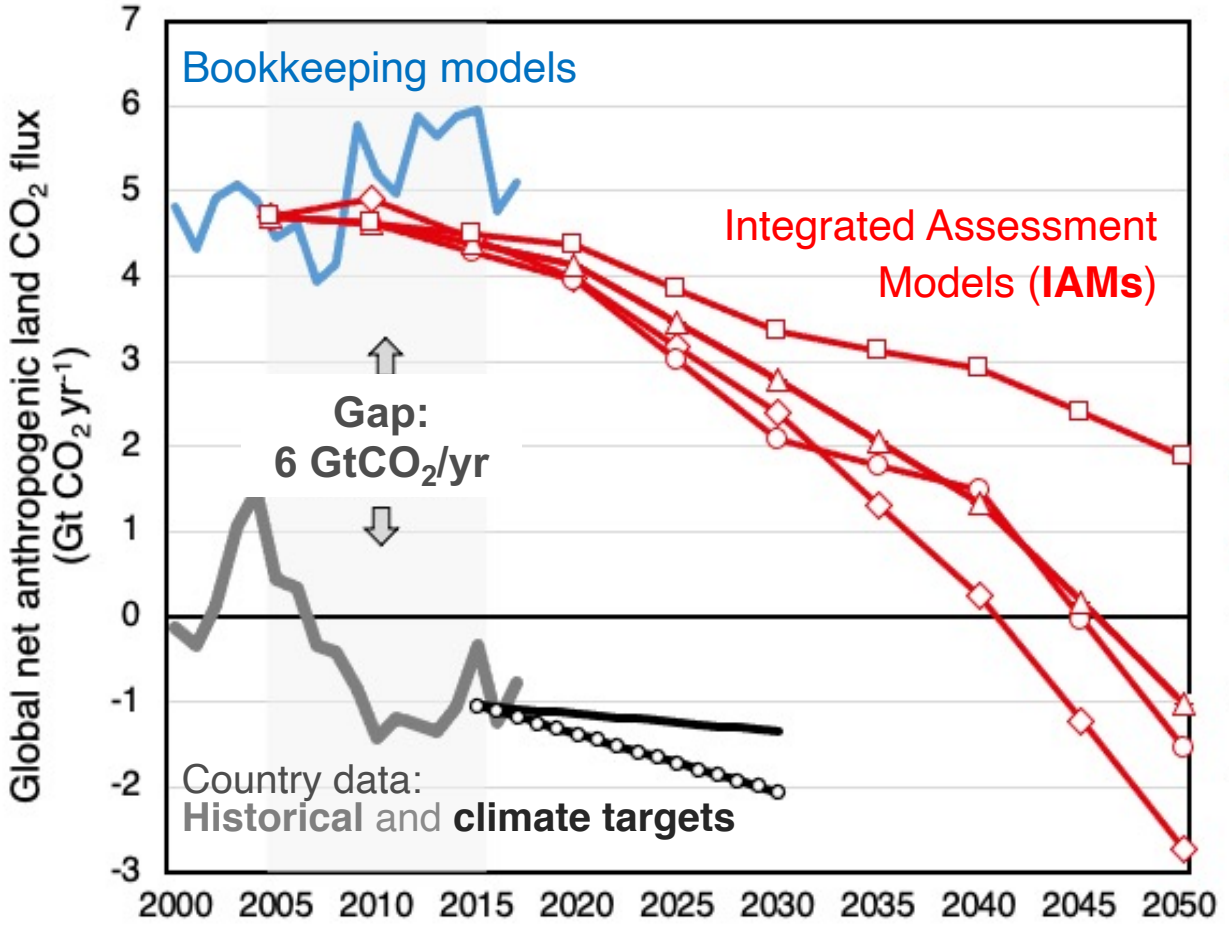
~ 5 $GtCO_2$/yr **(12%)**





(from the Global Carbon Project)

The problem: large gap on land-use CO_2 flux between models and countries



The Washington Post

Climate and Environment

The giant accounting problem that could hamper the world's push to cut emissions

This large gap is confusing:

- **Can we trust LULUCF country data?**
- **Can models be used to assess progress?**

Grassi et al. 2021, Nature Climate Change

European Commission

Can we trust country data?

