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Policies for Developing Country Engagement

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THE HARVARD PROJECT ON INTERNATIONAL CLIMATE AGREEMENTS

The goal of the Harvard Project on International Climate Agreements is to help identify key design elements of a scientifically sound, economically rational, and politically pragmatic post-2012 international policy architecture for global climate change. It draws upon leading thinkers from academia, private industry, government, and non-governmental organizations from around the world to construct a small set of promising policy frameworks and then disseminate and discuss the design elements and frameworks with decision-makers. The Project is co-directed by Robert N. Stavins, Albert Pratt Professor of Business and Government, John F. Kennedy School of Government, Harvard University, and Joseph E. Aldy, Fellow, Resources for the Future. For more information, see the Project's website: <http://belfercenter.ksg.harvard.edu/climate>

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Abstract

A successful global effort to mitigate global climate change will require substantial cooperation between developed and developing countries. Even as the bulk of the developed world is at some stage of enacting significant domestic regulations to meet global stabilization goals, growth in developing country emissions will easily thwart those goals unless a cooperative solution is found. We argue that there is a wide range of options that should be pursued, including domestic policy reforms in developing countries, expanded financing mechanisms to address incremental costs, and diplomatic efforts in a variety of forums, all aimed at increasing developing country mitigation efforts over time.

Key Words: climate change, sustainable development, finance, diplomacy

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Policies for Developing Country Engagement

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Introduction

One of the major challenges facing the world over the next half-century is achieving broad economic growth that significantly raises the living standards of the world's poor – and doing so without major climate consequences. Indeed, much of the debate surrounding the successor to the Kyoto Protocol, and global climate policy more generally, focuses on the appropriate role for developing countries vis-à-vis industrialized countries in terms of mitigating global emissions, and how industrialized countries can best support and encourage that role. Climate change is fundamentally a global problem requiring mitigation efforts in all countries – or least all major emitting countries – to effect a successful solution. And developing countries are an important – indeed the most important – source of emissions growth over the next century (see Figure 1). If current developing countries are going to make significant progress towards the level of prosperity in Europe, America, or Japan, while simultaneously global greenhouse gas (GHG) concentrations are to be stabilized at anywhere between 450 and 750 parts per million carbon dioxide-equivalent (ppm CO₂e), then current developing countries are going to have to develop in a less GHG-intensive fashion than Europe or the United States (Clarke et al. 2007).¹

Yet, developing countries face considerable obstacles to reducing or limiting the growth of their emissions: namely, their lack of resources and greater priority on economic development relative to environmental protection. At the same time, industrialized countries like the United States are well aware that their own efforts to reduce emissions can be thwarted if, thanks to open trade in goods and services, their emitting activities shift to non-participants.² This has motivated developed countries to look much more carefully at what they have to do to make developing countries serious partners in mitigation efforts.

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¹ Atmospheric GHG stabilization also depends, obviously, on industrialized nations reducing their emissions from current levels.

² Not to mention production and jobs, making this a political as well as environmental concern.

The focus of this paper is precisely this intersection of interests between developing and developed countries, an intersection that opens the door to potential solutions. How can developed countries – with more resources and, for the most part, a greater sense of urgency – engage developing countries in a cooperative effort to mitigate climate change? Part of the answer is clearly diplomacy and an increasing awareness that developing countries themselves are vulnerable. Indeed, developing countries are more and more focused on their rising need for resources to adapt to climate change. But engaging developing countries as partners in climate change mitigation will require more than just the threat of physical impacts or the promise of funds for adaptation: it will require increased attention to sensible domestic policies within developing countries, an increase in financial support from developed countries to help pay the incremental costs of shifting to cleaner technologies, and creative diplomacy to carefully integrate different tools.

Domestic policy improvements in developing countries, international financing, and diplomacy – these are the key ingredients to successfully engage developing countries in climate change mitigation. The bulk of this paper looks at each of these areas in more detail in the three sections that follow, with particular attention to the options we face and without necessarily recommending a single course of action. This is also a dynamic problem: roles and mechanisms will evolve over time as countries develop, institutions emerge, lessons are learned, and cooperation builds. Yet right now, the world has to decide how best to get started. We therefore conclude with a few observations about how that decision should be framed.

Domestic Policy Improvements

There is an emerging consensus that developing countries will pursue mitigation actions under any new climate agreement.³ Chief among these actions would be policy reforms which developing countries could take that would have domestic benefits – political, economic, environmental – and would simultaneously provide global climate benefits. These opportunities for “win-win” policies remain unexploited for a variety of reasons, including domestic political realities, mismatches between the pattern of costs and benefits over time, or limited technical

³ The Bali Action Plan agrees to consider “nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.” See also footnote **Error! Bookmark not defined.** in the Declaration of Leaders of the Major Economies Meeting.

expertise or institutional capacity. In order to realize emissions benefits from these reforms, developed and developing countries will have to find the right mix of domestic political will and international funding and expertise that can deliver effective policy reforms. While we address the structure of this funding and the diplomatic effort necessary to find the right mix in later sections, here we focus on the domestic policy opportunities themselves. In particular, we look at three areas that appear to offer significant potential for both emissions reductions and domestic benefits: reforming energy subsidies, enhancing energy efficiency, and improving technology transfer.

Reforming energy subsidies

Many non-OECD countries currently subsidize energy, and particularly fossil fuels, thereby creating an opportunity for subsidy reform or elimination that would have a variety of domestic benefits while also reducing GHG emissions. Energy subsidies encourage the over-consumption of fuels and increase CO₂ emissions. Yet, many countries pursue these policies to accomplish specific domestic policy objectives such as social stability, access to cleaner cooking fuels, increased electrification, or industrial policy. In some cases these are worthy objectives, but the energy subsidies have significant domestic costs including budgetary pressures, decreased energy security, inefficient energy markets, black markets for fuels, and distributional consequences (UNEP 2008).⁴ It is worth asking whether developing countries could reform energy subsidies and seek less costly avenues to accomplish related policy objectives while simultaneously reducing CO₂ emissions.

The eight non-OECD countries with the largest total subsidies in 2005 are reported in Table 1 along with the subsidy level (in the middle panel). Combined these countries provided about \$185 billion of the \$220-280 billion in energy subsidies in all non-OECD countries.⁵ For comparison, a 2002 report (UNEP/IEA 2002) estimated that gross energy subsidies in OECD countries totaled \$20-30 billion, typically directed towards R&D and production subsidies. Further, in most OECD countries these gross subsidies are outweighed by taxes on fuels (Morgan 2007). Reforming energy subsidies in non-OECD countries would slow the growth of

⁴ Energy subsidies often help the urban middle class far more than the rural poor.

⁵ These figures are the net economic value of subsidies as estimated using a price-gap approach (described in IEA 2006). They do not necessarily represent the budgetary cost of subsidies, as they include both direct interventions (such as grants or soft loans) and indirect interventions such as price ceilings or the free provision of energy infrastructure. For more recent discussions, see Bradsher (2008), Hargreaves (2008), and Paulson (2008).

a significant portion of global emissions. The eight nations in Table 1 accounted for just over one-third of global CO₂ emissions in 2005 (see left-most panel), and their importance is increasing given current economic trends, particularly growth in China. Subsidies to fossil fuels act as a “negative tax” on carbon emissions. The right-most panel in Table 1 reports the effective negative CO₂ price that is implied by energy subsidies for a few of these countries.⁶ Thus, for example, the elimination of subsidies for transport fuels in China would be equivalent to an \$11 per ton CO₂ tax on gasoline – or a \$25 per ton CO₂ tax on diesel – relative to current prices. Note that these specific numbers could have changed significantly since 2005: if countries have tried to maintain historical local energy prices while global prices rise then the implicit CO₂ subsidy becomes larger; at the same time many of these nations have raised fuel prices in the last two years.

