Key challenges in stimulating diffusion of clean technologies in Latin America

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The Climate Technology Initiative (CTI) promotes the objectives of the United Nations Framework Convention on Climate Change (UNFCCC) by fostering international co-operation for accelerated development and diffusion of climate friendly technologies. The CTI is a multilateral initiative of the 23 of the member countries of the International Energy Agency (IEA) and Organisation for Economic Co-operation and Development (OECD). The **objectives** of the CTI program for Latin America are to:

- Disseminate information on technologies and best practices in technology transfer in Latin America
- Identify technology needs and enhance capacity to create a market for these technologies
- Promote policies and institutional changes that lead to the removal of barriers and increased market penetration of climate friendly technology
- Mobilize private sector financial and technological resources that match Latin American technology needs

The CTI Secretariat is located in Paris, France, at the IEA. This article is intended as an informational article, reflecting CTI's ongoing and future activities, and is not intended to reflect individual CTI country positions or policies.

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Introduction

Many Latin American countries face rapidly growing demand for energy and transport services, and have to take important decisions on putting into place or replacing their capital stock to provide these services. There is a very strong argument to act now to aggressively apply Environmentally Sound Technology (EST) whenever possible. After all, many of the technology decisions that we make today, whether in energy production, energy efficiency in buildings, transport, industry, or agriculture/forestry, will be in use for the rest of the current and even the next generation.

The transfer of these technologies and practices happens all the time, primarily through trade and foreign direct investments. The role of the private sector is key in this process, but governments play an important role in influencing the quality and quantity of technology transfer. The transfer of climate-friendly technologies includes hardware and software, such as consulting services, technical and legal advice, training, etc., that result in a reduction of the growth of emissions of greenhouse gases or avert the impacts of global warming.

This article outlines some of the key barriers and opportunities to spur the transfer and diffusion of climate friendly technologies in Latin America. Three key challenges are: (i) creating an environment that attracts investment in projects involving climate friendly technology; (ii) raising awareness of climate friendly technology options; and (iii) seeking investment opportunities involving these technologies that match national development and environmental agendas. In meeting these challenges, a number of specific issues typically have to be faced, including institutional or policy issues, capacity building and information issues, and financial issues.

In order to gain a better understanding of private sector perspectives on key issues to enhance diffusion of climate technologies in Latin America, the Climate Technology Initiative (CTI) organised an industry seminar for Latin America. This seminar was organised in co-operation with the United Nations Framework Convention on Climate Change Secretariat (UNFCCC), and took place in El Salvador, in March, 2000. The seminar included focused workshops on transport, renewable energy, and energy efficiency. These discussions were seeded with a number of case studies on technology transfer, prepared by Econergy International Corporation (EIC consultants, based in Boulder, USA). These case studies, as well as a report on the industry seminar in El Salvador, (both available on the CTI web-site) form the basis of this article.

Institutional and policy issues

A widely acclaimed stimulus for the diffusion of climate friendly technology is the creation of a market environment that attracts private sector investment in these technologies. This may demand changes in policies in the receiving country, as well as incentives in the industrialised country to promote the export of such technologies. These changes in policies can be placed into three categories: (i) the removal of barriers and distortions; (ii) proactive policy and incentives in developed and developing countries to stimulate investments in climate friendly technologies; and (iii) corporate policy and green marketing.

Removing policy and institutional barriers

Lack of environmental policy and standards, perverse subsidies, lack of protection of property rights or weak enforcement of existing policies are discouraging foreign direct investment in projects involving clean technology. On the project development level, investors perceive bureaucratic procedures for project approvals, complicated legalities, corruption, and lack of co-ordination between different authorities as key barriers to the selection of alternative technology. Monopoly-dominated marketplaces and price distorting subsidies tend to impede investments in EST, while, for example, more representative energy prices create an incentive toward more rational energy usage. Some countries design specific policies to address specific obstacles, such as laws to protect intellectual property. The list of distortionary policies and institutional barriers is long, and it is often more rewarding to think in positive terms on how a country may commit to creating an attractive

environment for climate friendly technologies, which may lead to the removal of the barriers mentioned.