Reporting under the Convention

Current GHG reporting requirements differ between Annex I and Non-Annex I countries in terms of frequency, quantity of information and review procedures

Annex I	**GHG-Inventory + Report** annual IPCC Guidelines 2006 1990-201X Review	**National Communication** 3-5 years IPCC Guidelines 2006 1990-201X Review	**Biennial Report** biennial IPCC Guidelines 1990-201X Review
Non-Annex I		**National Communication** 3-5 years IPCC Guidelines 1996/2003/2006 1990/1994/2000 no Review	**Biennial Update Report** biennial IPCC Guidelines 1996/2003/2006 year minus max. 4 Consultation + Analysis Process

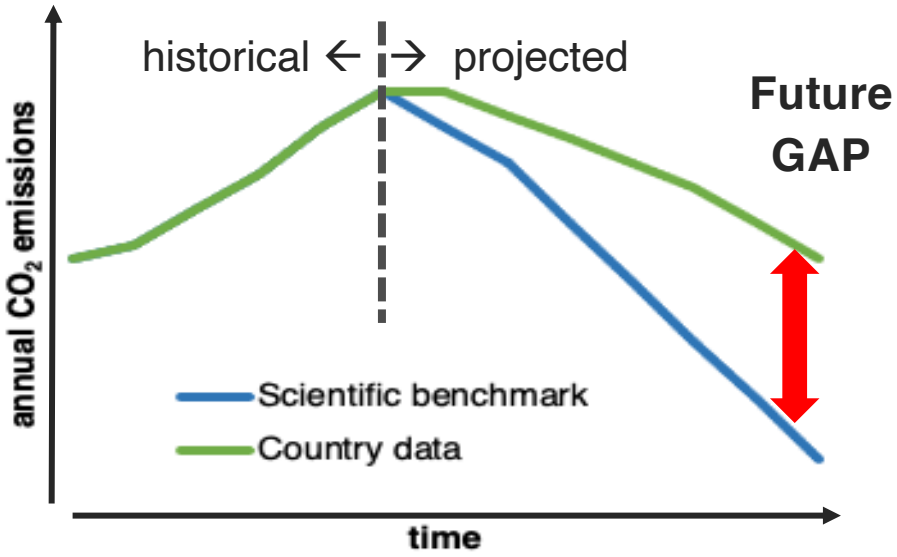
Reporting under the Paris Agreement

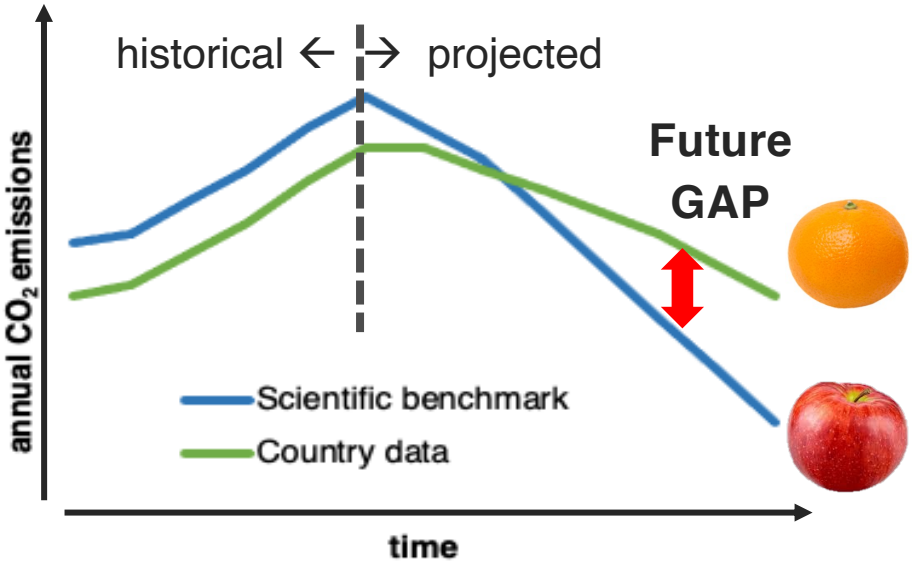
From 2024, under the Enhanced Transparency Framework, all UNFCCC Parties will start reporting with a harmonized format, with flexibility for developing countries

Reporting	**All Parties *(shall)***	• National greenhouse gas (GHG) inventory report *{Article 13.7(a)}* • Progress made in implementing and achieving nationally determined contribution (NDC) *{Article 13.7(b)}*
	All Parties *(should, as appropriate)*	• Climate change impacts and adaptation *{Article 13.8}*
Technical expert review	**All Parties *(shall)***	• Undergo technical expert review of information submitted under Article 13.7 *{Article 13.11}*

Although the quality of GHG inventories is improving, it varies among countries and sectors.
The most uncertain and incomplete sector is LULUCF

