

**TRANSFER AND ACCESS TO ENVIRONMENTALLY SOUND TECHNOLOGIES UNDER THE
UN FRAMEWORK CONVENTION ON CLIMATE CHANGE**

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Introduction

The United States is committed to working with developing countries and countries with economies in transition to advance cost-effective technology solutions to the global challenge of climate change. The U.S. government has a strong track record in the design and implementation of environmental technology transfer activities worldwide. Among the lessons learned from these programs are the importance of, inter alia, engaging in-country stakeholders, tailoring programs and activities to host market demands, developing public-private partnerships, utilizing market-based approaches wherever possible, and ensuring sustainable programs through capacity building. This paper addresses ways Parties can learn from and build upon existing activities to advance the spirit and intent of Article 4.5 and other technology transfer-related provisions of the United Nations Framework Convention on Climate Change (UNFCCC).

In considering our experiences in technology transfer activities, the United States has identified several key lessons which are relevant to the consultative process and potential technology cooperation approaches under the UNFCCC. First, it is important to recognize that technology transfer includes both “soft” and “hard” elements of technology transfer. Specifically, in addition to equipment that controls, reduces or prevents anthropogenic emissions of greenhouse gases, the term “transfer of technology” encompasses practices and processes which support the adoption, maintenance and use of such equipment and can include capacity building, information exchange, training and research.

The U.S. experience illustrates several technology cooperation principles which we believe are relevant to the consultative process and potential technology cooperation approaches under the UNFCCC.

1. Technology cooperation must be implemented in accord with country priorities.
2. Successful technology cooperation approaches must include development of in-country enabling conditions and capacities to achieve sustainable markets for environmentally sound technologies (ESTs).
3. Private sector participation will be critical to any technology transfer program. The private sector supplies most climate-friendly technologies around the world and can provide much of the human and financial capital for effective deployment. Government resources should be used to catalyze other investment in partnership with the private sector and other

stakeholders.

4. An integrated approach involving government agencies, private enterprises, international donors and key stakeholders can address the technology needs of developing and transition countries most effectively.

Recognizing that efforts to mitigate GHG emissions will not entirely avert human induced climate change, the United States also supports the inclusion of adaptation technologies in the discussions on technology transfer. This area warrants more extensive analysis. The USG supports active consideration of the adaptation component through the consultative process and in development of a framework for technology transfer. The consultative process may also explore effective ways for Parties to share information on adaptation needs and technological responses.

Effective implementation of the above principles in technology transfer efforts may include the following activities:

- **Building capacity of indigenous private sector** – Successful activities enhance skills of enterprises in the installation, operation, maintenance and adaptation of specific technologies, and broaden understanding of methodologies for evaluating alternative technological options. This can include training for employees of companies in select industries, creating opportunities for business-to-business exchanges, and sponsoring business incubators.
- **Design and implementation of policy, regulatory and institutional reforms** -- Governments can encourage new investments in emerging technology markets by revising policies and reforming institutions that may be impeding technology investments. This can include revising tax and other financial incentives, streamlining project approval and accreditation procedures, revising codes and standards, improving enforcement of existing regulations, and reforming key institutions (e.g. judicial procedures, utility restructuring). Reforms can be encouraged through training and capacity building in government regulatory and policy institutions that could include integrating clean technology strategies into national development plans, quantifying environmental benefits, addressing market-based approaches to environmental protection, and establishing and managing clear regulatory frameworks.
- **Protection of intellectual property** -- Protection of intellectual property rights is also an important issue for both developing and developed countries. Most property rights are owned and controlled by the private sector, not governments. For example, in the US every year, less than 2 percent of patents are granted to government organizations.ⁱ In market economies, governments, by design, have very limited control over technologies and property rights. If the private sector does not have the means to protect ownership of assets due to slow and expensive enforcement of contracts by national courts or international arbitration and

ⁱ. 1997. *A Patent & Trademark Office Review: Creating a Patent & Trademark System for the 21st Century*. Patent & Trademark Office, United States.
<http://www.uspot.gov/web/offices/com/annual/1997/97reptab.pdf>.

insecure property rights, it will be less likely to invest in further technology advancements and transfer. This in turn inhibits the ability of governments and the international community to achieve effective international technology transfer.

