



European Commission

# Uncertainty in the EDGAR v5.0 inventory of greenhouse gases emissions



## WHY

- Quantitative assessment of uncertainty of emissions of greenhouse gases (GHG) is a requirement introduced by UNFCCC;
- The effectiveness of measures for achieving emission reduction targets depends on the uncertainty in emissions of sectors that contribute to the overall reduction target;
- The VERIFY consortium aims to develop a system to estimate GHG emissions to support countries' emission reporting.

## WHAT

The Emissions Database for Global Atmospheric Research (EDGAR) builds emissions by coupling information on international statistics and default emission factors from IPCC. Uncertainties are mainly due to incomplete knowledge on these two factors.

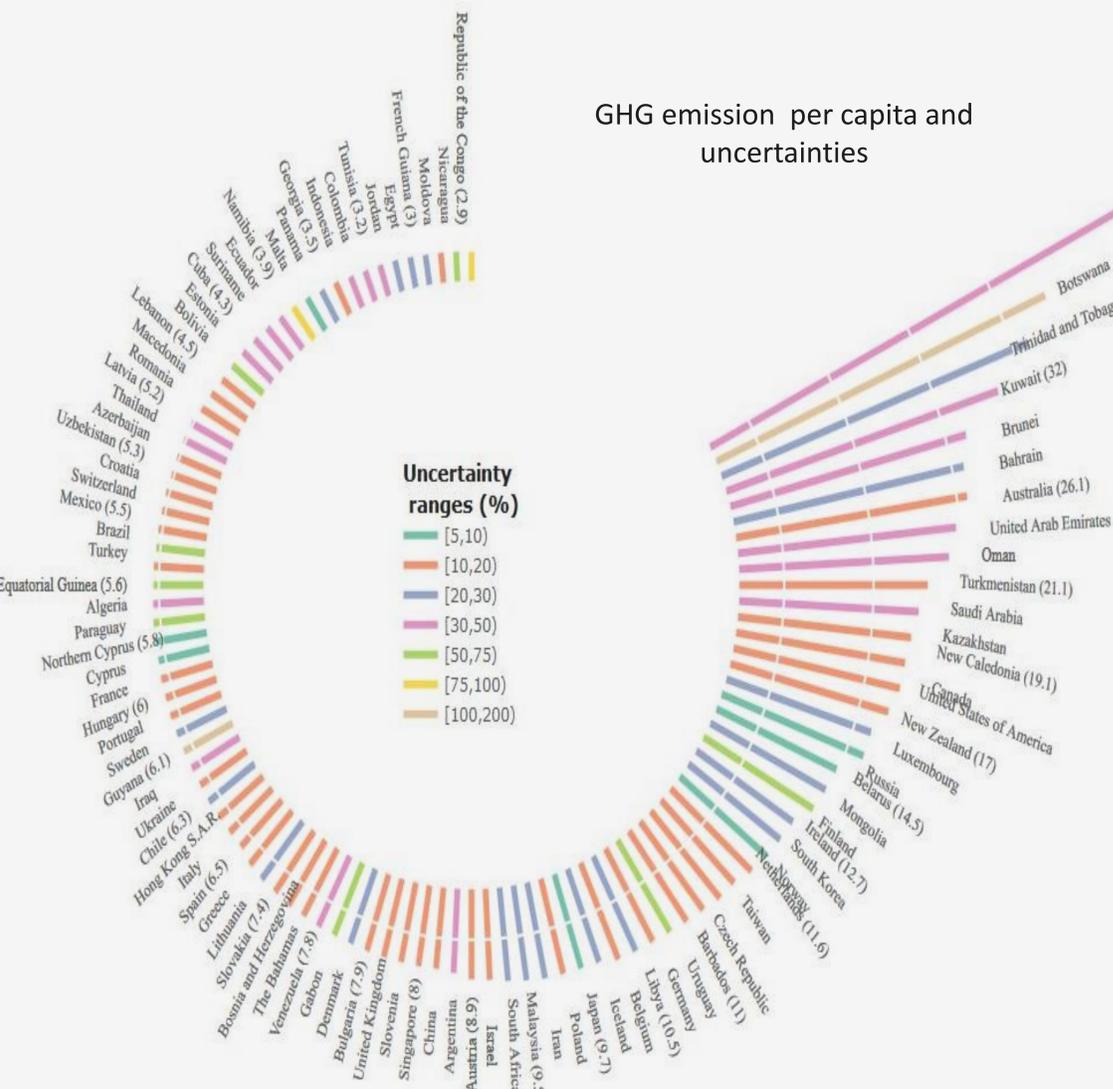
IPCC estimates uncertainty of emission factors defined by fuel for CO<sub>2</sub> and by sector for CH<sub>4</sub> and N<sub>2</sub>O (although with some exceptions).

