

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

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**Introduction**

Although much has been accomplished 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, there is still more that needs to be done. At the Fourth Meeting of the Conference of the Parties, a decision was taken to establish a consultative process to consider the relevant issues and make recommendations on how such issues might be addressed to achieve agreement on a framework for meaningful and effective actions to enhance implementation of Article 4.5 of the Convention. As the consultative process moves forward, all Parties should recognize that existing bilateral and multilateral technology transfer activities, along with their documented successes and failures, can provide useful guidance for establishing even more effective approaches to technology transfer.

Such existing bilateral and multilateral technology transfer efforts developed to address national, regional and global environmental problems can serve as important models for designing effective technology diffusion approaches under the UNFCCC. In considering these models, it is important to recognize that the definition of technology transfer under the UNFCCC includes both “soft” and “hard” elements of technology transfer. Specifically, the term “transfer of technology” . . . encompasses practices and processes such as “soft” technologies; for example, capacity building, information networks, training and research, as well as “hard” technologies, for example, equipment to control, reduce or prevent anthropogenic emissions of greenhouse gases in energy, transport, forestry, agriculture, and industry sectors, to enhance removal by sinks, and to facilitate adaptation.

Experience has demonstrated that country-specific, market-based technology transfer programs will be most effective in achieving the goals of the UNFCCC. The recognition that the private sector is the primary vehicle for transfer of environmentally-sound technologies in most regions of the world does not suggest that there is no role for government. Indeed, successful technology transfer is largely dependent on the establishment of proper conditions to enable, facilitate and create incentives for private investment in and exchange of technologies. The most important opportunity for facilitating and enhancing this source of technology is through sound economic policy and regulations. Government's most effective role is to create the economic, legal, and regulatory conditions that promote private sector trade and investment resulting in technology transfer.

One important example is treatment of intellectual property rights, 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.<sup>1</sup> In developed market economies, governments, by design, have very limited control over technologies and property rights. Private sector involvement is therefore a key element for technology transfer. Enforceable property rights are an effective and important mechanism for protecting the investment that is made in developing a new technology, and potential future profits from the use of that technology. 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 insecure property rights, it will be less likely to invest in further technology advancements and transfer.

In addition, governments, international organizations, and community organizations--working to the greatest possible extent with the private sector--can provide strategic and coordinated support to overcome technical, regulatory, and economic barriers and thus provide stimulus to technology transfer where such important supplementary actions may be warranted. The public sector can play a pivotal role in promoting market-based technology transfer by assisting in the removal of market barriers and building human capacity; in other words, helping to create an enabling environment to facilitate enhanced flows of technology. Some examples include:

- training and capacity building for private enterprises in developing countries in installation, operation and maintenance of specific technologies, but also in business and management practices, preparation of business plans, methodologies for evaluating alternative technological options;
- training and capacity building in government regulatory and policy institutions on legal and regulatory approaches, market based approaches to environmental protection, issues associated with energy sector and economic restructuring, approaches to integrating clean technology strategies into national development plans, establishment and management of clear regulatory frameworks;
- training of personnel in financial institutions on evaluation of alternative technologies and development of bundling approaches to increase the availability of finance to small-scale clean technologies;
- public education and voluntary technology programs to raise the level of understanding of consumers, industry, professional associations, and other stakeholders of the opportunities and benefits of clean technologies;

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 Asian region by the United States on both a bilateral and multilateral basis are discussed in the next section of this brief paper.

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

## **U.S. Government Support for Climate Technology Cooperation in the Asia-Pacific Region**

It is the position of the United States that public-private sector partnership programs should be viewed as important vehicles for expanding technology transfer, including the development of associated capacity, in the area of climate change. The United States government 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, developing public-private partnerships, and ensuring sustainable programs through capacity building. 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." 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 assistance, training, technology demonstrations, and financial assistance. Additionally, the initiatives of the U.S. Country Studies Program in assisting many developing countries in Asia and the Pacific, as well as other regions, to develop climate change country studies and national actions plans have 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. For example, the United States Government launched the Technology Cooperation Agreement Pilot Program (TCAPP) to explore means to bring donors, host country governments, and the private sector together to focus on delivering concrete results in climate technology cooperation. This is in keeping with the core belief upon which all of these initiatives are founded: that by incorporating market-based approaches into our joint efforts can we achieve results that are both sustainable and replicable.

