

# Climate change is a global injustice. A new study shows why.

 [vox.com/2018/9/26/17897614/climate-change-social-cost-carbon](https://www.vox.com/2018/9/26/17897614/climate-change-social-cost-carbon)

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26 septembre 2018

The United States stands to pay the second-highest social cost of carbon in the world.

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All efforts to fight climate change face the money test: Are the benefits of stopping global warming — and avoiding sea level rise, heat waves, and wildfires — greater than the costs?

The dollar balance we arrive at should be one of the biggest factors in deciding what we're willing to do to tackle the problem, whether that's shuttering all coal plants or building thousands of nuclear reactors.

Some groups have taken a stab at calculating what climate change will cost the world, or conversely, how much humanity would save by becoming more sustainable. Earlier this month, the [Global Commission on the Economy and Climate](#) tallied the number at a truly massive \$26 trillion in savings by 2030.

Getting a slice of those savings requires figuring out which actors stand to lose the most as the climate changes, whether that's countries, companies, or even individuals.

And this is where the idea of the [social cost of carbon](#) comes in. It's a policy tool that attaches a price tag to the long-term economic damage caused by one ton of carbon dioxide, hence the cost to society. It's related to a carbon tax (more on that below), and it serves as a way to distill the vast global consequences of climate change down to a practical metric.

Critically, it's also the foundation of US climate policies, including the [Clean Power Plan](#). Revising this number down has been a key part of the Trump administration's strategy to [roll back environmental rules](#). Under Obama, the [social cost of carbon](#) was set at [\\$45 per ton](#) of carbon dioxide; under Trump, it's as little as \$1.

A new study published Monday in the journal [Nature Climate Change](#) calculates the social cost of carbon down to individual countries. This adds an important bit of nuance because climate change is going to cost some countries more than others, a fact that's lost when you try to tabulate a global average.

The team found a global social cost of carbon vastly higher than many previous estimates, drawing on more recent climate projections and more robust macroeconomic models. The results also highlighted the fundamental injustice of climate change: Many of those who contributed the least to the problem stand to suffer the most. And the study has a stark message for the United States: The economy stands to pay one of the highest prices in the world for its emissions.

## We're drastically underestimating how much climate change will cost the global economy

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Even if you've just skimmed climate policy discussions in recent years, you've likely come across the idea of a carbon tax. In short, a carbon tax helps attach the consequences of climate change to the greenhouse gas sources that are driving it. Ideally, it would push economies toward sustainability by making dirtier energy sources and industries more costly relative to their alternatives. It's a useful tool in estimating the costs and benefits of different ways to fight climate change.

Though a tax is just one way to price emissions, most economists and scientists agree that pricing in some form is the sine qua non of fighting climate change. (My colleague David Roberts has written extensively about the limits of a carbon tax and the recent Republican carbon tax proposals.)

How high you set your carbon tax is a function of how aggressively you want to clean up your act and how much damage you're expecting if you don't. The former is an objective that's set by policymakers, but the latter, in theory, has an empirical value. This is the social cost of carbon.

The lead author of the *Nature Climate Change* study, Katharine Ricke, an assistant professor at the Scripps Institution of Oceanography at the University of California San Diego, explained that calculating the social cost of carbon requires coordinating several variables.

"You need to make assumptions about socioeconomic progress and changes in the world that are going to happen out a century in the future," she said. "You need to contend with uncertainty about how climate change is going to look."

The social cost of carbon is an imperfect measure: It focuses on broad changes in the economy rather than abrupt shifts from extreme weather or disasters. It also requires making many arguable assumptions. However, it's still a useful tool in estimating the costs and benefits of different ways to fight climate change.