- **Technology demonstrations and commercial pilot projects** - Governments can further the market readiness of emerging technologies, and lower the risks to private firms, by supporting demonstrations that place new clean energy technologies in public view. This can include support for pilot projects that demonstrate technologies that do not yet enjoy broad acceptance. Such projects are most effective when they are connected to a larger strategic approach which focuses on specific applications that can capture significant near term market potential.
- **Educational programs on technology benefits and applications** -- Governments can support initiatives to educate businesses, key government agencies responsible for approving new investment projects, and consumers about the benefits and applications of specific technologies. Such programs can include labeling, promotional activities, documentation of social and environmental benefits of alternative technologies, and consumer education. Voluntary technology programs can also raise the level of understanding of consumers, industry, professional associations, and other stakeholders of the opportunities and benefits of clean technologies. For example, awareness and understanding of the local air quality and public health benefits of climate-friendly technologies can provide added incentives and help build political and public support for technology substitutes.
- **Technology testing certification and labelling** -- Programs to test, certify and label technologies that meet voluntary or mandatory government performance standards are a highly effective way of building markets for ESTs. Such programs can help overcome private sector resistance to investment in new technologies due to concerns about technology performance, reliability, and competitiveness.
- **Government procurement** – Federal, state, and local government agencies have important influences on technology markets and transfer through their own procurement agencies that have direct purchasing authority for government buildings and vehicle fleets, government owned corporations, government land management programs, and many other similar mechanisms. Broadening government procurement options can significantly expand the use of innovative technologies and provide a model for private sector investment.

The U.S. Government has been implementing a range of programs for the diffusion of environmentally sound technologies and practices which include support for many of these capacity building and barrier removal activities. A representative group of these programs being pursued in the Latin America and the Caribbean region by the United States on both a bilateral and multilateral basis are discussed in the next section of this paper.

U.S. Government Support for Climate Technology Cooperation in the Latin America and Caribbean Region

This section describes current U.S. government programs that facilitate the transfer of climate-friendly technologies and help developing countries build their capacity for measuring, monitoring, and reporting their greenhouse gas emissions.

These activities demonstrate the United States' continuing and vigorous commitment to sustainable development and the objectives of the United Nations Framework Convention on Climate Change (UNFCCC). Article 4.5 of the UNFCCC commits developed countries to "take all practicable steps to promote, facilitate, and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention." As shown by the programs described herein, the United States Agency for International Development, Department of Energy, Environmental Protection Agency, and Department of Agriculture are working around the world to fulfill this commitment, providing information exchanges, technical and financial assistance, training, technology demonstrations, and financial assistance. Additionally, the U.S. Country Studies Program assisted many developing countries in Latin America and the Caribbean, as well as other regions, in conducting climate change country studies and preparing national actions plans. This has contributed to these countries' capacity to assess technology needs and develop strategies for enhancing transfer of climate-friendly technologies.

All of these initiatives seek to engage local stakeholders in finding solutions to the dual global challenges of sustainable development and climate change. This is in keeping with the core belief upon which all of these initiatives are founded: by incorporating market-based approaches into our joint efforts we can achieve results that are both sustainable and replicable.

Contacts for further information on most of the projects described below can be found in the report: *U.S. Government Support for Climate Technology Cooperation: Projects and Activities, October, 1999*, which was distributed by the U.S. Government at the 5th Conference of Parties in Bonn.

Region-Wide Activities

Small Island States Greening Initiative

The U.S. Department of Energy is collaborating with the Climate Institute and member nations of the Alliance of Small Island States to increase deployment of energy-efficient and renewable energy technologies in these nations. The Climate Institute is conducting outreach and information dissemination to government leaders, policy analysts, and energy officials of small island states building on prior experience in the region.

Small Island Developing States Climate Change Project Proposal Development

USAID is collaborating with AOSIS and several member nations in an activity aimed at developing private sector-oriented proposals to attract investment to the islands and to build capacity among island nations to develop and manage climate-friendly projects.

CONCAUSA

The US Government provides energy-sector assistance in Central America through a set of programs that implement the "Conjunto Centro America y USA" (CONCAUSA). Signed by President Clinton and the presidents of the seven Central American countries at the Summit of the Americas in December 1994, the CONCAUSA Declaration commits all signatories to energy sector follow-up actions and committed the U.S. to provide targeted assistance. USAID, in conjunction with US DOE and USEPA, have supported the following activities:

Policy and Regulatory Reform: USAID has funded capacity building activities in Guatemala, Honduras and El Salvador on energy policy and regulatory reform and a regional training course on the management of electricity transmission and distribution systems.

EEAF and its Central American Affiliate EACA: The CONCAUSA Declaration explicitly called on the U.S. to continue support for the Environmental Enterprises Assistance Fund (EEAF), a non-profit investment company established in 1991 by USAID to provide equity financing and loans to environmentally progressive businesses and projects. In 1993 EEAF set up an affiliate in San Jose, Costa Rica, Empresas Ambientales de Centro America (EACA) to stimulate investment opportunities throughout Central America.