Contacts for further information on 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 5<sup>th</sup> Conference of Parties in Bonn.

## **Asia / Pacific Regional Activities**

### ***Asia Forestry and Climate Change Mitigation Project (FORCLIMIT)***

From late 1999 to late 2000, the FORCLIMIT project will assess the potential implications of the United National Framework Convention on Climate Change and other potential agreements on the forestry sector in 3 countries – Philippines, Malaysia and Indonesia. Project activities include: a) helping in-country analysts to improve their forestry (and possibly agriculture) sector GHG emissions inventory estimates; b) identifying and evaluating potential national policy and project-level sustainable forestry management options with climate change benefits; and c) introduction of forest project evaluation for risk, investment potential and credibility of performance over time.

The project is funded by the Department of State's East Asia and Pacific Environmental Program, the USEPA/Office of Policy, and its partner Lawrence Berkeley National Laboratory (LBNL) of US DOE. EPA and LBNL have worked in Indonesia, Thailand, Malaysia, South Korea, India, China and four other countries over the past eight years on climate change and forestry inventory and mitigation analyses. They also trained in-country experts to run the COPATH and COMAP computer models that were collectively built, and had published results. Several workshops are being developed to bring together analysts and potential forestry project developers to compare analyses and raise technical issues.

### ***Internet-Based Information Resource and Discussion Platform on Greenhouse Gas Reduction Strategies in Asia, USDOE***

To achieve greenhouse gas reductions in Asia, U.S. DOE and the TATA Energy and Resources Institute are collaborating to build an Internet-based information resource and discussion platform on the issues of energy efficiency and renewable energy technologies.

## **China**

### ***Rural Solar, Biomass and Wind Energy Development***

- **Solar Home Systems** – The installation of 320 photovoltaic (PV) solar home systems and ten school systems was completed in 1998. This success helped the Ministry of Agriculture to expand its solar home system project to 10,000 households in six northwestern provinces.
- **Rural Biomass Collaboration** - U.S. DOE provided technical assistance and collaborated with the Chinese Ministry of Agriculture and the Chinese Center for Renewable Energy Development to develop the first complete assessment of biomass and bioenergy potential for China. The assessment of indigenous technological and market potential was jointly prepared and published in a bilingual format for both countries. It is expected to lead to collaborative market developments and joint ventures.
- **Inner Mongolia Hybrid Household Project** - PV/wind (450-500 W) systems were installed in 125 households in 1999 and with an additional 120 planned in year 2000. The U.S. is providing PV modules for this project.
- **Wind Resource Assessment and Mapping** – A pilot project is being developed to install a wind/diesel/battery system to electrify 120 households on an island called Xiao Qing Dao located in the Yellow Sea off Shandong Province.

### ***Coalbed Methane***

This project involves assessments and pilot projects for capturing abundant gas resources at

Chinese mines, with concurrent mine safety, power production, and climate benefits. A Coalbed Methane Information Clearinghouse is housed at the Ministry of Coal and has conducted considerable outreach to U.S. and other companies interested in this market. The Clearinghouse publishes a journal in Chinese and English, has hosted several domestic and international seminars, and has developed with EPA an economic analysis model to identify profitable projects to reduce methane emissions. The Clearinghouse and EPA signed an agreement in April of 1999 at the Gore-Zhou Energy and Environment Forum outlining a two-year market data development project, which, building upon the Clearinghouse's experience, will provide information and analyses on specific coal mine methane project opportunities for Chinese and Western investors and developers.

### ***Integrated Gasification Combined Cycle Power Generation to Achieve Emissions Reductions***

This project involves technical cooperation with China to lay the groundwork for construction of Integrated Gasification Combined Cycle (IGCC) demonstration power plants. These plants use 1/3 less water and provide up to 23 percent in carbon dioxide reductions through efficiency gains as compared with conventional coal plants. The project also includes cost efficiency studies, research and identification of manufacturing capabilities in China, and workshops and training on IGCC technology and benefits.

