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'Greening' Economic Development Activities for Greenhouse Gas Mitigation

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Introduction

The decade since negotiation of the United Nations Framework Convention on Climate Change (UNFCCC) has seen much acrimony as well as cooperation between developed and developing countries on how quickly global greenhouse gas (GHG) emissions should be cut, in what fashion, and by whom. Recently, as uncertainties have lingered about the practical consequences of the Kyoto Protocol and about the future direction of climate change negotiations,¹ there has been increased interest in how development activities might be structured to convey more substantial climate change mitigation benefits (see, e.g., Halnaes and Olhoff 2002) while, at the same time, stimulating economic growth in developing nations.

This possibility seems especially attractive for promoting longer-term international cooperation. Developing countries have limited willingness to bear near-term costs associated with greenhouse gas mitigation, but they presumably are willing to share the costs of actions that more unambiguously would help them develop. By the same token, the interest of more developed countries in supporting economic development in poorer countries may be enhanced (beyond what would be undertaken in the name of market development and “doing good”), if such support also can generate substantial greenhouse gas mitigation.

Development policies can have a range of possible GHG consequences. The degree to which development policies with large GHG mitigation capacities are in the interests of

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¹ The 1997 Kyoto Protocol to the United Nations Framework Convention stipulates numerical limits on the levels of GHGs emitted in developed countries and industrialized economies in transition; developing countries do not have GHG reduction obligations, though they are encouraged to seek opportunities to do so consistent with their sustainable development objectives, and the developed world is to support technology transfer to that end. While it appears the Kyoto agreement will enter into force, the unwillingness of the U.S. government to accept its Kyoto limit and uncertainty about other factors (the implications of Russian surplus emissions allowances, the degree of compliance by other countries) have created doubts about how extensive GHG reductions under Kyoto will be. Over the longer term, there is doubt as well about when and how developing countries would assume greater formal responsibility for reducing their GHGs.

developing countries depends on questions of comparative advantage in GHG control. Some experts suggest that significant curbs could be made at low or no cost through improvements in energy efficiency and corrections in market distortions. Some of these gains may be more easily realized if they are led by development measures rather than by GHG mitigation efforts.

This issue brief describes different pathways for direct and ancillary benefits under various types of policies aimed at mitigating GHGs and spurring economic development, as well as the synergistic effects of these policies. We then briefly consider some practical considerations related to GHG mitigation and energy development activities. We conclude with a discussion of what kinds of options might be pursued with respect to climate and development policies and measures.

Development-Mitigation Synergies

Obviously the first-order aim of domestically undertaken GHG mitigation policies and measures, in developed or developing countries, is GHG mitigation. The aim of development policies, in contrast, is a mixture of economic development and other forms of social progress, including local environmental improvement. (The degree to which these various goals are in harmony is itself a topic of debate, but that is not our focus here.) Both mitigation and development policies have ancillary effects. What is ancillary to what is not always clear because the synergies among various policies can be quite complex.

It is possible that GHG mitigation will have ancillary economic benefits through improved efficiency in energy markets. This depends, however, on the level of pre-existing distortions in those markets and the extent to which the GHG policies reduce those distortions. Reductions of energy subsidies is a good example of win-win action in principle, but the magnitudes of these subsidies continues to be debated (and many developing countries have been acting to reduce those subsidies). The political barriers to such reforms also can be formidable. A GHG policy that also reduced an informational barrier to the adoption of a cost-effective energy-efficiency technology would be another good example in principle, as would be the relaxation of other institutional barriers to energy efficiency (e.g., archaic building codes, lack of affordable credit for financing first purchases of modern technology). But the magnitude of these opportunities also is debated, as discussed below.

GHG mitigation policies probably would induce increased innovation activity that stimulated the productivity of energy and energy-using capital in the economy. But this could

come at the expense of other even more valuable productivity-enhancing investments or learning-by-doing efforts (Goulder and Schneider 1999).