Renewable Energy Support Office (REPSO): Through Winrock International, USAID is building a network of NGOs Renewable Energy Project Support Offices (REPSOs), to increase the use of renewable energy in developing countries. The USAID-funded REPSO-Guatemala operates programs that support activities throughout Central America. In 1994 USAID provided start-up funding for the creation of the Fundación Solar, a local Guatemalan NGO managed by persons with significant experience in rural electrification. The Fundación acts as an information clearinghouse for Guatemala and neighboring countries and provides partial funding and technical assistance to the private and public sectors for pre-investment studies for site-specific projects. USAID support has enabled the Fundación to obtain additional funding for projects from the Government of Canada, Plan International, World Vision, and the Government of Guatemala. With those funds the Fundación introduced solar (photovoltaic) home systems in rural villages of Guatemala and expanded the use of solar energy for village water-pumping installations, schools, and health clinics.

Technical Assistance to Facilitate Greater Use of Renewable Energy Technologies

The US DOE and the National Renewable Energy Laboratory (NREL) are collaborating with the governments of Argentina, Brazil, and Chile to facilitate greater use of renewable energy in these countries. Activities include demonstrating commercially viable wind, photovoltaic, and hybrid technologies that are appropriate to local conditions, as well as establishing capacity and institutional, individual and business partnerships necessary to implement sustainable programs.

International Motor Challenge Program: Latin America

The U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy is partnering with developing countries to build on the U.S. experience and implement country specific programs to help local manufacturers reduce energy costs and increase productivity

through improved industrial motor systems. Latin America efficiency opportunities have been identified in five countries: Brazil, Mexico, Argentina, Chile and Venezuela.

International Co-Control Analysis Project: Estimating the Environmental Benefits of Greenhouse Gas Reduction

Under this initiative the US Environmental Protection Agency is providing technical and financial support to developing countries to assist with analysis of the environmental and health benefits associated with technologies and policies that reduce greenhouse gas emissions. The US EPA is collaborating with Argentina, Brazil, Chile, China, Korea, and Mexico. Led by teams of experts from these countries, along with the technical support of US EPA staff and consultants, the work is tailored to the needs and priorities of each country. US EPA supplies access to quantitative models and analytic tools and provides technical assistance in conducting these environmental assessments. Currently this work primarily focuses on the air pollution and public health benefits of clean energy technologies, but is capable of addressing water and soil pollution and non-energy technologies where appropriate.

Renewable Energy for Hurricane Mitch Reconstruction

USAID and USDOE are implementing this program to improve regional capacity to mitigate transnational effects of disasters and demonstrate the value and effectiveness of renewable energy technologies in the context of ongoing reconstruction efforts in the Central American countries affected by Hurricane Mitch. Renewable energy projects will be identified, developed, and implemented in close collaboration with local partner organizations.

Energy Partnership Program (EPP)

The US Energy Association collaborates with USAID on this partnership program to link US and developing-country interests in energy. In 1999, Central American officials concerned with regulatory reform attended a regulatory course sponsored by USEA at the National Regulatory Research Institute (NRRI) in Columbus, OH. Key topics included: restructuring, conflict resolution, independent power, quality of service, tariff setting and customer service. The program also addresses issues including rate structuring, wholesale market development, transmission pricing, changes that have been occurring in the U.S. electric energy sector, FERC's role in electric industry restructuring and its organizational structure, and the role of federal versus state regulation. As part of this effort, the Idaho Public Utilities Commission and the Kansas Corporation Commission are partnering with the Asociación Coordinadora de Entidades Reguladoras de Centro América (ACERCA).

Energy Efficiency Standards, Economics, and Policy Program

USAID and US DOE provide joint support to the Lawrence Berkeley Laboratory to provide expertise to developing countries on energy efficiency standards and energy economics and policy related to greenhouse gas emissions.

Cities for Climate Protection

US DOE, USAID, and the U.S. EPA are collaborating with the International Council for Local Environmental Initiatives to address climate issues in select municipalities in Latin America.

Global Guardianship Initiative

US DOE is collaborating with the Center for Resource Solutions and the Nature Conservancy to establish models for community renewable energy deployment as a strategy for protected area management and an alternative to grid extension in developing countries in Latin America.

