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U.S. Agency for International Development

GLOBAL CLIMATE CHANGE PROGRAM

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USAID Center for Environment

The USAID Global Climate Change Program

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THE USAID GLOBAL CLIMATE CHANGE PROGRAM

Deforestation, combustion of fossil fuels, and other human activities are profoundly altering the composition of the atmosphere by increasing the concentration of carbon dioxide and other greenhouse gases. According to the Intergovernmental Panel on Climate Change's recent report, the most authoritative scientific assessment on this subject, discernible changes in climate have already occurred. If GHG emissions do not decrease, catastrophic global impacts are likely. These include:

- inundation of low-lying coastal areas due to a rising sea levels;
- increased incidence of certain tropical diseases;
- loss of biodiversity and natural ecosystems; and
- change in agricultural patterns.

Because Americans have a vital interest in protecting both the atmosphere and the environment, the problems associated with climate change are a primary concern. One response to this has been the U.S. participation in the Framework Convention on Climate Change (FCCC). This international treaty focusses on stabilizing greenhouse gas concentrations in the atmosphere at a level that prevents dangerous human interference with climate, allows ecosystems to adapt naturally to climate change, ensures that food production is not threatened, and allows economic development to proceed in a sustainable manner. Over 150 nations have made a serious commitment to address climate change by ratifying the FCCC. The convention espouses "common but differentiated responsibility", with developed countries taking the lead in combating climate change. However, all parties have committed to implementing measures to mitigate GHG emissions and facilitating adequate adaptation to climate change.

Global climate change and the resulting U.N. FCCC, are a major focus of U.S. foreign policy, and therefore, of the U.S. Agency for International Development. As the foreign assistance arm of the U.S. Government, the Agency is strongly committed to both mitigating and sequestering greenhouse gas (GHG) emissions and increasing the understanding about the global environmental, economic, and societal impacts of climate change.

However, increased Administration focus on global climate change will require coordinated policies and programs in developing countries. By virtue of its technical expertise and field presence, USAID is well-positioned to lead Administration programs on global climate change in developing countries. USAID has the largest portfolio of greenhouse gas mitigation and sequestration activities in the U.S. Government, and a long record of work in the developing world. USAID programs almost $200 million annually on activities such as energy efficiency, renewable energy, and forest conservation, with a primary focus on ten "key" countries chosen for their high greenhouse gas emissions

USAID's Role in Combating Global Climate Change

The impact of climate change will fall most harshly on the vulnerable communities that USAID traditionally serves -- poor people and poor countries that lack the resources to adapt the aforementioned impacts. Although historical emissions of GHGs are primarily attributable to industrialized countries, emissions are growing most rapidly in the developing world. Some increase in emissions is an inevitable result of economic growth in developing countries, but technologies and practices exist to minimize this increase. In fact, excessive emissions are often a symptom of the inefficient use of energy or unsustainable exploitation of forest resources, otherwise referred to as "unsustainable development."

By promoting "win-win" strategies aimed at reducing GHG emissions that utilize resources more efficiently and sustainably, USAID plays an important role in helping developing countries meet their obligations under the FCCC. Specifically, USAID programs promote renewable energy, efficient energy generation and use, and sustainable forest management. USAID climate change activities are focused in ten "key countries" with large and growing emissions. Rather than promoting programs focussed on adaptation to climate change, USAID has concentrated, instead, on mitigating it. However, many USAID programs designed for other purposes (e.g. drought early warning or coastal zone management) will be useful to countries that need to adapt in the future to an altered climate.

The Global Climate Change Initiative (GCCI) in the Global Bureau's Center for Environment complements regional activities in energy and forestry by working across sectors to address climate change. This initiative has helped countries increase their capacity to understand and address climate change mitigation and sequestration issues. The GCCI assists USAID-presence countries in the development of analytical tools and resources for mitigating GHG emissions.

USAID is involved in several other regional initiatives focused on averting potentially negative changes in the global and regional climate by fostering the development and implementation of energy production and distribution strategies that reduce GHG emissions. These include, among others, the Central African Regional Program for the Environment (CARPE), the Asia Sustainable Energy Initiative (ASEI), and the Environmental Initiative for the Americas (EIA). In addition, the Agency's role in interagency initiatives, such as the U.S. Country Studies Program and the U.S. Initiative on Joint Implementation (USIJI), helps to bring sustainable development focus to U.S. Government programs.

Results and Lessons Learned

USAID has a strong record of energy and forestry activities that mitigate GHG emissions. The Global Bureau is providing leadership for the Agency in the development of resources the developing world can use to craft their own climate change strategies. Examples include development of a methodology for establishing Joint Implementation national programs to attract climate-related investment from industrialized countries, and a

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handbook for conducting technology assessments to identify technologies that can mitigate GHG emissions.

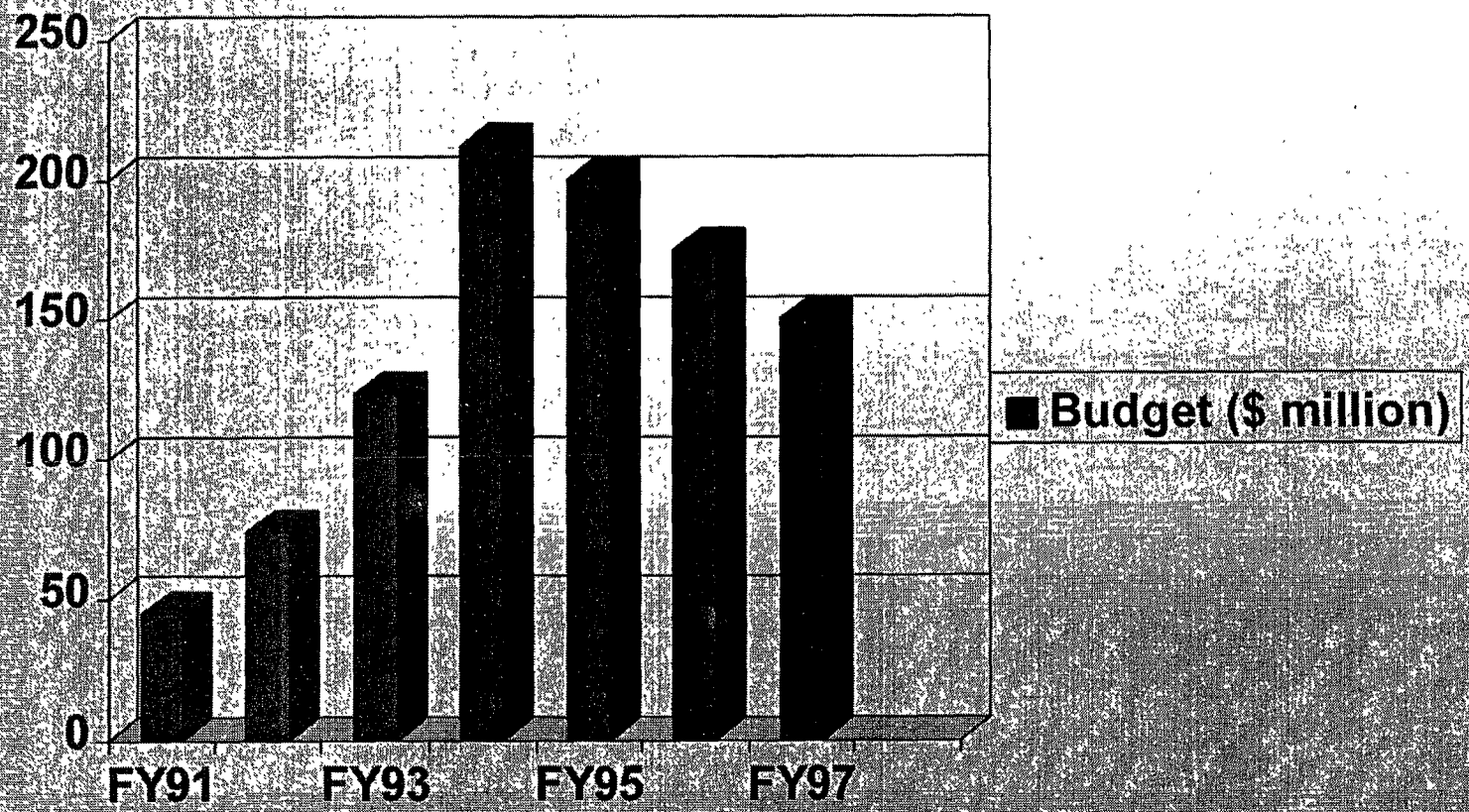
A number of lessons have been learned from USAID's efforts to combat global climate change:

- **Although developing countries generally are not willing to sacrifice economic growth to reduce GHG emissions, this does not mean they are not willing to address climate change.** Many countries are concerned about the impact of climate change and are eager to contribute constructively to international efforts to reduce GHG emissions, as evidenced by their ratification of the FCCC and by the participation of fifty-five countries in the U.S. Country Studies Program. They are especially interested in pursuing "win-win" development strategies and in translating international concern about climate change into investment in sustainable development.

- **The knowledge and sophistication of governments on climate issues varies greatly from country to country.** Support for National Action Planning in global climate change is important not only for building up an empirical basis upon which to design and implement climate programs, but also for educating policy makers to include climate change in national resource and development plans.

- **Efforts to mitigate greenhouse gas emissions need not conflict with other development priorities.** Better energy management attracts private investment, reduces local pollution, and increases profits while reducing CO_2 emissions. Forest preservation may be achieved by increasing the sustainable income of forest dwellers. And the global environmental benefits of both these types of activities can attract foreign investment.