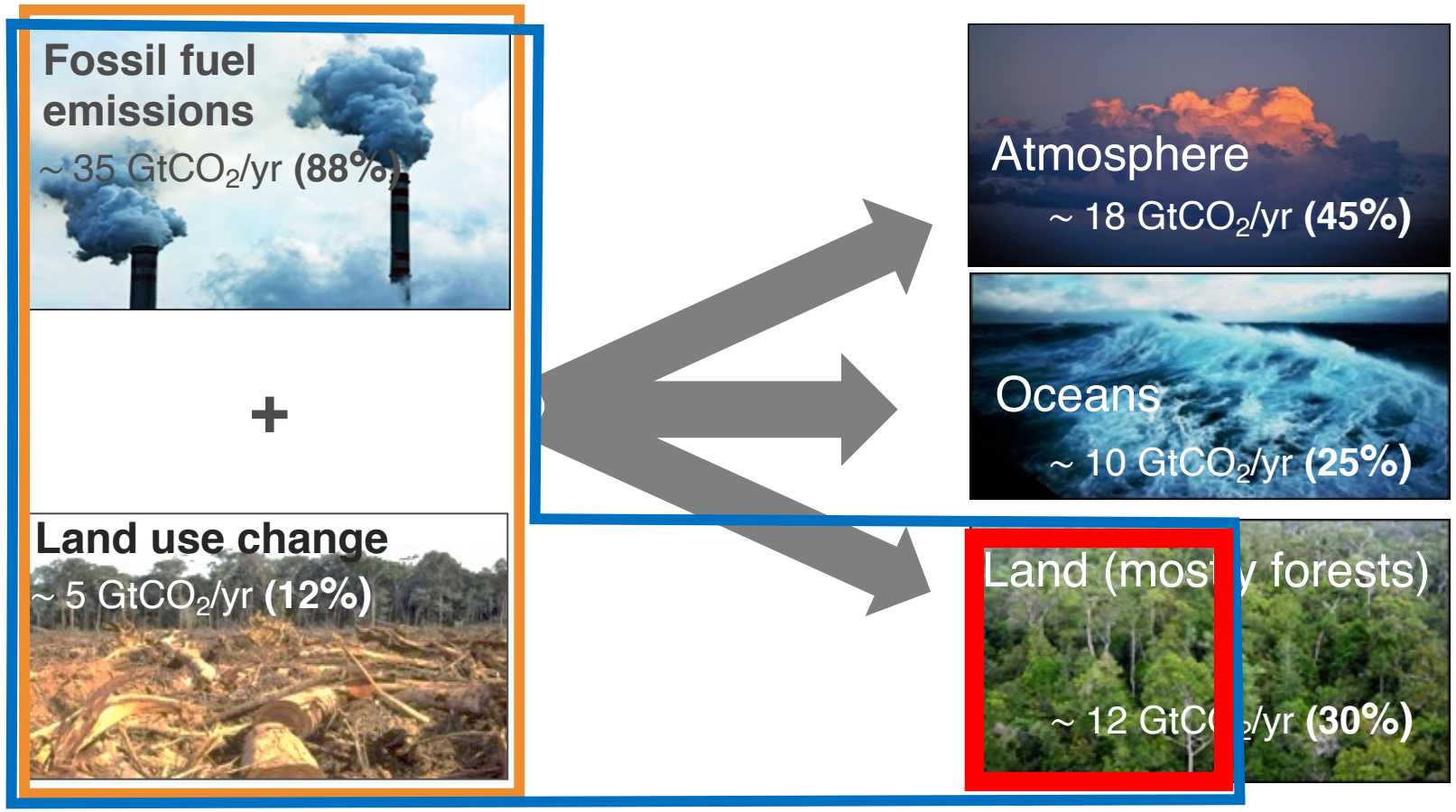
Can models be used to assess progress?