Developing Regional Baselines for Renewable Energy/Energy Efficiency in the Caribbean

US DOE and USAID are collaborating with the Center for Clean Air Policy to provide technical assistance to Caribbean nations to increase energy efficiency and renewable energy technology diffusion by developing regional baselines for greenhouse gas emissions that can be used as a basis for developing projects under the UNFCCC.

Activities in Selected Countries

BRAZIL

In Brazil, the U.S. Government supports a wide range of activities that enhance capacity and promote private sector involvement in the transfer of climate friendly technologies. What follows are descriptions of technical assistance, training, technology demonstration, and funding activities in four areas: (1) renewable energy; (2) energy efficiency; (3) regulatory and policy reform; and (4) other projects.

Renewable Energy Activities

Renewable Energy Project Support Office (REPSO) - The REPSO in Brazil is located in Salvador, Bahia and is staffed by industry experts who work with cooperatives, NGOs, and private companies interested in renewable energy projects. The REPSO-Brazil provides assistance in local market and capacity building, information dissemination, project identification and development, provision of pre-investment study funds, and industry based training in collaboration with other energy program initiatives. Through the REPSO, USAID has assisted municipalities to maximize the potential benefits of the World Bank's Programa de Apoio ao Pequeno Produtor (PAPP, or Small Producers Support Program), to improve their energy services and meet growing energy needs with renewable energy.

Renewable Energy Technology Cooperation -- US DOE is collaborating with the Department of Minerals and Energy and providing technical support to design and implement renewable energy technology programs. Technology areas include photovoltaic (PV) systems, PV/wind water pumping systems, home PV systems, and village scale hybrid PV replacement for diesel.

Energy Efficiency Activities

Adaptation of the North American Energy Measurement and Verification Protocol (NEMVP)-- Investments in energy efficiency benefit from an accurate measurement of potential savings. To standardize methodologies for measurement and verification, US DOE developed a protocol called the North American Energy Measurement and Verification Protocol (NEMVP). USAID is currently working to adapt this protocol to a Brazilian context for the purpose of creating credible business and contractual instruments as well as channels for financing energy efficiency performance contracting.

Manaus Demand Side Management (DSM) Support -- USAID is working with PROCEL (Programa Nacional de Conservação de Energia Elétrica, the National Electric Energy Conservation Program) and a local utility, Eletronorte, in support of pilot DSM activities in Manaus, Amazonas. The activity supports target development and start-up of air-conditioning and lighting programs in the commercial and industrial sectors.

Assistance in Establishing Efficiency Standards -- USAID assists Brazil to conduct studies on the potential for and design of appliance efficiency standards. USAID also assists Brazilian energy decision-makers in developing strategies to advance building energy codes and to advance energy efficiency in the transportation sector.

Support of the National Program for Electrical Energy Conservation (PROCEL) -- USAID is assisting PROCEL, Brazil's Ministry of Mines and Energy (MME) program for energy efficiency, to program funds which are to be targeted towards energy efficiency, collected as a result of Brazil's one percent energy efficiency levy.

Energy Sector Policy and Regulation

USAID is providing assistance to the Brazilian government to incorporate energy efficiency explicitly into their new energy regulatory framework. Assistance also includes support for the Agência Nacional de Energia Elétrica (ANEEL), the recently established Federal Power Regulatory Agency, to establish the regulatory regime necessary to provide the right signals to the market to support the national energy policies promulgated by NEPC. USAID is also funding a Regulatory Partnership between ANEEL and the U.S. National Association of Regulatory Utility Commissions (NARUC) to facilitate the sharing of U.S. regulatory expertise between the U.S. and Brazil.

Reduction of Methane from Landfills

USAID collaborated with the Brazilian Ministries of Mines and Energy, Science and Technology, Environment, Water, and American Affairs to assess the potential of using methane gas from existing and future landfills. The assessment was conducted in December 1996, and included fourteen landfill sites preselected as being the most representative of the landfills in Brazil. The conclusion of this effort indicates that there are viable projects that, if fully implemented, would reduce methane emissions of approximately 1 million cubic meters for the next twenty years, while generating about 100 MW.

Feasibility Assessment—Power Generation with Blast Furnace Gas

USAID, in collaboration with SEMIG (a Brazilian utility company) and METALSIDER (a Brazilian pig-iron producer), studied the potential use of waste pig-iron blast furnace gas to power internal combustion engine generators for electricity production. Since there are 141 pig-iron blast furnaces in the state of Minas Gerais with estimated power generation capacity of 180 MW, interventions could provide an annual emissions savings of 16,000 tons/year of sulphur dioxide and 840,000 tons/year of carbon dioxide (CO₂).

