



Towards global CO₂ emission accounts

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Objective and rationale

Objective:

- Be able to provide first estimates of CO₂ emission accounts according to SEEA for countries that do not yet compile them.
- Contribute to global efforts to compile and disseminate SEEA accounts.

Rationale:

- Contrary to UNFCCC inventories, air emission accounts can be linked to national accounts and inter-country input-output (ICIO) tables, thus allowing to compute CO₂ intensity by industry and demand-based air emissions.
- Up to now, only few, mostly European, countries compile air emission accounts (24 European countries, plus Australia and Canada).
- Draft air emission accounts could be used (1) by countries as a starting point for improved estimates, and (2) by international organisations for computing demand-based air emissions.
- Some publicly available data with a wide geographical coverage can be mobilized: [UNFCCC inventories](#) and [IEA estimates of CO₂ emissions from fuel combustion](#).

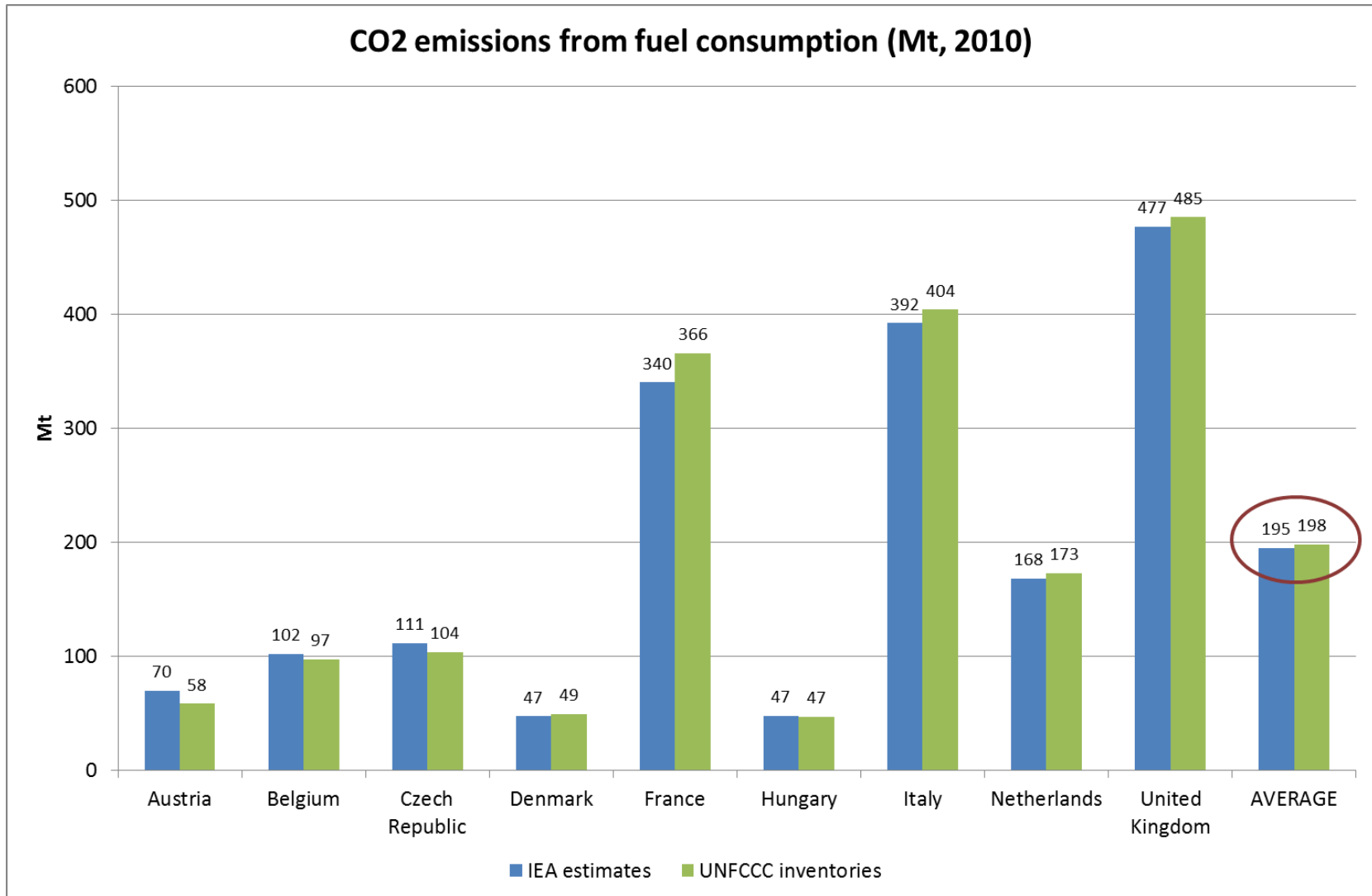


Existing data sources

- UNFCCC inventories
 - Data covering 42 Annex-I countries at annual frequency and 160 non-Annex-I countries more irregularly
 - CO₂ emissions from all sources (fuel combustion, fugitive emissions, industrial processes, other sources)
 - Breakdown of emissions by technical process (e.g. combustion processes, production processes, ...)
 - Territory principle
- IEA estimates of CO₂ emissions from fuel combustion
 - Data covering 110 countries at annual frequency
 - Breakdown of emissions by ‘flows’, i.e. by ISIC industries at a detailed level for some parts of the economy and at an aggregated level for some others
 - Based on IEA energy data and default (Tier 1) emission factors provided in the [2006 IPCC Guidelines for national GHG inventories](#)
 - Territory principle



CO₂ emissions from fuel combustion: consistency of existing data sources at the aggregate level