GHG policies that raised revenue (like higher energy taxes) could also reduce other distortions in the economy (the “double dividend” argument; see Parry et al. 1999). They could also offer increased and more reliable sources of financing for needed public goods (infrastructure, social security). Because fiscal systems in developing countries often are quite distorted, these arguments may be even more important than in developed countries. But whether revenue-raising GHG policies could generate broader economic gains through their fiscal impacts depends very much on how the revenues would be used and how much of the tax base and revenue flows were lost to corruption (as, for example, through revenue loss due to fuel smuggling).

Internationally financed GHG abatement, like the Clean Development Mechanism (CDM) or targeted bilateral financial and technical assistance to make more use of lower-GHG technologies,² can have the same positive spillover effects on development as those discussed above (Huq 2002), and the same caveats apply. The added advantage here from the perspective of a developing country is that international financing lowers the effective net cost. Moreover, it is possible that the increased financial capital flows into the developing country will have a “leverage effect” (Mathy et al. 2001): they could stimulate growth more broadly in the face of capital market imperfections that make the opportunity cost of financing new investment high. More empirical work is needed to assess how large this effect might be as a consequence of financial flows linked to GHG mitigation.

The effects of development policies on GHG emissions need not always be “climate friendly.” If policies are successful in stimulating economic activity, they also likely will stimulate some increase in energy use. The only way the policy could then mitigate GHGs is if

² The CDM was created in the Kyoto Protocol as a means for developed countries to earn GHG emissions credits toward meeting their emissions targets under the protocol by achieving reductions in developing countries. In the CDM, entities in developed and developing countries can partner to undertake projects that reduce emissions relative to some assumed business-as-usual baseline (for example, energy efficiency investments or, to a limited extent, increases in forest cover that sequester carbon in new tree growth). Credits also can be created by developing countries acting on their own. Credits created under the CDM can be freely bought and sold in international trade. For more information about the CDM see <http://unfccc.int/cdm/index.html> and Toman et al. 2002. The Kyoto Protocol also envisages financial and technical assistance from richer to poorer countries to support more “climate-friendly” development in the latter countries.

the carbon-intensity of economic activity decreased by more than the increase in the scale of activity. This could result from a change in the composition of economic output or from changes in the energy-and-carbon intensity of specific production activities due to energy conservation and fuel switching.

One prominent illustration of the challenges alluded to in the previous paragraph involves efforts to promote transition from dirty biofuels toward cleaner fossil fuels (see Barnes and Floor 1996 for a discussion of energy transitions and economic development). Such changes can have enormous salutary effects on health and productivity, yet they can lead to a net increase in GHG emissions (depending on how sustainable or unsustainable was the harvesting of biomass fuels, among other factors). A more positive example would be development activities focused on improving the thermal and economic efficiency of the national power sector, a major source of emissions in many developing countries and a sector whose inefficiencies arguably are a significant drag on development.

Local environmental measures may or may not concurrently reduce GHGs. Reductions would come, for example, through switching away from coal use rather than just end-of-pipe emissions control that would actually increase GHG emissions by reducing overall energy efficiency. Improvements in solid waste management could reduce methane emissions. Thus the impacts of local environmental policies on GHGs cannot be characterized in advance, but depend on the specific measures undertaken. Similarly, development could have different effects on GHGs through various patterns of change in land use and industrial activity—moves toward or away from heavy industry, or into or out of land clearing for agriculture.

In many cases, the local environment may be improved through fuel switching and energy conservation that reduces emissions from fossil fuels (Morgenstern et al. 2002). However, to the extent that a GHG mitigation policy that makes fossil fuels more expensive in a developing country induces a switch back down the “energy ladder” to dirtier, locally gathered biofuels, the health effects will be adverse and possibly significant (Barnes and Floor 1996, Ezzati and Kammen 2002). Conversely, if actions by developed countries to reduce their emissions also lower the local prices of cleaner fossil fuels in the developing world, there is a health benefit to compare against the globally unwelcome “carbon leakage.” Local environmental benefits from GHG mitigation also will be limited or ambiguous if local pollutants are regulated through emissions caps, so that the side effect of the GHG mitigation policy just redistributes the actions to control the local pollutants.