### ***China-US Partnership in Industrial Pollution Prevention and Energy Efficiency***

This effort aims to establish a long-term partnership to assist China in its goals of reducing pollution emissions (with an emphasis on source reduction) and improve energy efficiency in its industrial sector. The project has three primary components in addressing (1) strategies to integrate pollution prevention and energy efficiency incentives into environmental regulations and programs of environmental agencies; (2) supporting government-industry partnerships to motivate significant environmental and energy efficiency improvements in two industry sectors; and (3) assisting China in building its environmental information networking system and improving access to EPA and other U.S. information resources to support the partnership objectives.

### ***Modeling National Economic Impacts of Climate Change Policy***

This joint effort with national experts from China and the US in economic modeling and environmental policy will work to increase technical cooperation between experts to improve capacity for analysis of costs and other economic impacts of policies to limit greenhouse gas emissions.

## **India**

### ***Bagasse Cogeneration***

USAID has done extensive work on opening the market for cogenerated power through policy studies that have led to breakthroughs in power purchase pricing in all the key sugar producing states, providing direct incentives to investments in cane cogeneration. In 1992, USAID developed a program to bring together the sugar industry, utilities, and state governments to overcome existing barriers to grid-connected cogeneration. In January 1994, the Indian Ministry for Non-Conventional Energy Sources (MNES) launched the National Program for Bagasse-based Cogeneration, supported in part, by USAID. To date, three reimbursable cost share grants have been issued by USAID to private firms for the development and construction of sugar cane cogeneration facilities, and several private projects are under way that are expected to reduce CO<sub>2</sub> emissions by one million tons

annually. Government regulations and appropriate tariffs for cogenerated power have been established. Almost 300 MW of installed capacity in India can be tied to USAID's work promoting Bagasse cogeneration.

### ***Greenhouse Gas Pollution Prevention Project***

USAID/India is implementing the greenhouse Gas Pollution Prevention Project in India in collaboration with the Industrial Development Bank of India and the National Thermal power corporation (NTPC) with funding from the U.S. Government contribution to the pilot phase of the Global Environment Facility. The project aims to reduce carbon dioxide emissions per unit of electric power generated by optimizing the efficiency of generation from existing thermal power plants and encouraging bagasse and biomass utilization for year-round cogeneration in selected utilities.

USAID/India's technical assistance and training work with NTPC (whose 17 plants generate 25% of India's electric power) has helped establish the Center for Power Efficiency and Environment Protection (CENPEEP) as a national center for providing technical leadership and advice to the electric power sector. USAID's power plant efficiency demonstrations at four Indian power stations have resulted in NTPC investing \$2.5 million in new environmental equipment, with the potential for saving millions annually in coal purchases, and generating huge reductions in greenhouse gas emissions.

USAID/India's investment grant assistance, through IDBI, to nine sugar mills will set up nearly 200 MW of bagasse (waste from sugar cane crushing) cogeneration units to supply of power to the grid based entirely on biomass fuels. Of these nine sugar cogeneration facilities, four were commissioned and supplied nearly 300 million kilowatt hours of biomass-fired electric power last year. Further, USAID/India's technical assistance has, in part, helped develop a pipeline of further 200 MW sugar cogeneration facilities. This activity builds upon the previous work of USAID/Global Environment Center and USAID/India on policy studies for opening the market for cogenerated power. The establishment of government policy and appropriate tariffs for cogenerated power was in part a result of USAID policy studies.

### ***Renewable Energy Project Support Office (REPSO)***

USAID assists a number of non-government organizations in developing countries to promote the use of renewable energy by establishing Renewable Energy Project Support Offices (REPSOs). These in-country facilities are managed by local institutions and are designed to provide the technical and financial assistance necessary to help identify and evaluate renewable energy projects. The REPSO-India is based in New Delhi and is now a registered Indian not-for-profit organization. Under a USAID/India grant, REPSO provides technical and financial advisory services to set up commercialization models of renewable energy projects in India. One of major success of this grant is accelerated commercialization of solar photovoltaic domestic lighting systems that REPSO-India supported Solar Electric Light Company (SELCO) established in southern Indian states. Another major achievement is the commercial sales of solar photovoltaic water pumping systems for irrigation by Polyene Film Industries, Chennai. These operations have resulted in improvements in the quality of rural living and expansion in the livelihood options for rural villagers.