USAID Climate Change Funding Trends



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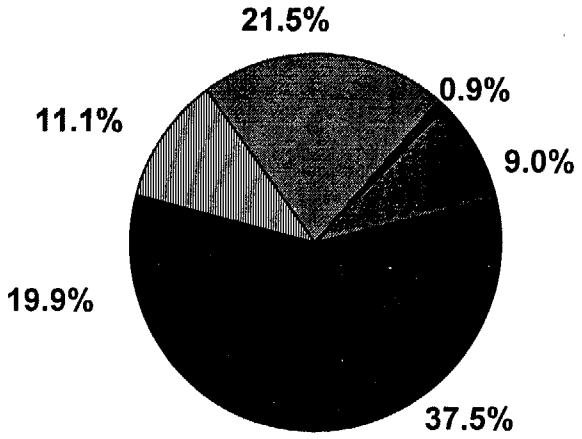
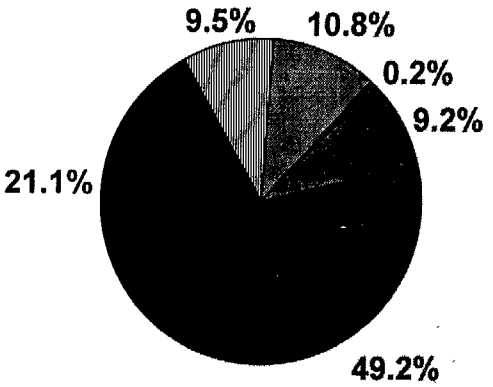
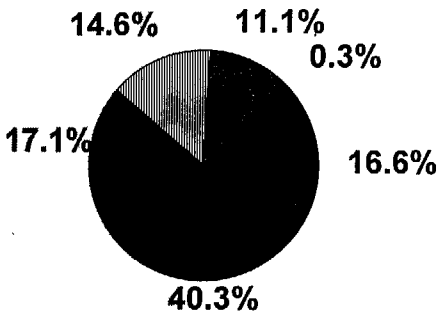
GCC Funding Trends



FY 95 Actual = $191.6 million



FY 96 Actual = $174.2 million



FY 97 Proposed = $149.5 million

Africa
Asia/Near East
Europe and NIS
Latin America and Caribbean
Global Programs
Humanitarian Response

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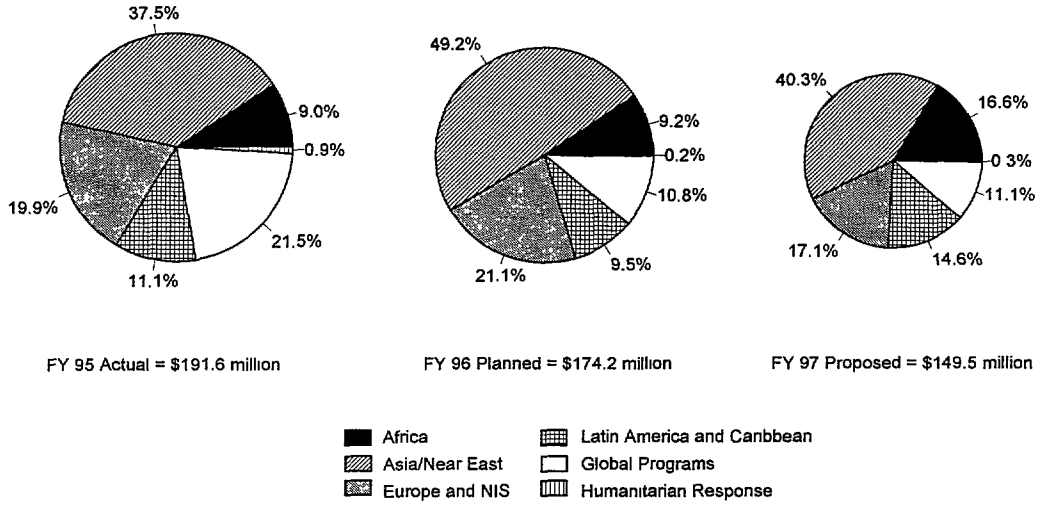
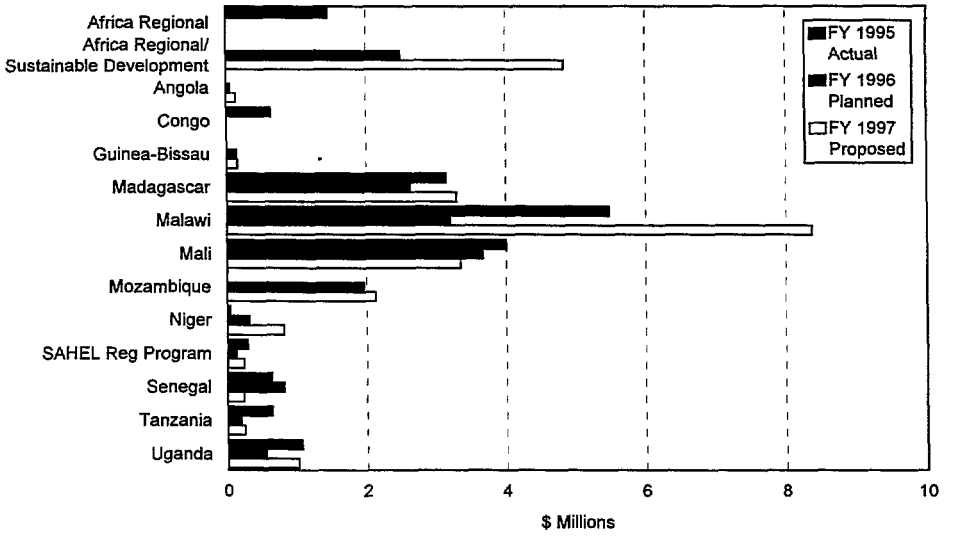
USAID Center for Environment

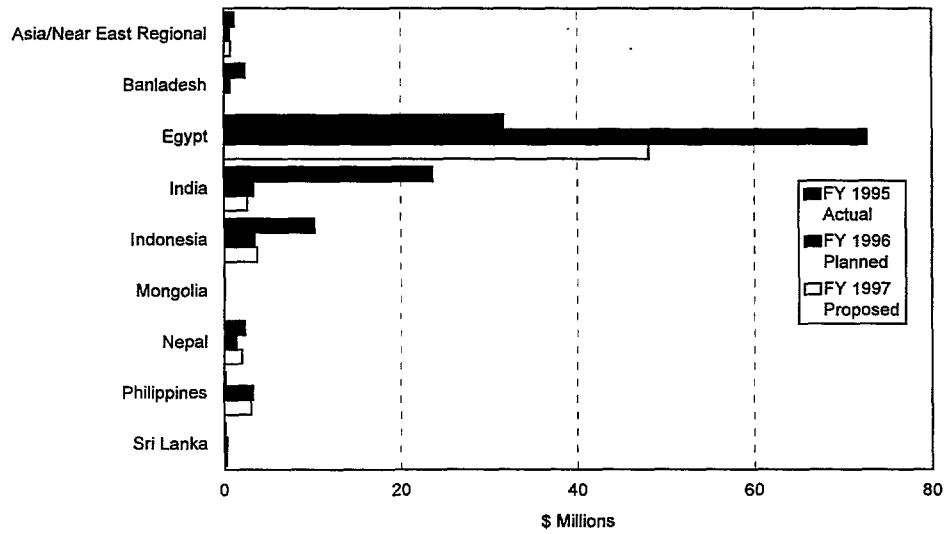
Global Climate Change Obligations by Region, FY 1995-97



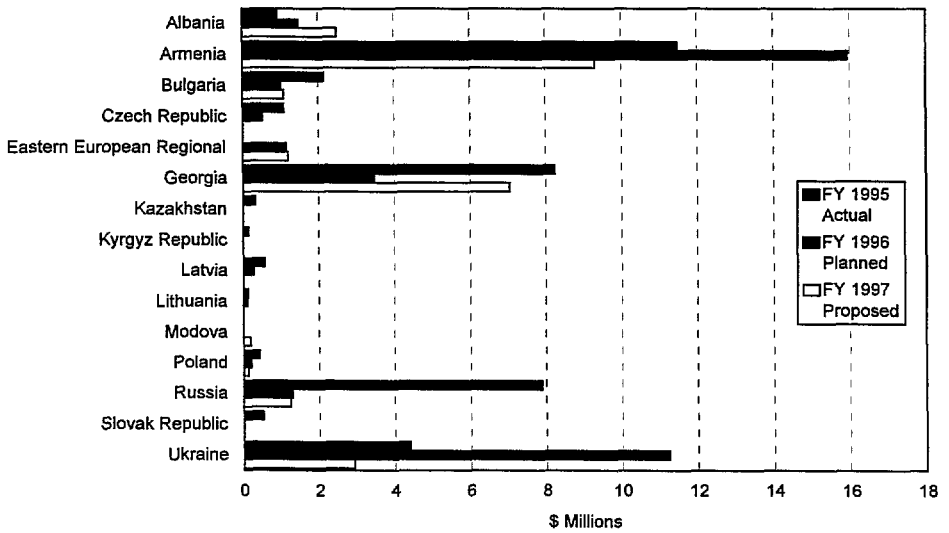
Global Climate Change Obligations by Mission/Office: Bureau for Africa