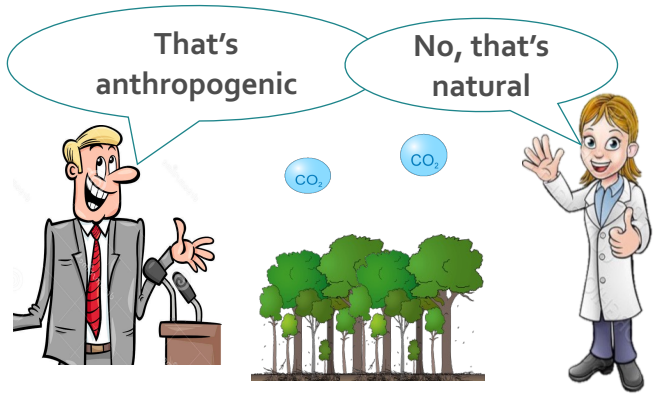




Comparability is crucial

anthropogenic in global models



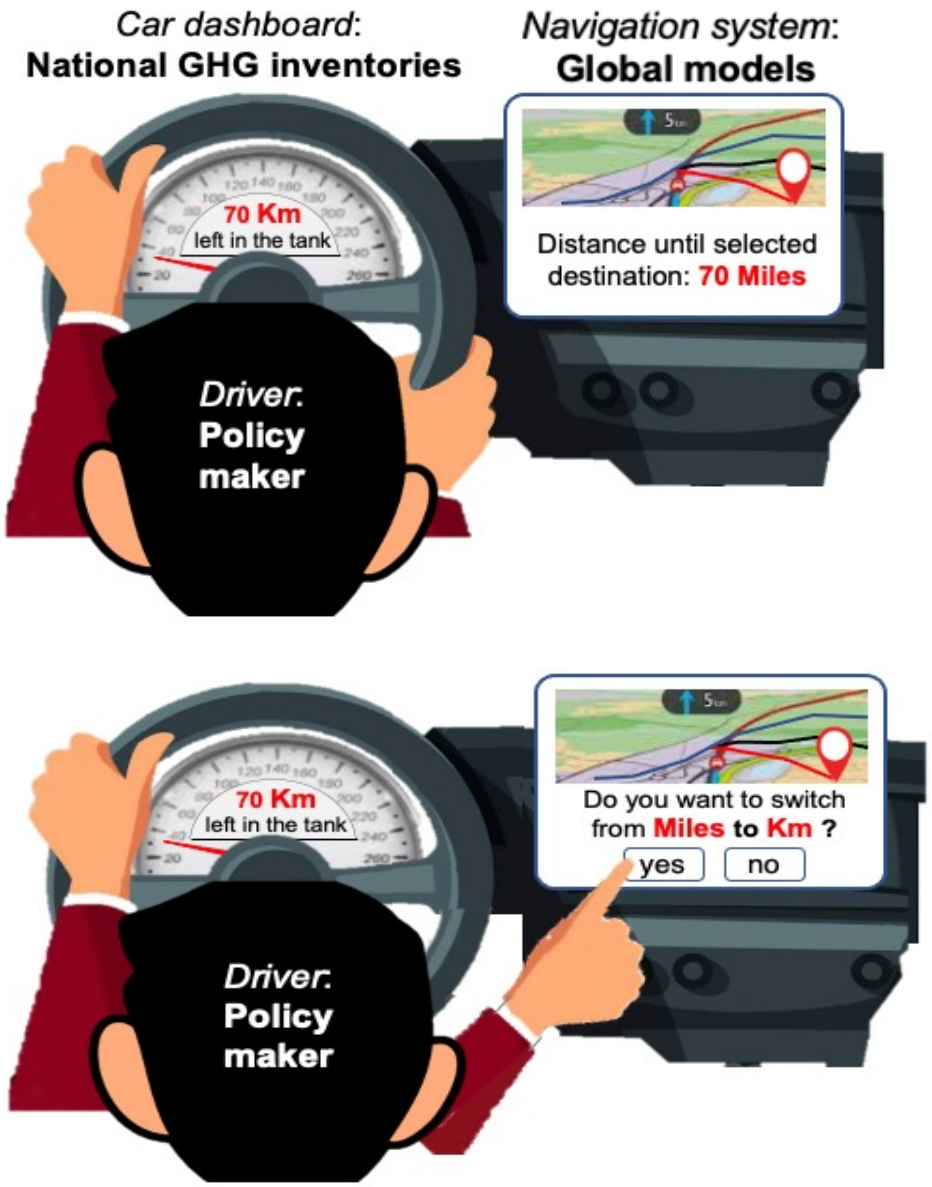


anthropogenic in national inventories

Proposed fix to **reconcile estimates**: add **the CO_2 sink considered 'natural' by models and 'anthropogenic' by countries** to the original **anthropogenic land use flux by models**