Previous studies have suggested there would be significant emissions benefits to eliminating subsidies. Modeling work from the OECD in 2001 suggested that the immediate removal of all subsidies in the industrial and power sectors worldwide would have reduced global CO₂ emissions by 6 percent in 2010 relative to business as usual (OECD 2001). An earlier study from the IEA suggested that the removal of consumption subsidies in eight of the largest non-OECD countries would have lowered global CO₂ emissions by 4.6 percent relative to (then) current emissions (IEA 1999). Although the precise magnitude of current subsidies is uncertain given recent changes in both commodity prices and national policies, there can be no doubt that reducing subsidies, and eventually eliminating them, would have salutary effects for global emissions. Further, such actions are necessary to pave the way for the effective pricing of emissions in developing countries in the future, if the impact of emissions pricing is not to be undercut by subsidized energy prices.⁷

This leaves the question of how to convince nations to eliminate fuel subsidies. Current global energy prices make the case easier in many respects, but in the near-term many of these countries will want to minimize the impact of high energy prices on low-income consumers, particularly to allow access to cleaner cooking fuels and electricity. These objectives could frequently be more efficiently pursued through raising energy prices to market rates while

⁶ We report information for only a few countries as reliable data on end use fuel prices is not available for all countries and fuels.

⁷ A key question that arises in the context of incremental financing, discussed in the next section, is whether it is fair to count the incremental cost associated with overcoming domestic energy subsidies as a true incremental cost.

directly supporting consumers with lump-sum distributions (such as per capita rebates) and/or (in the case of electricity) by subsidizing the cost of connections rather than energy (UNEP 2008). This raises the possibility of an agreement where the developed world provides financing and technical assistance for these types of programs in exchange for energy subsidy reforms in developing nations.

Enhancing energy efficiency

Many developing countries have made significant strides in decreasing the energy intensity of their economies in recent decades. In general, however, most remain more energy intensive than Europe, Japan, and North America. This suggests there remains significant scope for energy efficiency (EE) programs to improve climate outcomes. The IPCC 4th Assessment Report estimated that efficiency improvements in the residential and commercial building sector – which includes end-use devices such as appliances – could reduce emissions in non-OECD countries by 1.5 GtCO₂ per year in 2020 at zero marginal cost (Levine et al. 2007). Meanwhile, efficiency improvements offer additional benefits to developing nations: they can dampen the need for new infrastructure (which may be particularly attractive given current construction prices), reduce local environmental pollution, and increase energy security (a topic we return to in our discussion of diplomatic leverage). These benefits can also have important interactions with the subsidy reductions discussed previously; a recent analysis of Maharashtra state in India (Phadke et al. 2005) suggested that EE improvements could reduce more than \$600 million in government deficits exacerbated by energy subsidy policies.

Given these local benefits, most countries – developed and developing – already have a national program or plan that specifies objectives for EE improvements, with a national agency or ministry designated as responsible for EE policy.⁸ But these agencies tend to be understaffed and underfinanced, particularly in developing countries, and often lack the capacity to effectively implement policies (Sugiyama and Ohshita 2006). This has led to a variety of proposals for international funds that would support EE policies, either through direct funding for national

⁸ See Annex 2 of WEC 2007 for a thorough survey of national-level energy efficiency agencies and programs.

agencies, through partnerships with national agencies to implement EE policies or projects, or through technical assistance and capacity building.⁹

The kinds of developing country policies that might be targeted by these efforts include public procurement of efficient products, efficiency labeling and standards, and support for energy service companies. Public procurement of more efficient products is perhaps the easiest to implement and provides important demand-side stimulus to the development of markets for efficient products. For example, China's Ministry of Finance has directed government agencies to preferentially procure high-efficiency products (Caifeng and Tienan 2006). Public procurement is relatively easy because it does not require institutional capacity for regulation or enforcement.

Labeling programs, which require manufacturers to provide information about the energy efficiency of a product, are one step up and help resolve information problems that hinder the adoption of energy efficient products, especially for consumer items. Extending labeling schemes, while requiring the institutional capacity to rate products, may be a low-cost way to increase end-use energy efficiency because they do not attempt to regulate actual production.

The next stage, requiring increased government intervention, is to mandate energy efficiency standards for products. These remain relatively less common in developing countries (although China has standards for many products). Whether these standards are economically efficient can depend on how they are designed and whether they resolve a market failure (Jaffe et al. 2001). But even if they are not the first-best policy tool to address a market failure, efficiency standards may be attractive to governments as a second-best approach if policies such as pollution taxes or other market-based regulations are not politically or institutionally feasible. Independent technical associations such as CLASP (the Collaborative Labeling and Appliance Standard Program) provide technical assistance and help design labeling and efficiency standards.¹⁰ A recent study published by CLASP found that non-OECD emissions could be

⁹ The UN Foundation has called for a policy push for energy efficiency from the G8 and the so-called "+5" countries (Brazil, China, India, Mexico, and South Africa) that includes a facility for loan guarantees for commercial EE projects (Expert Group on Energy Efficiency 2007). Another recent report (Sugiyama and Ohshita 2006) proposed creating a regional policy development fund in East Asia with a broader mandate that includes financing (or co-financing) for EE policy development and implementation. Note that none of these funds suggested developed countries should pay for energy efficiency projects themselves – rather they should support domestic institutions to address the market failures giving rise to such opportunities in the first place.

¹⁰ CLASP also offers a comprehensive survey of labeling and efficiency standards worldwide at their website: <http://www.clasponline.org/index.php>

reduced by 0.4 GtCO₂ in 2020 if energy efficiency standards were implemented in 2010 for a range of residential and commercial appliances, where standards were set based on technologies that are already commercialized (McNeil et al. 2008).

Finally, developing country governments can also improve energy efficiency by encouraging key private sector activity. This may occur directly through work with large energy users, or indirectly through energy services companies (ESCOs) which offer financing and expertise for EE projects.¹¹ (They are also sometimes referred to as energy management companies, or EMCs, especially in China.) They arrange financing, internally or through third-parties, to implement efficiency improvements, with loans typically guaranteed by projected cost savings for energy. With their expertise, ESCOs can help other firms overcome barriers to EE such as credit constraints, technical knowledge, and transaction costs. A recent study (Zhao Ming 2006) noted the rapid growth of ESCOs in China, from a handful of companies in the late 1990s to over 100 in 2006. The study pointed out that government policy can encourage further growth: public procurement policies would both encourage growth of domestic ESCOs and save the government money in the long run.

A key element in all of these EE policies is the diffusion of new, more efficient technologies. Such diffusion is often enhanced by increased trade with, and technology transfer from, developed countries. We turn now to a discussion of policies for technology transfer.

Increasing technology diffusion and deployment

Even with substantial improvements in energy efficiency, dealing with climate change will require the diffusion and deployment of technologies which are less emission-intensive than their historical counterparts. Over time, these “climate-friendly technologies” (CFTs) are the only way developing countries can raise their incomes and standards of living – which remain a fraction of those in developed countries – without simultaneously putting global GHG stabilization out of reach.

Economists who have studied technology diffusion broadly agree that widespread diffusion takes time. Adoption is typically slow at first, then proceeds more rapidly, before

¹¹ Improved operation and maintenance (O&M) can be an important way to improve energy efficiency of industrial production and facilities where such ongoing activities can have a significant impact on energy consumption. Sharing O&M best practices in developed countries with facilities in developing countries can catalyze these efforts because O&M in developing countries tends to be poorer.

slowing as a technology specific “adoption ceiling” is reached. How can governments encourage more rapid and more thorough technology diffusion? Policy levers that can influence the speed and depth of adoption include: information, input prices, regulation, credit, subsidies, investment in human and physical capital, and protection of intellectual property rights. (Blackman 2001)

While multilateral funds can provide subsidies to higher cost CFTs in developing countries, a topic we address in the next section, the domestic policy environment in developing countries provides the enabling conditions for CFT transfer and diffusion and greatly influences the effectiveness of incremental financing from developed countries. To this end, developing country governments can facilitate the formation of human and institutional capacities; encourage the development of supporting infrastructure; provide a supporting legal environment, including secure property rights and appropriate intellectual property (IP) protection; and support R&D (Metz et al. 2000). Some of these policies can have broad social benefits apart from facilitating technology transfer and so may be particularly attractive first steps for domestic policies; examples include investments in human capital, energy infrastructure, and R&D (Blackman 2001).

