EXECUTIVE SUMMARY

COLLABORATIVE GLOBAL ACTION TO CUT CO_2 EMISSIONS CAN SIGNIFICANTLY LOWER THE COST OF CLIMATE CHANGE MITIGATION AND INCREASE BOTH GDP AND EMPLOYMENT IN ALL MAJOR ECONOMIES.

The economic costs of tackling climate change have long been a point of debate for academics, politicians and business leaders. Concerns about these costs, and where and how they might fall, have proved one of the major obstacles to more ambitious international action on climate change, explaining in large part the world's failure so far to put itself decisively on a low-carbon development path.

The debate, however, has shifted greatly in recent years. The Stern Review unambiguously demonstrated the global benefits of early action and the high cost of inaction, while the IPCC's assessment reports have illustrated the major cost reductions achievable globally through collective effort.

This report builds on these earlier findings. It reframes the debate in terms of investment benefits rather than mitigation costs. It demonstrates that collaborative international action, involving both developed and developing countries, can greatly lower the cost of CO_2 reductions at both national and global levels. It shows that economic growth and job creation in all major economies can be sustained and even increased under ambitious mitigation scenarios. And it shines a light on the potential benefits from reflating the global economy through a global green 'New Deal' in Copenhagen.

THE CASE FOR COLLECTIVE MITIGATION ACTION

Scientists and economists are clear: cutting greenhouse gas emissions is urgent, and major progress is needed in the next ten years to avoid serious consequences for both the global economy and the environment.

But forging multilateral agreements can be difficult, time consuming and hostage to least-best compromises. Unilateral action is also politically difficult. Concerns about free riders, carbon leakage and the fact that no single country alone can stabilise global emission levels have proven to be critical barriers to action. Implicit in all these problems is an overarching concern with perceived cost, both at the national and global level.

Yet, the economic cost of achieving a given level of emission reduction could be reduced by international cooperation. Previous research has indicated that the establishment of a global carbon price, supported by coordinated research and development, and the adoption of ambitious international standards for low-carbon products could greatly lower the cost of climate change mitigation.

MODELLING THE EFFECTS OF COLLABORATION

This latest report from the Breaking the Climate Deadlock initiative, commissioned from a group of leading econometric researchers at the University of Cambridge, goes further, asking:

- If all nations work together, does it require a higher or lower carbon price per tonne of carbon dioxide to reduce emissions than if some countries or regions go it alone?
- Do some countries gain while others lose, or can all benefit?
- What are the impacts on GDP and employment at global and national levels?

To answer these questions, the research team estimated the mitigation costs and macroeconomic benefits of different unilateral, regional and global emission reduction scenarios using E3MG, a computer model of the global economy developed at the University of Cambridge. The model simulates economic activity under a range of policy scenarios and estimates energy demand and related greenhouse gas emissions. It is able to demonstrate the effect on economies and emissions of specific mitigation policies and capture the economic impacts of interactions between sectors and countries.

The model utilises a two-pronged approach for achieving emission reduction targets: i) carbon pricing and ii) progressive fiscal and taxation policies combined with other direct regulation. This combined approach is essential for addressing the twin market failures of global warming and insufficient technological innovation and development.

In each of the scenarios modelled, countries set the respective emission reduction targets for their economies as a whole. Revenues from carbon taxes or emissions allowances are recycled back into the economy, as reduced employment taxes and incentives for adopting low-carbon behaviours and technologies. Strong regulations are applied by all governments, coordinated internationally depending on the scenario, to rapidly reduce emissions from vehicles, buildings and power generation equipment. The model then establishes the lowest carbon price which will achieve this target and the resulting impact on economic output and employment.

The following emission reduction scenarios were modelled:

- EU-only action
- US-only action
- Joint EU and US action
- All developed countries take action
- All developed countries plus China take action
- Global agreement (all developed and developing countries take action)

For those scenarios that include developing countries, two variant approaches, involving relatively more or less ambitious action in developing countries, were modelled.