## **Indonesia**

### ***Windpower For Islands And Non-Governmental Development Project***

USAID/Indonesia's project aims to introduce wind power technology in the eastern islands of Indonesia and to involve local NGOs on these islands in providing local power needs,

primarily through technology transfer. Since 1995, Windpower For Islands And Non-Governmental Development (WIND) has mapped wind power resources and installed wind monitoring equipment in 10 locations, and has conducted studies to determine the feasibility of wind-based generation and transmission projects, including commercial possibilities. It has established wind power demonstration projects at 20 sites, and has built the capacity of local NGOs and community members to establish and operate small, wind power generation and transmission facilities. WIND's overall objectives include technology demonstration, technology commercialization, institutional capacity-building. Current efforts focus on determining how to ensure project sustainability and how to best commercialize wind power in the focus area.

## **Republic of Korea**

### ***Modeling National Economic Impacts of Climate Change Policy***

This joint effort in Korea with national experts in economic modeling and environmental policy will work to improve communication and technical cooperation and to develop improved capacity for analysis of costs and other economic impacts of policies to limit GHG emissions, including analysis of the economic effects of flexibility mechanisms.

## **Nepal**

### ***Forestry/Biodiversity Conservation***

USAID/Nepal's program supports increased sustainable production and sales of forest and high-value agricultural products. Participating community groups are achieving sustainable production increases. The program provides technical assistance, marketing and nutrition assistance to 500 production and marketing groups, through strengthened government capacity to provide extension services. It also supports natural resource legislation that expands community and private management of forest and water resources. More than 1,000 community forest user groups are managing communal forest areas.

## **Philippines**

### ***Philippines Climate Change Mitigation Program***

To mitigate GHG emissions, USAID/Philippines collaborates with 10 U.S. government agencies, 12 GOP agencies, and several environment sector non-governmental and private organizations. The Agency's response focuses on establishing a favorable policy and regulatory climate, increasing the availability of financing from public and private sector institutions, building capacity within host-country organizations, and transferring technologies. The Agency's technical assistance to improve energy sector policies is also providing the basis for other donors and multilateral banks (e.g., the World Bank and the Asian Development Bank) to extend energy loans to the Philippines.

## **Small Island States**

### ***Small Island States Greening Initiative***

The U.S. DOE 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.

## **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**

As shown in Figure 1, 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.

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*Figure 1. Major Program Elements*

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 2). 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.

**Figure 2. The TCAPP Country Driven Process**

Priority Selection Phase	Strategy and Action Development Phase	Implementation Phase
<ol style="list-style-type: none"> <li>1. Country Teams Formed</li> <li>2. Establish Prioritization Process</li> <li>3. Compile Information on Technologies and Barriers</li> <li>4. Select Technology Cooperation Priority Areas</li> <li>5. Prepare Technology Cooperation Framework</li> </ol>	<ol style="list-style-type: none"> <li>6. Prepare Market Strategy and Select Actions</li> <li>7. Design Actions to Address Legal and Institutional Barriers</li> <li>8. Design Investment Actions</li> </ol>	<ol style="list-style-type: none"> <li>9. Implement Technology Cooperation Actions</li> <li>10. Evaluate Lessons Learned</li> </ol>

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 Asian and Pacific 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 Asia and the Pacific (China, Kazakstan, Philippines, and Republic of Korea) are presented in this section of the paper.

