Center for Global Development

Identifying a Fair Deal on Climate Change

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CGD Notes

What constitutes a fair deal between the developed and developing countries on climate change—including for example between the United States on the one hand and China and India on the other? In the academic and policy literature, the answer to this question is emissions-focussed and mostly arbitrary.

The Stern Review implicitly endorses equality of greenhouse gas emissions per capita as a desirable long-run objective and derives from this objective an emissions-reduction allocation of 80:20 for rich and poor countries, respectively. Other authors (Frankel, 2009; Jacoby et al., 2008) have tended to discuss fairness in terms of allocating the future "rights" to emissions across countries based on such parameters or combinations of them as current total emissions, cumulative past emissions, emissions per capita, income per capita, and so forth.

A new approach

In a recent paper (Birdsall et al. 2009), we propose a new and empirically tractable approach to address this fundamental question. The novelty of our approach lies first in making basic energy services available to people—such as meal preparation at home, pleasant ambient temperatures indoors, or access to transportation ensuring personal mobility—the sensible indicator of what is fair across the world. The second novelty is in positing a simple principle, namely that developing countries' peoples' future access to energy services per se (not to emissions) should be no different from the energy services enjoyed by rich countries' peoples at the latter's comparable stages of development. To give a simple example, the access of a household in Chennai (India) to the services provided by air-conditioning or by cooking gas should be no different from its counterpart in Austin (United States) at comparable levels of income per capita.

At the same time, the efficiency of meeting future energy needs should reflect the most efficient technology actually available. To go back to the example, the technology used by the household in Chennai in getting the air-conditioning services in 2025 should not be the same as that used by the Austin household in 1990 (when say it had the same income level); instead, it should reflect and be very similar to the technology used by the Austin household in 2025 itself.

We empirically operationalize these principles. To do so, we disaggregate existing annual data on emissions into production and consumption emissions, and back out from consumption emissions measures of energy use per capita for developed and developing countries. We use these data to quantify the historical relationships ("development elasticities") between energy needs and the efficiency of energy use in production and consumption on the one hand, and development measured in terms of income per capita on the other.

This analysis clarifies that

- energy use per capita is much greater in industrial than in developing countries; in both sets of countries energy use is rising almost as

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fast as income (a positive elasticity); and this rise is greater in developing countries.

In developed countries, the elasticity is lower than in developing countries and is trending down, perhaps because people are conserving with income growth, either using less energy directly (turning down the thermostat) or investing to insulate and using less energy for the same degree of warmth.

The implication is not surprising: energy services are a normal good and we should expect demand for them to rise with income—and apparently somewhat faster at lower levels of income where "needs" have been less fully met.

- Developing countries are still far more carbon-intensive in their production than are developed countries; but that in virtually all countries, the elasticity is negative, so that less carbon is emitted per unit of output as countries become richer; and that this elasticity itself increases as countries become richer.

- There are also efficiency gains in terms of emissions associated with consumption, although they are more modest; in developed countries, the elasticity with respect to recent income growth is negative, but in developing countries it is positive though low.

We use our "development elasticities," along with country-specific information on likely growth of income and population, to project the magnitudes of likely and possible changes in emissions over the next four decades under our different assumptions.

Key findings

Our key finding is that in a business-as-usual scenario, which assumes continuing gains in efficiency in line with the recent past, rich countries' emissions will increase by about 70 percent and poor countries' emissions by over 200 percent from the 1990 baseline year.

Equitable burden sharing in the business-as-usual scenario would involve rich countries cutting their emissions by 270 percent (!); that is, for developing countries to continue on a relatively unconstrained development path, rich countries would have to find ways not just to go to zero emissions but to actually contribute negative emissions (for example, through reforestation that adds to the carbon-absorption capacity of the atmosphere). While this may be unrealistic and even scientifically infeasible, it shows that the 80:20 emission reductions rule that is currently being discussed could in fact, in the absence of more rapid technological or other changes, constrain the development process in poor countries despite seeming to put the greater burden of future emissions reductions on the rich countries.