To be certain, establishing some other enabling conditions will be more politically contentious. Protection for intellectual property (IP) has been one sticking point in recent global negotiations. Trade agreements are another politically contentious lever to influence technology transfer: developing countries retain relatively high tariffs on many CFTs compared to OECD countries creating a barrier to CFT diffusion (Iturregui and Dutschke 2005)

Table 2 summarizes the policy actions that developing countries might take that have both local benefits and reduce greenhouse gas emissions, along with the types of support from developed countries that would facilitate these policy changes. As the table highlights, this support can be crucial: even policies that may be in the long-term interest of developing countries can remain unemployed due to lack of (near-term) funding, technical expertise, or private sector experience. It also suggests that developing and developed country actions are linked and need to be coordinated through negotiation. These two suggestions lead naturally to our remaining sections on financing and diplomacy.

International Financial Mechanisms

Recent IEA estimates (2008b) indicate that if global emissions are to be stabilized at current levels by 2050 – an emissions trajectory that could still allow significant warming – there would need to be an additional \$10 trillion of cumulative investment in non-OECD countries by

mid-century.¹² If global emissions are to be brought down to less than half of current levels – as has been proposed by Europe and Japan – the level of additional investment needed rises to \$27 trillion. It is unclear how much of this incremental cost in developing countries, as well as support for domestic policy improvements noted in the previous section, will be paid for by developed countries. Yet, even a fraction of these estimates should be sufficient to encourage us to rethink our use of the international financial mechanisms used to support such investments.

There are two key questions associated with the design of financial mechanisms to support developing country mitigation (or adaptation) activities: the size of the transfer and its form of delivery. At one extreme, one could offer payments equal to full environmental value of additional emission reductions under another existing market-based CO₂ regulation (e.g., the market value of reductions under the EU ETS). At another, one could seek to cover all or even just part of the incremental cost of lower-emissions technologies (given the gains to trade, the market value typically exceeds the incremental cost).

A key concern associated with the level of any payment must be the so-called dynamic incentives that are created. Baumol and Oates (1988) were among the first to highlight an important difference between subsidy schemes – like any of the finance mechanisms discussed in this section that pay for reduced emissions that are not otherwise capped – and a market-based regulatory scheme that, in contrast, requires payment for *un*-reduced emissions. Namely, subsidy schemes tend to reduce the total costs associated with an investment – unless the subsidy only covers incremental costs – and therefore leads to excess entry into a market and what is known as a dynamic inefficiency. When the payment for emission reductions is sufficiently high, this inefficiency can have particularly perverse consequences with firms focusing on creating more emissions – rather than ordinary products – simply to collect the subsidy for subsequently cutting those emissions.

In addition to the level of payment, the other key question is form. Possible financial mechanisms include grants, concessional loans, loan guarantees, or credits that can be sold into a regulated greenhouse gas market or tax system. Simple economic theory would suggest that the form of the incentive will not matter, assuming that each option has the same expected net present value. In reality, incomplete markets for risk and/or arbitrage over time mean that such details can matter. An incentive structure that addresses incomplete markets (e.g., loan

¹² There would also need to be \$7 trillion in additional investment in the OECD.

guarantees that address the absence of insurance for various political risks) or that matches the temporal pattern of costs (e.g., grants for up front capital costs) may be more effective at promoting action. On the other hand, providing the incentive at the point where emissions are actually reduced can help ensure that the actors making decisions that affect emissions are given the proper incentive to act.

The remainder of this section looks at the question of form in greater detail. Given their significant institutional and operational differences, we organize this discussion around offset mechanisms and international public funds.

Offset Mechanisms

Arguably, the most critical distinguishing feature of offset mechanisms is their capacity to channel private financial flows, rather than depending on government appropriations or more obvious diversion of public monies. While offset approaches typically try to measure and provide credit at full market value for real reductions that, in turn, “offset” higher emissions under a regulated system, viewing offsets this way ignores recent offset proposals, the endogenous nature of offset programs and emission limits, and the potential scale of financial flows. Recent offset ideas proposals are both blurring the notion of exact additionality and the distinction with linked trading systems. In many debates over emission caps, the use of offsets and the assumption of inexpensive offset opportunities is often a critical element.¹³ This translates into potentially large financial flows: suggestions that up to 15% of a facilities’ obligation under the recent U.S. Lieberman-Warner proposal could be met with international offsets equals tens of billions of dollars in financing for developing country mitigation.

As the leading example of a greenhouse gas offset mechanism in developing countries, the Clean Development Mechanism (CDM) under the Kyoto Protocol provides a useful way to organize our discussion – in terms of experience so far and proposed reforms. Through the CDM, Annex B Parties to the Kyoto Protocol can comply with their obligation using credits – referred to as certified emissions reductions (CERs) – that are issued for emissions offset projects in developing countries. This has led to demand by governments seeking to comply with the Kyoto Protocol. More importantly, the EU ETS allows participants to meet their obligations with CERs, creating widespread private demand.

¹³ US EPA (2008) highlights that the use of offsets is necessary to keep the price of allowances under the proposed Lieberman-Warner legislation at \$40 rather than \$77 dollars. Unlimited offsets could lower the price to \$11.

On the one hand, the CDM is frequently highlighted as a particularly successful aspect of the Kyoto Protocol in terms of generating a large amount of CERs and lowering the cost of emissions reduction targets by the developed Kyoto Parties. The CDM has been operational since the Marrakesh Accords were reached in late 2001; by July 2008, 1,151 projects were registered, 183 million tons of credits were issued, and more than 1 billion tons of CERs were expected to be issued by 2012, according to the UNFCCC secretariat.¹⁴ Figure 2 shows the development of these credits over time.

On the other hand, there have been many criticisms. First, a relatively small number of non-CO₂ project types initially dominated the array registered projects and projected credits. In the first few years, the CDM was overwhelmed by projects to reduce high Global Warming Potential (GWP) gases such as HFC23 and N₂O, which even now account for 28% of projected credits (UNEP/RISO Centre 2008). More recently, wind power and other renewable projects have gained traction and now represent more than 30% of expected credits through 2012. However, as shown in Figure 3, energy efficiency still represents a very small share of expected credits (12%, combining both energy demand and supply sides projects).

Second (and related to the first point), the CDM is frequently criticized for its “excessive subsidies” for low-cost projects (Wara 2006). Incremental costs of high GWP industrial gas projects are typically very low, compared to the price of CERs that have recently exceeded \$20 per ton. This discrepancy has both political and economic consequences. It clearly upsets developed country constituents to be sending such large excess payments above incremental costs to developing countries – particularly ones that are also trade competitors. But there is also the dynamic inefficiency noted earlier, as these excessive subsidies may be increasing entry into the market (with the perverse effect of raising emissions) in the hope that future reductions can be equally profitable.

Third, some have criticized the regional distribution of projects for being unbalanced in terms of bringing the benefits of sustainable development to least developed countries that do not have capacity to achieve them.¹⁵ As shown in Figure 4, four big countries (China, India, South Korea, and Brazil) dominate more than 60% of generated credits, while less than 5% come from

¹⁴ See the UNFCCC’s website <<http://cdm.unfccc.int/index.html>>.

¹⁵ Article 12 (2) of the Kyoto Protocol prescribes that “[t]he purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development.”

African countries. Thus, the CDM benefits an OECD country (South Korea) and emerging economies (China, India, and Brazil).

Finally, and most fundamentally, the CDM creates perverse incentives for developing country governments. Specifically, developing countries may hesitate to enact domestic policies – even policies in their own self-interest – if they believe it may adversely affect future CDM financing and a correspondingly profitable financial flow. Efforts to remove such perverse incentives by excluding the influence of new policies on baseline emissions simply shift the problem from one of domestic inaction to one of paying for non-additional efforts.

Numerous proposals for reforming the CDM have emerged to address these criticisms, providing guidance for both the CDM and offset mechanisms more generally.¹⁶ Most proposals fall into two categories: adjusting crediting rules to address the distribution of projects and level of subsidy, or moving beyond projects to provide credits for programs, policy reforms, or sectoral targets. The former attempt to address the first three concerns, while the latter begin to provide incentives for developing countries to change their own policies.