Grassi et al. 2021, Nature Climate Change

The problem and the proposed solution



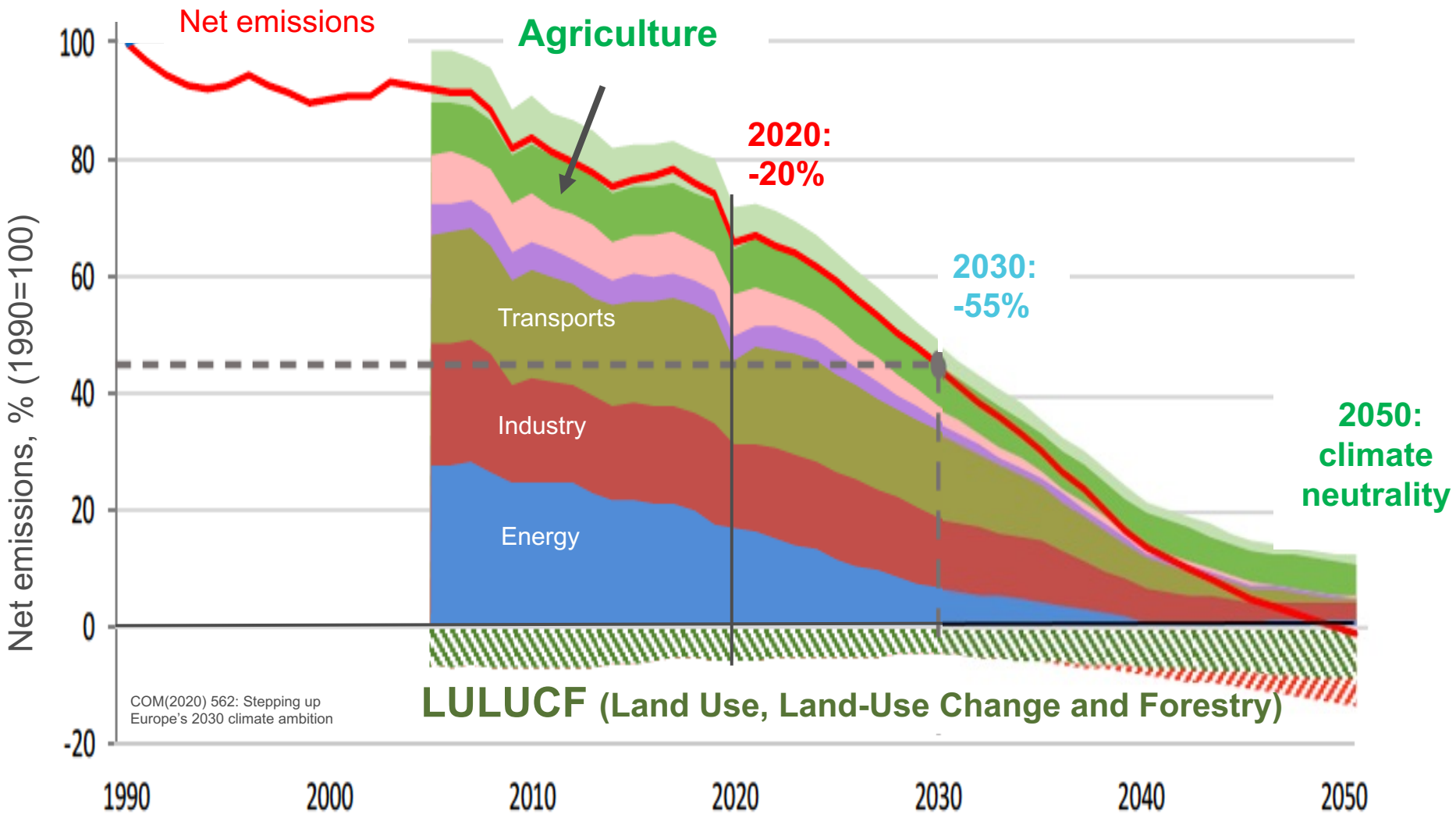
The gap in global land-use CO_2 fluxes by National inventories and models is like if the *dashboard* uses **km** and the *navigation system* **miles**.

This mismatch may confuse the driver.

Changing the dashboard is impractical. Changing the unit of the navigation system is easier.

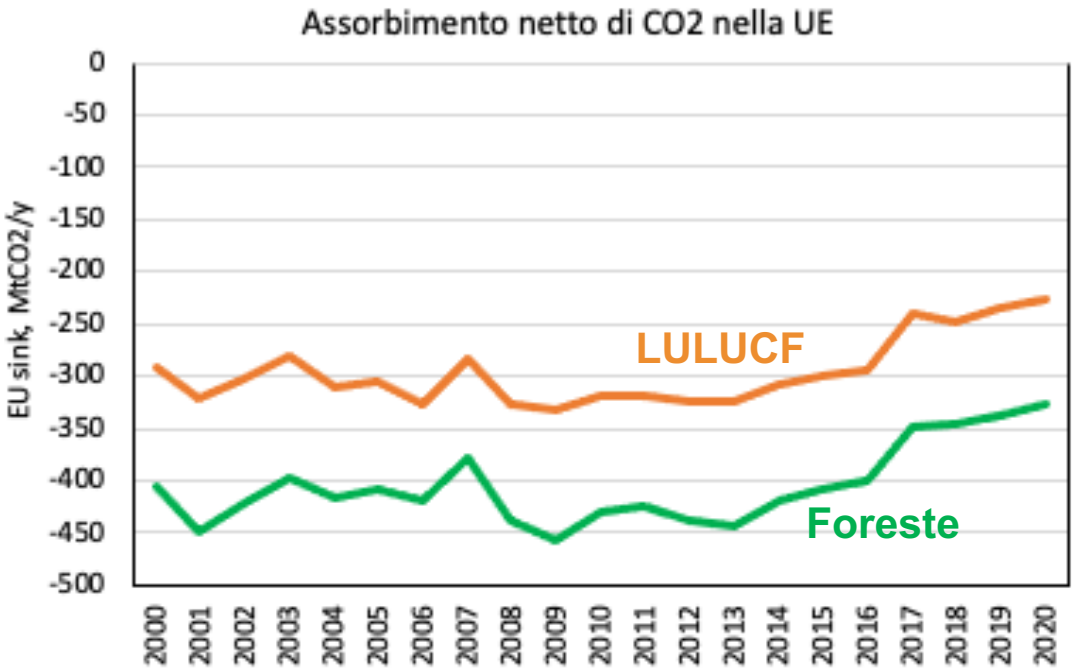
Likewise, “translating” models’ results is a pragmatic short-term fix to ensure comparability and more accurate assessment of the collective climate progress.