No hope without faster pro-green technological progress

In short—and this is a key finding—improvements in technology (or reductions in the emissions-intensity of energy produced and used) at rates consistent with those we observe historically provide little hope of meeting the broadly agreed global target for emissions reductions of 50 percent relative to 1990. That is true even for the most carbon-efficient economies among major emitters (Germany) and true even taking into account the current modest gains in conservation of energy use by rich consumers.

Put differently, we find that any prospect of meeting the aggregate global emissions target (of a 50 percent reduction in annual global emissions by 2050) consistent with developing countries not sacrificing their energy needs requires massive, revolutionary improvements in the technology margins far greater than those seen historically. If equity matters, there is no alternative to a low-carbon path out of the climate change problem. Meeting the global emissions targets equitably implies narrowing of the current inequity in energy use per capita in the coming years (figure 1), in line with and in support of economic growth in the developing world. It also implies convergence

everywhere toward far greater carbon efficiency of production (figure 2).

Policy conclusions

What does this mean for international cooperation?

First, industrial countries should drop their demand that developing countries commit now to binding emissions targets, given the current huge shortfall in access to energy services for people in the developing world.

Second, they should themselves commit now to tough emissions targets and accompanying policies and subsidies that will elicit major technological breakthroughs, including maximizing public funding of new green technologies through advance market commitments and other incentives for private investment.

Third, the advanced developing countries, especially China and India, should emphasize domestic actions to reduce the carbon intensity of their production—as China has recently.

Fourth, all countries should focus on the tough challenge of an agreed global intellectual property regime specific to clean energy that balances the need to preserve incentives for technology creation while allowing for rapid dissemination—in the interests of all people everywhere.

Figure 1

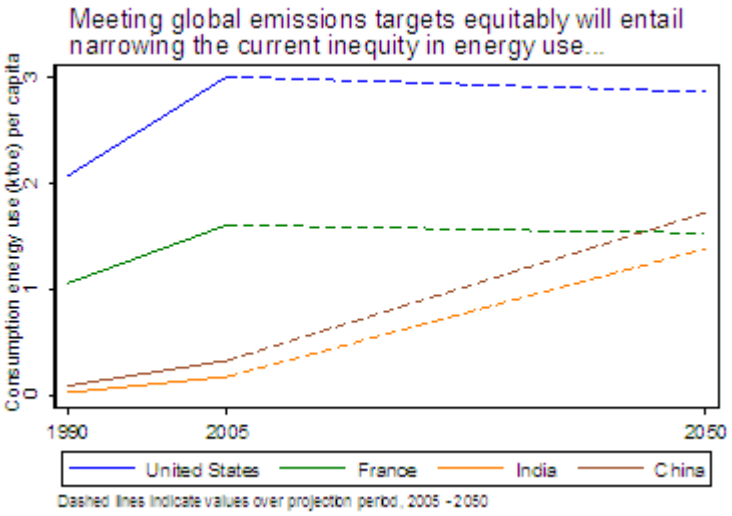
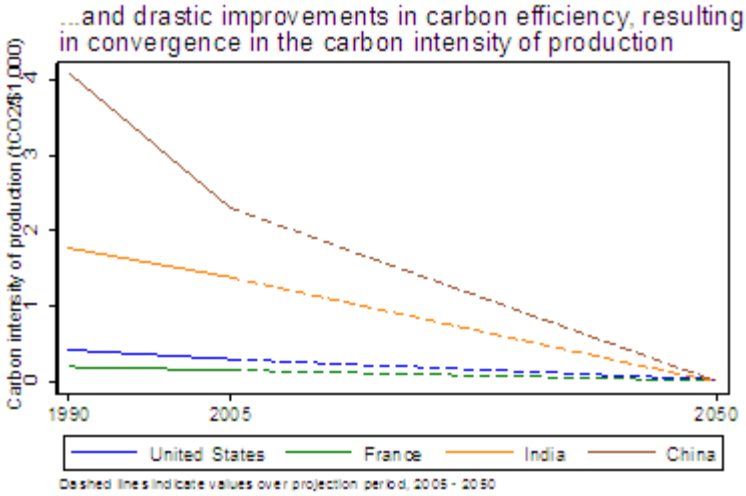


Figure 2



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