

With the right price path, there is no need for excessive carbon dioxide removal

April 15 2021



Credit: CC0 Public Domain

Technologies to remove CO₂ from the atmosphere, such as reforestation or bioenergy with carbon capture and storage (BECCS), are an indispensable part of limiting climate change in most scenarios.

However, excessive deployment of such technologies would carry risks such as land conflicts or enhanced water scarcity due to a high demand for bioenergy crops. To tackle this trade-off, a team of researchers from Potsdam and Berlin has now identified requirements for a dynamic, long-term carbon price pathway to reduce the demand for CO₂ removal technologies and thus effectively limit long-term risks. The approach minimizes governance and sustainability concerns by proposing a market-based and politically feasible approach.

"The CO₂ price needs to be high enough at the outset to make sure that emissions are reduced quickly and to achieve emissions neutrality relatively fast," explains lead author Jessica Strefler from the Potsdam-Institute for Climate Impact Research PIK. "Once we have achieved this, the price curve should flatten to avoid excessive CO₂ removal ([carbon dioxide removal—CDR](#)). It can be a real win-win: Such a price path reduces both the risks associated with increasing reliance on CO₂ removals and the economic risks of very high CO₂ [prices](#) in the second half of the century."

Costs, eco-systems, land-use conflicts

Currently discussed and in part already implemented carbon removal technologies such as reforestation, direct air capture or bioenergy, both combined with geological carbon storage, could be promising ways to complement emissions reduction efforts. These technologies are necessary to compensate the remaining few percent of emissions and achieve emissions neutrality. However, if rolled out on a planetary scale, substantial risks such as high economic costs, enhanced [water scarcity](#), or land-use conflicts could arise.

Such a large-scale deployment would only be necessary if emissions were reduced too little or too late, such that net-negative emissions would become necessary to reduce [global mean temperature](#) again after

the target has been reached. Both effects could be avoided with a high enough carbon price early on. Even if not necessary, excessive CDR could still be incentivized if the carbon price continues to increase after [emission](#) neutrality.

After steep increase, carbon pricing must remain constant

"Carbon pricing is key to reach net zero greenhouse gas emissions—there is frankly no other way to reach that target," says co-author Ottmar Edenhofer, Director of both PIK and the Mercator Research Institute on Global Commons and Climate Change. "After a high start and a rather steep increase, the price curve should flatten once emission neutrality is achieved, but it needs to remain on a high level if we want to maintain both a fossil-free world and a reasonable amount of carbon dioxide removal. Our calculations in fact show that we need a substantial pricing of CO₂ emissions throughout the 21st century—with beneficial effects for both the economy and the people."

The study is published in *Nature Communications*.

More information: Jessica Strefler, Elmar Kriegler, Nico Bauer, Gunnar Luderer, Robert C. Pietzcker, Anastasis Giannousakis, Ottmar Edenhofer: Alternative carbon price trajectories can avoid excessive carbon removal. *Nature Communications*. [DOI: 10.1038/s41467-021-22211-2](https://doi.org/10.1038/s41467-021-22211-2)

Provided by Potsdam Institute for Climate Impact Research

Citation: With the right price path, there is no need for excessive carbon dioxide removal (2021,

April 15) retrieved 6 May 2024 from <https://phys.org/news/2021-04-price-path-excessive-carbon-dioxide.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.