CHILE

The U.S. Department of Energy's Clean Cities Program is working with the city of Santiago, Chile, to develop a public/private partnership to help build a local market for alternative

transportation fuels. Efforts are underway to establish a Chilean program that can partner with the U.S. domestic Clean Cities Program to create a network of communities that encourage fleet owners to purchase alternative fuel vehicles.

ECUADOR

Technical Assistance for Improved Urban Environmental Management and Clean Production

USAID works in Ecuador to support NGO technical assistance to local firms, universities and municipalities on pollution prevention and increased dissemination of technical information on cleaner production technologies, international trade environmental concerns, and urban environmental management.

Institutional Capacity Building for Industrial Pollution Prevention and Control. USAID recently began work to strengthen the technical, fund-raising and income-generation capabilities of Oikos Corporation, an Ecuadorian NGO active in promoting scientific, technical and educational approaches for environmental management. The Oikos Corporation has worked with various chambers of commerce to improve production techniques, while reducing pollution and costs. In addition, Oikos has provided assistance to municipalities in the adoption of cleaner production policies and improved solid waste management practices.

GUATEMALA

U.S. Energy Companies Assist Guatemala to Develop Wholesale Energy Market. USAID has sponsored an executive exchange visit between three U.S. energy companies, the U.S. Energy Association (USEA), and the Administrador del Mercado Mayorista, the newly formed wholesale market coordination organization responsible for establishing and administering a private wholesale market for electric power in Guatemala. The visit allowed the Guatemalans to identify state-of-the-art procedures, systems and equipment used in the U.S. for the development of the wholesale market and a new dispatch center in Guatemala.

JAMAICA

Public/Private Partnership to Monitor Coastal Water Quality. Significant USAID-supported achievements include start-up of the first public/private partnership for coastal water quality monitoring and development of a plan to introduce voluntary user-fees in Jamaica's two national parks. In buffer zones and protected areas, local communities are adopting environmentally sustainable practices and standards. Some private sector/NGO partnerships have resulted in sustainable eco-enterprises. As the result of an environmental audit program many resort hotels are adopting environmental management systems (EMS) that comply with international standards.

MEXICO

Power Wheeling

USAID is supporting analysis of the legal, regulatory, and environmental factors affecting cross-border trade in electricity between the U.S. and Mexico. Since cross-border trading between the two countries could optimize the power generation mix, GHG reductions would be achieved.

Reduction of Power Station Emissions in Mexico

USAID is collaborating with the Electric Power Research Institute (EPRI) to accelerate technology transfer of environmental control technologies to Mexico. The program aims to promote the implementation of energy efficiency technologies and introduce low carbon-emitting energy systems through the private sector and public/private partnerships.

Fuel-Cell Buses

The US EPA is supporting a project to demonstrate the use of zero emissions buses in Mexico City.

Energy Efficiency Voluntary Program

The US EPA has provided training and technical information to Mexico regarding the development, implementation and evaluation of the Energy Star Buildings voluntary program to promote energy efficiency.

Renewable Energy Technology Cooperation

The U.S. DOE is collaborating with the Department of Minerals and Energy and providing technical support to design and implement renewable energy technology programs. Technology areas include: solar thermal technology outreach, energy-efficient water works; monitoring of wind/hybrid village power projects; grid and off-grid PV and wind technology projects; and geothermal electric power generation.

PERU

Sustainable Environmental and Natural Resources Management (SENREM). The Consejo Nacional del Ambiente (CONAM), Sociedad Peruana de Derecho Ambiental, and other non-government organizations implement this program aimed at increasing the capacity of public and private institutions to identify and resolve environmental and natural resources problems. This activity includes several demonstration activities to improve the use of environmental technologies. A solid waste management pilot project has helped demonstrate highly effective and profitable new technologies using women-owned microenterprises to manage solid waste. The project is now being replicated in a much broader area of Lima. SENREM's pilot activity in Paracas, completed in 1998, is showing an impact in the fishmeal industry with seven plants having switched to the use of more efficient pumping equipment. Two plants have reduced pollution by more than 10 percent, and a large number of other plants are beginning to adopt more efficient technologies.

USAID/IDB Market Based Energy Services Program – Energy Services Companies (ESCOs) Exchange Program for Peru. Beginning in 2000 USAID and the Inter-American Development Bank will implement an exchange program to strengthen Peruvian energy services companies whose activities will increase the efficiency of energy utilization in the industrial sector. This exchange program will provide opportunities for local small and medium Energy Services Companies (ESCOs) to obtain first-hand practical experience in designing and implementing projects through interaction with North American ESCOs. This exchange program is one element of a comprehensive action plan to support the development of a market for energy efficiency services in Peru.