Changing the rules for project credit

Responding to criticism over project types, excessive subsidies, and regional distribution, the Parties to the Kyoto Protocol are engaged in negotiations on possible CDM reforms. They have proposed a wide range of ideas for managing the project pipeline, including:

- positive and/or negative lists of project types (i.e. automatic registration and/or rejection of certain types of projects)
- loose application of rules for specific project types (e.g. less strict criteria for energy efficiency projects)
- multiplication factors to increase or decrease the amount of issued credits for specific project types (e.g. discount for industrial gas projects, favorable multiplication factors for emerging technologies)¹⁷

¹⁶ The proposals by the Parties to the Protocol are summarized in UNFCCC (2008).

¹⁷ While there is a tendency for economists to look at such multiplication factors as distorting efficiency – placing different per-ton values on different activities – it is, in reality, a form of price discrimination. Given the monopsony power of countries purchasing CDM credits, it may make sense for them to pay less for identifiably less costly activities.

- limit of countries eligible for CDM based on categorization of countries (e.g. only least developed countries (LDCs) are eligible for CDM)
- minimum quotas for specific project types (e.g. 10 % of all credits used for compliance by developed countries must be from renewable energy projects)
- minimum quotas for specific regions (e.g. 5% of all credits used for compliance by developed countries must be from projects in African countries)¹⁸

A variety of concerns surround these proposed reforms, in particular, the potential economic efficiency of discriminating among reductions from different regions or activities and for the risk of non-additional projects if looser rules are imposed. And, even if adopted, reforms may not achieve their declared goals of boosting credit supply from certain project types or regions because other barriers related to market failures, institutional capacity and/or enabling environments may be limiting offset project development.

Offsets for programs, policies, and sectoral targets

The aforementioned limits to project-level activities has led to proposals to expand the CDM to include credit for programs of bundled activities, policy reforms, and even sectoral targets.¹⁹ Because efforts to provide these credits are sufficiently large to require idiosyncratic negotiations, they also create an opportunity and incentive for domestic policy reform.

The most limited approach, referred to as programmatic CDM (pCDM), would grant credits for program-level activities as opposed to project-level activities in the conventional CDM. Frequently, these programs would consist of dispersed small-scale efforts that collectively generate large reductions (e.g. a program to replace incandescent lamps with compact fluorescent lamps). The pCDM is a promising way to remove methodological barriers to end-use energy efficiency, one of the most underdeveloped project types with vast potential for emissions reduction (Levine et al. 2007).²⁰ This might arise, for example, through demand-side management (DSM) programs that decouple utility profits from power volumes – thus

¹⁸ These ideas are briefly analyzed in the UNFCCC's Technical Paper (UNFCCC/TP/2008/2).

¹⁹ Parties to the Kyoto Protocol have been hesitant to allow policy-level activities to be registered as CDM. The 1st Conference of the Parties serving as the Meeting of the Parties to the Protocol (COP/MOP1) decided that a local/regional/national policy or standard cannot be considered a CDM project, but a program of activities can.

²⁰ On underdevelopment of energy efficiency CDM, see Arquit Niederberger (2007) and Arquit Niederberger and Fecher (2006).

reorienting utility incentives around energy efficiency rather than production – and subsidizing energy-efficient products.²¹ Nonetheless, substantial technical challenges exist in attributing specific emissions reductions to program activities.

Alternatively, one could imagine expanding the notion of pCDM, which would deal with one initiative in a given sector or area of activity, with the entire suite of relevant efforts to influence product penetration in a particular sector. This might include sectoral policies, crediting for reductions from sectoral baselines, and crediting for agreed sectoral targets below baselines – collectively referred to as sectoral crediting (Bosi and Ellis 2005, UNFCCC 2008; Schmidt et al. 2006).²² The negotiation of country-specific terms for sectoral crediting, even more than pCDM, would begin to remove – or at least reduce – perverse incentives that discourage developing countries from taking proactive mitigation action. In the end, a sectoral target for offsets could begin to look a lot like a linked cap-and-trade program.

For precisely this reason, sectoral targets are likely to face strong opposition by developing countries who fear that even limited, no-lose targets, will eventually lead to binding caps in the future – an outcome the vast majority are strenuously seeking to avoid. Sectoral crediting is also likely to require differentiation among developing countries as it is appealing mainly for a small number of large-emitting, middle income countries that collectively account for a large share of global emissions, and not the bulk of developing countries. This differentiation also faces opposition among at least some developing countries who see such an effort as dividing the unity of among developing nations.

International Public Funds

Regardless of how offset programs in general and CDM reforms in particular progress, there are obvious funding gaps that need to be addressed. Offsets are poorly designed to support core capacity building and technical assistance, more targeted financial products, and efforts in countries with weak institutions. They are also impossible to support without sufficient demand

²¹ California Energy Efficiency Evaluation Protocols and International Performance Measurement & Verification Protocol are frequently mentioned as a prototype methodology on which pCDM methodology should be built. The former was developed by California Public Utilities Commission, and the latter by U.S. Department of Energy. On technical and methodological work to apply DSM methodologies to pCDM, see Figueres and Philips (2007) and Figueres (2005).

²² This might include “no-lose” targets, where baselines would be set below business as usual, with countries allowed to sell credits if emissions were below the baseline but not penalized if the baseline was exceeded.

from large and robust market-based regulatory programs or quantitative commitments. Offsets are also criticized for failing to provide reductions additional to the regulated cap or commitment demanding the offsets – though such criticism ignores the endogeneity of offsets noted previously.

These are exactly the advantages of international public funds where support need not be tied to the timing and price of reductions delivered to an existing market, and, second, they can deliver reductions additional to existing emission cap.²³ While offsets deliver payment when reductions occur and based on the market price of those reductions somewhere else, funds can make payments earlier and with more attention to the incremental cost rather than market price. Currently, these funds are supported by government contributions; however, future funds could be supported by a facility to auction credits into an existing market-based system, with these credits established within, or in addition to, the system's cap.²⁴ Reductions financed in this way would clearly be additional if the credits are within the cap, and, to the extent the financed cost of reductions is less than the market price, they would be additional even if credits were created beyond the system's cap.²⁵

Funds can also more closely tailor the level of financing to that required in order to make viable an otherwise un-viable investment or activity that mitigates GHG emissions, a characteristic generally not shared by emissions trading.²⁶ With emissions trading – in terms of permits or offsets – there is typically surplus for both buyers and sellers. From the buyer side, the fund approach clearly shifts the surplus from sellers (developing countries) to buyers (developed countries) – allowing them to pay all or part of the cost, rather than the market price, for emission reductions in developing countries. From the seller side, it also allows developed countries to pay *more* than the market price in some cases, if there is potentially a longer-term or coincidental benefit, such as early technology development or conservation efforts with non-climate global benefits.

²³ Offsets by their nature are simply shifting emission reductions that would occur under a cap to emission reductions outside of the cap – with no net gain from having the offset mechanism. As noted in the next section, however, the expected use of offsets will typically allow one to implement a tighter cap in the first place.

²⁴ Such auctions would still tend to appear as a government appropriation, as the allocated resources could alternatively go to finance domestic activity.

²⁵ That is, selling an extra one-ton credit into a capped market in order to raise perhaps \$25 that is then spent on 5 tons of developing country reductions costing perhaps \$5 each yields a net decrease of 4 tons.

²⁶ An exception is the proposed reform discussed in the text surrounding footnote 17.

Equally important, the fund approach is more flexible in terms of the form of support. Rather than credit for emission reductions when the reductions occur, funds can provide up front grants, loans, loan guarantees, or other risk mitigation products. In particular, funds may be able to encourage mitigation activities where the obstacle is not a straight calculation of cost and benefit, but rather a market failure for risk or borrowing. At the same time, despite these advantages, funds can be problematic.

