Climate Risks and Carbon Prices:
Revising the Social Cost of Carbon

Q&A

What does the term "social cost of carbon" mean?

The social cost of carbon (SCC) is the estimated price of the economic damages caused by each additional ton of carbon dioxide released into the atmosphere. Scientists know that the release of carbon dioxide from human activities is causing global temperatures to rise. As a result, scientists predict (amongst other things) sea level rise from warmer temperatures and the melting of glaciers and polar ice caps; more frequent and intense extreme weather events like the 2011 Mississippi River floods; and changes in agricultural productivity and the availability of fresh water as weather patterns diverge from historical trends.

How is the social cost of carbon used?

Agencies seeking to incorporate climate change considerations in rules and regulations often rely on a cost-benefit analysis, weighing the cost of curbing emissions against the expected damages from every ton of carbon dioxide that goes into the atmosphere — the social cost of carbon (SCC). The higher the social cost of carbon, the more stringent the regulatory standards. The social cost of carbon, therefore, is important to a wide range of potential regulatory proposals, from energy efficiency standards, to tailpipe emissions, to EPA limits on greenhouse gas emissions.

What is the government's estimate of the social cost of carbon?

In 2010, the U.S. Government's Interagency Working Group on Social Cost of Carbon estimated the SCC at $21 per ton of carbon dioxide emissions in 2010, equivalent to just $0.21 per gallon of gasoline. This is not a large number. If a proposed policy would cost more than $21 per ton of reductions in carbon dioxide emissions, then, according to this calculation, it's not worth doing. However, *Climate Risks and Carbon Prices: Revising the Social Cost of Carbon* uncovers serious flaws in the Working Group's calculations. The government's estimate of the SCC omits many of the biggest risks associated with climate change, and downplays the impacts of climate change on future generations.

What is the true social cost of carbon?

Climate Risks and Carbon Prices: Revising the Social Cost of Carbon recalculates the social cost of carbon using the DICE model, the best-known of the models used by the Working Group, and changing it as needed to better account for key uncertainties that affect the calculation. The report recalculates the SCC based on 16 scenarios and estimates a range of SCC values in 2010 from $28 to $893 per ton. In the worst case scenarios, the social cost of carbon could be almost $900 in 2010, rising to $1,550 in 2050. If the damages per ton of carbon dioxide are that high, then almost anything that reduces emissions is worth doing.

Why is does the report have a range of estimates, rather than just one?

Climate Risks and Carbon Prices: Revising the Social Cost of Carbon identifies four major uncertainties that affect calculations of the social cost of carbon: the sensitivity of the climate system to greenhouse gases; the level of economic damages expected at low temperatures during the early stages of global warming; the level of damages expected under higher temperature or catastrophic climate change scenarios; and the appropriate way to value future costs and benefits of climate change. The report's range of SCC calculations is based on combinations of high and low alternatives for each of these factors, yielding an array of 16 possible values, both for 2010 and for 2050. While there will always be uncertainty surrounding estimates of the social cost of carbon, this report finds that the government's current estimates significantly underestimate the economic damages from climate change.

What is the significance of a higher social cost of carbon?

A social cost of carbon of $21 per ton suggests that emissions reduction is only worth pursuing if the cost to reduce a ton of emissions is $21 or less. Knowing that the true social cost of carbon could be forty times that amount brings a whole new perspective, and sense of urgency, to the value of reducing our emissions.

Current estimates of the costs of emissions reductions plans aimed at achieving zero or negative net emissions range from $150-$500 per ton of reduction. The range of SCC estimates provided in this report tell us that is highly likely that we will pay more to suffer the consequences of carbon emissions that it will cost us to reduce them. As long as there is a credible risk that the damages from a ton of emissions exceed the costs of abatement, it is worth doing everything we can to reduce emissions. Cost-benefit analysis under such conditions coincides with a precautionary approach that calls for taking immediate, large-scale action to phase out carbon emissions and protect the Earth's climate.

What is the E3 Network?

The E3 Network is a national network of over 200 economists. The "E3" stands for "Economics for Equity and Environment".

Who wrote Carbon Risks and Carbon Prices: Revising the Social Cost of Carbon?

Commissioned by E3 Network, Dr. Frank Ackerman and Dr. Elizabeth A. Stanton authored *Climate Risks and Carbon Prices: Revising the Social Cost of Carbon*. The report follows E3 Network's publication of an April 2010 white paper – The Social Cost of Carbon – by the same authors. Dr. Ackerman holds the position of Climate Economics Group Director and Dr. Stanton is a senior economist at the Stockholm Environment Institute's U.S. Center at Tufts University.

Excerpt from a review of Carbon Risks and Carbon Prices: Revising the Social Cost of Carbon:

"The consequence of Ackerman and Stanton's modeling is thus to increase the range of possible climate damages, specifically to increase the upper limit, and this in turn increases the importance of properly handling risk and uncertainty."
Simon Dietz, Co-Director of the Grantham Research Institute on Climate Change and the Environment, London School of Economics