THE EU CONTEXT



L'importanza delle foreste aumentera' nel tempo

L’assorbimento netto CO_2 da parte delle foreste europee sta diminuendo



Meno 20% di 10 anni, a causa di:

- Aumento dei tagli (soprattutto per energia)
- Aumento dei disturbi naturali naturali (siccita’, fuochi, vento, insetti)
- Invecchiamento delle foreste (minore crescita, maggiore aree di foreste “pronte al taglio”)

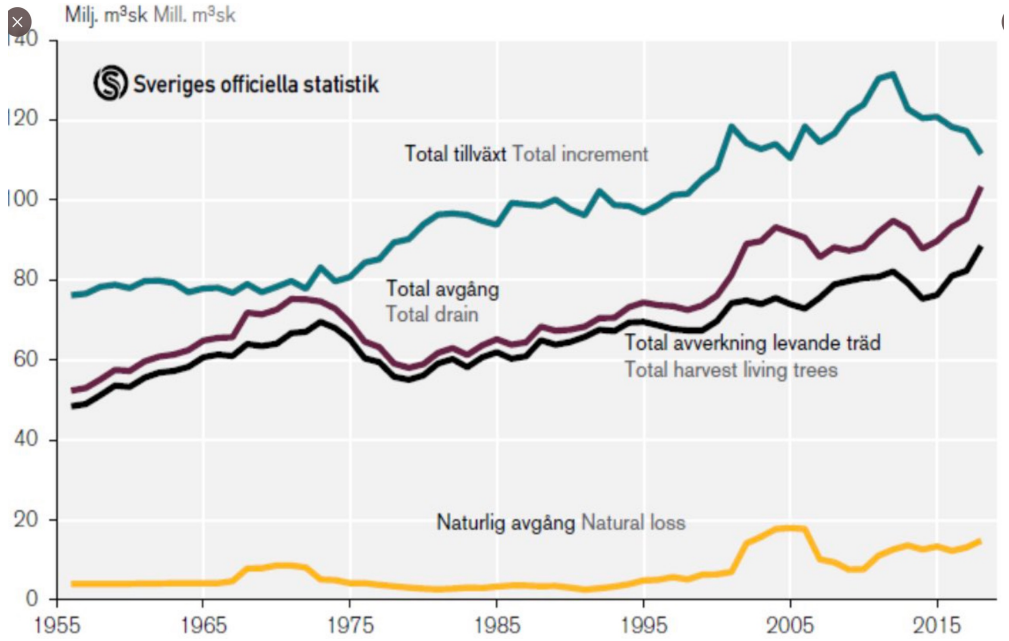
EU legislative proposal on LULUCF

Stop and reverse the current decline of the sink

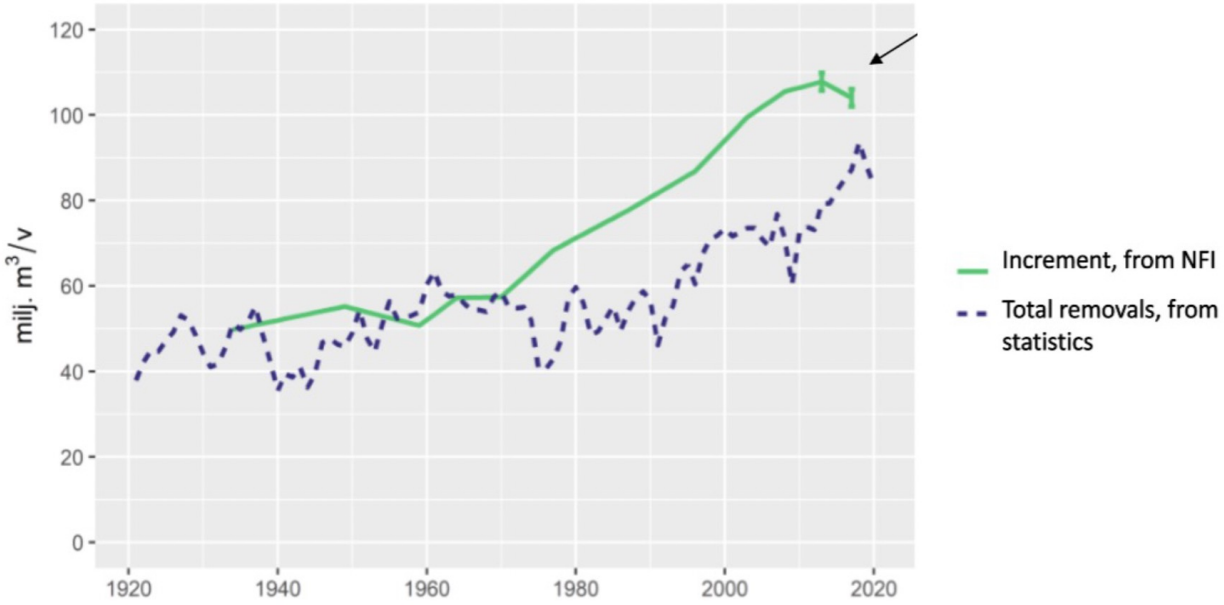
State of play	Decreasing trend in LULUCF CO2 removals	Complex accounting rules for LULUCF	Gaps in monitoring
Changes proposed	New ambitious MS targets in 2030 (-310 $MtCO_2$ for LULUCF)	From 2026, LULUCF like other sectors	Better monitoring (greater use of remote sensing)

