

# Research impact: making a difference

## **An economic solution to climate change that could save trillions**

LSE research helped governments worldwide put a price on carbon that could curb harmful emissions and save \$1 trillion annually

### **What was the problem?**

Amid rising concern over the impact of climate change, policymakers have been looking at ways to reduce carbon emissions.

For economists the problem is that polluters are not required to bear the full cost of the pollution they create in terms of the costs to wider society.

Economists have argued that putting a “price” on carbon, so that polluters are forced to take into account the negative effects of their harmful emissions, must be a core element of an economically efficient strategy to curb these emissions.

However, the pricing of carbon emissions is by no means an easy or straightforward undertaking. The approaches to such pricing are numerous, complex and competing, making it particularly challenging for policymakers, many with only a layperson's understanding, to decide on an optimal approach.

The stakes are huge. Estimates suggest that the cost savings from an economically efficient policy intervention could be as high \$1 trillion a year globally.

### **What did we do?**

Many countries such as the UK use cost-benefit analysis to evaluate new spending and regulations. The original approach used to price a ton of emissions was the so-called “social cost of carbon” - the economic value of the damage caused by an extra ton of greenhouse gases in the atmosphere.

The Stern Review on the Economics of Climate Change (2006) estimated the total cost of climate change to be equivalent to a one-off, permanent 5-20% loss in global average (mean) per-person spending in today's money. The cost of each extra tonne of carbon emitted today was estimated to be around \$312.

Researchers at LSE's Grantham Research Institute on Climate Change and the Environment, led by Associate Professor Simon Dietz, subsequently updated the economic modelling that they had produced for the Stern Review.

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They showed that the social cost of carbon that had been used in the Stern Review had a high level of uncertainty. They concluded that the most robust measure of the price of carbon for cost-benefit analysis should be the cost of cutting each extra ton of emissions.

Professor Sam Fankhauser and colleagues also looked at the specific tools being proposed to impose a price on carbon, such as carbon taxes and cap-and-trade. The latter was an approach in which governments set a limit or 'cap' on certain types of emissions and polluting companies could sell or 'trade' the unused portion of their limits to companies that were struggling to comply.

The researchers examined important design elements of cap-and-trade systems. These included: how to bank and borrow emissions permits and how this process interacted with other markets, taxes and subsidies; and ways to keep the permit price from rising too high or falling too low.

They also documented how carbon pricing policies had been implemented across the world so that countries could learn about what other jurisdictions were doing and become aware of good ideas and practices being tested elsewhere.

## What happened?

The research has influenced both the policy thinking as well as the design and substance of carbon pricing legislation in the UK and elsewhere in the world.

### *Carbon pricing in the UK*

In 2009 the UK Department for Energy and Climate Change (DECC) changed its guidance on the price of carbon for cost-benefit analysis, from using the social cost of carbon to using the marginal cost of cutting emissions, as the LSE research had proposed.

DECC's report cited Dietz, who had been one of six independent peer-reviewers of the interim guidance produced in 2007. He was employed as a consultant by DECC for the preparation of the new guidance in 2008/2009.

This change in carbon pricing was expected to increase the likelihood that the UK government would meet its statutory obligation per the Climate Change Act of reducing overall emissions by at least 26% by 2020 and 80% by 2050.

### *Carbon pricing worldwide*

The research has also had an impact on legislation to introduce new carbon pricing policies in Australia, China, Mexico and South Korea, all of which have adopted new measures or are in the process of doing so.

"Thank you to the Grantham Research Institute of the LSE for their hard work behind the scenes."

**Christiana Figueres, Executive Secretary of the United Nations Framework Convention on Climate Change**

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The United Nations has referred to the Grantham research as contributing to the prospects for an international agreement on climate change.

The research was also used as the basis of discussions between UK and EU legislators and China's chief negotiator, Minister Xie Zhenhua, in the House of Commons in October 2011 when the two sides examined examples of "good practice".

The researchers have worked closely with GLOBE International, a global forum of parliamentarians. Their research fed directly into an international policy paper that aimed to help national legislators understand the nuts and bolts of carbon markets as they draft their own country-specific legislation.

The LSE team also provided direct advice on a particular technical point of the Australian trading scheme related to the treatment of carbon offsets (credits that can be earned by reducing greenhouse gas emissions in one location that can offset pollution elsewhere).

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**Dr Simon Dietz** is one of the founders and is a current Co-Director of the Grantham Research Institute on Climate Change and the Environment at LSE, where he is also Director of the ESRC Centre for Climate Change Economics and Policy, and Associate Professor in the Department of Geography and Environment. Simon is an environmental economist with diverse interests, from climate change to biodiversity and from decision theory to growth theory. As an undergraduate he studied Environmental Science at UEA Norwich and ETH Zürich, before completing an M.Sc. and Ph.D. at LSE in environmental policy and economics. In 2006-7 he was an analyst at the UK Treasury on the Stern Review on the Economics of Climate Change, and played a leading role in the Review's modelling of the 'cost of inaction'. He sits on the editorial boards of the Journal of Environmental Economics and Management and the Journal of the Association of Environmental and Resource Economists.

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**Dr Sam Fankhauser** is Deputy Director of the ESRC Centre for Climate Change Economics and Policy at LSE and Co-Director of the Grantham Research Institute for Climate Change and the Environment. Sam has been involved in climate change economics and policy for over 20 years. He is a former Deputy Chief Economist at the European Bank for Reconstruction and Development (EBRD), and served on the 1995, 2001 and 2007 assessments of the Intergovernmental Panel on Climate Change (IPCC). Sam studied economics at the University of Berne and LSE, and holds a PhD from University College London. He is also a member of the UK Committee on Climate Change (CCC), an independent body that advises the UK government on carbon targets, as well as the CCC's Adaptation Sub-Committee, and Director at Vivid Economics. His research interests include the economics of adaptation to climate change; climate finance and the functioning of carbon markets and climate change policy in the UK.

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