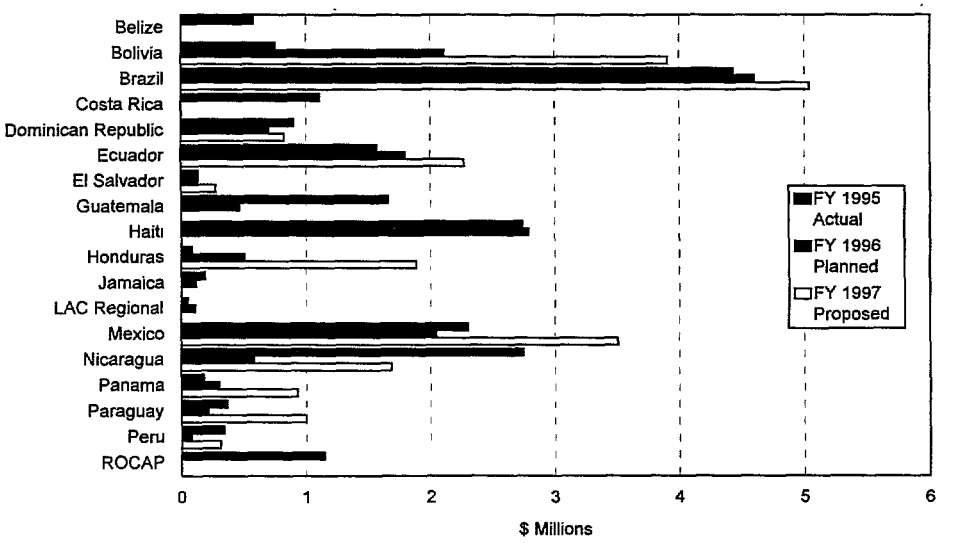
Global Climate Change Obligations by Mission/Office: Bureau for Asia/Near East



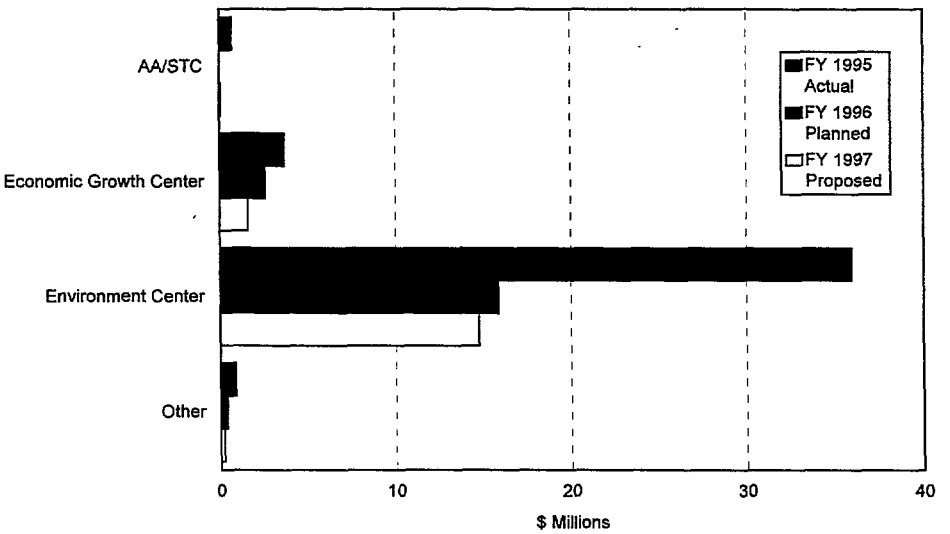
Global Climate Change Obligations by Mission/Office: Bureau for Europe and NIS



Global Climate Change Obligations by Mission/Office: Bureau for Latin America and Caribbean



Global Climate Change Obligations by Mission/Office: Bureau for Global Programs



Global Climate Change

OBLIGATIONS BY BUREAU

Based on the 1997 CP Figures in the $ millions

Bureau	Obligations FY 1995 Actual	FY 1996 Planned	FY 1997 Proposed
Africa	17.3	16.1	24.9
Asia/Near East	71.8	85.7	60.4
Europe and N.I.S.	38.2	36.7	25.6
Latin America and Caribbean	21.3	16.6	21.6
Global Programs	41.2	18.8	16.6
Humanitarian Response	1.8	0.3	0.4
TOTALS:	191.6	174.2	149.5

1997 CP data downloaded on 09/18/96 from USAID PBDS.

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Global Climate Change

OBLIGATIONS BY MISSION/OFFICE

Based on the 1997 CP Figures in the $000 s

Mission/Office	Obligations FY 1995 Actual	FY 1996 Planned	FY 1997 Proposed
Bureau For Africa			
Africa Regional	1,456	0	0
Africa Regional/Sustainable Development	0	2,491	4,832
Angola	0	53	135
Congo	630	0	0
Guinea-Bissau	0	141	152
Madagascar	3,140	2,632	3,290
Malawi	5,474	3,201	8,370
Mali	4,005	3,660	3,349
Mozambique	0	1,959	2,129
Niger	40	312	808
SAHEL Reg Program	285	121	234
Senegal	634	804	235
Tanzania	631	192	246
Uganda	1,054	545	1,088
Total for AFR:	17,349	16,111	24,868
Bureau For Asia/Near East			
Asia/Near East Regional	1,195	636	767
Bangladesh	2,398	674	0
Egypt	31,703	72,648	48,080
India	23,592	3,320	2,625
Indonesia	10,224	3,427	3,733
Mongolia	0	0	0
Nepal	2,371	1,369	2,000
Philippines	187	3,300	3,000
Sri Lanka	139	349	229
Total for ANE:	71,809	85,723	60,434

Global Climate Change

OBLIGATIONS BY MISSION/OFFICE

Based on the 1997 CP Figures in the $000 s

Mission/Office	Obligations FY 1995 Actual	FY 1996 Planned	FY 1997 Proposed
Bureau For Europe and N.I.S.			
Albania	934	1,480	2,490
Armenia	11,485	15,943	9,306
Bulgaria	2,145	1,020	1,097
Czech Republic	1,092	514	0
Eastern European Regional	0	1,150	1,200
Georgia	8,229	3,458	7,040
Kazakhstan	332	0	0
Kyrgyz Republic	144	0	0
Latvia	555	276	0
Lithuania	119	105	0
Moldova	0	0	200
Poland	414	201	128
Russia	7,883	1,287	1,244
Slovak Republic	516	0	0
Ukraine	4,388	11,235	2,920
Total for ENI:	38,236	36,669	25,625
Bureau For Latin America and Caribbean			
Belize	579	0	0
Bolivia	755	2,111	3,911
Brazil	4,435	4,600	5,040
Costa Rica	1,110	0	0
Dominican Republic	900	705	825
Ecuador	1,573	1,802	2,269
El Salvador	134	132	279
Guatemala	1,657	468	0
Haiti	2,740	2,790	0

Global Climate Change

OBLIGATIONS BY MISSION/OFFICE

Based on the 1997 CP Figures in the $000 s

Mission/Office	Obligations FY 1995 Actual	FY 1996 Planned	FY 1997 Proposed
Bureau For Latin America and Caribbean			
Honduras	86	504	1,886
Jamaica	191	117	0
LAC Regional	48	110	0
Mexico	2,300	2,051	3,503
Nicaragua	2,744	583	1,684
Panama	179	299	930
Paraguay	365	218	1,000
Peru	341	81	314
ROCAP	1,149	0	0
Total for LAC:	21,286	16,571	21,641
Bureau For Global Programs			
AA/STC	724	0	80
Economic Growth Center	3,700	2,563	1,593
Environment Center	35,934	15,855	14,729
Other	832	360	185
Total for G:	41,190	18,778	16,587
Bureau For Humanitarian Response (BHR)			
Private/Vol Coop	1,822	334	375
Total for BHR:	1,822	334	375
Total:	191,692	174,186	149,530

ACTIVITIES IN SUPPORT OF U.S. INITIATIVE ON JOINT IMPLEMENTATION

I. BACKGROUND

The U.S. Initiative on Joint Implementation (USIJI) is a pilot program encouraging organizations in the United States and other countries to implement projects that reduce, avoid, sequester greenhouse gas emissions. The United States announced the USIJI program in October 1993 as part of the U.S. Climate Change Action Plan. The objectives of USIJI are:

- to encourage the rapid development and implementation of voluntary, cost-effective projects between U.S. and non-U.S. partners aimed at reducing or sequestering GHGs;
- to promote technology cooperation with and sustainable development in developing and transition;
- to test and evaluate methods to measure, track and verify emissions reductions costs and benefits;
- to establish an empirical base for the formulation of international criteria for joint implementation;
- to encourage private sector investment and innovation in developing and disseminating technologies to reduce or sequester GHG emissions; and
- to encourage participating countries to adopt more complete climate action programs.

II. ACCOMPLISHMENTS

The Global Bureau of the U.S. Agency for International Development (USAID) has provided both funding and personnel support to the USIJI as part of USAID's efforts to address the problem of global climate change. This support has contributed to the following general accomplishments:

- training workshop support
- technical review of JI project proposals
- assistance in the development of national programs

Some specific results of the USAID support of the USIJI include:

February 19, 1997

- **Workshop Support**

  USAID has supported the following USIJI workshops:

  - JI Workshop in Chile
  - JI Workshop in Costa Rica
  - JI Workshop in Jakarta
  - JI Workshop on Energy Monitoring and Verification

- **JI Project Proposal Technical Review**

  USAID has supported technical review of the following JI project proposals:

  - Belize: BEL/Maya Biomass Power Generation Project
  - Honduras: Bio-Gen Biomass Power Generation, Phase II, Sava Site
  - Panama: Commercial Reforestation, Chiriqui Province
  - Czech Republic: The ECKG Fluidized-bed Combustion Project
  - Cameroon: CAMPRO Reforestation
  - Czech Republic: Biomass Fuel Switch, Breznice
  - El Salvador: Salvanatura Reforestation

USAID Contributions to the USIJI Project Pipeline

At least one-third of the twenty-four USIJI-recognized projects were made possible directly or indirectly by the U.S. Agency for International Development (USAID). Often USAID helped institute the policy framework that made a JI project feasible. The agency may have helped found the institution that is now a host country partners. USAID may have provided assistance for prefeasibility studies or contributed technical assistance and financial support. Currently USAID is actively helping develop several projects that will likely be submitted for recognition by USIJI in the near future.