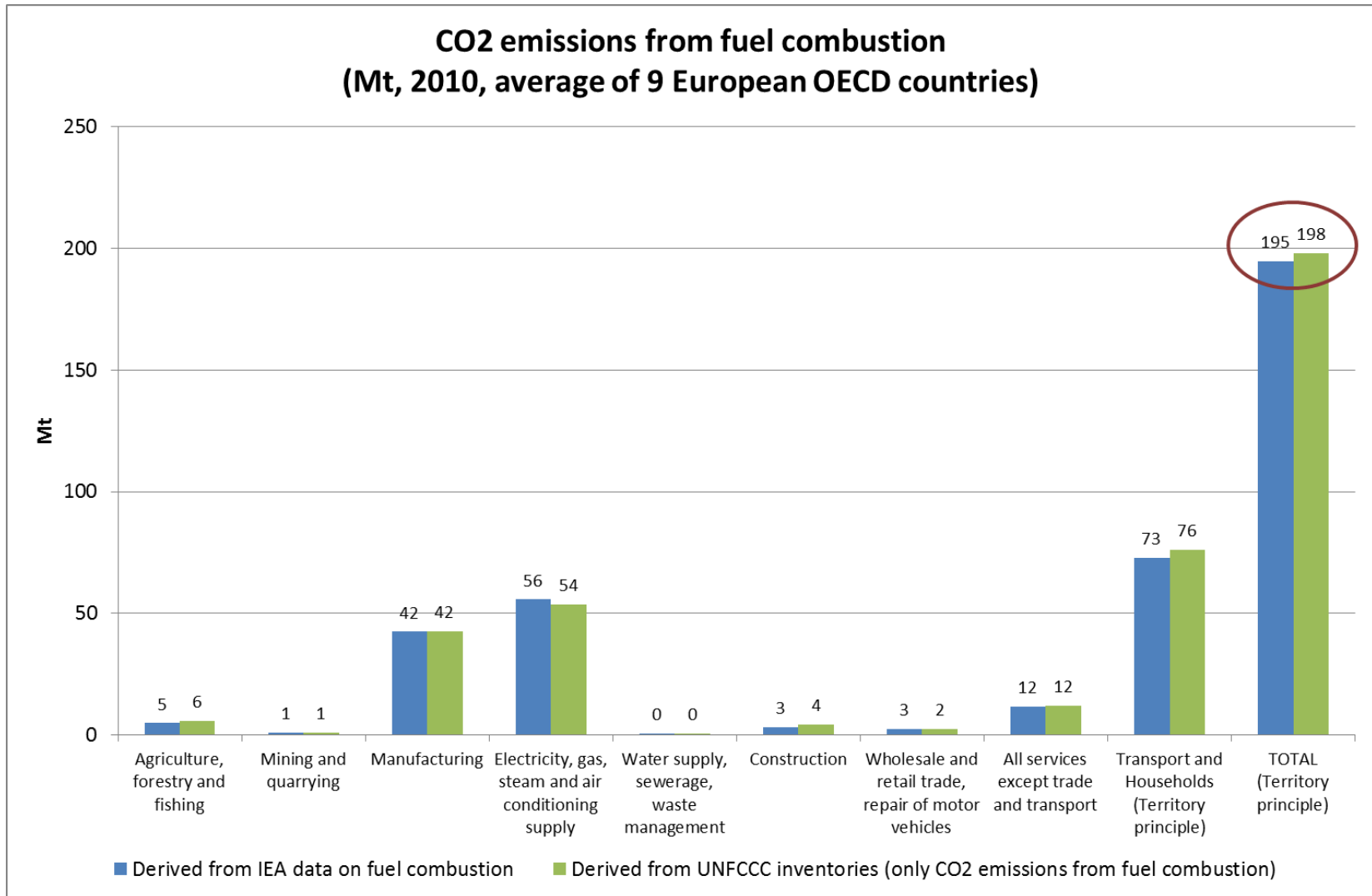


Breakdown by industry: methodology

- To check for unbiasedness and accuracy of the breakdown by industry, an average of already available air emission accounts is used as benchmark.
- Given time constraints, focus on year 2010 and 9 European OECD countries (Austria, Belgium, Czech Republic, Denmark, France, Hungary, Italy, the Netherlands and the United Kingdom).
- The territory-residence adjustment issue has been left aside for the time being.
- Link between available data sources and the ISIC classification of industries:
 - [Eurostat's correspondence table](#) between process-oriented classifications (UNFCCC inventories) and economic activities (ISIC rev. 4)
 - [IEA definition of 'flows'](#)
- In cases of one-to-many connections: allocation based on relative output share of the target industries (national accounts' data)
- Specific methodology for road transport (see below)



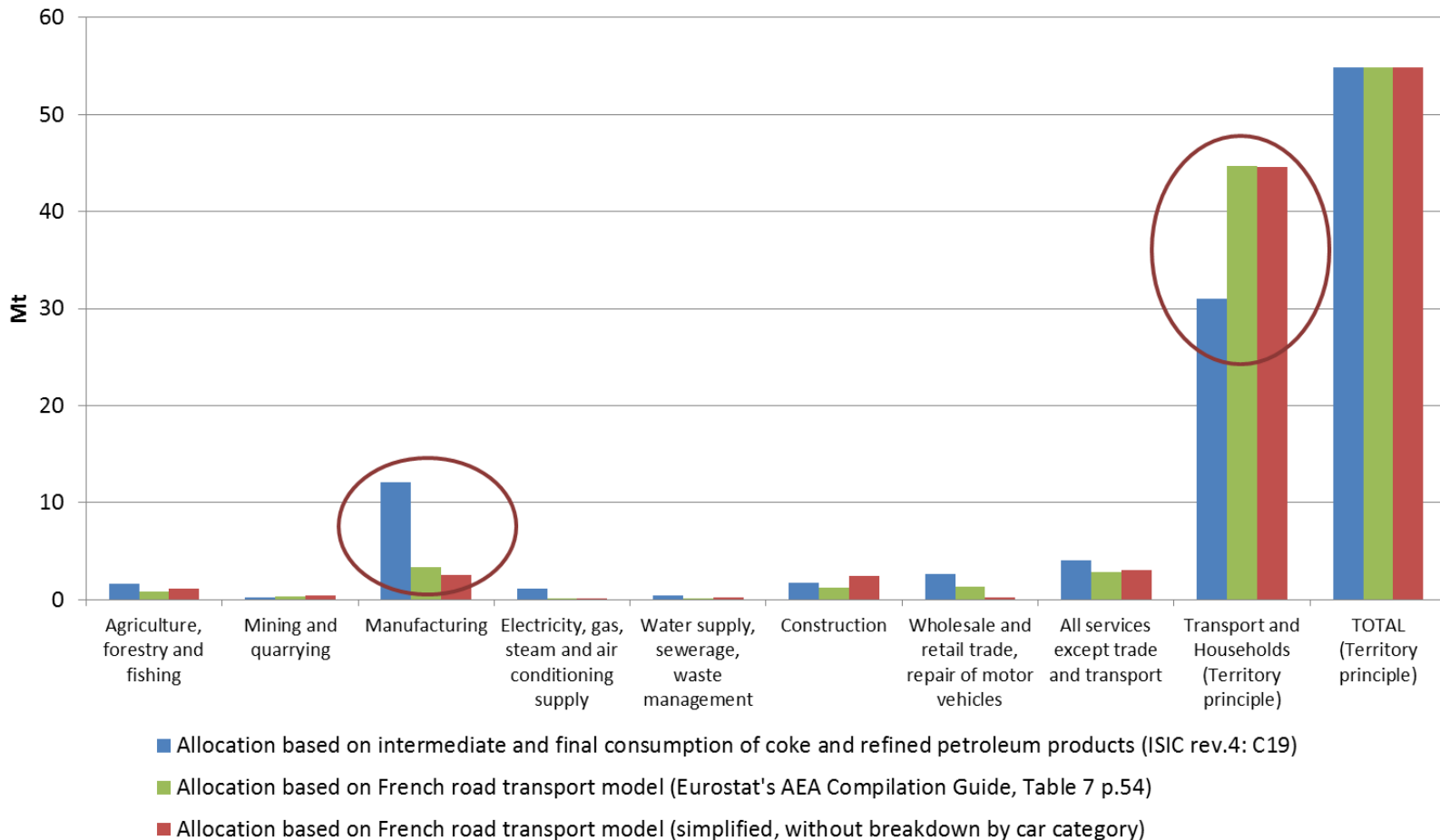
CO₂ emissions from fuel combustion: consistency of the breakdown by industry using the two different data sources