## HOW

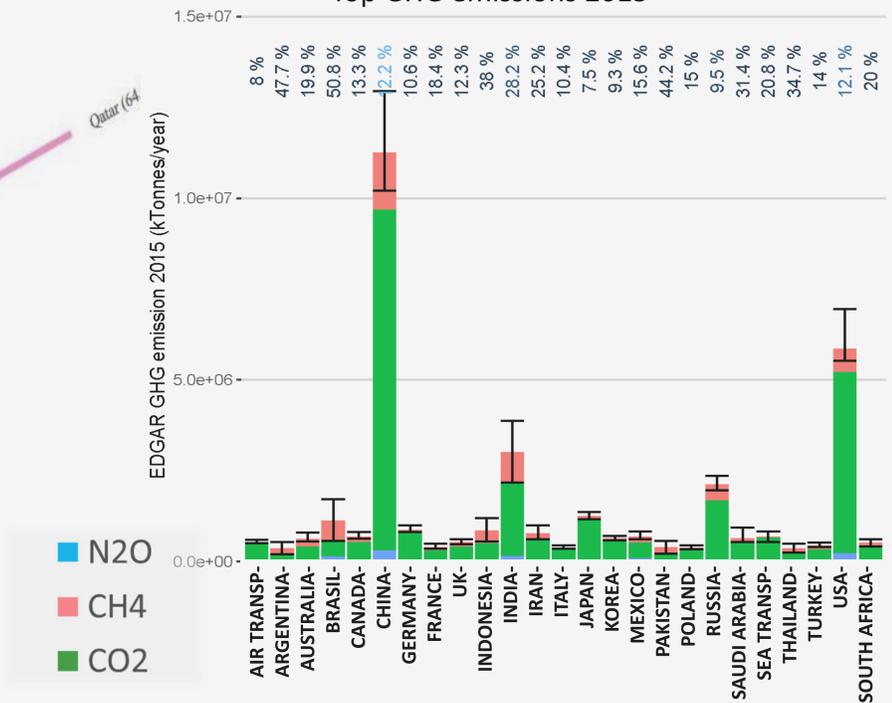
Some assumptions:

- Uncertainties of emissions from the same category (same fuel for CO<sub>2</sub>) are correlated;
- When aggregating emissions from different countries, uncertainty of same categories are correlated;
- For some sectors (e.g energy for CH<sub>4</sub>), IPCC guidelines define uncertainty within a range. We assign the upper bound of the range to developing countries and the lower bound to developed countries.

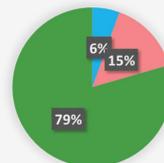
GHG emission per capita and uncertainties



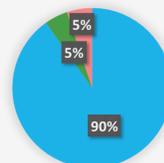
Top GHG emissions 2015



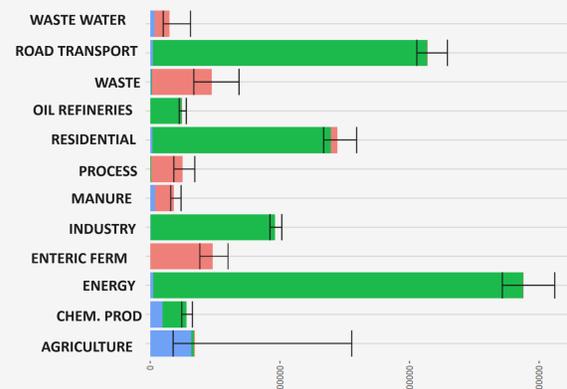
EU28 emission share



EU28 uncertainty share



Sectorial EU28 emissions



This work is part of the VERIFY effort to provide an accurate synthesis of available tools and methods used to inform policy on GHG emission reduction strategies. EDGAR's quantification of uncertainties is an essential component of the system's reliability assessment and

provides valuable information for policy scenario analysis and inverse modelling for emission verification. Total uncertainty is determined by the weight of emission (e.g. CO<sub>2</sub> for energy) and by the relative

uncertainty of each gas and sector. For USA, for example, CO<sub>2</sub> uncertainty adds up to 5%, while in total exceeds 12%. For EU28, although CO<sub>2</sub> represents 79% of GHG emissions, 90% of the total uncertainty is due to N<sub>2</sub>O from agriculture sector.

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