From 2023, GHG inventories need to provide 'near-real time' estimates (year -1) also for LULUCF

National GHG inventories rely on *periodic* National Forest Inventories.
Is the timeliness of this information enough to address the current challenges?

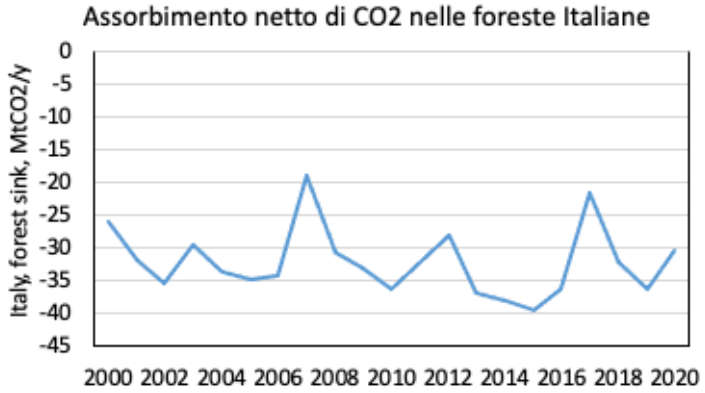


Sweden, https://twitter.com/mickej72/status/1567575560318066690



Finland, From Cescatti, https://forest.jrc.ec.europa.eu/en/activities/lulucf/workshops/workshop-2022/)

What about Italy?



Last measured data on harvest and increment:
NFI 2005

European Commission

New EU forest strategy for 2030

To improve the quantity and quality of EU forests

The new forest strategy **focuses on**:

- strategic forest monitoring, reporting and data collection
- developing a strong research and innovation agenda to improve our knowledge on forests