CO₂ emissions from fuel combustion: focus on road transport (~25% of overall CO₂ emissions)

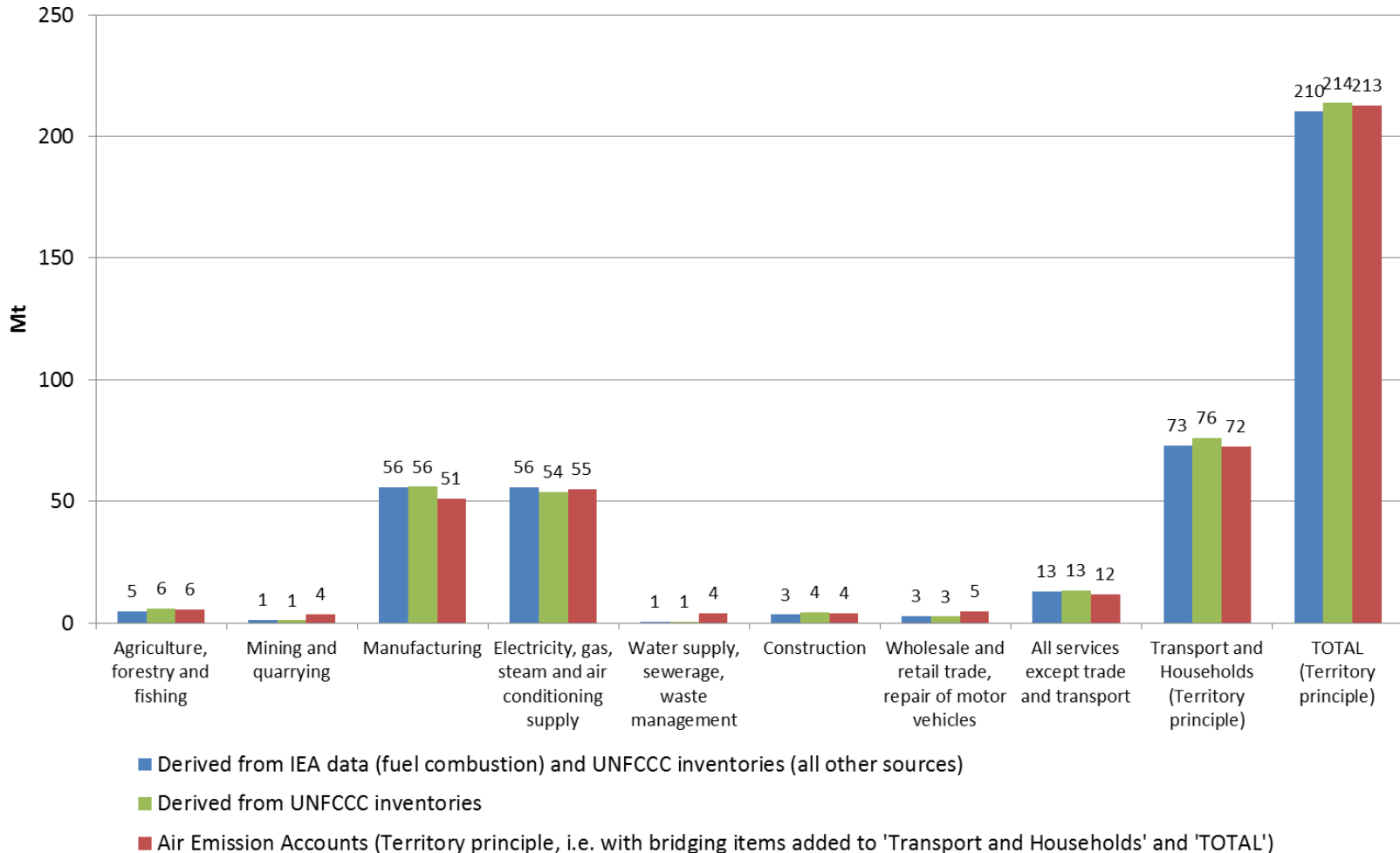
**CO₂ emissions from road transport (fuel combustion)
(Mt, 2010, average of 9 European OECD countries)**





