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Investing in the Economics of Climate Security

Nick Mabey, November 2007

The economics of climate change is lagging behind the science. We need to improve on this quickly if we are to take the right investment decisions, argues Nick Mabey.

Earlier this year, the Intergovernmental Panel on Climate Change[1] (IPCC) issued its Fourth Assessment Report[2] on the technology and economics of mitigating climate change.

Media reporting at the time focused on the now familiar message that the technology needed to stabilise greenhouse gases in the atmosphere already exists, and that reducing emissions will cost only a fraction of global GDP.

But this interpretation of the IPCC report hides a more important analytical debate, one that goes to the heart of the economics of climate change: how far and fast should we cut global greenhouse emissions to effectively ensure climate security?

The two central components of this debate are easy to identify, for there is currently a mismatch between them.

Firstly, there are the high profile calls from climate scientists for urgent and strong mitigation action so that we can avoid extreme climate change.

Secondly, and in contrast, are the weak mitigation scenarios analysed by the majority of economic studies reviewed by the IPPC.

Let's look at each of these aspects in turn.

Avoiding extreme climate change

The last year has seen increased focus on the potentially extreme and catastrophic impacts of climate change. New science is showing the fragility of climate systems.

The Stern Review[3] estimated climate change costs of 5-25% GDP - the combined costs of two World Wars and the Great Depression. The UN Security Council has also debated[4] how climate change is already driving large scale social disruption and conflict in many parts of the world.

There is an increasing recognition that without climate security there will be no long term foundation for prosperity and stability. And in an increasingly interdependent world the breakdown of social and economic systems has high costs for us all.

To take just one possibility, security analysts from RAND Corporation[5] have outlined a scenario where the European and US economies would be pitched into recession by widespread social instability in China driven by drought and food shortages. They believe that this could become a reality within the next two decades.

Indeed, recent research[6] from James Hansen and others suggests that moving above a maximum of 450ppm (CO_2 equivalent) would move global temperatures above 2°C and into a regime of "dangerous climate change". This would present two types of catastrophic risks:

Firstly, there would be a high risk of irreversible climate change impacts; for example, melting of the Greenland ice sheet or large scale desertification.

Secondly, this would also generate "positive climate feedback" where higher temperatures in turn release more greenhouse gases from tundra, forests and beneath the oceans.

Such a scenario would mean that we would lose the ability to limit global temperature increases. The concentration of greenhouse gasses would no longer be primarily driven by human activity but by the disruption of the global carbon cycle itself.

Science is not advanced enough to tell us when these tipping points will occur. But the warning signs are there. This year carbon absorption in the southern oceans "shut down"[7] - helping double the rate at which greenhouse gases are accumulating in the atmosphere.

What the best science does suggest is that the prevention of catastrophic climate change requires the stabilisation of emissions below 450ppm. But here is the analytical mismatch: surprisingly this target is not the focus of most economic and technical studies on climate mitigation.

Economic analysis of climate mitigation

The IPCC's comprehensive review of the academic literature found nearly 140 studies which looked at stabilising concentrations between 550-700 ppm (CO2 equivalent).This would result in at least a 3-4°C global temperature rise; up to double the "dangerous level".

Yet by contrast, only 6 studies looked at keeping concentrations below even 490ppm (CO2 equiv).

This analytical gap is a reflection of the economics literature, not the IPCC process, but it has real consequences for policy and the timetable of emissions reductions.

Stabilisation at 550-700ppm only requires global CO2 emissions to peak by 2020-2060; but stabilisation at 450ppm requires emissions to peak between 2015-2020.

Politically, high stabilisation targets remove any need for serious action in the next 15 years, conveniently over the election horizon. But delaying the peak of emissions also locks us in to another generation of high carbon infrastructure, making the eventual shift to a low carbon economy more difficult and expensive, and hence less likely.

Other risks are also absent from these models. Since oil prices rose in 2002, countries have rapidly moved into coal power and coal-to-liquids technology, increasing the rate of global CO2 emissions growth; a result not reflected in most long term modelling.

The models also seem to overestimate the ability of higher prices to improve efficiency. The experience of climate change policy in Europe is that the impact of even large price signals is quickly eroded, and most consumers and businesses are highly price insensitive.

The IPCC report itself discusses how even a small risk of catastrophic damages should motivate faster and deeper emission cuts. But none of the modelling studies it reviews includes either the risks of catastrophic costs or the co-benefits of climate mitigation action.

The IPCC is therefore forced to conclude[8] that the available model results

"do not as yet permit an unambiguous determination of an emissions pathway or stabilization level where benefits exceed costs." [page 18, paragraph 21].

The problem for policy-makers

This means that policy makers are left with little useful guidance from the economics literature on the core decision they have to make: how far and fast should we cut global emissions?

If we were to accept the need to stabilise emissions at 450ppm, this would require much faster investment in low carbon energy sources in the next 25 years. Investment would have to prevent lock-in to high carbon power infrastructure.

This would also require a far more aggressive and interventionist approach by policy makers to the research, development and deployment of new technologies over the next 5-15 years. For if these investments are not made soon, then there will be no chance of avoiding high risks of catastrophic climate change impacts.

So there is a real choice as to how much "climate insurance" we should buy. Achieving a 2°C world requires radical action in the next decade to shift private sector investment patterns, and substantial public investment in the acceleration of large scale zero-carbon technologies.

This is not just an economic choice but a security[9] choice as well. If we fail to drive transformation quickly enough we would have no ability to correct our mistake. For a high-carbon infrastructure cannot be dismantled overnight without prohibitive cost. Similarly, we cannot suck carbon from the atmosphere at scale.

Conclusion

The challenge for the economics of climate change is to assess the costs of catastrophic climatic and social disruption against the costs of shifting decisively to a low carbon economy over the next decades. Uncertainty abounds over any choice. But this is a risk management decision – not a quest for truth.

However, the critical point to remember is that while we can always reverse our choices to invest in a low carbon future; once we have passed the critical climate change tipping points we can never regain our climate security.

The economic study of climate change must reflect these realities if it is to provide any useful guidance on policy choices.

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1 http://www.ipcc.ch/

2 http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html

3 http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm

4 http://www.un.org/News/Press/docs/2007/sc9000.doc.htm

5 http://www.rand.org/hot_topics/global_warming/

6 http://pubs.giss.nasa.gov/docs/2007/2007_Hansen_etal_2.pdf

7 http://news.bbc.co.uk/1/hi/sci/tech/6665147.stm

8 http://www.ipcc.ch/SPM040507.pdf

9 http://www.cnas.org/attachments/contentmanagers/1278/CSIS-CNAS_AgeofConsequences_October07.pdf

10 http://www.amazon.co.uk/Argument-Greenhouse-International-Controlling-Environmental/dp/0415149096