The following are examples of USAID's contributions to the development of USIJI projects:

- **Rio Bravo Carbon Sequestration Pilot Project in Belize**

USAID provided grant funds to support the Program for Belize (PfB), the project's host country partner. PfB staff provided input to the development of the Rio Bravo proposal. The Nature Conservancy (TNC), which receives USAID assistance through the Parks in Peril Program, was also involved with the development of this USIJI project.

- **Noel M. Kempff Climate Action Forestry Project in Bolivia**

USAID provided extensive technical commentary on early drafts of this proposal. The USAID-funded Sustainable Forestry Management (BOLFOR) project also provided assistance. In addition, BOLFOR provided start-up support to the Fundacion Amigos de la Naturaleza (FAN), which is working in partnership with TNC on this multi-component land use project.

- **CARFIX Sustainable Forest Management Project in Costa Rica**

The CARFIX proposal was prepared by a USAID-created NGO, the Foundation for the Development of the Central Volcanic Cordillera (FUNDECOR).

- **Reforestation Project in Chiriqui Province (teak farming) in Panama**

USAID coordinated and expedited the host country acceptance process for this USIJI proposal. In addition, the Agency sent technical advisors to the site to assist with proposal refinement, the development of marketing strategies, and to advise project developers on financing options.

- **City of Decin: Fuel Switching for District Heating Project**

USAID raised Czech Government awareness of the environmental concerns related to district heating and provided the Center for Clean Air Policy with the grant funds used to support initial conceptualization of the Decin project.

- **Plantas Eolicas, S.A. Wind Facility, Costa Rica**

  USAID provided technical assistance to the Government of Costa Rica and the Inter-American Development Bank for legislation permitting private power production in Costa Rica.; hence, all of the energy sector JI projects in Costa Rica were due in some measure to USAID's regulatory reform efforts.

  USAID funded the pre-feasibility study for wind projects on the site Plantas Eolicas S.A. is using for its wind farm. (Two additional projects are planned for the site.)

ACTIVITIES OF THE COUNTRY STUDIES PROGRAM

I. BACKGROUND

The Government of the U.S., through the U.S. Country Studies Program (USCSP), provides financial and technical support to over fifty developing countries and countries with economies in transition. The purpose of this support is to assist these countries in:

- conducting greenhouse gas (GHG) emission inventories,
- assessing their vulnerability to climate change, and
- identifying and evaluating measures for mitigating or adapting to climate change.

Technical assistance on inventories has included:

- training in the use of Intergovernmental Panel on Climate Change (IPCC) guidelines,
- distribution of IPCC Guidelines (in United Nations languages) and associated computer software,
- regular technical consultation and advice,
- review of interim products,
- regional workshops to share experiences and results and to discuss problems of particular regional significance, and
- assistance in preparing the results of the countries' inventory effort.

In its second phase, USCSP is assisting countries in using the results of their studies in the development of their national climate change action plans. The national action plans are used in the implementation of mitigation and adaptation measures and are an important factor in assuring that the countries meet their obligations under the Framework Convention on Climate Change (FCCC).

II. ACCOMPLISHMENTS

The Global Bureau of the U.S. Agency for International Development (USAID) has provided both funding and personnel support to the USCSP as part of USAID's efforts to address the problem of global climate change. This support has contributed to the following general accomplishments:

- training workshops on the preparation of climate change action plans;
- site visits and technical assistance with technical experts;
- regional workshops and synthesis reports to promote the sharing of experiences between countries and with the international community;
- publication and distribution of guidance documents on energy, forestry, methane mitigation technologies and measures, technology implementation guidelines, and assistance with methods of obtaining financing for climate change projects;
- assistance in the identification and use of methods to assess countries' vulnerability to climate change and identification of the potential for implementing adaptation options; and
- technical assistance and training to countries in the development of their GHG emission inventories.

Some specific USCSP accomplishments include:

- **Action Plan Assistance - Czech Republic**

  USCSP has assisted in securing the inclusion of energy efficiency measures in the national action plan of the Czech Republic including:

  - CO_2 or energy taxes or subsidies for more efficient energy use,
  - energy legislation that would promote practices such as demand side management (DSM), integrated resource planning (IRP), and cogeneration,
  - energy standards for equipment and buildings,
  - energy audits,
  - procurement of energy efficient technologies, and
  - development, training, and support for energy efficiency financing.

- **Greenhouse Gas Identification Assistance - Egypt**

  USCSP has assisted Egypt in the identification of major opportunities for reducing GHG emissions in the energy sector. The five areas currently under development include:

  - fuel substitution,
  - cogeneration and waste heat recovery,
  - energy efficient lighting,
  - adaptation of combustion efficiency technologies, and
  - increased use of renewable energy technologies, especially the use of wind energy to produce electricity.

- **Action Plan Assistance - the Philippines**

  USCSP has provided assistance to the Philippines focused on the following energy efficiency measures in its national action plan:

  - implementation of DSM measures in the electric utility sector,
  - creation of rural- or community- based renewable energy cooperatives, and
  - promotion of mass transport in the transportation sector.

- **Action Plan Assistance - Bolivia**

  USCSP has assisted Bolivia in the development of their national action plan. Results of their inventory of GHG emissions and vulnerability assessment will help Bolivia identify mitigation options in the energy, agriculture, forestry, and water resource sectors.

- **Finance Identification Assistance - Kazakstan**

  USCSP is involved in cooperative efforts with Kazakstan to identify financing opportunities for the implementation of energy efficiency, water resource, and agricultural technologies that will help them meet the challenges caused by climate change.

- **Network Development Assistance - Worldwide**

  USCSP has supported the establishment of the Climate Network, an electronic conference for the discussion of climate change topics and the dissemination of technical information on global climate change.

- **Internet Assistance**

  USCSP supports the posting of Country Studies Results and final reports on the World Wide Web.

- **Information Exchange Assistance**

  USCSP assists in publication and dissemination of guidance documents for conducting country studies and preparing national action plans and other climate change related reports. These reports contain summarizing results and findings of the country studies. Many of the documents are high quality, technologically innovative publications that are used as models for helping countries meet UNFCC requirements.

USAID REGIONAL INITIATIVES TO MITIGATE GLOBAL CLIMATE CHANGE

Recognizing the global threat of climate change to both developed and developing countries, the U.S. Agency International Development (USAID) identified curbing climate change and protecting biodiversity as its two global environmental priorities. The Agency is committed to assisting developing countries and countries with economies in transition to reduce the growth of net greenhouse gas emissions through approaches that contribute to economic growth and local environmental protection. USAID places particularly emphasis on a set of key countries - Brazil, Central Africa (as a region), India, Indonesia, Kazakstan, Mexico, the Philippines, Poland, Russia and the Ukraine.

As part of this effort and as a component of the U.S. contribution to the International Climate Technology Initiative announced by OECD countries in April 1995, USAID developed four new climate change initiatives, totalling over $70 million:

1) *Asia - Asia Sustainable Energy Initiative* ($13.5 million).

2) *Latin America and the Caribbean - Environmental Initiative for the Americas - Global Climate Change and Sustainable Energy Use Components* ($9.7 million).

3) *Central and Eastern Europe and Newly Independent States - Environmental Improvement through Increased Energy Efficiency, Market Reform and Improved Natural Resource Management* (approximately $50 million).

4) Africa - Central African Regional Program for the Environment.

To support these regional initiatives and to further implementation of USAID's Global Climate Change Strategy, the Agency's Global Bureau has devoted an additional $8.5 million in FY 1995 to a Global Climate Change Initiative. The initiative supports activities in working with USAID missions to support: i) national climate change action planning efforts and; ii) climate change technology needs assessments; iii) projects to help countries begin to mitigate greenhouse gas emissions through energy efficiency, renewable energy, transport, and urban infrastructure activities; iv) activities to enhance existing carbon sinks and create new carbon sinks; and v) outreach, education and institutional capacity building.

The four regional initiatives and one global initiative complement USAID's existing programs and commitments to help countries address climate change issues in the context of their overall sustainable development programs.

CLIMATE CHANGE INITIATIVES IN ASIA

Asia Sustainable Energy Initiative Approximately: $9 million

The *Asia Sustainable Energy Initiative* fosters the development and implementation of energy production and distribution strategies that reduce greenhouse gas emissions and support economic growth while minimizing economic and environmental costs. The goal is a sustainable approach to meeting the growing demand for energy services by supporting: a) increased institutional capacity for integrated resource planning; b) pilot investment projects in energy efficiency and renewable energy technologies; c) innovative financing mechanisms for energy efficiency and renewable energy activities; and d) technological partnerships between U.S. and host country institutions.

The program focuses on the three key climate change countries in Asia -- India, Indonesia and the Philippines. The Asia Sustainable Energy Initiative has several components:

- Placement of resident sustainable energy advisors in the USAID mission in each country;
- The Ben Franklin Fellowship program allowing energy experts from U.S. utilities to work with their host country counterparts;
- Implementation grants to identify and support pilot energy efficiency and renewable energy activities; and
- A training program that will work with representatives from the three countries to build capacity to implement energy efficiency programs, waste to energy activities, load management and forecasting, and the use of alternative energy sources.