Finally, barriers to success in reducing GHGs and promoting economic development may lie outside the sphere of energy markets per se. For example, improvements in the operation of credit markets may facilitate greater access to energy efficiency and other GHG-curbing

technologies. There are, however, important caveats and counterexamples to this reasoning. Practical barriers to seemingly sound policies arise no less often in development than in GHG mitigation.

Some Specific Considerations Related to Energy

Most of the world's net increase in atmospheric GHG concentration comes from fossil fuel burning. Therefore, in considering development-mitigation synergies, it is useful to consider especially those development activities with significant energy dimensions. Other possibilities include improved land management practices and improved solid waste management practices that also reduce methane releases to the atmosphere. In the energy arena, development policies and measures could be expected to have substantial positive effects on GHG mitigation if two conditions hold: (1) if they were effective from the development perspective—that is, they provided increased and/or cheaper access to useful energy services consistent with local environmental goals; and (2) notwithstanding the expected increase in the use of energy services, they also reduced at least the rate of growth if not the absolute level of GHG emissions relative to some other plausible development path.

The IPCC Third Assessment Report (IPCC 2001, Chapter 3 and Technical Summary Table TS.1) highlighted a number of opportunities for energy savings at little or no cost (see also IEA 2002 for a compilation of this information). Especially significant, affordable, and likely opportunities were highlighted in buildings, appliances, and industrial energy efficiency, with substantial prospect of GHG reductions at a negative net cost. Less in the way of opportunities was foreseen out to 2020 from emission-reducing changes in energy supply, though substitution of gas for coal in developing countries—already in evidence—could deliver significant environmental improvements as well as GHG reductions at not too high a cost, and both wind and larger-scale (nontraditional) biomass also may be factors in the longer term. Cost-effective transportation-based reductions also are expected to be more limited, at least in the nearer term.

The barriers to the potential penetration of both economically attractive and GHG-friendly technologies identified in the IPCC report are familiar: lack of information, lack of human capital, weak financial markets, distorted energy prices, soft local environmental standards, and, for some technologies, limits on access to the technologies themselves. Many of these barriers are in fact amenable to being lowered by broader development policies and measures. This suggests that orienting energy-related development toward options that also are GHG-friendly may be a potent option.

However, there are also important caveats. Calculations of cost-effectiveness for the kinds of energy-related GHG mitigation evaluated by the IPCC depend critically on the choice of discount rate. As noted by IPCC (2001, page 180), much of the literature undergirding these estimates assumes discount rates in the 5–12% range. However defensible these or even lower rates might be for evaluating the social benefits and costs of GHG mitigation (a huge debate we sidestep here), these rates are well below commercial discount rates, especially in developing countries. Therefore, as noted by IPCC (2001, page 180), "... options reported in this chapter to have negative net costs will not necessarily be taken up by the market ... even small specific costs may form a substantial burden for companies."

To succeed in overcoming these barriers, over and beyond any more intrinsic market failures such as lack of information and distorted energy prices, requires either a source of external finance like the CDM or policies and measures in the development sphere that lower the effective cost of capital. Critics have rightly noted that the CDM may end up being a fairly cumbersome mechanism for emissions abatement, providing no panacea either for the problem of global GHG control. Over and beyond issues of establishing credible baselines and other operational matters, the volume of GHG abatement achieved through the mechanism ultimately depends on the willingness of richer countries to pay for international GHG reductions. That willingness to pay seems in practice to be limited for the time being, even though emissions credits under the CDM would be cheaper than domestic abatement for many developed countries.³

Most CDM prognosticators expect a positive price on carbon emissions post-2008, though the price may well be modest (e.g., ~\$5/tC). With proper attention to host country sustainable development considerations, the CDM can offer an opportunity for some mutually beneficial activities to promote development and limit GHGs. To achieve this potential, at least two concerns must be addressed. One is keeping the inherently nontrivial "transactions costs" of CDM activities as low as possible through clear and streamlined procedures throughout the

