UNIVERSITY OF CAMBRIDGE

Briefing Paper series from the Cambridge Centre for Climate Change Mitigation Research

4CMR

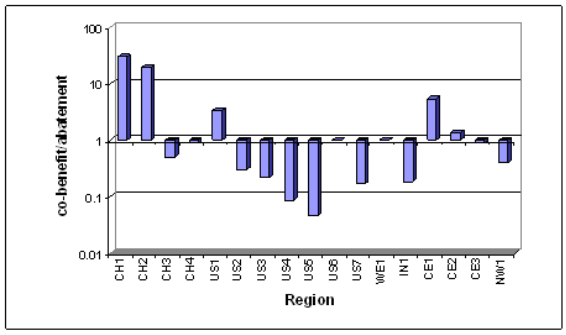
Global Co-benefits of Decarbonisation

Policy summary

Climate change policies are often justified on the basis of the direct risks to human health, ecosystems and the economy. These risks are in the future and characterised by significant uncertainty. When decarbonisation of the global economy occurs, however, it brings immediate benefits to human health through reduction of co-pollutants such as particulate matter. The resulting decrease in human health risk and costs of illness are immediate, better established, and amenable to the kinds of cost-risk-benefit calculations underlying traditional environmental policy.

The Setting

Decarbonising the global economy (climate change mitigation) is the primary strategy for reducing the risks of climate change. These risks include changes in rainfall (producing floods and droughts), migrating ecosystems, crop losses in some regions (but gains in others), and changes in patterns of disease by mosquitoes and other vectors. When these risks are quantified, they represent both significant losses in the health of human populations and significant hits to the global economy.



A 2009 study showed that the co-benefits of strategies that reduce carbon emissions can more than off-set the costs of mitigation. Values of the ratio above 1 are cases around the world where this has been the case. In the other regions, co-benefits have at least partially, and sometimes significantly, reduced the net cost of mitigation.

These risks, however, are not pressing in the minds of many decision-makers. They are in the future (often by several decades), occurring in nations other than their own, and clouded by uncertainty. It becomes difficult for decisions to be taken on reducing these risks through decarbonising the economy, when there are immediate challenges to health and the economy to be addressed. This makes it difficult to marshal the will to large-scale action, especially in the political arena where the next election looms.

The Solution

Strategies that reduce carbon dioxide emissions often bring broader and more immediate benefits. Particulate matter, ozone and other air toxics already are a source of concern in nations, with a toll on public health that has justified national policies despite significant costs of pollution prevention. Time and again, these costs have been found to be significantly less than the benefits to health, and so policies have been put in place. The ability to push forward with these strategies lies in the fact that the costs and benefits are in the same nation, and the same economy. Marshalling the political will to carry out the changes when risks are immediate, well-established and fit within a traditional cost-risk-benefit framework of policy is greatly simplified in contrast to climate change and decarbonisation policies. Examination of co-benefits can therefore be a more effective way to drive forward ambitious targets for climate policy than approaching climate change risks directly.

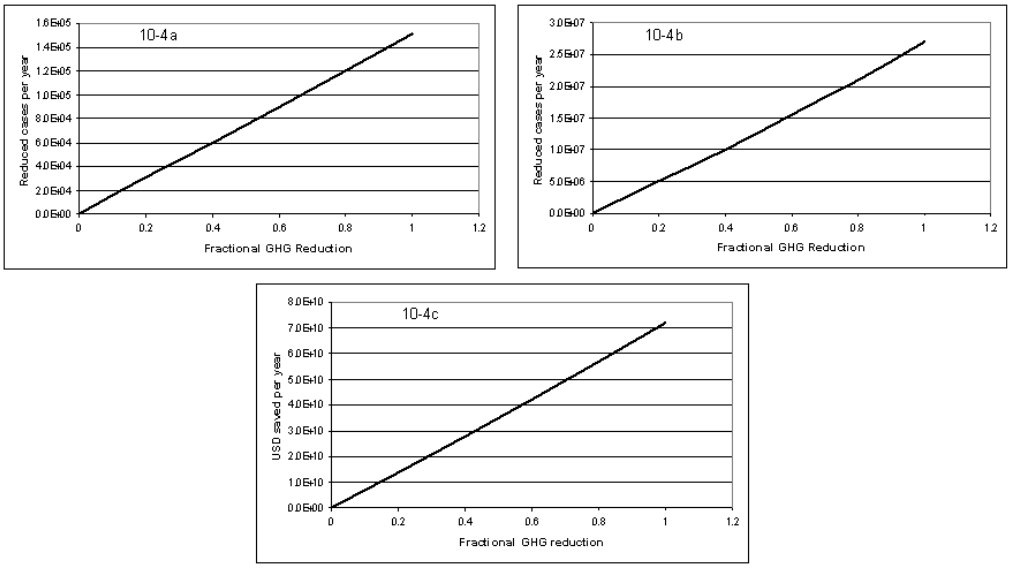
The Briefing Papers series by 4CMR provides policy makers, organisations, communities and citizens with advanced research on the roles of economic, energy and environmental strategies for reducing the risk of climate change.

The series is made possible through a generous award from the Three Guineas Trust supporting both the research described and public outreach and engagement.

To help guide this application of cost-risk-benefit analysis to climate change co-benefits, we at 4CMR have developed a Human Health Module to link to our macroeconomics models. The Human Health Module makes use of the latest epidemiological data on the relationship between air pollutants and human health, and empirical studies of how decarbonisation strategies simultaneously reduce air toxics such as particulate matter and ozone, to examine how these strategies will produce co-benefits to health. They can be used either to calculate the impacts of climate policies on other forms of improved public health (e.g. fewer cases of asthma as particulate matter is reduced along with carbon dioxide) in isolation, or the results can be fed back into macroeconomic models to understand how this improved health affects economic performance, as workers become more productive and less of the national wealth goes towards health care.

The Results

We used the Human Health Module to calculate the improvement in health worldwide, and the savings in health care cost (Cost of Illness, or COI) when global decarbonisation produces decreases in emissions of particulate matter. The findings are in the figure below:



The upper left figure shows savings of deaths per year globally when carbon dioxide (greenhouse gas) emissions are reduced by the percentages shown on the x-axis; the upper right figure shows the same for morbidity (diseases that don't cause death); and the bottom figure shows savings in costs of illness. As an example in reading the charts, an 80% reduction in greenhouse gas emissions saves 120,000 lives per year; 20,000,000 cases of significant respiratory disease; and $60B in annual costs of illness.

Conclusion

The results shown in the figure above are significant in regard to protection of public health. Immediate consequences could be found in populations taking the mitigation actions (rather than in some far-off place and time). They are not replacements for concerns over the risks of climate change, but they provide a perhaps more compelling basis for political actors to marshal the will and resources for action on climate change.

The Cambridge Centre for Climate Change Mitigation Research (4CMR) studies the interconnected economic, energy and environmental policies at the heart of climate change policy.

This Briefing Paper was developed from research by Doug Crawford-Brown of 4CMR.

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