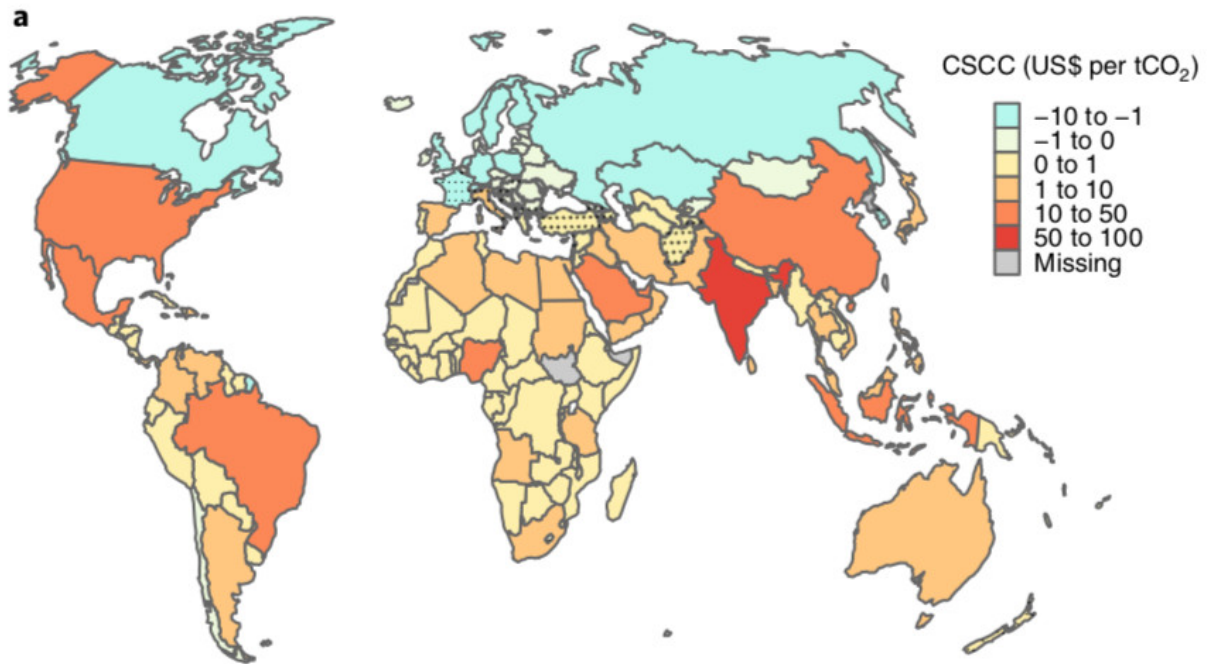
To account for this variability, Ricke and her team looked at a range of greenhouse gas emission scenarios, as well as several different economic damage models and multiple social discount rates.

The results showed that the world has been drastically undervaluing the potential economic damages from climate change. The median global social cost of carbon came out to \$417 per ton, an order of magnitude more than prior estimates of \$40 per ton.

India is poised to pay the highest social cost of carbon. Russia may not pay one at all.

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Drilling down into individual countries, the researchers spotted disparities in the economic consequences of climate change.



The social cost of carbon for individual countries in dollars per ton of carbon dioxide emissions.

### Nature Climate Change

Countries at northern latitudes, like Russia, face a *negative* social cost of carbon. This implies that the warming wrought by climate change will actually boost the economies of these countries. Warming can improve agriculture or reduce heating demands in the far north, for example. However, Ricke cautioned that these costs were calculated based on macroeconomic factors within countries; they don't account for things like international trade, which may suffer in a warming world.

The model also doesn't account for direct consequences of climate change, like sea level rise flooding coastal areas or thawing permafrost causing roads to buckle. In fact, northern latitudes are among the fastest warming regions in the world. These effects will impact the economies of northern countries, but they aren't baked into the economic model used in this study.

"We recommend taking the negative social cost of carbon values with a grain of salt," Ricke said. "These estimates likely represent a lower bound."

On the other hand, the findings are especially alarming for India. It has the highest social cost of carbon in the world, at \$86 per ton. Coming in second is the United States at \$48 per ton.

"The thing that drives the high social cost of carbon in the US to a great extent is the fact that we just have such a big economy, so we have a lot to lose," Ricke said. This value coincidentally aligns with the number the Obama administration came up with, but there's a crucial difference. Ricke explained that the government's numbers included social costs to the rest of the world from US emissions; the number Ricke calculated does not. If the team were to include everything in the Obama formula, then the social cost of carbon for the United States would be even higher.

As journalist David Wallace-Wells pointed out on Twitter, this shows that fighting climate change makes sense for the United States, even for purely selfish reasons:

This means that aggressive climate change policy is not a fantasy of moral leadership—the U.S. paying climate dividends to the rest of the world—but an act of economic self-interest and self-preservation.

— David Wallace-Wells (@dwallacewells) [September 24, 2018](#)

## Calculating the social cost of carbon is merely the starting point for climate policy

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Suppose every country in the world suddenly wakes up tomorrow in ecstatic cahoots on climate change and decides to implement a carbon tax at the level of their respective social costs of carbon. Will that solve climate change?