The parameters chosen for the model scenarios deliberately cover a range of options, from almost no additional action to cut emissions to a set of targets that probably go well beyond what will be agreed in Copenhagen. While they take into account the global emissions pathways suggested as necessary by the scientific community, they are in no way designed to be a policy recommendation or an indication of what is necessary or possible. Their purpose, instead, is to illustrate how collaboration on cutting emissions, even under stringent mitigation regimes, leads to net positive benefits for developed and developing countries alike.

KEY FINDINGS

The carbon price needed to reach emissions reduction targets drops dramatically as more countries are involved in an agreement.

This is a simple reflection of the larger pool of low-cost carbon reduction opportunities available under a multilateral agreement and the fact that, as markets grow, new technologies become commercially viable. Results show it would take a carbon price of $\$65/tCO_2$ for the EU to cut its energy related CO_2 emissions by 30% by 2020, operating alone. This falls to $\$28/tCO_2$ when the US joins in an agreement, and potentially to very low levels (about $\$4/tCO_2$) in the case of a global agreement. The very low carbon prices, however, are only valid if strong, coordinated, international regulations are in place so that key technologies are rapidly developed to decarbonise vehicles, electricity generation and buildings, in areas where low-carbon 'no regrets' options have been identified as available.[1] This dramatic fall in the required carbon price suggests that levels of ambition are achievable with global collaboration that would be prohibitive if countries acted alone.

Cutting emissions is good for the economy – projected global GDP increases with the coverage of the climate regime.

The modelling shows world GDP increasing slightly, compared to the 'no action' baseline scenario under all the climate mitigation scenarios considered. When there is only action in some regions, such as the EU and the US, these benefits are so small they fall within the margins of error of data and the model; nevertheless the fact that there is no negative impact suggests that possible carbon leakage impacts and loss of competitiveness are likely to be more than compensated by the benefits derived from leadership in a new range of low-carbon technologies and services. Under a global climate agreement, global GDP could increase by 0.8% by 2020 relative to projected GDP with no climate action.

[01] It must be noted that we continue to assume that other mitigation policies (e.g. regulations) are in place in all mitigation scenarios, in contrast to the baseline scenario (where such policies are not applied).

Employment benefits also increase with the coverage of the climate regime.
The greatest benefits for world employment come from a global agreement with more stringent targets adopted by developing countries. This creates in the region of 10 million more jobs worldwide by 2020. This is a small increase in relation to the global problem of falling employment in the current financial crisis, but valuable nonetheless. If only the EU or only the US take climate action, modelling predicts this will create around 1.1 million or 0.7 million more jobs in these regions respectively, and up to 2.89 million globally, by 2020. This is the first estimate of the employment effects at a global level of climate change mitigation policies.

Relatively less ambitious action by developing countries (reducing emissions to 2015 rather than 2010 levels by 2020) reduces the necessary carbon price, but means that the benefits of action, in terms of GDP and jobs, are lower too. This is because climate mitigation involves technological change. For developing countries, enhanced technological change acts as a spur to economic growth.

The electricity sector, heavy users of electricity and sectors with multinational firms such as motor vehicles are likely to benefit most from a global mitigation agreement, relative to a sub-global approach.

The benefits and impacts noted above stem mostly from knowledge sharing, agreed international standards, trading and expanded markets for new technologies, and they amplify the benefits of climate change mitigation when countries work together.

While these figures are striking, it is also important to avoid reading too much into the exact figures that are presented in this report. Policy is not often applied efficiently and the world economy is likely to change substantially in the coming years. In addition, the report does not consider the different ways in which the targets might be achieved. Its choice of emission reduction targets is illustrative and not intended as a recommendation for governments when they meet in Copenhagen. The core purpose of the report is to simply demonstrate the macroeconomic benefits and magnitude of cost savings possible through collective action. And, as we have shown, these benefits and savings are compelling.