There has been an explosion of funds over the past year, including several funds established at the World Bank²⁷ and a number of bilateral proposals (Porter et al 2008). These funds differ in a variety of ways from the most prominent existing fund – the Global Environmental Facility (GEF) – in terms of scale, governance, and focus. Some are much larger – with Japanese, US, and UK commitments totaling several times the GEF annual spending on climate change. Perhaps most importantly, they also shift the governance structure away from the heavily negotiated GEF model, where project approval requires a 60% vote of a governing council and a 60% vote of donors, towards a more donor-centric model (especially for many of the bilateral funds). Governance of public funds is an extremely contentious issue. On the one hand, these variations in donor support and governance are undoubtedly related: countries making larger contributions typically want more control over their funds. On the other hand, developing countries also want control and have argued for funds established under the UNFCCC, guided by the COP, and governed by a Board whose members are appointed by COP – all because this means their representation will be enhanced.²⁸ This suggests a trade-off: if developing countries want more control over the funds, they may reduce the amount of money they can receive because developed countries tend to pay more money for the funds over which they have control.

An interesting alternative in both financing and governance is the Adaptation Fund under the Kyoto Protocol. Funding comes from a 2% levy on CDM projects when the UNFCCC issues CERs. Meanwhile, developing countries are well represented with 10 members on the board of the Adaptation Fund, compared to 6 members from developed countries. While some countries see this model (or a related model of just auctioning allowances²⁹) as a significant source for

²⁷ See <http://www.worldbank.org/cif>.

²⁸ See the G77 and China's proposal for financial mechanisms under the Convention (Phillipines 2008).

²⁹ This includes Germany (Carbon Finance 2008), the US (NRDC 2008), the EU (EC 2008), and Norway (Norway 2007).

public funds, the governance of such market-financed funds may depend on whether allowances are issued domestically or internationally. National governments manage sales of domestic allowances and control how to use them, while sales of international allowances are currently managed by the UNFCCC. Perhaps more to the point, developing country offsets originate in developing countries, where they clearly have the capacity to tax them. While the governance model of the Adaptation Fund may only be relevant for this last circumstance where developing countries have the most leverage, even this venue may come under pressure if there is a significant scaling up of financial flows.

To the extent international public funds begin focusing on the private sector, become standardized (e.g., a renewable energy subsidy program in a particular country), and have access to a steady funding source (e.g., transaction tax or allocation share), they begin to look more like offsets. And, to the extent offset programs begin using multiple or fractional crediting to target some activities while avoiding over-subsidizing others, offset programs begin to have the more nuanced capacity of funds. In this way, the distinction we have drawn so far may blur and the real question is answering the key questions of: sourcing funds, delivering finance, and governing decisions. Here, funds may retain an advantage in terms of providing more flexible finance, where offsets tend only to provide finance for resulting mitigation, and offsets may retain an advantage in terms of stable funding sources, where public funds – regardless of the source – will always appear to be similar to an appropriation.

Private and Public Diplomacy

The possibility of domestic policy improvements and increased financing is inextricably tied to diplomatic efforts – efforts that both tie the two efforts together as well as to additional commitments by both developed and developing countries. How can we encourage developing countries to adopt the domestic policy improvements we identify? How do we negotiate for financing mechanisms that best serve environmental goals while leveraging developing country commitments?

This section addresses two dimensions of climate diplomacy that help answer those questions. First, it discusses various sources of leverage that might be used in climate negotiations, including, in particular, those that go beyond the financing of emissions reductions discussed so far. Wielding these levers may help the United States and other developed countries encourage both domestic action and favorable financing arrangements in developing countries. Second, it discusses various institutional arrangements that might be used for climate diplomacy. Although economists often think in terms of leverage, bargaining, and trades that

benefit all parties, institutions – in terms of the participants and rules – can have an enormous impact on the success or failure of climate negotiations. Even without significant leveraging of additional domestic action, it will be necessary to at least coordinate certain efforts.

Sources of Leverage

The last section discussed two approaches to financing emissions reductions in developing countries – private sector financing through offset markets and public sector financing through international funds – that might be used to alter decisions in those countries. Historically, this financing has not just sought to reduce emissions but has been the primary means used to influence developing country decisions. While it remains an important focus of such negotiations, many other tools are available. This section discusses four of them.

Energy Security as a Lever

In many countries, energy security—including security of supply of fuel for power generation, industry, and transportation—is as important as economics in driving energy policy decisions. A state might adopt policies that promote the use of alternative fuels in order to diversify its set of suppliers even if those alternatives are more expensive. Conversely, a state might avoid a shift to economically attractive alternative sources of energy if those sources are also unreliable or expose that state to intolerable influence from fuel suppliers. Altering a country’s energy security calculus can, therefore, be an effective way of influencing its decisions on fuel supply, and, as a result, its greenhouse gas emissions.

Consider an example.³⁰ China and India, in considering whether to increase their use of nuclear power, a zero-emission energy source, might hesitate due to worries that the need to import nuclear fuel would subject them to excessive outside influence – and such barriers could persist even in the face of special economic incentives for switching to cleaner energy sources. To address that, developed countries might take steps to improve the reliability of the nuclear fuel supply for China and India, allowing them to increase their use of nuclear energy in a way that also increases the reliability and diversification of their energy sources. To be certain, this sort of strategy introduces challenges with respect to proliferation, waste storage, and safety.

³⁰ For more on this example, see Victor (2007). To be certain, many options for reducing emissions other than those described here, including better efficiency and the use of renewable energy, improve security of supply while avoiding security challenges similar to those presented by the two examples discussed.

Nonetheless, such arrangements are being actively considered, most prominently in discussion of the U.S.-India nuclear cooperation agreement; Chinese officials have also expressed interest in achieving support for more robust expansion of nuclear power.

Financial Penalties

The threat of sanctions has long been used as a way to induce compliance with international regimes, including environmental regimes, most notably the Montreal Protocol on Ozone Depleting Substances.³¹ The possible use of trade sanctions against exports from countries that do not take strong steps to reduce emissions has become prominent in congressional discussion of climate legislation in the United States and has received favorable attention from many leaders in the EU.

The threat of sanctions has, in theory, the potential to motivate action in key emerging economies, whose governments and firms might take steps to avoid economic disadvantage. That said, many have argued that any feasible sanctions would not rise to the level where they would be significant enough to induce any major shifts.³² Still, even if that was true, the mere willingness on the part of developed countries to raise the prospect of trade sanctions might facilitate climate action by buying the political support of key players in countries for action at home.

Regardless of their leverage in climate diplomacy, sanctions would introduce other problems. To be legal, sanctions would likely need to aim to equalize an economic playing field that would otherwise be distorted by uneven greenhouse gas regulations – but it would be technically difficult to establish whether any sanctions were leveling the playing field and were in fact thinly disguised economic protectionism. Their use would also introduce political problems, putting strains on world trade at a time when global trade regimes are already in dire straits. In this respect in particular, there is an important distinction between sanctions imposed unilaterally and sanctions that are agreed to in advance as part of any regime. (In the latter case, sanctions would essentially be used as enforcement mechanisms; this type is what was used in

³¹ Because non-signatory countries could negate global efforts to reduce production of ozone-depleting chemicals, the Protocol introduced trade sanctions as an incentive for participation in the treaty.

³² See Trevor Houser et al., *Leveling the Carbon Playing Field* (Washington, DC: Peterson Institute, 2008).

the Montreal protocol.) It would, however, likely be difficult to get major developing countries to agree in advance to the legitimacy of sanctions that might be used against them.

Adaptation Support

Addressing climate change will require not only reducing emissions but also adapting to inevitable change. Poorer countries will generally be more vulnerable to climate change, and wealthier countries are expected to provide them with some support as they adapt. How that support for adaptation is realized will play a role in mitigation diplomacy.

There is considerable debate as to what role adaptation support should play in mitigation diplomacy, as well as to how influential it will be. Some argue that the link is strong, contending that the main tradeoff in climate negotiations will be between commitments from developing countries to emissions reductions and commitments from developed countries to provide assistance with climate adaptation. This is problematic, however, because those countries that require adaptation assistance the most are generally not those from whom the greatest commitments to reducing emissions are required: for example, countries in sub-Saharan Africa will need help with adaptation, but have few emissions to little in need of emissions to be reduced; in contrast, while it is difficult to envision an international agreement that provides China with large amounts of adaptation support, it is the country most like to need persuasion on the mitigation front.