Utilizing these mechanisms, the Initiative is:

- Leveraging multilateral and private sources of capital;
- Promoting policy formulation to expand access to private sector renewable energy sources; and
- Helping coordinate activities related to other U.S. government assistance including the U.S. Country Studies Program.

Energy Policy Reform in India Approximately: $5 million

This program is assisting Indian efforts at energy policy reform. It builds on earlier demonstrations of sugarcane bagasse co-generation. Using reform in one State, the program will demonstrations the impact of policy reform in encouraging expanded access to private sector energy sources, opening markets and creating opportunities for the use of new renewable energy technologies. Co-generation options from biomass and other renewables such as wind, hydro, and solar power will also be explored and demonstrated.

CENTRAL AND EASTERN EUROPE AND THE NEW INDEPENDENT STATES

ENVIRONMENTAL IMPROVEMENT THROUGH INCREASED ENERGY EFFICIENCY, MARKET REFORM, AND IMPROVED NATURAL RESOURCE MANAGEMENT

USAID energy assistance programs in Central and Eastern Europe and the New Independent States of the former Soviet Union helps countries reduce greenhouse gas emissions through improvements in the efficiency of energy production and consumption, and by supporting market reforms. Technical assistance and limited commodities and training support power sector restructuring, energy efficiency, and nuclear power plant safety.

New climate change activities in 1995 include:

Russian Federation Approximately: $42 million

- $35 million of the equipment to be imported in 1995 under the Energy and Environmental Commodity Import Program will go toward reducing greenhouse gas emissions from oil, coal, gas and heavy industry in dozens of locations around the country.
- Technical assistance to perform the analyses necessary to complete a loan to build a combined cycle, natural gas power station will introduce a much cleaner power production technology to Russian utilities.
- Activities with regional electric utilities, including partnerships with U.S. utilities, are introducing demand-side management and energy efficiency programs.
- The Russian Far East sustainable natural resource management project, which has three integrated components: (1) strengthening policy and institutional frameworks; (2) promoting sustainable forest management in the Khabarovsk and Primorskii Territories; and (3) enhancing protection of endangered species and critical habitat in the Sikhote-Alin Mountain Region.

Poland Approximately: $2 million

- A new regional energy efficiency project demonstrates demand-side management approaches with distribution companies, including the installation of U.S. energy efficiency equipment in industrial facilities, as part of a cooperative effort with the World Bank.
- A new restructuring and regulatory reform project is supporting market reform of the power sector to promote competition, energy efficiency, and environmental retrofit of coal-fired power plants.

Ukraine Approximately: $4 million

- A three-pronged approach to energy efficiency includes (1) energy audits and energy efficiency equipment installation in six combined power/heat plants which are using coal and gas, (2) industry energy audits and management improvements in five major industrial facilities, and (3) demand-side management demonstrations at two distribution companies designed to lead to multilateral bank funding of expanded activities.

Kazakstan Approximately: $2 million

- Two technical assistance studies are investigating opportunities to improve the efficiency and environmental performance of coal-fired power/heat plants in the country.
- A series of workshops to improve the institutional capability of Kazakstan and its four neighbors in the region (Kyrgyzstan, Turkmenistan, Tajikistan, and Uzbekistan) to trade electricity, and ultimately other energy commodities on a more internationally accepted commercial basis. Such trading will allow cleaner and more cost-effective fuels to come to the market.

CENTRAL AFRICAN REGIONAL PROGRAM FOR THE ENVIRONMENTAL (CARPE)

The goal of CARPE is to reduce the rate of deforestation of the tropical forests in the Congo Basin in order to conserve biological diversity and, in the long run, to avert potentially negative changes in the global and regional climate.

The Congo Basin contains the largest area of contiguous moist tropical forest in Africa, and the second largest such expanse in the world. Central Africa's moist lowlands forests cover approximately 2 million square kilometers, accounting for approximately 26 percent of the world's remaining forested area. As such, it forms a critical carbon sink and repository of biological diversity. This forest covers parts of Cameroon, the Central African Republic, and Zaire, and most of the Congo, Equatorial Guinea and Gabon. These six counties currently have a population of 60 million people that, given present rates of population growth, will increase to 150 million people by the year 2025. In the absence of more sustainable resource use practices, rapid population growth will result in increased deforestation and biodiversity loss. The loss of tropical forest in the Congo Basin is significant. Between 1980 and 1990, 44,000 square miles were cleared, an area larger than the State of Virginia.

CARPE will lay the foundation for future efforts that will be required to conserve this ecosystem involving host governments, international donors, and NGOs. The program will stress African participation in project design and implementation, and focus on supporting the activities of NGOs. It will emphasize identification and support for African NGOs; information sharing among NGOs, forest agencies and environmental researchers; and technical assistance for sustainable forestry practices. CARPE will identify and begin to establish the conditions and practices required for the conservation and sustainable use of the natural resources of the Congo Basin, in a manner which addresses local, national, regional, and international concerns.

ENVIRONMENTAL INITIATIVE FOR THE AMERICAS (EIA)

Through EIA, USAID is expanding efforts to address global climate change in Mexico and Brazil and environmental pollution and related issues in the region. The EIA helps disseminate and build markets for U.S. environmental technology in Latin America and the Caribbean (LAC) through partnerships between U.S. and regional governments, private sector companies and NGOs. A priority is to identify activities that other donors and multilateral banks are supporting that USAID could leverage and in which USAID might participate. Emphasis is given to community-based programs that strengthen local civic society. EIA has four components: sustainable energy production and use; trade and environmental regulatory integration; urban and industrial pollution mitigation and prevention; and, coastal and marine ecosystem conservation. Primary activities include:

- Leveraging multilateral and private sources of capital to facilitate technology investment;
- Establishing on-the-ground advisors to support technical assistance efforts;
- Supporting training and information dissemination to build implementation and enforcement capacity; and,
- Promoting institutional policy reform to standardize regulation and policy enforcement levels to encourage more sustainable development by, for example, increasing energy efficiency and the use of renewable energy, improving forest management and decreasing urban air and water pollution.

Global Climate Change and Sustainable Energy Production and Use Approximately: $9.5 Million

The EIA's global climate change component highlights the links of sustainable energy production and use, with: (1) the growth of LAC economies; (2) the demand for energy services of rapidly growing urban populations; (3) the need to reduce the poverty of marginalized rural and indigenous peoples; and,(4) the need to reduce greenhouse gas emissions from fossil fuel use and unsustainable wood burning. The following approaches are used to address the region's sustainable energy needs:

Energy Efficiency: USAID supports partnerships between U.S. and local organizations that promote: transfer of energy efficiency technologies for residential and industrial use; technical exchanges between U.S. utilities and regulatory agencies and LAC public and private energy organizations; and policies that support private production and free marketing pricing.

Renewable Energy: USAID supports partnerships between U.S. and LAC organizations to promote the assessment, financing, design and use of small-scale renewable energy activities. The work is enabling those beyond the electric grid system to receive

energy services. Potential activities include: renewable energy technologies for lighting, heating, brick making, cooking, water pumping and refrigeration; fuel production from agricultural wastes; and technical assistance and training to government social development agencies.

USAID'S FORESTRY AND LAND USE ACTIVITIES TO MITIGATE GLOBAL CLIMATE CHANGE

I. BACKGROUND

USAID's forestry and sustainable land use efforts foster environmentally sound growth by promoting activities to combat deforestation and the inefficient use of natural resources, improving analysis monitoring and evaluation capabilities, and heightening public awareness. The Agency's natural resource and forestry efforts are primarily focused on:

(1) developing and disseminating successful models for sustainable land use - USAID targets high risk areas for the use of these models as substitutes for destructive practices that lead to global warming.

(2) overcoming institutional and policy constraints that hinder and discourage improved land use - Specifically, USAID works to overcome these constraints by establishing innovative partnerships between U.S. and developing country non-governmental organizations (NGOs), and between local communities and their governments.

USAID's funding for forestry activities has been substantial, reaching a peak of $125 million in 1991. Through its Global Bureau, USAID supports international research in both forestry and agroforestry, as well as studies to develop methods to measure carbon in different land use systems. In addition, USAID is extending proven technologies for sustainable forest management. USAID has also been considered the leader among donors in forestry and conservation, particularly for its work at the community level and its permanent overseas presence.

Of USAID's ten key climate change countries, five have significant forestry/land use activities or strategies as part of their programs: Brazil, Mexico, Indonesia, the Philippines, and Russia. Several other countries, including Bolivia, Costa Rica, Ecuador, Guatemala, Haiti, Honduras, Panama, and Sri Lanka have important forestry/land use or conservation activities or achievements which are also worth mentioning. In addition, USAID supports regional efforts in Africa, Latin America, and the Caribbean, and spearheads globally-focused activities as well.

