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## Economics must be at the heart of any discussion of how to fight climate change

By Nicholas Stern

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The scientific case on climate change now seems overwhelming: we face an enormous problem and tremendous costs for inaction. The latest science also gives us insight into the magnitude of damage we are risking if we continue to emit greenhouse gases on a business-as-usual basis. If we carry on emitting on this basis, temperature increases by 2035 could well take us outside of human experience, and the costs for disruption to economic and social activity could rise to 20 percent of global GDP. Moreover, to prevent this from happening, stabilization of global emissions would mean cutting annual emissions by at least 25 percent by 2050.

On the brighter side, the cost of stabilization can be limited to around one percent of global GDP a year. But to achieve stabilization at that cost, action over the next few decades is crucial. Like any policy problem, to keep the costs down, it will be necessary to formulate a clear, robust policy framework that uses a mix of instruments (including carbon pricing through trading and taxes, regulation, and technology policy) across sectors and countries in the short and long term. Poorly constructed policy will increase the costs of stabilization.

Action by individual countries is, however, not enough, and it will prove more costly. Climate change is a global problem, and solutions will require coordinated action by rich and poor countries, based on a shared vision of long-term goals and mutually reinforcing approaches at the national, regional, and international level. With a globally shared vision, policy can then reap the benefits of joint action and global markets for the lower carbon technologies that will be necessary. Action need not be anti-business or anti-growth—in fact, failing to act is anti-growth, since it risks the future of growth itself. A transformation of global infrastructure and an investment in energy, transport, buildings, and agriculture offers new opportunities and markets.

But these markets can only be created at scale if an effective global response is realized. Climate change is the biggest market failure the

world has ever seen, and strong policy will be necessary to correct it. The UN Framework Convention on Climate Change and the Kyoto Protocol provide a basis for international cooperation, but more ambitious action is required, and economics has to be at the heart of any serious discussion of how to proceed.

Consider where the greenhouse gases come from: mostly from energy use that is *central to economic activity*. Electricity and heat generation, transport, industry, and other energy is 61 percent of the story. Land use accounts for a large percentage, too: deforestation is 18 percent and agriculture also is another 14 percent. Furthermore, with economic growth, countries become larger sources of greenhouse gases. Thus, the big emitters now are the United States and Western Europe; China is also quite big. Going forward, the increases for China and India are expected to be substantial. My rough rule of thumb is that rich countries are responsible for 79 percent of the cumulative energy emissions over the last 50 years or so; in a decade or so the emissions from the developing countries will overtake those from rich countries; and in 20 to 25 years, the current developing countries will likely be responsible for 70 percent. (The importance of this is that the developing countries currently don't have targets under the Kyoto agreement, and there will be a major challenge in bringing them into the whole story of emissions.)

What follows from these economic fundamentals?

*Global collective action.* You can't conjure collective action out of the air, especially when interests partially conflict. All the players need to understand the implications for them, their growth, their mortality rates, and the survival of species and natural flora and fauna in their country. In addition, policy has to take into account equity and fairness in the burdens of adjustment. The rich countries are primarily responsible for where we are now. But the poor countries are going to be major contributors to future emissions, so even if the rich world takes on responsibility for absolute cuts in emissions of 60 percent to 80 percent by 2050, developing countries must take significant action too. Moreover, the costs of taking action are not evenly distributed across sectors or around the world. So developing countries should not be required to bear the full costs of this action alone. But they will not have to. Carbon markets in rich countries are already beginning to deliver flows of finance to support low-carbon strategies of economic development, including through the Kyoto's Clean Development Mechanism (which permits countries to achieve emissions reductions by investing in projects in

developing countries that reduce emissions and that would not have otherwise happened). A transformation of these flows is now required to support action on the scale required...

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