European Green Deal

European Climate Law

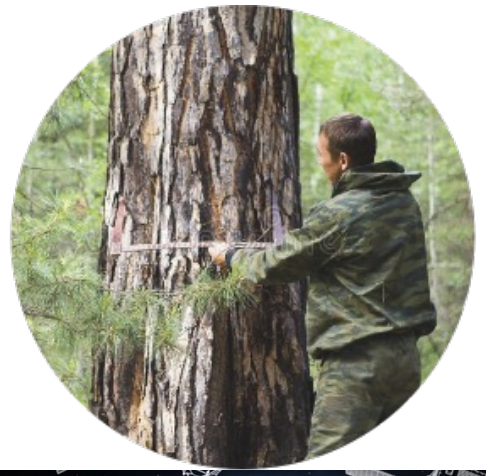
Sustainable Carbon Cycle

Nature Restoration Law

Biodiversity Strategy

LULUCF Regulation

Forest Strategy



Circular Economy Strategy

Bioeconomy Strategy

Common Agricultural Policy

Renewable Energy Directive

EU Timber Regulation / FLEGT

New European Bauhaus

Deforestation-free Product Regulation

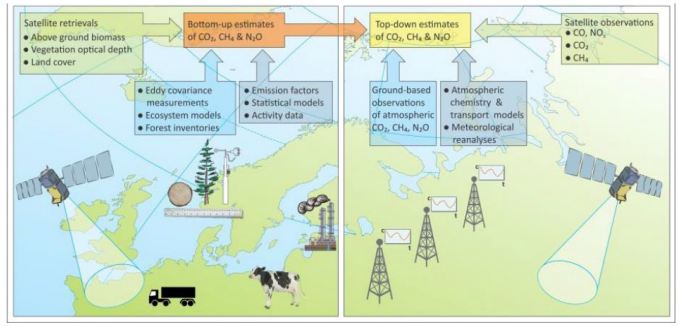
From Cescatti

VERIFY Project

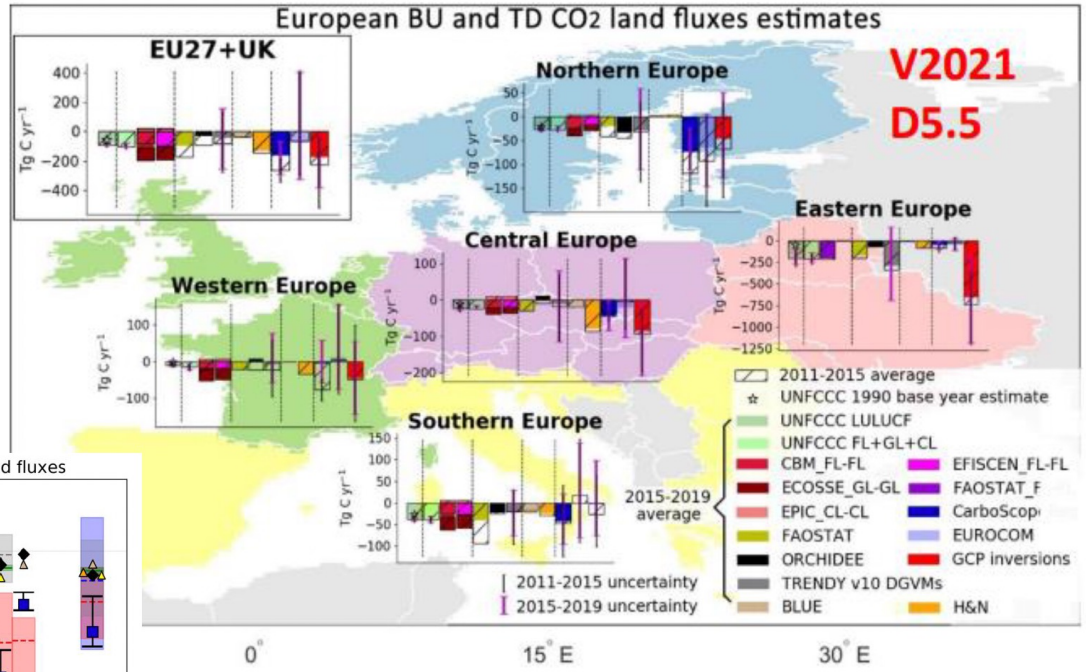
Aim:
Quantify more accurately C Stocks & fluxes of
CO2, CH4, and N2O across the EU

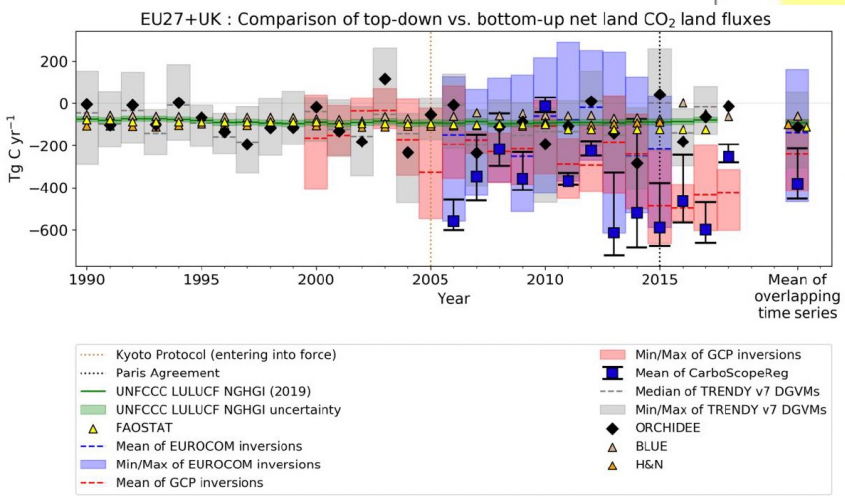
How:
Based on independent observations and modelling.

Why:
To support the Paris Agreement



Web site for more details
http://verify.lsce.ipsl.fr/





Bottom-up models show larger (climate) variability (i.e. ORCHIDEE, DGVMs)

Terminology!

Measuring seasonal variation of biogenic sinks→reduction in CO2 removals in summer due to drought ((Ramonet et al., 2020; Thompson et al., 2020)

CONCLUSIONS

- Country inventories should be improved in terms of transparency, completeness and accuracy. Science may help providing data and/or independent verification
- Earth Observation increasingly crucial, but still much work to do (e.g., definitions, timeseries consistency, resolution, anthropogenic vs. natural)
- Land CO_2 flux models also key, but should be improved in terms of representation of land management and disaggregation of results.
- When using independent data to assess country GHG inventories, a key questions must be answered: Am I comparing apples to apples (categories, processes, area)?

If you don’t measure, you don’t manage


Thank you!