Technology Cooperation Agreement Pilot Project (TCAPP)

The U.S. Government launched the Technology Cooperation Agreement Pilot Project (TCAPP) in late 1997 to provide a model for implementing technology transfer under the United Nations Framework Convention on Climate Change (UNFCCC). TCAPP is helping developing countries design and implement actions to attract investment in clean energy technologies that will meet their economic development goals, while mitigating greenhouse gas emissions. TCAPP is currently facilitating voluntary partnerships between the governments of Brazil, China, Egypt, Kazakhstan, Korea, Mexico, and the Philippines, the private sector, and the donor community on a common set of actions that will advance implementation of clean energy technologies. The countries participating in TCAPP have made significant progress in developing strategies for building sustainable technology markets and have begun to implement actions aimed at mobilizing private investment and donor support to address country-specific technology cooperation needs.

TCAPP Goals

TCAPP is designed to achieve the following major goals:

- Foster private investment in clean energy technologies that meet development needs and reduce greenhouse gas (GHG) emissions.
- Engage host country and international donor support for actions to build sustainable markets for clean energy technologies.
- Establish a model for international technology transfer under the FCCC.

TCAPP Program Elements

TCAPP includes four major program elements:

- 1) A country-driven process for selecting priorities, preparing market development strategies, and defining and implementing technology cooperation actions
- 2) International coordination and technical support to facilitate the work of the country teams and their collaboration with international businesses and donors
- 3) Business participation in the development of strategies and the design and implementation of investment actions
- 4) Donor participation in development and implementation of strategies and technology cooperation actions.

TCAPP activities are directed by the host-country. Countries structure their approach, select technology cooperation priorities, develop strategies to promote long term sustainable markets for these technologies, and define and manage implementation of actions to best meet national development priorities. The work of the country teams follows three basic phases of activities (see Figure). The U.S. TCAPP team provides technical assistance to the countries with their work and facilitates international business and donor participation. The participation of international businesses in all phases of the process is especially important to help countries identify market barriers and design and implement actions that will ensure a robust international business response to the country's investment needs.

The TCAPP Country Driven Process

Priority Selection Phase	Strategy and Action Development	Implementation Phase
1. Country Teams Formed	6. Prepare Market Strategy and Select Actions	9. Implement Technology Cooperation Actions
2. Establish Prioritization Process	7. Design Actions to Address Legal and Institutional Barriers	10. Evaluate Lessons Learned
3. Compile Information on Technologies and Barriers	8. Design Investment Actions	
4. Select Technology Cooperation Priority Areas		
5. Prepare Technology Cooperation Framework		

TCAPP programs are intended to further national development priorities while increasing investment in clean energy technologies and reducing greenhouse gas emissions. A variety of actions may be taken to help achieve those outcomes, including:

- Implementing policy reforms to remove legal or institutional barriers to clean energy deployment
- Issuing investment solicitations and convening investment conferences to help in-country businesses find international technology transfer partners and financing for new investments.
- Training to build local business capacity
- Assisting clean energy businesses in securing financing for business growth and technology implementation
- Implementing pilot or demonstration projects and programs
- Conducting educational programs to encourage host country businesses to increase their investments in clean energy technologies and increase consumer demand for these technologies.

Summary of TCAPP Activities in Latin American Countries

The countries participating in TCAPP have made excellent progress in defining priority areas and developing and implementing technology cooperation actions. Highlights for participating countries from Latin America (Brazil and Mexico) are presented in this section of the paper.

Brazil

The Ministry of Mines and Energy (MME) has served as the lead agency for TCAPP work in Brazil, with active participation of the following government agencies and technical institutions

- Ministry of Science and Technology;
- Ministry of Foreign Relations;
- National Program for Electric Energy Efficiency (PROCEL)
- Program for Energy Development in States and Municipalities (PRODEEM),
- National Program for Oil and Natural Gas Conservation (CONPET)

- Brazilian Foundation for Sustainable Development
- National Confederation of Industry
- National Institute for Energy Efficiency

Through a consultative process, Brazil selected five priority areas for technology cooperation in 1998.

- transportation,
- direct use of natural gas,
- electrical energy efficiency,
- rural renewable energy,
- and fuel cells.

A representative of one of the national programs serves as the lead in designing and implementing actions to attract investment for each of the five priorities . Brazil has now initiated the implementation of specific investment actions in each priority area. These investment actions are described below:

International Conference on Truck and Bus Energy Efficiency. TCAPP is working with partners in Brazil to convene a conference on transportation efficiency that can attract international companies into this market.