## China

The TCAPP effort in China enjoys high level Chinese and U.S. support and was recently formalized through an agreement between China's Minister of the State Development and Planning Commission and the Administrator of the U.S. Environmental Protection Agency. Under this agreement the Chinese and U.S. teams will focus on design and implementation of technology transfer actions for the following technology priorities:

- high efficiency electric motors,
- grid-connected wind electric power,
- efficiency improvements in coal-fired industrial boilers,
- cleaner coal technologies for power generation, and
- two additional priorities to be selected in January, 2000.

The agreement stipulates that results of this technology cooperation work will be provided as a contribution to the implementation of technology transfer under the FCCC. The Canadian government is also exploring providing support for the China TCAPP work and participated in technology expert meetings held in 1999.

The initial list of technology priorities was established through a consultative process, including key Chinese government agencies and research institutions. The technologies were selected using four criteria:

1. Environmental benefits (including GHG mitigation and reduction of other pollutants)
2. Economic development benefits (new economic growth and job creation)
3. Conditions for technology transfer (local capacity and potential to localize manufacturing in China)
4. Investment potential (scale and timing of potential investments, Chinese business capacity, international investor interest)

The Chinese wind and motors teams with assistance from U.S. experts are currently completing technology strategy reports to be presented to an interagency meeting in China on January 7, 2000. These reports review the current use and market potential for these technologies in China, the international status of these technologies, and the impediments to transfer and dissemination of these technologies in China, and define technology transfer actions that China can implement, supported by the U.S., to overcome these barriers and increase investment in these technologies. In addition to providing technical expert support, the U.S. is also engaging international clean energy businesses in reviewing these reports to ensure that the actions that are selected for implementation will be effective at mobilizing business investment. International businesses that have participated most actively in this process include Enron, Bechtel, Caterpillar, GE Motors, ITT Fluid Technologies, Babcock and Wilcox, Burns and Roe, Vestas, Cashco-Ellsworth, Micron, Bailey Controls, Spencer Management, Global Concepts, Nordex; Honeywell, and Shell.

Potential technology transfer actions under consideration by the wind and motor teams in China include:

- business training and other capacity building programs
- investment workshops and solicitations
- demonstration projects
- financing programs
- testing and certification programs, and
- research and development initiatives.

During the January 7, 2000 interagency meeting, China will select six of these actions for implementation. The China teams with assistance from U.S. experts will then prepare detailed action proposals and initiate implementation of the six actions in 2000. Lead points of contact for boilers and coal technologies have also been established in both the United States and China and these two teams will initiate their work in 2000.

## **Kazakhstan**

Kazakhstan was one of the first countries to join TCAPP and has been a leader in developing this process. The Kazakhstan TCAPP team identified four technology priorities: power plant carbon efficiency program (fuel-switching, combined-cycle gas, and improved heat rate); energy-saving and district-heating improvements; wind power; and small hydro. Work has been delayed due to changes in the government and on their team, but Kazakhstan has formed a new TCAPP team, led by the Ministry of Energy, Industry and Trade, and its affiliate KEGOC, with broad-based participation from other key agencies. KEGOC is a joint stock company set up to develop improved electric utility systems. A new working group has selected promising investment projects for development from the following sectors: small hydropower, combined heat and power, and gas utilization from oil refineries.

Through TCAPP, the U.S. is currently assisting Kazakhstan in attracting international investment partners for the following investment projects:

- 350kW Almaty Small Hydro Plant
- 900kW Almaty Combined Heat and Power Plant
- 40 MW Aktubisk Combined-cycle Plant
- 14 MW Shimkent Gas Plant
- 51 MW Condensate Gas Plant
- 35 MW Kumkol Gas Plant
- 18 MW Prorva Gas Plant

During the next year, the group will be working under TCAPP to secure investment partners and financing for these projects while also implementing other investment and policy actions that will help facilitate large-scale investment and remove market barriers.

## **Philippines**

The Philippines TCAPP effort has included a very strong consultative process with high level support from the Philippines government. The Philippines Department of Energy leads the TCAPP work in the country in close consultation with a broad group of other agencies and NGOs. The Philippines team selected priorities in mid-1998 including energy efficiency, renewable energy, and cross cutting initiatives. The Office of newly elected President Estrada became engaged in the TCAPP effort and together with the Philippines Department of Energy determined that future TCAPP work should focus on increased use of renewable energy in rural areas to address their primary goal of poverty alleviation.

