Incentive Mechanisms and Climate Friendly Technologies

Muthukumara Mani
Senior Environmental Economist
World Bank

Climate risk management is fundamental for preserving and enhancing development progress in many developing countries. Successful mitigation efforts by the global community will reduce the burden of adaptation. At the same time, adaptation to aggravating climate risks and low carbon growth options are often directly linked to national development priorities and business opportunities, such as energy efficiency, renewable energy, sustainable livelihoods and environmental protection, and building resilience of infrastructure to climate variability.

While accelerating economic growth is a priority in developing countries, climate action can — and should — result in multiple local benefits including: commercial, developmental and environmental. Lessons from the Clean Energy Investment Framework and many long-standing World Bank and International Finance Corporation engagements show that the best entry points to client dialogue and program development on climate change arise from the synergies between development progress, and the business opportunities of investing in energy efficiency, renewable energy and other "low carbon" projects. The scope for cost-effective, pro-development investments in energy efficiency and, increasingly, renewable energy especially against the background of rising oil prices, is particularly broad.[1]

According to the IPCC, the stabilization of GHG concentrations to as low as 450 ppm CO2-eq can be achieved by deployment of currently available technologies, which are expected to be commercialized in the coming decades in the energy supply, transport, buildings, industry, agriculture, forests, and waste management sectors (IPCC 2007). Socolow and Pacala (2004) and others have used these technologies to identify strategies that are climate friendly. They introduce the concept of the now famous "stabilization wedges," which is helpful in understanding the scale of the challenge in order to stabilize carbon emissions by 2054—aiming at a CO2 concentration of 500 ppm.

The magnitude of the resources needed to finance access to and implementation of environmentally sound technologies and processes is such that the bulk must be provided through private sources, with the public sector serving in a catalytic and/or facilitating role. The degree to which such a transition will be successful is highly dependent on the establishment of the necessary enabling environments within the host country complemented by the development of endogenous capacities to adopt, operate, and maintain the technology.

[1] In 2007, only 20% of the overall investments in renewables were in developing countries (NEF, 2008).

Current channels of technology transfer under UNFCCC

The Kyoto Protocol defines three mechanisms—known as joint implementation (JI), the Clean Development Mechanism (CDM), and emissions trading—to help Annex I Parties lower the overall costs of achieving emissions targets by allowing them to reduce emissions, or increase greenhouse gas removals more cheaply in other countries than at home. These were also intended as vehicles for transferring cleaner technology to developing countries. However, these mechanisms are demonstrably too small in scale and processes too convoluted to deliver the technology on the scale requited for rapid climate change mitigation. The UNFCCC's Expert Group on Technology Transfer (EGTT) was commissioned to facilitate and advance technology transfer activities under the convention. Apart from initiating technology assessments and studies on the enabling environment, the EGTT has so far produced a guidebook to on preparing technology transfer projects.

Trade

The Stern Review identifies transfer of energy efficient and low-carbon technologies to developing countries as key to reducing the energy intensity of production. It further observes that "the reduction of tariff and nontariff barriers for low-carbon goods and services, including within the Doha Development Round of international trade negotiations, could provide further opportunities to accelerate the diffusion of key technologies." Looking at the removal of tariff and nontariff barriers, a recent World Bank (2007) study finds that it can significantly increase the diffusion of clean technologies in developing countries. Within the context of current global trade regimes, the study finds that a removal of tariffs and NTBs for four basic clean energy technologies (wind, solar, clean coal, and efficient lighting) in 18 of the high-GHG-emitting developing countries will result in trade gains of up to 13 percent. If translated into emissions reductions, these gains suggest that—even within a small subset of clean energy technologies and for a select group of countries—the impact of trade liberalization could be reasonably substantial. The study further suggests that the ongoing WTO negotiations on environmental goods have the potential to contribute significantly to both trade and climate change liberalization efforts.

Official Development Assistance

Official Development Assistance has been a major source of energy sector investments in developing countries and could significantly influence future GHG emissions. Following the Gleneagles comminique, bilaterals and multilaterals have responded to the increasing challenge of climate change--with an agenda for action to integrate climate concerns into the mainstream of developmental policymaking and poverty-reduction agendas. All have defined major new initiatives designed to help their clients mitigate the impact of past and future development programs on climate change and also have intensified joint efforts on both climate change mitigation and adaptation.

In addition to their involvement in the energy sector, they can also significantly influence by supporting (a) policies (e.g., changes in price regimes) to promote low-carbon growth globally and nationally), (b) support enabling regulatory and investment environment for renewable energy and energy efficiency, (c) help develop mature, efficient, and accessible carbon markets and (d) stimulate investment in the dissemination of climate friendly technologies investment projects.

Investment

Even if trade is liberalized, streamlining of intellectual property rights, investment rules, and other domestic policies will further aid in widespread assimilation of clean technologies in developing countries. While FDI is another most important means of transferring technology, weak intellectual property rights (IPR) regimes (or perceived weak IPRs) and other barriers in developing countries often inhibit diffusion of specific technologies beyond the project level. These barriers range from weak environmental regulations, fiscal feasibility, financial and credit policies, economic and regulatory reforms, and the viability of technology to local conditions (including availability of local skills and know-how).

On the international side, there is no global regime governing clean technology investments. In the absence of a multilateral agreement on FDI in manufacturing, over 2000 bilateral investment treaties (IIAs/BITs) indirectly assume importance. Although there is much variability in their coverage, they typically provide for non-discriminatory treatment for foreign-owned firms and opportunities for dispute settlement. Traditionally, BITS have often been negotiated on an as-needed basis by countries. There is a need to explore mechanisms to encourage clean energy investments in FTAs and BITs.

Research, Development and Deployment

While increased spending will certainly be required for rapid development, deployment and diffusion of clean technologies, creative approaches and novel paradigms beyond traditional RD&D vehicles will be necessary to accelerate energy technology innovation on the scale and in the time frame required. The time is right for introducing new RD&D approaches to inform and influence many of the new initiatives now being launched.
Lessons learned from initiatives in other sectors such as the Consultative Group on International Agricultural Research (CGIAR), Advanced Market Commitments (AMCs), and the Human Genome Project can strengthen the development of new technology initiatives, which will address the needed balance between climate mitigation and the growing energy demands of the developing world.

Carbon markets

Finally, pricing of carbon is critical for development and dissemination of clean energy technologies. In addition to development of mature carbon markets, getting carbon prices right would involve: (a) eliminating fossil fuel subsidies, (b) taxing carbon emitters, (c)

using shadow pricing or social cost of carbon in project analysis, and (d) using hurdle and switching prices: using carbon markets to buy down the cost of reducing carbon missions in projects.