March 4, 1997

II. COUNTRY-SPECIFIC FORESTRY AND LAND USE ACTIVITIES

■ Brazil

Ten percent of the world's carbon dioxide emissions are due to deforestation and extensive burning which occurs in the Amazon and Campo Cerrado savannah zones in Brazil. USAID-supported activities in Brazil to date have included:

- supporting the development of a model for reduced-impact logging (RIL) using research and demonstration plots on eight forest sites in the Brazilian Amazon - Timber extraction techniques are currently being demonstrated and promoted for adoption by private timber association members to reduce forest damage and carbon loss while improving forest management. The techniques have generated wide-spread interest at universities and international research centers, as well as at the World Bank, which consequently redesigned a new $18.1 million activity in forest management. Simultaneously, USAID's Global Environment Center is sponsoring a study of methods for measuring carbon sequestration under a low-impact logging scenario using these research sites in Brazil;

- advancing the political visibility of extensive fires that emit greenhouse gases and destroy carbon sinks in the Amazon - USAID has helped to monitor forest burning through the use of satellite imagery by working with Brazilian NGOs and government, and by sponsoring a joint study by the U.S. Forest Service, NASA and Brazil's Environmental Protection Agency (IBAMA). Brazil is giving high priority to this activity as a means to monitor and control the rate of deforestation. Collaboration has already begun with neighboring Bolivia, which already suffers from Brazil's forest fire smoke;

- leading USG efforts in Brazil in support of the Rio Summits' Framework Convention on Climate Change (FCCC) - In May 1995, the Brazilian Ministry of Science and Technology signed an agreement with the U.S. Country Studies Program (U.S. CSP) to dedicate $400,000 ($350,000 from USAID core funds) for sector studies of greenhouse gas emissions in Brazil. The U.S. CSP provides financial and technical assistance to developing and transition countries to prepare climate change action plans for implementing mitigation and adaption measures. USAID/Brazil has also identified Brazilians for training courses and workshops sponsored by the U.S. Initiative on Joint Implementation (USIJI), a program which promotes cooperative efforts between countries to reduce net greenhouse gas emissions; and

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- promoting the first partnerships between Brazilian NGOs and IBAMA to manage the Jau National Park, a 2 million hectare flooded forest in Amazonas State - As a result of this partnership, this carbon sink is protected from conversion.

USAID's programs in Brazil have led to increased protection and enhancement of carbon sequestration. The portfolio of USAID program accomplishments indicates that::

- 190 hectares of cleared area have been planted with improved agroforestry systems;
- 123 families have adopted improved agroforestry systems;
- two parks have adopted management systems; and
- 3.1 million hectares of forested areas are under approved management.

- **Mexico**

In 1990 the U.S. Congress designated Mexico as a key global climate change country in an effort to address (1) Mexico's high level of greenhouse gas emissions (most notably from the inefficient and high-level consumption of non-renewable energy [fossil fuels]), and (2) the rate of deforestation in Mexico of up to 600,000 hectares per year.

In Mexico, USAID seeks to play a role in environmental management that furthers the bilateral interest of both countries while focusing on global goals of mitigating climate change and preserving biodiversity. USAID's achievements in Mexico include:

- strengthening the management and protection of 11 protected areas with key ecosystems (totalling 3.1 million hectares, and containing 2.1 million hectares of forest) - USAID/Mexico has worked with U.S. NGO partners and the Mexico Ecodevelopment Program to greatly reduce conversion of these carbon sinks;

- encouraging better forest and land use management - USAID has performed studies of government policies that currently encourage deforestation, sponsored workshops on sustainable forestry practices, and trained environmental enforcement officials in sustainable land use practices;

- leading the creation and capitalization of the Mexican Fund for the Conservation of Nature - This Fund is an endowment (currently $20 million, and expected to reach $100 million from Government of Mexico and other sources) that will continue in perpetuity to fund global climate change and conservation work in Mexico; and

- assisting with the identification and development of potential project concepts to submit to USIJI.

- **Indonesia**

Indonesia's tropical forests, rich marine resources, and great biodiversity are being degraded at an accelerated rate. Resource mining followed by colonization and combined with a weak policy and legal framework are the principal causes. These are exacerbated by the lack of participation of civil society in policy making and management. Indonesia has over 40 million acres of once-forested land that is now degraded and unproductive.

The key word in USAID/Indonesia's strategy is "partnerships." Greater stakeholder participation is considered key to starting Indonesia off on the path towards sustainable management of its forestry and coastal natural resources. USAID is working to ensure local community participation in decision-making processes and benefit-sharing arrangements with the private sector and government by:

- developing "integrated conservation and development" models for coastal resources management in non-protected areas and promoting "best practices" forest product harvesting and processing;

- developing an enabling policy environment for the involvement of local communities in management of forests and coastal areas;

- establishing local government institutional structures and capacities for promoting decentralized and more effective natural resource and environmental planning and impact review;

- supporting degraded lands research and policy reform - USAID's efforts directly influenced the Indonesian Government to grant tenure rights to those who reclaim degraded lands through reforestation and agroforestry. USAID supports the development of agroforestry systems by the International Center for Research on Agroforestry (ICRAF) which will enable landless farmers to gain economic benefits while improving the environment; and

- strengthening the capabilities of the Indonesian Ministry of Forestry in the area of remote sensing and GIS applications for forest health monitoring by working in collaboration with the U.S. Forest Service, the Center for International Forestry Research (CIFOR), and NASA.

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- **Philippines**

In April 1995, USAID/Philippines agreed to develop a new Strategic Objective on global climate change in line with the Agency's development priorities. Since then, USAID/Philippines has been developing mitigation options and methodologies to measure the reduction of global and local greenhouse gas emissions. In addition, USAID has a long-standing strategic objective to enhance the management of renewable natural resources, including forests and coastal mangroves.

In order to accomplish these goals, USAID established the Community-Based Forest Management Program (CBFM) in the Philippines. CBFM is committed to the sustainable management of forests, the promotion of social justice, and the well-being of communities. CBFM's goals are accomplished by giving communities legal rights to their forest resources, and by developing, strengthening, and institutionalizing workable partnerships among local communities, government agencies, NGOs, and the private sector. One of the results of this program has been the establishment of legal agreements between the GOP and local communities to perform community-based forest management on public forested lands on over 50,500 hectares. Through CBFM USAID has also:

- helped to significantly reduce slash-and-burn deforestation and illegal logging and promote forest regeneration;
- promoted security of tenure so that forest communities are formally entitled to use forest resources for 25 years, with provisions for renewal;
- provided technical assistance for sustainable forest management, supported by the Department of Environment and Natural Resources (DENR) and local government units;
- helped participants gain access to investment capital to identify markets and to build marketing capabilities.

CBFM was recently designated as the national strategy for forest management by the President of the Philippines. In addition, the program is helping DENR redraft guidelines to transfer management of their functions to local governments to improve the enforcement of forestry laws in local communities.

- **Russia**

Russia harbors a large portion of northern boreal forest. Sections of this forested land are threatened by periodic catastrophic fires and dangers of immediate exploitation to relieve economic strains.

USAID is promoting sustainable, multiple-use natural resources management in the Khabarovsk and Primorski by providing assistance on institutional development, sustainable forest management, and biodiversity conservation. USAID's efforts include support for the development of forestry "best management practices" and forest fire prevention techniques, as well as control efforts with the U.S. Forest Service.

- **Bolivia**

In response to forest exploitation in Bolivia, USAID is funding a seven-year $20 million Sustainable Forestry Management (BOLFOR) project. BOLFOR will help Bolivia institute environmentally sound forest management practices that can provide sustainable incomes for generations to come. The project will enable Bolivian public and private sectors to establish programs to support sustainable forest use and minimize forest, soil, and water degradation while protecting the country's rich biological diversity. BOLFOR also aims to have 25 percent of all forests in the Department of Santa Cruzas sustainably managed by an accredited third party certifying organization.

The project has three primary components: natural forest management, policy and institutional analysis and development, and product development. Other elements include research and training coordination, environmental monitoring, evaluation, and communications. To carry out these forest management programs, BOLFOR:

- provides technical training to private industry and indigenous community organizations;
- assists in the development of forest management techniques and plans and conducts ecological research related to forest management;
- conducts comparative economic analysis of various forest management systems;
- assists the Government of Bolivia in improving the regulatory investment environment for sustainable forest use and legal reform;
- promotes new, certifiable products to increase the value of forest resources; and
- supports scientific research by Bolivian Masters students and disseminates research findings;

BOLFOR has played a critical role in assisting the Government of Bolivia in the development and adoption of a new forestry law. The law ensures the sustainable

management of Bolivia's large forest resources. USAID's assistance in the development of the law won the Agency praise by Bolivia's President, who then engaged BOLFOR in the drafting of the law's regulations.

- **Costa Rica**

Rapid expansion of farmland has threatened Costa Rica's rich supply of natural forests, and has degraded watershed, soil and water resources -- most dramatically in the Grande de Terraba watershed of the Zona Sur. The expansion also threatens future supplies of timber and wood products.

To improve reforestation rates and expand the range of options for Costa Rican farmers, USAID has supported a four-year project, the Native Tree Reforestation Project (TRIALS III), in collaboration with the Organization for Tropical Studies (OTS), a non-profit consortium of 54 universities and research institutions in Latin America. USAID funded 75 percent of the $1.1 million project to promote native tree species and stimulate planting for timber production, agroforestry, and watershed reclamation. Reforestation stabilizes soil and water resources, preserves the genetic diversity of trees, and stimulates rural economic development. TRIALS III produced nearly 75,000 seedlings to use in adaptability trials for six native species and an additional 50,000 seedlings for distribution to local farmers and their organizations.

- **Ecuador**

In 1991, USAID/Ecuador initiated the seven year, $9 million Sustainable Uses for Biological Resources (SUBIR) project to identify, test, and develop resource management models in three Ecuadoran parks and their buffer zones: the Cotacachi-Cayapas Ecological Reserve, Cayambe-Coca Ecological Reserve, and the Yasuni National Park. The 600,000-hectare Yasuni National Park has large expanses of rich ecologically valuable land, but is presently threatened by oil interests. Cotacachi-Cayapas and Cayambe-Coca, which encompass biozones ranging from treeless Andean paramo to lowland humid rain forest, face encroachment by colonists. Indigenous groups reside in the three areas. SUBIR has assisted in:

- policy analysis and training,
- organizational development,
- management of protected areas,
- development of ecotourism,
- land use planning,
- and research and monitoring.