Incentives to stimulate investments in EST
Some countries have successfully adopted an image of environmental friendliness, or a commitment to live up to the "spirit" of the Convention. Costa Rica is trying to build a reputation as a country which takes environmental and climate change issues seriously, and turns what others perceive as a threat or a cost into business opportunities (Activities Implemented Jointly (AIJ), eco-tourism, infrastructure for CDM projects, etc). Other countries have successfully created a market for a climate friendly technology by 'getting the prices right' to internalise external environmental effects. With the rapid improvements of gas- and diesel-fired generation technologies in the last decade, the needs of rapidly growing energy markets or quick and inexpensive generation capacity are increasingly met by these fossil-fired technologies. Honduras is an example of a country that created an investment climate that discourages investments in fossil-fired generation by introducing an incentive to invest in renewables. Similarly, in the context of electricity deregulation, some states in the US have adopted portfolio requirements to include renewables and to allow consumers to choose renewables sources for their power needs.

Corporate policy and green marketing
Many companies are increasingly aware of the commercial benefits of becoming environmentally responsive. British Petroleum and Shell, historically opposed to any climate actions, are taking aggressive climate mitigation policies, and market themselves today as environmentally responsible energy companies. The degree to which companies in developing countries have implemented environmental management systems (EMS) depends to a large extent on the domestic regulatory environment, as well as their perception of business standards in the major industrial countries of the world. The development and increasingly widespread adoption of the ISO 14000 series of standards is an example of how the environmental concerns and management practices are driving companies in emerging markets to implement EMSs.

Technology assessment
Climate change is typically not on the top of the environment or sustainable development agenda in Latin America. Raising awareness of climate change at a national level therefore requires connecting climate change related issues (energy, transport, industry, agriculture, land use change, coastal adaptation, etc.) to sustainable development priorities. It is therefore all the more important to help countries assess technologies needs that match their development or local environmental agenda. Agendas differ widely from country to country. Also critical are differences in a country's capacity to adapt and absorb technology, infrastructure, human and natural resource availability, culture, policy and economic environment etc. These differences make technology assessment by region, country or sector key in the technology transfer process. Technology assessment is only useful if it includes an assessment on how to effectively attract and apply these technologies.

Capacity building and information issues
One of the keys to promoting technology lies in access to information. Countries and companies differ in their capacity to access information and assess and select appropriate technology. Information is increasingly available to companies via the Internet, fax lines and through conferences and seminars. However, smaller enterprises, especially those located in more rural areas or that are part of unorganised or informal sectors, may have less than adequate access to information, as well as to financing, technical support, and other requisites for project development. The quanity of information available through the Internet may be overwhelming, and its quality and reliability may not suffice for technology selection. Thus, for example, once applied financial, economic, environmental and social performance of technologies may turn out differently from that projected by theoretical analysis or by information obtained from suppliers through the Internet. Useful information goes far beyond information on technical hardware. A country or company may only select a climate friendly technology when the neighbour has successfully implemented a technology or practice. Building

confidence through demonstration projects and feasibility studies is therefore key, as well as the dissemination of best practices, training/education and exchanges.

Financial issues
Financial considerations are perhaps the most pervasive obstacle facing projects with climate change benefits in Latin America. The origin of this problem lies both in the project characteristics as well as in the nature and availability of financing sources. Some climate change projects have characteristics in common that make it difficult to secure financing, such as high development costs, large 'soft' components (feasibility studies, energy audits, hiring overseas and local consultants, conducting training programmes and cost of travel, etc), small size of investments, and higher transaction costs. Project financiers on the other hand, are reluctant to finance small projects, and seek projects involving well-developed and proven technologies with clear risk and return profiles.

