

Carbon dioxide should cost 3.6 times more than US price, study says

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Each ton of carbon dioxide that exits a smokestack or tailpipe is doing far more damage than what governments take into account, researchers conclude in a scientific paper published Thursday.

Major hurricanes pack more rain, while extremes of wildfire, drought and downpours are all happening more often and with more intensity due to [climate change](#), causing loss of communities, homes and lives all over the world. But what is the actual cost in dollar terms of the [carbon](#) emissions driving climactic change?

That's what researchers from a variety of fields—science, economics, medicine—are trying to figure out through a metric called the social cost of carbon, a price that represents the total climate damage caused to society through carbon emissions. It's been used in the past to justify tougher limits on carbon emissions and more spending on climate solutions, like transitioning to [renewable energy](#) and natural flood protection.

Currently, the United States government uses a price of \$51 per ton of carbon dioxide emitted, but the researchers wrote in the journal *Nature* that the price should be \$185 per ton—3.6 times higher than the current U.S. standard.

"Our results suggest that we are vastly underestimating the harm from each additional ton of carbon dioxide in the atmosphere," said Kevin Rennert, a study author and director of the federal climate policy initiative at Resources for the Future, an environmental nonprofit based in Washington, D.C. "And the implication is that the benefits of government policies and other actions that reduce global warming pollution are greater than has been estimated."

Rennert and colleagues created an updated model to measure the societal cost of emitting carbon that includes several measures excluded in previous research. They say key additions include a better accounting of the uncertainty of future climate policy, economic growth and environmental phenomena like sea level rise. They also include damages to ecosystems, biodiversity and human health, which previously weren't

accounted for.

The changes come in response to a 2017 report from the National Academy of Sciences, Engineering and Medicine that said current carbon pricing calculations were inadequate and gave several recommendations for bringing the outdated models up to speed.

Researchers began calculating damages from carbon emissions in the 1980s and before 2017, the last updates to the modeling were in the early to mid 1990s, "when the Counting Crows were still at the top of the charts," said Max Auffhammer, an author of the 2017 report and professor of international sustainable development at the University of California, Berkeley. Auffhammer, who was not involved in the *Nature* study, praised the updated model.

"A lot of science has happened," he said. "A lot of amazing datasets have come online for us to study how environmental change translates into outcomes we care about. So, that's in there now."

But not all of the authors of the 2017 report think the updated model presented in *Nature* is ready for use on the federal level.

"I found it to be ... an interesting academic piece. It offers a lot of food for thought," said Steven Rose, another author of the 2017 report and a senior research economist at the Electric Power Research Institute.

"However, I also thought it's a long way from what the current administration needs," he said, noting the new research relied on limited prior damage studies.

In the U.S. [federal officials](#) began applying the cost estimate to new regulations more than a decade ago after environmentalists successfully sued the government for not taking [greenhouse gas emissions](#) into account when setting vehicle mileage standards.

The \$51 per ton estimate under Biden restored a figure used during the Obama administration. The Trump administration had reduced the figure to about \$7 or less per ton. The lowered estimate counted only damages felt in the U.S.

Republicans have fought against using estimated future climate damages to steer policy, and officials in 23 states last year joined together on a pair of lawsuits claiming the Biden administration's use of the social cost of carbon was illegal. Led by the attorneys general of Louisiana and Missouri, the states allege the Biden administration wants to use the future costs to justify stringent curbs on energy companies and other polluting industries.

The GOP states won a temporary victory in February when a judge in Louisiana blocked the administration's use of the \$51-per-ton value. That was reversed in March by the 5th U.S. Circuit Court of Appeals, which said the states had not shown any specific harm caused by the administration's consideration of climate damages.

The states are still pressing the lawsuits and in June argued before the 8th U.S. Circuit Court of Appeals seeking to again block the administration.

At the core of the legal dispute is how much effect the social cost of carbon will have on industry. That's likely to be much greater at a higher value of \$185 per ton, because as potential future damages become more costly, the benefits from avoiding those damages through more stringent rules grow accordingly.

"It suggests there are many more actions we can take to curb [carbon emissions](#) that are going to be on the table that were not on the table before," said Stanford University economist Marshall Burke.

While the social cost of carbon has been considered in more than a dozen actions under Biden—including tougher fuel efficiency standards for cars and light trucks and new oil and gas lease sales on public lands—federal officials have said in court briefings that so far it has not been a deciding factor.

The Biden administration was due to release an updated estimate in January, but that was delayed in part by the litigation from states.

The White House said it is still reviewing the best way to price climate damages when making policy decisions. But officials already have determined that the interim price of \$51 per ton is too low. In an analysis of the new climate law published last week by the White House Office of Management and Budget, officials wrote that "the interim social cost of carbon estimates are currently significantly underestimated because they do not account for many important climate damage categories, such as ocean acidification."

An agency spokesperson declined to give a timeline for a new cost estimate.

"This Administration remains committed to accounting for the costs of greenhouse gas emissions as accurately as possible, and we continue to assess how best to account for these costs in regulatory and budgetary contexts in the future," the Office of Management and Budget said in a statement to The Associated Press.

More information: David Anthoff, Comprehensive Evidence Implies a Higher Social Cost of CO₂, *Nature* (2022). [DOI: 10.1038/s41586-022-05224-9](https://doi.org/10.1038/s41586-022-05224-9).
www.nature.com/articles/s41586-022-05224-9

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