Industrial Efficiency/Cogeneration/Direct Use of Natural Gas. This activity area addresses the priorities identified for electrical efficiency and the direct use of natural gas. TCAPP is helping to organize and attract the interest of international companies in briefings on cogeneration and distributed generation markets in Brazil. TCAPP plans to support some of the program activities which the Confederation of National Industry (CNI) is conducting within their industrial energy efficiency by compiling a directory of energy efficiency products and services and by helping Brazilian companies to identify international companies to participate in industrial efficiency projects.

Rural Renewable Energy - Introducing New Technologies to PRODEEM. TCAPP has assisted PRODEEM in developing a solicitation to attract international companies to field test renewable energy systems for small rural, productive-use applications. This solicitation describes a partnership between the Brazilian government and the private sector to create viable commercial markets for off-grid renewable energy. An announcement that the solicitation was forthcoming has attracted great interest in the international renewable energy industry. The solicitation is expected to be issued in the near future.

Fuel Cell Market Development. The direction of this priority area has changed from a focus on cooperative R&D between the U.S. and Brazil in the area of ethanol based fuel cells to a more pragmatic goal of attracting demonstrations of fuel cell applications that are closer to being ready for commercialization. TCAPP will assist partners in Brazil in identifying an action plan by the end of May that can accomplish this new goal.

Mexico

Mexico's National Commission for Energy Savings (CONAE) leads an interagency Mexico TCAPP team, that also includes the National Ecology Institute (INE), the Secretary of Energy (SE), the Trust Fund for Electric Energy Savings (FIDE), the National Solar Energy Association (ANES) and others. The Mexico team developed a Technology Cooperation Framework that established technology cooperation priorities based on their economical and technical feasibility and their attractiveness for near-term investment. These technologies have also been identified by the U.S. - Mexico Bi-National Committee as having important benefits for both countries. The three technologies that Mexico selected are:

1. Steam generation and distribution systems
2. Solar Water Heater Systems
3. Efficient lighting in buildings

The TCAPP effort is receiving high-level support in Mexico as a useful mechanism to advance implementation of investment projects, and to bring in technical assistance to create sustainable markets for clean energy technologies that reduce greenhouse gases. In addition, TCAPP has been noted in Mexico as a practical model for technology transfer under the UNFCCC.

CONAE, in collaboration with other agencies is now initiating implementation of investment actions for the three technology priority areas. These investment actions include:

Developing model Energy Service Company (ESCO). TCAPP is working to develop model performance contracts and applying these contracts to help develop new public and private sector ESCO projects in collaboration with international and Mexican business partners, with the goal of assisting in advancing 4-8 pilot ESCO projects through this initiative.

Solar Water Heating. TCAPP is expanding the solar water heating pilot program by identifying potential joint ventures or partnerships between Mexican and international solar companies and supporting other efforts to establish solar water heating financing programs.

Steam Generation and Distribution Systems. TCAPP is helping to attract increased investment in steam generation and distribution projects by utilizing the international business network to help attract private sector interest, and aggressively recruiting the best possible project teams and securing commitments from facility managers.

Multilateral Activities Supported by the USG

To date, the most significant multilateral technology transfer activity under the UNFCCC process is the Climate Technology Initiative (CTI). Launched at COP-1 in Berlin in 1995 by 23 IEA/OECD countries and the European Commission, the CTI mission is to promote the objectives of the Convention by fostering international cooperation for accelerated development and diffusion of climate-friendly technologies and practices for all activities and greenhouse gases. The United States has taken an active role in the CTI since its inception, serving as Chair since the Third Conference of the Parties in Kyoto.

CTI's primary focus areas are on: (1) capacity building; (2) technology assessment, analysis and strategy; and (3) research and development. Specific activities stressing near-term results include: technology training courses; joint seminars with industry on technology diffusion; and the development of Cooperation Technology Implementation Plans (CTIPs).

CTI conducts technology training courses on a regional basis, providing hands-on training in environmentally sound technologies and practices. The courses are structured to offer the participants the opportunity to develop the skills necessary to assess how these technologies can be applied to suit country-specific circumstances. Since the regional training courses were instituted in 1998, two very successful technology training courses have been held in Japan to assist developing countries in Asia and the Pacific Region with climate change mitigation options. The one week courses focused on such topics as energy efficiency in various industrial sectors and included participants from China, Indonesia, Malaysia, Thailand and the Philippines. Training courses have also been held in Germany for countries of Eastern Europe and the former Soviet Union countries and in the US for Mexico, Central America, and the Caribbean. Additionally, a course will be held in early May for countries of northern Africa and the Mediterranean, in Naples, Italy.