In several financial markets, such as in Mexico, sharp restrictions on liquidity have compounded the underlying reluctance of bankers to consider lending for projects outside of a narrowly defined set of project types. Complementing the limitations on liquidity, pay back periods of loans tend to be relatively short. This can be more problematic in the case of renewable energy projects and most especially in the case of land use projects, given the long growth period of most tree species. Even if commercial funds/ venture capital is available, companies may be hesitant to access these resources if the costs of borrowing are too high. Grant funding may be required to offset costs that cannot be borne economically by revenues from the project, as is often the case in rural applications of renewable energy. Creative financing is required while markets adjust to the real cost of projects, which incorporate externalities. One good example of a creative financing mechanism for energy efficiency projects is Energy Service Companies.

There are numerous programs designed to facilitate financing for climate change projects by providing fresh risk capital and debt for investment in enterprises, as well as by mechanisms that provide guarantees. Examples from multilateral organisations include the SME Program of the International Finance Corporation (IFC), the Global Environment Facility (GEF), and the Renewable Energy and Energy Efficiency Fund (REEF). Many perceive it difficult to access these funding sources, particularly for small enterprises. Many see the 'Kyoto Mechanisms' (Clean Development Mechanism and Joint Implementation) as vehicles to make climate-friendly projects commercially viable. Costa Rica effectively created an infrastructure to develop CDM projects. If the projects financed by the commercial banks are also assessed for their climate friendliness, it would certainly boost investments in this area. In this respect there is a need to train 'green bankers' capable of analysing and financing climate friendly projects, as well as training financial intermediaries on how to identify and pro-actively develop financiable projects in this area.

What can the CTI do to address these issues and challenges in Latin America?
From the analysis above it appears that there are many policies and initiatives that can influence the quality and quantity of technology transfer to Latin America emerge. This section summarises the key challenges and makes a few suggestions on the type of activities the CTI may support.
The section on **technology assessment** indicates that the key challenges for Latin America are to help countries assess their technology needs, and most importantly, help countries assess what it takes to create a market for these technologies. Related to this issue, the section on **institutional and policy challenges** suggested that it is key to create awareness on how to create a policy environment that attracts investments in climate-friendly projects.

In response to these needs, the CTI can initiate a sectoral, national, or *regional Cooperative Technology Implementation Plan (CTIP).* A CTIP is a mechanism through which the collective experience and expertise of CTI member countries can work in partnership with individual countries and key stakeholders to create a market and accelerate the application of specific climate-friendly technologies within its economy. CTIPs are tailored to the country's needs, and may include the following elements:

- Identify a set of climate friendly technology options to meet sectoral needs.

- Assist developing countries in preparing CTIPs that will define actions for removing impediments to the application of climate-friendly technologies.
- Engage in-country and international businesses in the design and implementation of actions to overcome barriers to investment in climate-friendly technologies.
- Facilitate implementation of the plans by coupling host country action with private sector participation and donor support.

The CTI is exploring the possibility of a CTIP in Central America with a focus on promoting investments in renewable energy technology.

Understanding how to create a policy environment that attracts investments in climate-friendly projects may also include an **in-depth analysis of barriers** as perceived by the private sector, as well as an **exchange of experiences** of "what works and what doesn't" amongst countries.

In response to this need, the CTI can organise targeted *training courses*, train technical staff and managers to incorporate environmental issues in decision making and ensure sustainability of this experience through knowledge management and by 'training the trainers'. CTI's capacity building activities include the preparation and dissemination of studies on practical experiences and practices that have been successfully applied to facilitate the adoption of climate-friendly technologies. This summer the CTI plans to organise a training course on introducing energy efficiency standards in Latin America.

Another way the CTI responds to this need is by organising targeted *industry workshops*. These seminar typically provide (i) an opportunity for the private sector to voice their policy recommendations to key decision-makers, helping to create a climate that attracts environmentally sound technologies; (ii) a platform to pave the way for project development; (iii) insight into financing opportunities for climate projects, including the Clean Development Mechanism, and risk management opportunities. The Industry Seminar in El Salvador was a general seminar and served to identify more targeted follow up activities and seminars in the Latin America and Caribbean region in the area of transport, energy efficiency, and in renewable energy.