Overall CO₂ emissions: consistency of the breakdown by industry with air emission accounts

Overall CO₂ emissions (Mt, 2010, average of 9 European OECD countries)

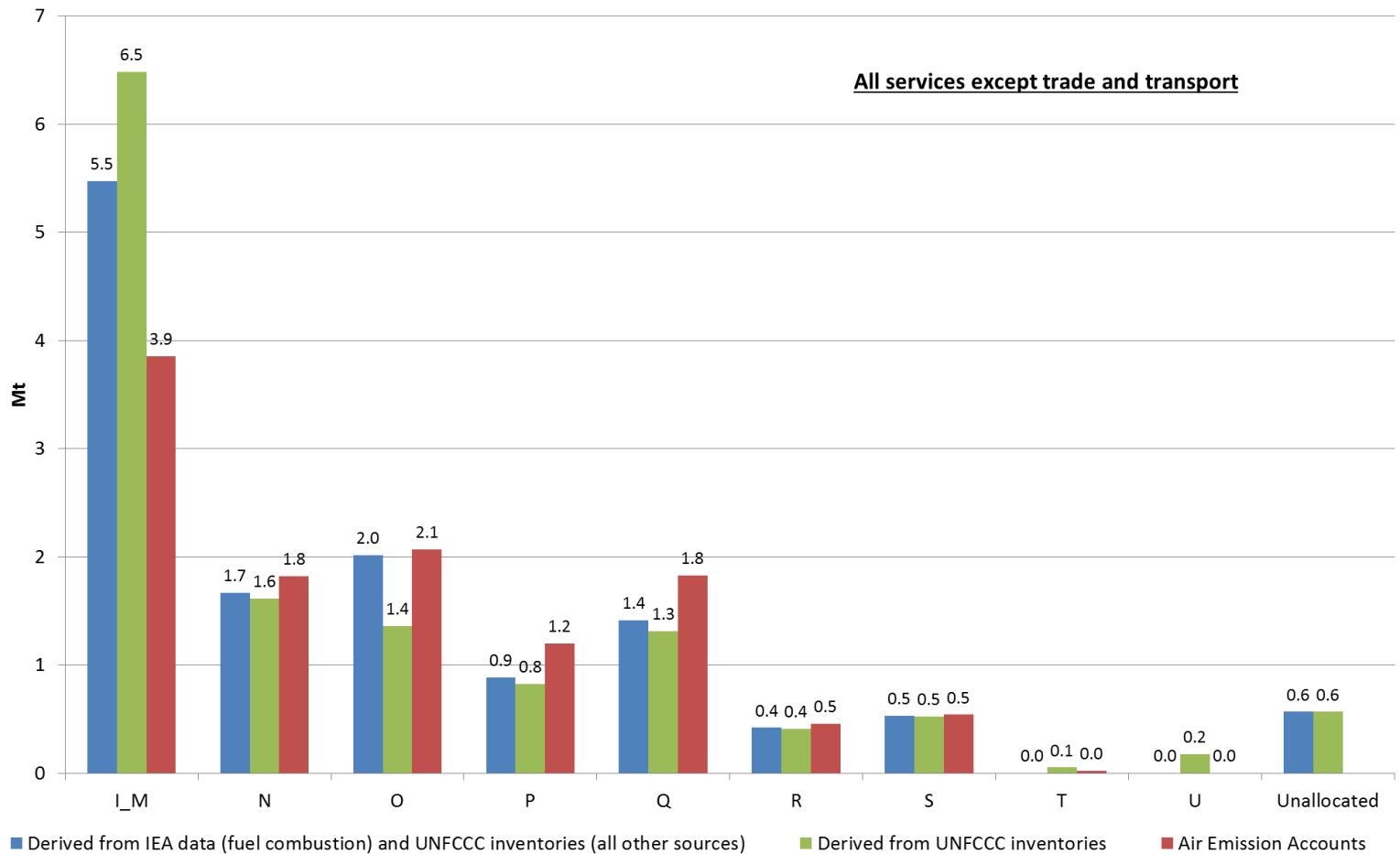




Overall CO₂ emissions: focus on services

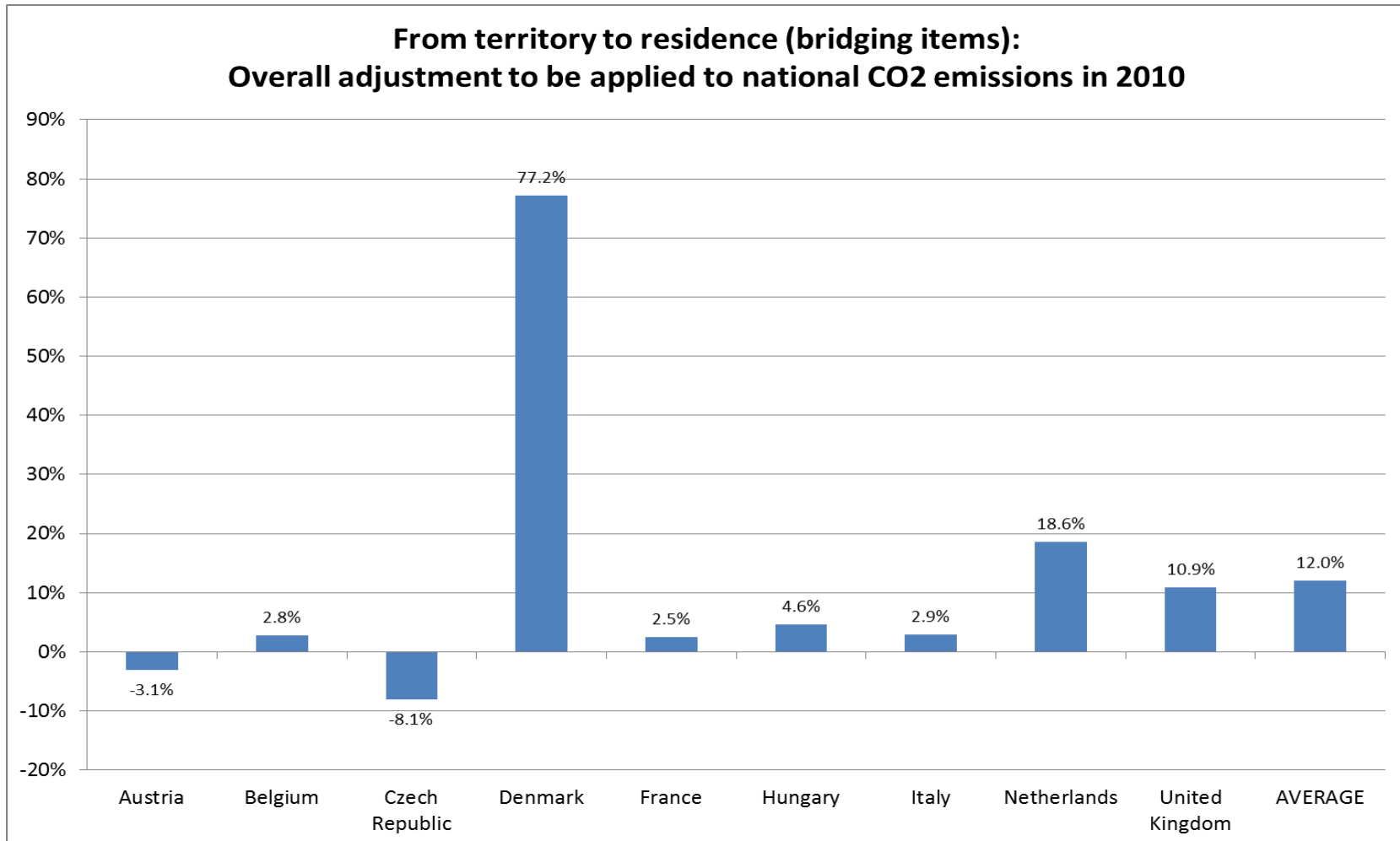
Overall CO₂ emissions (Mt, 2010, average of 9 European OECD countries)