Others see the diplomatic link between adaptation and mitigation as more indirect. The developing world has consistently shown solidarity against any restrictions on greenhouse gas emissions by any of its members. Some argue that if developed countries make adaptation assistance for the poorest developing countries part of a deal requiring mitigation commitments from the wealthier developing countries, those poorest countries are less likely to provide political cover for countries like China. However, while this dynamic is almost certain to occur, its importance is debatable. Countries like China and India are sensitive to political pressure in their regions and more broadly from the developing world, but it is unclear how much such pressure can sway their decision making on broader climate deals that have large economic and security implications.

Broader Issue Linkage

In order to press developing countries to reduce their emissions, developed countries may seek linkages that go beyond the climate sphere, allowing them to offer a wider variety of incentives in exchange for mitigation actions. The clearest example of this is in the deal made to

obtain Russia's ratification of Kyoto protocol. Russia had previously been blocked from WTO membership by EU leaders, who were concerned by (among other things) Russia's high-priced natural gas exports. Yet worried that Russia's failure to ratify would doom the Kyoto protocol, EU leaders offered Russia a deal: if Russia ratified Kyoto, EU leaders would ease its entry into the WTO. To be certain, there is much legitimate debate as to whether this was a good deal, particularly given the lax emissions caps Russia ultimately signed up to. Nonetheless, it illustrates how progress can be made through linking climate commitments to other major foreign policy issues.

Such linkages can be specific, as in the Russian case, but they can also be more diffuse. In particular, if major developing countries can be brought to believe that taking their own actions to restrain greenhouse gas emissions will help better integrate them into the class of great powers (with the broad benefits that would confer for them internationally), that could promote greater action on their part to reduce emissions. So long as key countries such as China are seen as out of the global mainstream in a wide variety of ways, they suffer little damage for also being outliers on climate issues. In addition, so long as there are key developed countries that are taking insufficiently strong climate action, it will be difficult to equate global stature with climate responsibility. But as both of those pieces change, there is likely to be increasing pressure for developing countries to take mitigation action for its own sake. This is not likely to be a significant issue for many of the key developing countries – notably China and India – between now and Copenhagen, but it is likely to become increasingly relevant over time.

Institutions

Efforts to exploit the aforementioned sources of leverage will happen in a variety of forums, including through bilateral and regional relationships.³³ However, global negotiations, at least among key countries, will be necessary to significantly address the climate challenge. Failing a grand deal, other coordination among key countries will be necessary to make sure various efforts reinforce each other and to minimize potential conflicts. The need for cooperation includes ensuring comparability of effort among developed countries; coordinating domestic policies, as necessary, including harmonization of carbon trading systems and financing;

³³ The most prominent regional relationship is the Asia-Pacific Partnership on Clean Development and Climate, which is focused on sector-by-sector action on the ground and on implementing emission reductions. Japan has provided energy and environmental assistance for China and South East Asian countries for many years. Beyond regional ties, the US-India nuclear deal is a prominent example of bilateral cooperation.

developing common understanding on the roles of different negotiating forums; and agreement on the role of trade sanctions. With these needs in mind, we now discuss the two main types of forums for global negotiations: the United Nations, and minilateral climate-focused groups such as the G8+5 “Gleneagles” process and the Bush administration’s Major Economies Meetings.

UNFCCC

All major countries have emphasized the centrality of the United Nations Framework Convention on Climate Change process as the main vehicle for international climate diplomacy, including efforts to promote action on the part of developing countries. There are three basic motivations for working within the UNFCCC. Because greenhouse gases emissions have the same effect on the climate regardless of their source, a global forum in principle provides the greatest possible set of opportunities to reduce them. In addition, because free riding by even small numbers of countries can undermine emissions reductions and introduce competitiveness concerns, a forum that leaves out even a relatively small number of countries may be unable to deal with such issues effectively. Meanwhile, the UNFCCC has become associated in many circles with serious action on climate change – and, conversely, alternatives to it have become associated by many with a lack of ambition. As a result, emphasizing the centrality of the UNFCCC has become symbolically important.

Within the UNFCCC, there are two basic models for how an agreement might be reached. One would be a self-contained agreement, where different countries would make different commitments with tradeoffs acceptable to all. This is similar to the Kyoto deal but enlarged to include other key emitters. Alternatively, a deal might be reached within the UN process but only as the result of many other tradeoffs and bargains made outside of that forum. There is widespread concern, however, that no comprehensive deal of either variety will be reached within the UNFCCC. It was already very difficult to reach the agreement on the Kyoto protocol, which only required commitments from a small number of advanced countries. Adding several rapidly emerging economies to the mix, as is likely to be necessary to sell a deal in many of the developed countries, will make things far more difficult – and embedding this negotiation within a forum involving nearly two hundred countries only exacerbates the challenges. All of these problems are reflected in the recent failure of the Doha round of trade negotiations –

negotiations that involve far fewer countries than the UNFCCC and that are, in other ways, simpler (and certainly more familiar) than climate negotiations.³⁴

The UN process is also distinguished by its emphasis on legal arrangements. This is helpful in that such agreements are often a stronger basis for collective action of the sort required for dealing with climate change, where inaction (or recidivism) by one country can undermine the viability of action by others. At the same time, treaty-focused negotiations can often drive states to focus on committing to the weakest possible actions; the resulting treaties can then become rallying points for national-level actors who do not wish to go beyond what their countries have formally committed to, in turn undermining those who advocate more ambitious efforts to cut emissions. To achieve a strong outcome, it is essential that negotiators keep this in mind and aim to conclude a deal that promotes the greatest emissions reductions from developing countries, not merely the strongest *form* of commitment to reduce emissions.

Minilateral Forums

There has been a move in recent years, pushed particularly by the United States and the UK but supported by several other key countries, toward using smaller groups for climate negotiations, whether as complements or alternatives to the UN process. The most prominent of these have been the G8+5 “Gleneagles” process established by Prime Minister Tony Blair in 2005, and the meetings of the Major Economies Meetings (MEM) established by President Bush in 2007. By lowering the number of participants in negotiations while including major emerging economies, these efforts aim to simplify discussion while still encompassing the majority of greenhouse gas emissions.³⁵ The MEM effort has also emphasized the inclusion of government officials outside environment and foreign ministries, on the premise that many of the most powerful relevant actors in national climate and energy policy often come from elsewhere in governments.

It is difficult to judge whether the MEM effort has been successful. The perception of the Bush administration as being unwilling to engage seriously on climate change has undermined the effectiveness of any U.S.-sponsored forum, including the MEM. The MEM is also

³⁴ See, for example, comments in Stephen Castle, “For Global Trade Talks, the Stakes Have Risen,” *New York Times*, July 19, 2008.

³⁵ Eight countries or groups – the United States, the European Union, Japan, Russia, China, India, Brazil, and Indonesia, are responsible for roughly three-quarters of the world’s greenhouse gas emissions.

distinguished by the fact that it is not aimed at establishing independent agreements, but at laying the groundwork for a global post-Kyoto deal. This means that many of the same impediments that face UNFCCC negotiations – in particular, the difficulty of finding a legal arrangement (either a treaty or a protocol to an existing treaty) acceptable to all key developed and developing countries – apply to the MEM. This is not a necessary feature of all multilateral efforts, but it was required in order for the United States to gain acceptance by assuaging others that it did not intend to sideline the UN process.

The G8+5 effort, in contrast, has been aimed not only at feeding into the post-Kyoto negotiations but also at establishing complimentary agreements, such as a recent agreement to jointly pursue carbon capture and sequestration demonstration projects.³⁶ Such agreements indirectly support diplomacy and negotiations by building countries' confidence that they can meet promises to control emissions; they also take advantage of the greater ease with which political (rather than legal) agreements can be made. The G8+5 process has, however, suffered from concerns by some key developing countries about what they perceive as their second class status in the forum. Its focus on non-binding commitments also means that promises may be more likely to go unfulfilled.