The section on challenges in **financing climate-friendly projects** highlighted the importance to stimulate the development of creative financing and guarantee mechanisms. It also stressed that enhancing commercial financing for climate-friendly projects by increasing awareness among the financial community of climate change projects will have potentially a much larger impact. There is also a need to increase awareness among project developers/ intermediaries of available funding resources and assist in accessing these (for SMEs in particular).

In response to this need, the CTI can organise industry seminars that focus on financing climate change projects. Such a seminar can bring together the financial community, insurance companies, and project developers addressing these key financing issues.

The section on **information challenges** indicates that the key challenges for Latin America are to help countries collect and organise information on the actual economic, environmental and social performance of specific technology and to use industry associations and/or a central info-pool to widely disseminate these experiences.

The CTI now provides improved access to relevant technology information through a specialised *Internet web-site and search engine* (http://www.ClimateTech.net). The CTI is also stimulating the diffusion of climate technology by its awards program. Nominations are currently being accepted for the 2000 CTI awards. (see Box). More information on the CTI and its activities in Latin America can be obtained from the website: http://www.ClimateTech.net

Conclusions

Enhancing the transfer of climate-friendly technologies, or diverting foreign direct investment and trade flows into climate-friendly directions is challenging but possible. This article outlines some key areas where this process can be influenced. The transfer of climate technology appears to be more tangible than many suggest. The CTI plays its most valuable role as a facilitator, offering a liaison between governments, donors, industry, financiers, and other stakeholders. Through consultations, workshops and policy papers, the CTI can help promote policies and institutional changes that can lead to the removal of barriers and increase the market penetration of climate friendly technology. The role of the private sector in this process is key. The CTI Secretariat invites the readers of this article to make specific suggestions on activities to include in its business plan and work program for Latin America.

The CTI World Climate Technology and Leadership Awards for the Year 2000

The Climate Technology Initiative (CTI) is continuing its Awards Programme that recognises success in deploying climate friendly technologies. Applications are now being accepted for the Year 2000 awards until 13 July 2000.

Award winners are outstanding individuals and organisations who have helped to commercialise and diffuse climate friendly technologies in developing countries and in countries with economies in transition. Award winners will receive global, high profile recognition for their valuable work at a ceremony held in their honour at an United Nations Framework Convention on Climate Change (UNFCCC) sponsored event, such as the Sixth Conference of the Parties (COP6) in the Hague in November 2000.

There are two categories of awards for which an individual, an organisation, or someone else you know might qualify. The CTI World Climate Technology Award is intended for organisations that have successfully introduced climate-friendly technologies or practices particularly, but not necessarily exclusively, in the developing world or in economies in transition. The Climate Technology Leadership Award is geared toward individuals who have furthered the goals of the CTI and the UNFCCC, and shown continued dedication to sustainable development, and particularly overcoming barriers to deployment of climate-friendly technologies in developing countries.

Do you know an individual who has brought a new technology to a region where it was previously unavailable or seldom used? Or, do you know an organisation that has designed and implemented successful programmes that demonstrate outstanding and innovative management, finance techniques, or other successful measures to get climate-friendly technologies into the field where they are needed? If so, the CTI wants to reward you, your organisation, or your nominated person or programme for their outstanding contributions made in this challenging field. We look forward to hearing from you today.

The Climate Technology Initiative (CTI) brings 23 developed countries and the European Commission together to support the United Nations Framework Convention on Climate Change in its objective to achieve stabilisation of atmospheric concentrations of greenhouse gases (GHG). In support of this goal, the CTI has been aggressively pursuing a series of R&D, capacity building, and technology enhancing activities intended to accelerate development and diffusion of technologies and practices which emit less GHG than those currently in use and are consistent with the sustainable development of the particular country or region.

Applications and criteria for the CTI Awards, as well as a multimedia display of past winners and ceremonies, are available on the CTI website at http://www.ClimateTech.net.

For more information contact:

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