SUBIR helped create a lumber commission to develop a timber certification program to ensure the sustainable, ecologically sound harvesting of lumber. In addition, 3 million hectares were mapped to create an inventory of plants and animals used to develop a park biodiversity database.

- **Guatemala**

USAID/Guatemala has contributed $12.6 million to the Government of Guatemala and NGOs for the Maya Biosphere Reserve Project. The project, begun in 1990, assists Guatemala's National Council for Protected Areas (CONAP) in promoting biosphere administration, environmental education, public awareness, and sustainable resource management for income generation. Through the Maya Biosphere Reserve Project, USAID has helped decrease the rate of deforestation in the Department of Peten, by:

- establishing new private and public conservation institutions,
- creating a multi-sectoral coordination committee, and
- increasing local communities' responsibility for sustainable forest management through long-term concession agreements.

The Project has also:

- slowed down colonization in the Maya Biosphere Reserve,
- assisted local NGOs in establishing themselves as local voices for forest conservation, and
- contributed to the establishment of an "Eco-School" in San Andres.

In addition, through USAID efforts, 25,000 people have adopted one or more sustainable practices such as the use of agroforestry, green manures, forest management. Since 1990, with USAID assistance, Guatemala has increased the areas under protected status by more than 600 percent, from 287,000 hectares to 1.9 million hectares in 1995.

- **Haiti**

In a departure from past top-down approaches to reforestation, USAID/Haiti has initiated the Agriculturally Sustainable Systems and Environmental Transformation (ASSET) 2000 program to promotes broad-based, environmentally sound, sustainable growth through activities in agriculture and micro-enterprise.

ASSET 2000 encourages farmers to plant fast-growing trees that could be harvested in a short time and would regrow after cutting. USAID has collaborated with foreign and

domestic NGOs to develop innovative systems for tree seedling production and distribution to small farmers. Some ASSET 2000 accomplishments include:

- the planting by Haitian farmers of some 85 million trees side-by-side with their staple food crops; and

- the preservation through seed collection, propagation, and wide-scale planting of two endemic species of endangered palm trees.

Additional activities of the program will include:

- working to strengthens the national framework for environmentally sound development;

- helping to implement a National Environmental Action Plan (NEAP) to prioritize and coordinate the environmental actions of the government, NGOs, and private sector;

- providing funding and technical assistance; and

- assisting the Ministries of Agriculture and Environment in developing policy on environmental management issues.

In addition to these efforts, ASSET 2000 includes sustainable hillside agricultural practices, enhanced agroforestry practices, and farming systems. The program promotes community participation in tree planting. ASSET 2000 is also supporting the establishment of a new Community Forestry Corps that will provide training, financial, and technical assistance to communities. A Natural Resources Management Fund will be set up to help fund this. Finally, ASSET 2000 supports Environmental Quality in Targeted Urban Locations, including low-cost solid waste management models and education programs on environmental issues.

- **Honduras**

With the government of Honduras, USAID/Honduras is funding the ten-year, $35.7 million Forestry Development Project (FDP). In the first seven years, FDP improved the management of commercial pine forests and the efficiency of manufacturing and marketing of wood products. The project supported the institutional reorientation of the Honduran Forest Development Corporation, the establishment of sustainable forest management in selected pilot areas, and the strengthening of the private sector forestry industry.

In 1995 the project was expanded to include the management of protected areas. For the remaining activities, the emphasis will be to develop a national forest management plan and create and test a national protected areas system based on effective and sustainable management practices at ten pilot sites. This project helps the Honduran Forest Development Corporation with new timber sales system. The new system allows the forestry industry to utilize 20 percent more of each harvested tree and to obtain 50 percent more timber per area harvested.

- **Panama**

USAID has contributed $18 million over eight years for the Natural Resources Management (NRM) project to help Panama's public and private organizations manage the country's renewable natural resources -- especially in the 326,000 hectare Panama Canal Watershed.

One of the NRM efforts has been the formation of a thirty-four member interagency committee to complete a Panama Canal management plan. The Natural Resources Management project also assisted the Panama's National Institute of Renewable Resources in the development of three new environmental laws. The law topics were reforestation incentives, reforestation management, and environmental regulations. Also, the project provided LANDSAT technology to determine the rate of deforestation in Panama.

USAID, the Nature Conservancy, and the government of Panama will commit $25 million to establish an environmental trust fund to implement Natural Resources Management activities as well as non-projected related activities. USAID's contribution to this fund has been $8 million and represents the first time that the Agency has capitalized on an endowment.

- **Sri Lanka**

The Natural Resources and Environmental Policy Project (NAREPP) is USAID's first operation in Sri Lanka to cover a full range of environmental issues with the goal of integrating sound resource management and conservation into the country's economic development policies and programs. Under the $19 million project, USAID has been working with over a dozen governmental and non-governmental organizations since 1991 to help the country avoid the environmental mistakes of other rapidly industrializing nations and to ensure that economic gains are not undermined by the costs of declining ecological quality. NAREPP efforts are focused in six areas:

- environmental policy and institutional development,
- urban and industrial pollution abatement,

- coastal resource management,
- biodiversity conservation,
- public participation, and
- watershed conservation.

NAREEP has been successful in:

- promoting and improving environmental management by initiating new regulations on industrial siting;

- implementing environmental impact assessment requirements and an environmental pollution licensing program;

- initiating nearly 40 environmental impact assessments on large development projects; and

- establishing a pollution prevention auditing program.

III. REGIONAL FORESTRY AND LAND USE ACTIVITIES

■ LATIN AMERICA and the CARIBBEAN

■ Central American Regional Environment Project

USAID has helped create a unifying vision for Central America by supporting the development of a network of connecting ecosystems interconnected through terrestrial and marine biological corridors. The Central American Regional Environment Project (PROARCA) is coordinated by the Guatemala and Central American Programs Mission and promotes, through small grants to NGOs, compatible land uses that sequester or conserve carbon, such as ecotourism, shaded coffee, organic agriculture, and natural forest management. Eight national parks and reserves have been strengthened through USAID's regional program, reducing the chances that these will be converted to other land uses. Issues such as illegal timber trafficking are being resolved through a conflict resolution program between stakeholders and decision makers.

■ Parks in Peril

USAID's Parks in Peril project began as an effort to help Latin American governments and private organizations develop fully functioning, sustainable protected areas in their respective countries. The Nature Conservancy (TNC) designed the project and

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subsequently identified approximately 200 sites whose size and biological wealth were important and were threatened due to human activities. The three strategic objectives of the cooperative agreement between USAID and TNC include:

- on-site protection and management,
- compatible use and economic development, and
- long-term financial sustainability.

The present agreement will establish basic protection infrastructure in 25 to 50 protected areas. The project seeks to direct support of park managers, TNC, NGOs, and government collaborators away from USAID funding. The project has been initiated in 26 parks covering a total of 5.7 million hectares. Protection and management elements include park equipment, country marking, monitoring activities, and training.

- **Hemispheric Free Trade Expansion Project**

USAID promotes environmentally sound free trade in the Americas through its Hemispheric Free Trade Expansion Project (HFTE). Through its environmental component, HFTE seeks to increase understanding of the impact of private investment, policy reform, and trade on the forestry sector. HFTE activities include:

- support for sound legal frameworks and policies for forest concessions management, and
- identification of issues related to certifiable timber and non-timber forest product management and trade.

HFTE project promotes institution-building and supports networking for better local stewardship of forest resources. HFTE also develops model small-holder activities that can claim potentially-tradeable carbon benefits through environmentally sound production of coffee.

- **AFRICA**

- **The Central African Regional Program for the Environment**

The Central African Region harbors an important Carbon sink: the tropical forests of the Congo Basin. Political instability, economic hardship, and a weak policy environment are contributing to a high rate of forest loss, and consequently, carbon emissions. To respond to natural resource policy and management concerns, USAID developed a regional project, The Central African Regional Program for the Environment (CARPE). CARPE's accomplishments include:

- the development of a program design based on the USAID-supported Central African Global Climate Change Study - The study analyzed change, assessed emissions from savanna and forest areas, assessed impacts of deforestation and burning, and designed and tested methods and tools for mitigating emissions from burning and deforestation;

- the strengthening of management of protected areas in the Congo Basin - This has resulted in the protection of over 202,950 km2 of forest ecosystems (carbon sinks); and

- the support and strengthening of institutions, policy analysis, and policy related to land use for the purposes of mitigating deforestation.

- **Policy, Analysis, Research, and Technical Support Project**

To implement USAID's objectives in Africa for natural resource management and sustainable development, the USAID Africa Bureau has funded the Policy, Analysis, Research, and Technical Support (PARTS) project. This seven-year, $74 million project builds on activities similar to those begun under the Agency's Natural Resources Management Support (NRMS) project - including biodiversity conservation. This project support's the Bureau's Development Fund for Africa (DFA) objectives of achieving sustainable increases in income and/or productivity through better management of natural resources and African economies, strengthening of competitive markets, and improvement of food security. The project is working to meet these DFA goals by developing effective strategies, policies, and programs in key agricultural and natural resource areas. Activities are focused on research and analyses covering sectoral, cross-sectoral, synthesis studies, and impact evaluations, including biodiversity conservation research and demonstration activities. This project supports a Multidonor Secretariat at the World Bank that coordinates donor activities in the environmental sector in Madagascar and supports development of national environmental action plans in Africa.

