

New carbon accounting method proposed

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Credit: Alfred Palmer/Wikipedia

Established ways of measuring carbon emissions can sometimes give misleading feedback on how national policies affect global emissions. In some cases, countries are even rewarded for policies that increase global emissions, and punished for policies that contribute to reducing them.

"We have developed a new method that provides policy makers with

more useful information, in order to set national targets and evaluate their climate policies", says Astrid Kander, Professor in Economic History at Lund University, and lead author of the study, published in the latest issue of *Nature Climate Change*.

Consumption-based accounting, also known as carbon footprints, has been suggested as an alternative to today's production-based accounting. With carbon footprints, each country must account for all emissions that are caused by its final consumption - regardless of where the goods were produced.

This has been called a fairer way of measuring emissions, potentially avoiding so-called carbon leakage, where rich, developed countries can reduce their domestic emissions by shifting carbon-intensive production abroad.

The new study, a collaboration between researchers in Sweden, Norway and Australia, demonstrates that carbon footprints do not credit countries for cleaning up their export industries. It also punishes countries with more carbon efficient technology than their trading partners for engaging in trade, even if trading leads to a more carbon efficient allocation of production resources, and hence contributes to reducing emissions globally.

The new measure is therefore based on consumption-based carbon footprints, but adjusts for technology differences between countries in their export sectors.

"With the proposed technology adjusted footprint, we explicitly give credits to clean exports," says co-author Daniel Moran, a researcher in the Industrial Ecology Programme at the Norwegian University of Science and Technology.

"Heavy industry is also given a more creative role in the struggle to reduce global emissions. Companies that have done their homework and improved carbon efficiency more than their competitors actually make a positive contribution by being commercially successful", says Magnus Jiborn, philosopher at Lund university and co-author of the paper.

Applying the new method, the researchers also calculated carbon accounts for 40 countries, jointly responsible for more than 97 per cent of global GDP, between 1995 and 2010.

"The results challenge the gloomy picture of developed countries outsourcing dirty production. In fact, many countries have managed to reduce their carbon footprints by cleaning up their own production. But under our proposed method they must continue to improve their carbon efficiency faster than world average to lock in those gains", says co-author Tommy Wiedmann, Associate Professor of Sustainability Research at University of New South Wales in Sydney.

New method: how do individual countries fare?

Some highlights:

- For several European countries, technology adjusted footprints are considerably smaller than their standard carbon footprints, and for some even smaller than their production based emissions. This indicates that these countries supply the world market with carbon efficient export goods, and hence contribute to reducing [global emissions](#) in a way that standard carbon footprints fail to credit.
- For the US, UK and Australia, technology adjusted carbon footprints remain much larger than their production based emissions. This indicates that these countries do not have carbon efficient export industries and that outsourcing of dirty

production is an important factor.

- For China, technology adjusted footprints are larger than their standard consumption based footprints, but substantially smaller than their production based, territorial [emissions](#). This indicates that China is acting as the workshop of the world, providing rich, developed [countries](#) with many consumption goods, but with dirty, carbon based technology.
- For some developing countries, such as Brazil, technology adjusted [footprints](#) are substantially smaller than their conventional [carbon footprints](#), suggesting that Brazil, just like much of Europe, provides the world with low-carbon goods.

More information: National greenhouse-gas accounting for effective climate policy on international trade, [DOI: 10.1038/nclimate2555](https://doi.org/10.1038/nclimate2555)

Provided by Lund University

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