Regional Technology Diffusion Seminars to Broaden Understanding and Explore Options

These regional seminars are intended to broaden understanding of the information and tools necessary to increase penetration of climate-friendly technologies. Engaging a broad range of public and private sector participants provides the opportunity to share perspectives and identify definitive ways to promote the more-rapid adoption of climate-friendly technologies and practices. Of particular interest at these seminars has been the sessions devoted to exploring the steps and institutions involved in the financing of actual projects.

Two seminars were held in 1998, one in Beijing, China and one in Pretoria, South Africa. During 1999, two additional seminars were held; one in Victoria Falls, Zimbabwe for Southern Africa and one in Bratislava, Slovakia for Eastern European region. The one in Zimbabwe was held in cooperation with the Southern African Development Community (SADC). Ministers from most SADC countries participated along with a wide range of regional industry and NGO representatives, including the UNFCCC Secretariat. The seminar in Slovakia was attended by over 130 public and private sector representatives. An additional seminar was held in Cebu, Philippines during January for the countries of Asia and the Pacific. The outcomes of these seminars have been previously communicated to the UNFCCC Secretariat to contribute to the exchange of relevant information under the consultative process.

The objective of the CTIP is to assist countries to establish a collaborative process for determining sector-specific technologies and practices that are consistent with a particular country's development goals. This "bottom-up" process involves a range of stakeholders from both developing and developed countries, including the private sector.

Anticipated outcomes of the consultative process on transfer of technologies

The consultative process on transfer of technologies, established at COP-4, has been an important step forward in discussions on this issue under the UNFCCC. Through successful regional workshops in Tanzania in August 1999 and the Philippines in January of this year, and enhanced dialogue during the negotiation meetings in Bonn, as well as valuable information provided by Parties in their submissions of views, the consultative process has already contributed to a better understanding of the needs and views of Parties regarding technology transfer.

Through these exchanges, the needs and concerns of developing countries have begun to emerge more clearly. For instance, there has been a clear indication that technology transfer for adaptation, as well as mitigation, is a concern of many countries. Thus far, many countries have also spoken to the challenges of access to information on opportunities for technology transfer in their countries and in the international community. By this sharing of experiences and perspectives, there has also emerged a better understanding of successes and failures in technology transfer programs. Also recognized has been the important role of the private sector as the primary vehicle for technology transfer in most regions of the world.

The U.S. hopes that the sharing of experience and free exchange of ideas featured in these workshops will continue through the consultations associated with the upcoming subsidiary body meetings. After this concentrated effort to collect and evaluate experiences and views from all regions, the participants in the consultative process can work toward consensus on specific approaches to improving technology cooperation and transfer under the Convention.

The U.S. looks forward to the development of technology transfer approaches which are responsive to the various needs and concerns identified through the consultative process. The lessons learned in the process should inform the evaluation of existing bilateral and multilateral programs of technology transfer. These approaches should be consistent with the relevant provisions of, and focus on improving the implementation of, the Convention. They should develop sustainable flows of technology by harnessing market forces to the extent possible. They should promote strategies which strive to maximize environmental benefits, sustainable development and cost-effectiveness.

To advance this consultative process and enable greater access to information on technology transfer, the U.S. is contributing to the development of an enhanced technology transfer information system on the UNFCCC Secretariat's website. The U.S. welcomes and encourages the guidance of other Parties in the development of this system as a useful tool to support the consultative process and the information needs of Parties relating to technology transfer.

Conclusion

Our success in mitigating and adapting to global climate change will be greatly facilitated by the extent to which the international community is able to develop and disseminate technologies which enable us to pursue a cleaner path to development. Therefore, it is worth the investment

of considerable time and effort through the consultative process and related activities, such as the CTI programs and bilateral work, to find ways of improving technology cooperation and transfer of climate friendly technologies. Our goal should be to achieve results which are practical, effective and acceptable to all parties.

The consultative process should continue as a vehicle for expanded dialogue on technology cooperation, enabling Parties to present and consider new models and programs that can be implemented, tested and adopted. It provides an opportunity for technical experts, private industry, negotiators and policy officials from both developed and developing countries to share experiences and views in detail. This is essential to the development of a common understanding of technology cooperation as a basis for next steps under the Convention. The U.S. urges all participants to engage fully in the consultative process as an important opportunity to establish effective programs that meet UNFCCC goals.