³ The Bush Administration policy against the ambitious and "hard" targets for domestic GHG abatement under the Kyoto Protocol are more easily understood than the apparent indifference (or worse) to the notion of international credits being used for meeting voluntary and "intensity based" emissions targets. Perhaps the fact that the CDM was part of the Kyoto Protocol has created a political prejudice against any sort of international joint action other than limited bilateral consultations and technical assistance. This view is extraordinarily short-sighted, however, since it deprives the United States of an important option for acting positively and in its own self-interest on global climate and international development concerns concurrently.

project pipeline. The other is strengthening the capacity of developing countries to host and evaluate CDM projects.

Policies that lower the effective cost of capital are an important focus of development in a number of countries, sectors, and institutions. However, lowering of capital costs may not immediately translate into greater investment in energy efficiency either. Assuming capital still remains scarce, greater capital availability may flow into a number of other areas of greater social need (education, health, resource development). Some of these could even increase energy use (e.g., expanded road infrastructure).

Moreover, even where competition for capital at an economy-wide level did not crowd out investments in energy efficiency, increased availability could lead to an expansion of energy supply infrastructure and energy use if the economy has been relatively energy-starved along its previous growth path. We have already noted this in connection with the potential shift from traditional and dirty biofuels to cleaner fossil energy forms. Another possibility is expanded electrification with substantial economic benefits but upward pressure on GHGs, at least in the short to medium term (Toman and Jemelkova 2003).

Conclusions

Developing countries have made clear their position that while they are concerned about the long-term implications of climate change—they are almost surely the countries most vulnerable to climate change—they are not prepared to shoulder significant costs to reduce their own emissions in the short to medium term while living standards in the developing world are so low. Leaders in poorer countries argue that the developed world should take the lead in GHG mitigation. The United States has used concern about the “meaningful participation” of developing countries in global GHG mitigation as one of its arguments against more aggressive GHG abatement. Other developed countries have expressed more support for significant curbs on their own emissions, but it remains to be seen what is accomplished in practice.

In this kind of international political environment, the search for win-win strategies becomes especially seductive. But the “greening” of international development assistance is no panacea. In the wake of the 2002 World Summit on Sustainable Development in South Africa, there is still limited evidence that the developed world is ready to substantially increase international development assistance generally or specifically through promoting low-GHG energy development.

As already noted, moreover, concern with the GHG implications of development activities must be balanced against what is in the best interests of the developing countries. Some

valuable energy-related projects will raise GHGs. In addition, limited financial resources and institutional capacities for development support may be better allocated to activities other than energy (or carbon sequestration) projects. Even where climate-friendly energy development might make sense economically, lowering economic and political barriers to success is not a trivial proposition (particularly with limited resources).

Expectations for the “development first” approach to GHG mitigation need to be modest, at least until experience gives more cause for optimism. Development first requires a genuine effort to make overall sustainable development interests primary; while GHG mitigation is welcome as part of this, it should not be the most decisive element. Otherwise, the ostensible beneficiaries rightly can question whether the activities are targeted to benefit them. Possible consequences for longer-term climate politics also must be considered; in particular, how will reduced carbon intensity of economic activity through development activities affect the developing countries’ bargaining position vis-à-vis future negotiations of GHG mitigation targets?

Ultimately, longer-term progress on climate change mitigation depends on some combination of three factors. One is greater political will in rich and poor countries alike to assume larger cost burdens in order to reduce the long-term accumulation of GHGs in the atmosphere. The second is a greater capacity between North and South to strike a bargain over sharing the burden of these costs, balancing development and climate protection interests over the longer term. The third is technological progress of various forms to reduce the cost to all countries of climate protection, whether it takes the form of more affordable carbon-free energy technologies or reliable and affordable ways to collect and dispose of emissions from fossil fuel combustion. Win-win opportunities certainly need to be seized upon in traversing this longer-term path, but they will not obviate the longer-term challenges.

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