In addition to these two types of global efforts, regional forums can play important roles. The most prominent is the Asia-Pacific Partnership on Clean Development and Climate, which is focused squarely on sector-by-sector action on the ground and on implementing emission reductions. By working in a regional grouping, it simplifies interactions, and by focusing on concrete cooperation, it removes some of the difficulties associated with higher-level negotiation. At the same time, it has been criticized for its focus on aspirational rather than binding goals; it has also suffered from lack of political attention and additional public funding for implementing projects.

Conclusions

Over the next few years, as the United States likely returns to a more prominent role on the international stage and as the end of the first Kyoto commitment period draws near, there will be increasingly intensive efforts to reach a new global climate agreement. There is obviously

³⁶ "G8 Declaration on Environment and Climate Change", July 8, 2008, accessed at www.whitehouse.gov/news/releases/2008/07/20080708-3.html, 9 September 2008.

enormous value in such an agreement to address both mitigation of rapidly increasing developing country emissions as well as financial support for that mitigation from developed countries (and, of course, mitigation for developed countries themselves). If no arrangement can be found that both reduces emissions and provides the right financial support for developing countries, there will be virtually no chance of simultaneously achieving stabilization at an acceptable level while fully promoting increased economic prosperity in the developing world.

Much of this effort is likely to focus on some kind of a “grand bargain,” with developing countries offering some form of commitments in exchange for both emission commitments and significantly increased financing from developed countries. Developing country commitments could take the form of domestic policy reforms, sectoral targets, or even economy-wide limits (for higher income developing countries). This paper has sought to highlight precisely the kinds of domestic policy reforms that might make sense in developing countries, ways in which sectoral targets could be coupled with CDM reform, and diplomatic leverage that might lead to a variety of different commitments. Sectoral commitments, in particular, may be a useful way to break the problem down into more manageable steps in developing countries. Support from developed countries will be essential to this grand bargain, and this paper has highlighted possible vehicles for increased financing – including both CDM/offset reform and the use of international public funds (both multilateral and bilateral) – and areas where technical assistance and capacity building can also play a supporting role.

A grand bargain will not be reached easily. Both the domestic debates within countries like the United States and the struggles in the UNFCCC negotiating tracks demonstrate the significant challenges. On the other hand, there are an emerging number of diplomatic forums that may support the UNFCCC or provide alternative routes to some kind of deal (or to a series of deals). It is difficult to judge now exactly what approach, what diplomatic and financing tools, and what forum are going to prove most successful. For this reason, the main conclusion of this paper is that there is no obvious silver bullet; we need to pursue a variety of policy reform efforts, financing approaches, and diplomatic venues in parallel.

This leaves open an important question of balance – how much effort goes into each approach and how much overall? Right now, the greater share of resources is focused on the

UNFCCC process and associated finance mechanisms; however, the emergence of new forums and mechanisms suggests a shifting balance. Such dynamics are inevitable until it becomes clearer what works and what does not, and until developing countries reach a level of wealth and well-being that allows them to take equal rather than differentiated responsibilities. While there is a tendency to think of the current march toward Copenhagen and a post-2012 agreement as an endpoint, it is really just a beginning, and we will likely continue to confront these same questions for quite some time.

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Tables and Figures

Table 1: Energy subsidies in developing countries

Country	Emissions (2005) [1]			Subsidies, total (2005, \$B) [2]					(Consumption) Subsidy CO2 price equivalent in 2005 (\$/mt CO2) [3]			
	MtCO2	% global emissions	% non-OECD emissions	Coal	Oil	NG	Electricity	Total	Coal	Gasoline	Diesel	NG
China	5101	18.8%	35.9%	7.8	7.0	3.8	7.0	25.6	\$4.76*	\$10.98	\$24.90	NA
Russia	1544	5.7%	10.9%	0.0	0.4	25.4	14.7	40.5	\$0.00	\$0.00	\$0.00	\$33.34
India	1147	4.2%	8.1%	0.0	6.9	2.2	10.1	19.2	\$0.00	\$0.00†	\$0.00†	NA
Iran	407	1.5%	2.9%	0.0	24.2	9.4	2.7	36.3	No IEA energy price data.			
Indonesia	341	1.3%	2.4%	0.5	14.0	0.0	1.7	16.2	NA	\$62.91	\$115.55	NA
Saudi Arabia	320	1.2%	2.2%	0.0	10.0	4.3	5.5	19.7	No IEA energy price data.			
Ukraine	297	1.1%	2.1%	0.5	0.2	12.4	2.4	15.4	No IEA energy price data.			
Egypt	148	0.5%	1.0%	0.0	9.2	1.2	1.8	12.2	No IEA energy price data.			
Total	9304	34.3%	65.4%	8.8	71.9	58.7	45.7	185.1				
World	27136											
non-OECD	14226						estimated	220-280				

*Calculated from 2004 coal price.

†Consumption subsidies for refined oil products in India are focused on kerosene and LPG.

[1] IEA Key World Energy Statistics 2007 (data for 2005)

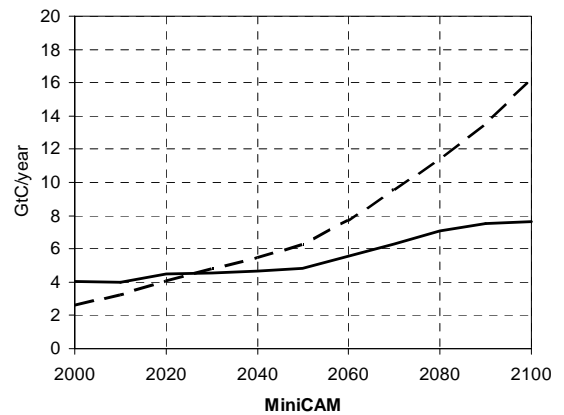
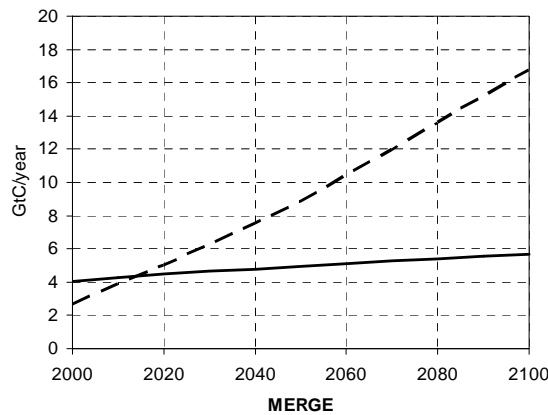
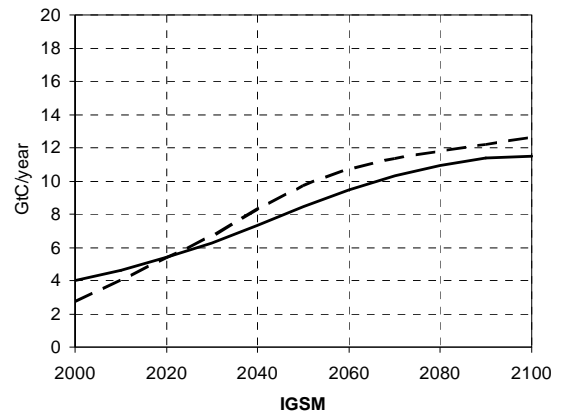
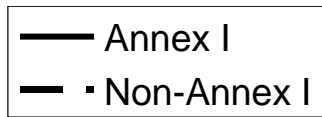
[2] IEA WEO2006 (Figure 11.7)

[3] Calculated from IEA WEO2006, Table 11.1, and IEA Energy Prices & Taxes 1st Quarter 2008 (2005 end-use energy prices)