Following this directive from high level Philippines official to focus on rural electrification with renewable energy, the Philippines and U.S. TCAPP teams initiated a consultative process to solicit input from Philippines government agencies and in-country and international businesses on the most effective actions for mobilizing investment in rural renewable energy. These consultations determined that the following “fast track” policy reforms should be implemented to improve the market for renewable energy investments:

- Revising new and renewable energy project accreditation requirements
- Exercising the full powers of the Philippines Department of Energy to facilitate mini-hydropower development
- Using the host community fund to promote renewable energy development
- Revising an executive order (462) to increase incentives and remove barriers to renewable energy investment
- Issuing a new Philippines Department of Energy policy directive on renewable energy

The Philippines Secretary of Energy has agreed to implement the fast track recommendations and the necessary implementing documents are currently being finalized.

Now that these fast track policy reforms are well underway, the Philippines TCAPP effort is now focusing on mobilizing increased investment in the improved markets for renewable energy technologies. The following investment actions are under development:

- Wind-diesel hybrid project development in collaboration with General Power and other potential investors.
- Renewable energy for agricultural water pumping project development together with World Water Corporation and other potential investors.
- Development of hydropower market development actions together with the U.S. Hydropower Association
- Other investment actions under consideration for grid-connected renewables and energy efficiency

## **Republic of Korea**

The Republic of Korea joined TCAPP in January 1999. The Ministry of Commerce, Industry and Energy (MOCIE) of the Republic of Korea chairs a TCAPP steering committee and has designated the Korea Energy Management Corporation (KEMCO) to lead the implementation of technical TCAPP activities for Korea. The Korean TCAPP effort is focused on establishing effective mechanisms for attracting international private investment in emerging clean energy markets in Korea.

A scoping meeting was held in March 1999 to select priority technologies. This scoping meeting utilized Korea's ten year Energy Technology Development Plan as a basis for defining priorities and established 4 criteria for selection of priority technologies and actions under TCAPP. These criteria are:

1. The technology is close to commercialization
2. The technology cannot be fully commercialized without government intervention
3. The technology will benefit from further demonstration of its market potential so that TCAPP can have a "trigger effect" in advancing the market
4. Building capacity of businesses through exchange of scientific and engineering knowledge and tools and managerial and operational skills can help advance technology penetration in the market

Based on these four criteria and Energy Technology Development Plan, three priority technologies were selected:

- Advanced energy management (including ESCOs)
- Methane recovery from organic waste, and
- Waste energy recovery using heat pumps.

The Korean TCAPP team has completed an investment strategy for advanced energy management and is currently completing similar strategies for the other two technologies.

The Korean Team and U.S. TCAPP teams have initiated implementation of investment actions to help promote ESCO investments in the Korean market. A critical first step is a visit of international ESCO companies to Korea in January, 2000 to respond to specific project opportunities defined by the Korean TCAPP team and identify other ESCO investment opportunities that can be facilitated through TCAPP. Several international ESCO companies are planning to participate in this visit including Duke Energy, Sempra, and other similar companies.

## **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, 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 such 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.

### **Regional Technology Diffusion Seminars to Broaden Understanding and Explore Options**

These regional seminars are intended to broaden developing country 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. 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, is an important step forward in discussions on this issue under the UNFCCC. Through a successful regional workshop in Tanzania in August 1999 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.

From 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. Through the sharing of experiences and perspectives thus far, 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 will continue through the remaining regional workshops and consultations associated with the upcoming subsidiary body meetings. We urge other Parties and experts to carefully consider the experiences gained from the ongoing technology transfer cooperation programs described in this paper and to share similar lessons from their own experiences with such programs. 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 common but differentiated responsibilities of Parties under the Convention, and 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**

To a large degree, our success in mitigating global climate change will be measured 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 adapted. 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 models as a basis for next steps under the Convention. The U.S. urges all participants to take seriously and engage fully in the consultative process as an important opportunity to establish effective programs that meet UNFCCC goals.