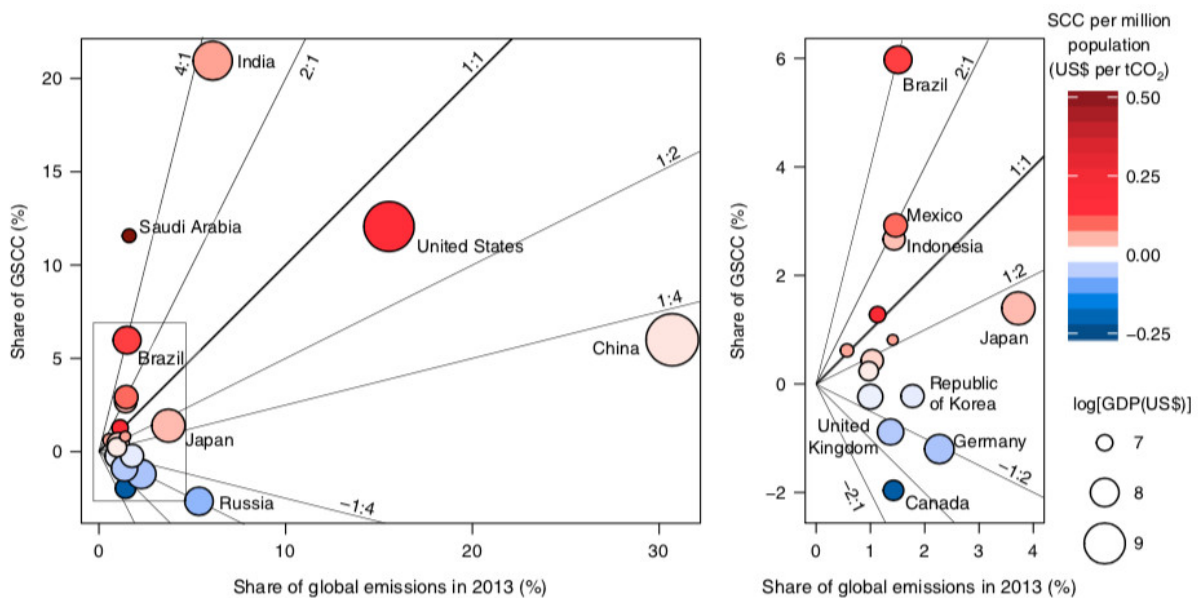
Not even remotely.

“If countries were to price their own carbon emissions at their own [country-level social cost of carbon], approximately 5 [percent], a small amount, of the global climate externality would be internalized,” the researchers wrote.

That’s because there are some countries that emit very little and will be hit hard by climate change, while others emit a lot and won’t see as many damages. So for a country to set a meaningful carbon tax, or any other price on carbon, it has to include damages caused to other countries, as former Obama adviser Jason Bordoff wrote in the [Wall Street Journal](#):

Unlike other regulated pollutants that have almost entirely domestic consequences, CO<sub>2</sub> impacts are global, and climate change is a “tragedy of the commons” problem. A ton of CO<sub>2</sub> contributes equally to climate change regardless of where it comes from. If all nations looked only at the impact of a ton of CO<sub>2</sub> on their own nations, the collective response would be vastly inadequate to address the true damages from climate change.

This wonky chart (bear with me) from Ricke’s study explains the dilemma:



A figure comparing the social cost of carbon within a country to its share of global emissions.

*Nature Climate Change*

The chart compares a country’s social cost of carbon to its share of global emissions. The radiating lines show the ratios of a country’s share of global emissions to its share of the damages.

The United States is almost balanced, with its high social cost of carbon roughly proportional to how much carbon dioxide it emits. But India pumps out just 6 percent of global greenhouse gases and will bear more than 20 percent of the global economic burden from climate change. In other words, India faces almost quadruple the damages of global warming compared to its contribution to the problem. Zoom in further and you’ll notice that many of the wealthiest countries in the world stand to bear the lowest costs of climate change.

This is part of why the global social cost of carbon, \$417 per ton, is so much higher than it is for any individual country. The costs of climate change are greater than the sum of their parts. Yet it also shows that many of the wealthiest countries, which contributed the most greenhouse gases, stand to be the best insulated from its costs.

That makes climate change a global justice concern. In limiting global warming, wealthy countries face a moral imperative to look beyond their borders and GDPs, pushing even harder to cut their own emissions. The social costs of carbon also show why climate change really has to be tackled as a global problem rather than by individual nations. But as long as countries like Russia, the United Kingdom, and Germany face little financial fallout, that policy case becomes much harder to make.