Policy arena	Action by developing countries	Areas for support from developed countries
Subsidy reform	<ul style="list-style-type: none"> •Reduce subsidies •Establish alternative programs or policies to accomplish objectives, e.g., subsidize connections for electricity rather than power 	<ul style="list-style-type: none"> •Technical assistance and funding for alternative programs, e.g., subsidized electricity connections, expanding access to cleaner stoves, etc.
Energy efficiency	<ul style="list-style-type: none"> •Establish national plan or program •Labeling programs •Energy efficiency standards •Public procurement of EE products •Improved operation and maintenance •Enabling environment for ESCOs (access to capital, public procurement, etc.) 	<ul style="list-style-type: none"> •Funding for EE programs •Technical assistance and training •Regional or agency-level partnerships to support energy efficiency standards
Technology diffusion	<ul style="list-style-type: none"> •Establish enabling conditions: fund R&D and infrastructure, and invest in human capital •Reduce trade barriers (e.g., tariffs) •Improve IP laws and/or enforcement 	<ul style="list-style-type: none"> •Technology funds •Capacity building for establishing IP laws and enforcement •Soft loans and/or export guarantees for exports

Table 2: Summary of actions for domestic policy improvements in developing countries

Results presented for three CCSP models



“Emissions of fossil fuel and industrial CO₂ in the Non-Annex I countries exceed Annex I emissions for all three reference scenarios by 2030 or earlier. The MERGE and MiniCAM reference scenarios exhibit continued relative rapid growth in emissions in Non-Annex I regions after that, so that emissions are on the order of twice the level of Annex I by 2100. The IGSM reference scenario does not show continued divergence, due in part to assumptions of relatively slower economic growth in Non-Annex I regions and faster growth in Annex I than the scenarios from the other modeling groups. The IGSM reference scenario also shows increased emissions in Annex I as those nations become producers and exporters of shale oil, tar sands, and synthetic fuels from coal.”

Figure 1: Fossil Fuel and Industrial CO₂ Emission forecasts for developed (Annex 1) and developing (Non-Annex 1) countries.

Source: Clarke et al (2007), Figure 3.16.

Accumulated expected CERs for registered projects

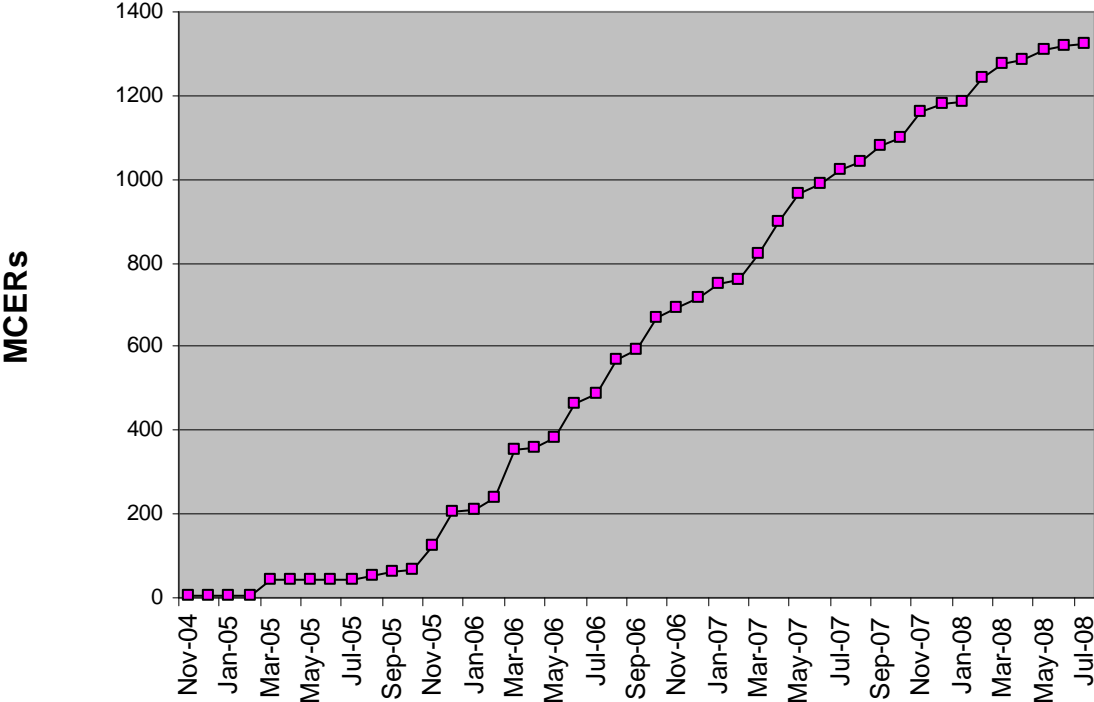


Figure 2: Accumulated number of credits generated from registered projects

Source: UNEP/RISO Centre (2008)

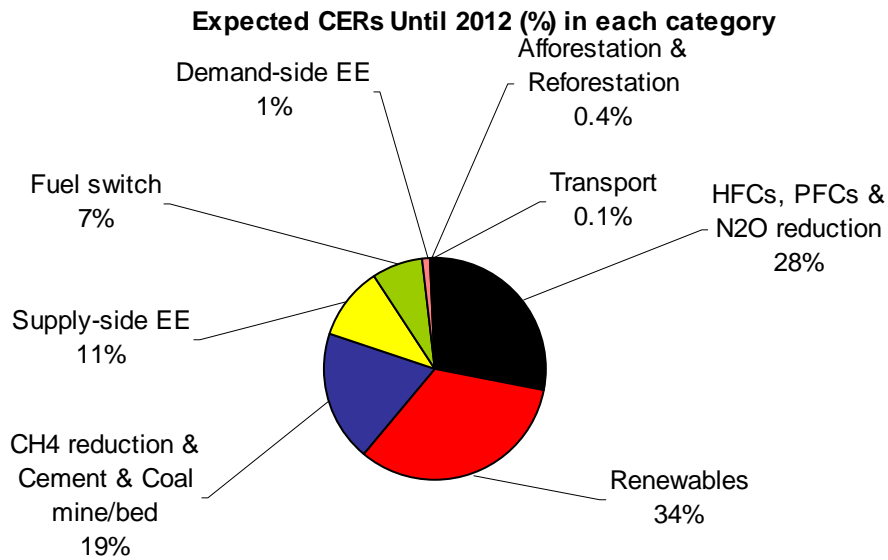


Figure 3: Distribution of project types

Source: UNEP/RISO Centre (2008)

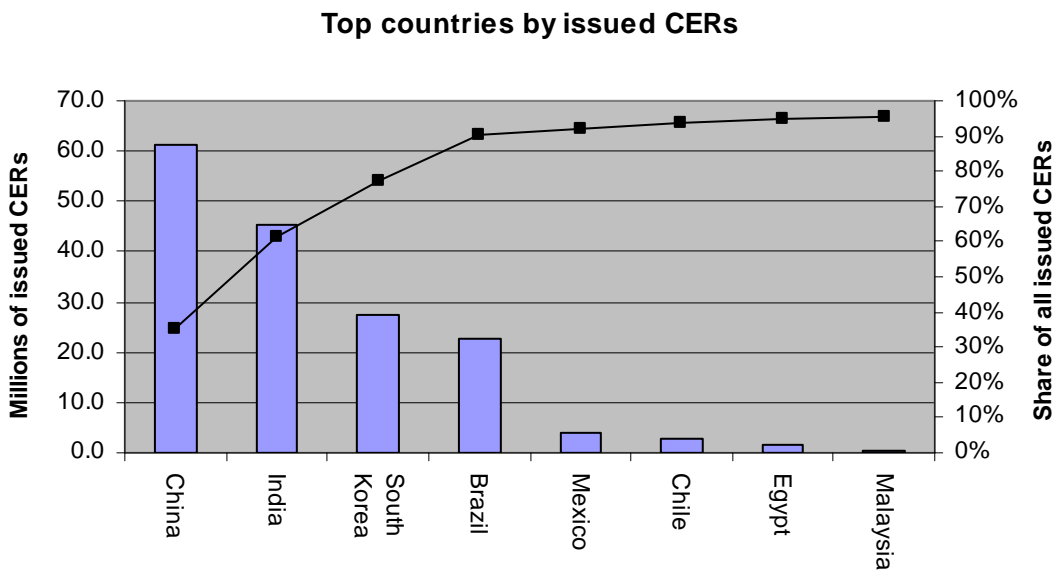


Figure 4: Regional distribution

Source: UNEP/RISO Centre (2008)