All services except trade and transport





Remaining issue: Territory-residence adjustment – How to estimate it from publicly available data?



Source: Eurostat/OECD



Conclusions

- In terms of accuracy of the breakdown by industry, no clear advantage of one data source over the other at this stage.

On average for 9 European OECD countries in 2010 and when only few industries are considered, IEA estimates of CO₂ emissions from fuel combustion and UNFCCC inventories (fuel combustion) lead to similar breakdowns.

- Better geographical coverage of IEA data, but limited to CO₂ emissions from fuel combustion.



Way forward

- Further test and refine methodology based on additional countries.
- Further disaggregate manufacturing industry into sub-industries.
- Explore whether using a breakdown of fuel combustion by fuel type improves the accuracy of the results:
 - IEA: Possibly improved correspondence between IEA ‘flows’ and ISIC industries using CO₂ emissions by fuel type.
 - Energy accounts (when available): They provide a breakdown of fuel combustion by industry. Using specific emission factors (see 2006 IPCC Guidelines), CO₂ emissions by industry can then easily be derived.
- Explore how to provide (crude) estimates of the territory-residence adjustment.
- Extend the methodology to other gases covered by the UNFCCC inventories (other GHGs -- CH₄, N₂O, HFCs, PFCs, SF₆ --, SO_x, NO_x, CO).



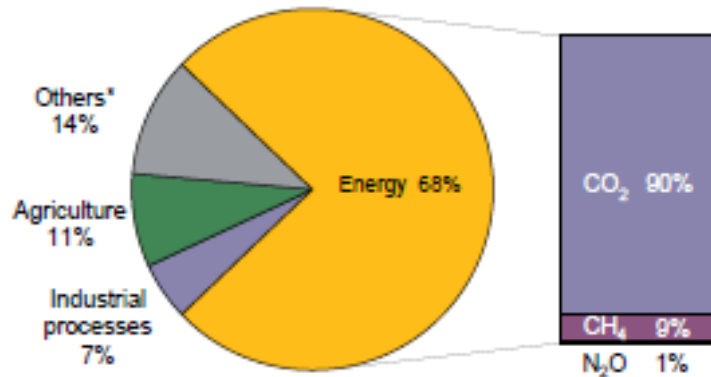
Thank you for your attention





Annex: Global GHG and CO₂ emissions

Origin of global GHG emissions in 2010



* Others include large-scale biomass burning, post-burn decay, peat decay, indirect N₂O emissions from non-agricultural emissions of NO_x and NH₃, Waste, and Solvent Use.

- In 2010, emissions from energy account for 2/3 of all GHG emissions over the world, and most of them (90%) are CO₂ emissions.
- CO₂ emissions mainly come from fuel combustion, but may also be related to industrial processes and other sources (e.g. fugitive emissions and emissions from biomass).
- Only considering CO₂ emissions from fuel combustion is a good approximation of overall CO₂ emissions in OECD countries, but less so in developing countries.

Source: [IEA \(2016\)](#)