Tool: Implicit and explicit weighting of the population in the allocation of a global CO2 budget

The tool is based on the distribution of a global CO2 budget using a weighted distribution key.

The weighted distribution key takes into account the share of the global population and the share of global emissions of the selected country in a base year (*BY*):

$$B^i = \left(C * \frac{P_{BY}^i}{P_{BY}} + (1 - C) * \frac{E_{BY}^i}{E_{BY}} \right) * B$$

where

E_{BY} or E_{BY}^i	global emissions or emissions of country *i* in the base year
P_{BY} or P_{BY}^i	global population or population of country *i in the* base year
B	global CO2 budget
B^i	national CO2 budget of the country *i*
C	weighting of population

Implicit Weighting Population

Given a national and global budget, the implicit weighting of the population can be calculated:

$$C = \frac{B^i - B * \frac{E_{BY}^i}{E_{BY}}}{B * \frac{P_{BY}^i}{P_{BY}} - B * \frac{E_{BY}^i}{E_{BY}}} = IWP$$

The national budget can be derived from an NDC, for example. The IWP can thus be used to **evaluate NDCs**. The base year is 2019 and the budget period is 2020 - 2100 when calculating the implicit weighting.

Explicit Weighting Population

In this tool, the national budget can also be calculated for each country in the world by explicitly specifying the population weighting.

The national budgets from 2020 on are given with a distribution of the global budget from 2016 or from 2020.

References

Sargl, M., Wiegand, D., Wittmann, G. & Wolfsteiner, A., 2021. *Distribution of a Global CO2 Budget - A Comparison of Resource Sharing Models.* [Online]
Available at: https://doi.org/10.5281/zenodo.4603032