IV. GLOBAL FORESTRY AND LAND USE ACTIVITIES

- **USAID's Bureau for Global Programs, Field Support and Research**

- **Research and Technology Development**

USAID is supporting two important research and technology development programs to combat climate change and forest degradation. USAID provides support to CIFOR to test

reduced-impact harvesting in tropical forest areas in Indonesia and Brazil. CIFOR is also working to improve monitoring and assessment techniques in natural forests.

In addition, USAID is supporting the Alternatives to Slash-and-Burn (ASB) program at ICRAF. Slash-and-burn agriculture was recently identified as the major cause of deforestation and carbon emissions in the tropics. A major part of ASB includes the reclamation of degraded lands. ASB has the potential to create large carbon sinks. Once such example is the 18 million hectares of restored land in Indonesia. Support is also being given to the Tropical Forest Foundation (TFF) to establish demonstration plots for reduced-impact harvesting and extend these technologies to forest industries in Latin America and Asia.

- **Forest Carbon Monitoring**

USAID is supporting the development of methodologies to measure carbon storage under various forest management systems. These methodologies include:

- the preservation of natural forests,
- improved silviculture in natural forests,
- the placement of forests under reduced-impact management,
- agroforestry,
- farm forestry, and
- the establishment of plantations.

These methods will strengthen technical assistance by the USIJI Secretariat on monitoring forest carbon changes due to project activities. The World Bank is also using this methodology for measuring carbon storage in its projects in India. These methodologies will be ground-truthed on a world-wide network of research sites managed by CIFOR and ICRAF.

- **Fire Management**

USAID provides support to a number of host governments in assessing and managing forest fires. Additional assistance provided in the analysis of fire risk reduction in areas where reduce-impact harvesting has been used as a sustainable forest management practice. USAID's fire management efforts in Brazil, Southern Africa, and Indonesia are being replicated worldwide.

- **Forestry/Global Climate Change Initiative**

This Initiative strengthens the sustainable management of natural forests and tree systems through the development of sustainable forest management policies and the improvement of local management capabilities. It includes integrated assessment and monitoring systems to improve forest health, biodiversity conservation, and carbon sequestration. The project's major activities include:

- Mission support for forest management and conservation,
- research integration,
- reduced-impact harvesting demonstration and training,
- forest concessions management,
- fire reduction,
- analysis of non-forestry sector influences,
- participatory forest management,
- regeneration and management of degraded forests,
- forest cover and health monitoring,
- sustainable forestry criteria and indicators,
- measurement of the impact of forest management on carbon storage, and
- technical training.

USAID Support for the Protection and Sustainable Management of Forests

The United States Agency for International Development (USAID) is the primary U.S. government agency responsible for delivering U.S. bilateral assistance to developing countries and countries whose economies are in transition. USAID supports one of the largest bilateral assistance programs for forest protection and sustainable management. USAID's goal is to assist nations, communities and individuals to achieve sustainable development. Helping countries protect their environment, conserve their natural resources endowment, and utilize their forest resources in a sustainable manner is an important part of this goal.

Conservation of the world's diverse biological resources and reduction of the threat of global climate change are USAID's broadest environmental objectives. Forest protection plays a vital role in meeting these priorities inasmuch as forest habitats, particularly tropical forests, are home to more than half of the world's plant and animal species. Forests also account for as much as 20 percent or more of atmospheric carbon released annually, either through clearing and burning for conversion to agriculture or through biomass decomposition. Because of the great influence that forests have on global weather patterns and atmospheric carbon release, sustainable forest management has become a critical component of USAID's strategy for global climate change.

USAID's combined funding for activities in the forestry sector between FY 1991 and 1995 exceeded US$427 million (see Figures 1 and 2). Nearly one-third of this funding has been directed to activities in the Asia and Near East region, with the Philippines accounting for 67 percent of all forestry sector support to the region (see Table 1). Latin America and Caribbean countries account for another one-third of the Agency's total forestry sector support for this period, with Haiti accounting for at least 18 percent of the region's funding and the countries of Ecuador, Guatemala, Honduras, and Panama accounting for at least another 37 percent. The Africa region accounts for another one-quarter of USAID's forestry sector funding during the same period, with Madagascar accounting for at least 28 percent of the region's funds. Funding for global programs in forestry—including support for policy, planning, and institutional strengthening at the regional and national levels, research, and support for international organizations—accounts for another 18 percent of USAID's investment in the sector during the same period. The Agency's current forestry portfolio, which supports activities in 40 countries, amounted to an estimated US$61 million in assistance during 1995.

Figure 1: USAID Funding for Forest Conservation, FY 1991–95
(millions of U.S. dollars)

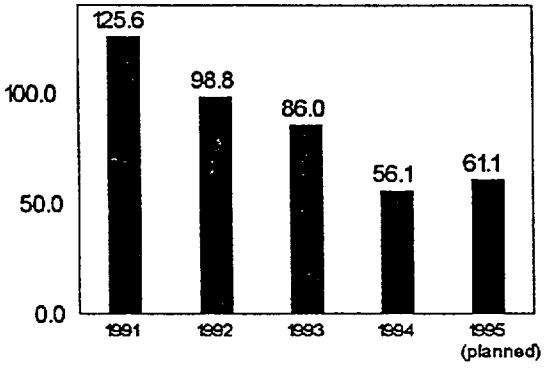
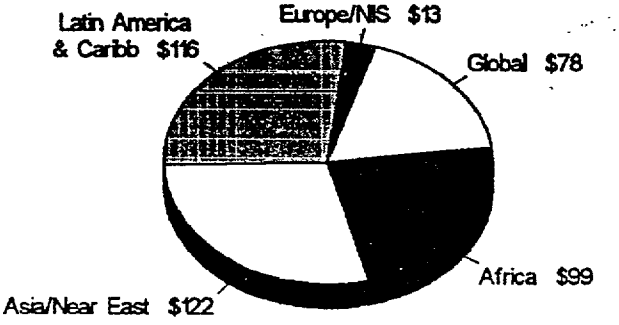


Figure 2: USAID Assistance for Forest Conservation, Cumulative by Region for FY 1995
(millions of U.S. dollars)



Total = $428 million

In addition to maintaining this substantial forestry portfolio on a bilateral basis, USAID provides a wide range of financial and technical support to other international agencies, NGOs, and scientific research centers, including the Center for International Forestry Research (CIFOR) and the International Center for Research in Agroforestry (ICRAF) under the Consultative Group on International Agricultural Research (CGIAR). Through a variety of agreements, USAID also marshals the

extensive resources of other U.S. government agencies such as the Department of Agriculture's Forest Service, the Department of Interior's Fish and Wildlife Service and National Park Service, the Environmental Protection Agency and the Peace Corps. By these means, USAID is providing critical technical and institutional support for improving the management of forest resources and biological diversity throughout the world.

The principal objectives of USAID's support for forestry are: reduce loss of forests and their biodiversity by fostering sound forestry and natural resources management practices; enhance forest-based carbon sinks through reforestation of degraded lands; promote broad-based economic growth through the introduction of sustainable harvesting of timber and non-timber resources at the local level; and encourage the more efficient use of woodfuel. Operational approaches to achieve these objectives include capacity-building in sustainable land use, resource and technology assessment and development, and empowerment of communities, NGOs, and other participatory institutions involved in forest resources management.

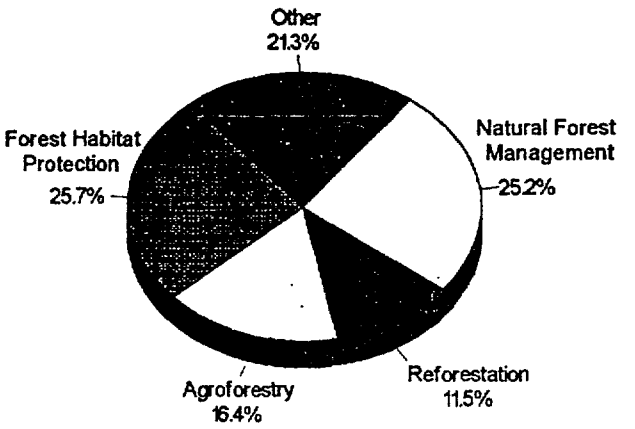
These operational approaches can be organized into the following categories:

- ***Natural Forest Management.*** The problems of rapid rural population growth and declining productivity of lands already under cultivation affect many developing countries. These conditions result in increasing rates of deforestation, loss of biodiversity, and associated carbon emissions. Increasing the economic value of standing forests may raise the incentives for local communities to protect and manage them sustainably. USAID supports research and development of more efficient harvesting to make sustainable forestry more productive financially. Adding value to forest products through better processing and commercial use of lesser-known tree and non-tree species also helps raise the economic value of standing forests and increases the incentives for long-term management. USAID also builds capacity of host country institutions to analyze policies and integrate forest management and biodiversity conservation in sustainable development planning.

- ***Forest Habitat Protection.*** Forest ecosystems play a critical role in both conservation of biological diversity and in the economic development of forest-dependent communities. USAID's forestry activities integrate sound forest management techniques with sustainable economic extraction and protection of environmentally sensitive areas. This strategy promotes improved economic returns to the forest-dependent communities and, as a consequence, reduced pressure for these communities to encroach upon protected areas. Managers of these areas can then focus on protecting core habitats of endangered and threatened flora and fauna.

- ***Reforestation.*** Woodfuel remains the principal source of energy for the majority of rural households throughout the developing world. Overharvesting of woody biomass poses a greater threat to forests and woodlands than do commercial logging operations in many countries. USAID supports the rehabilitation of degraded forests and woodlands through reforestation, and the development of fuelwood plantings as essential components of agroforestry and sustainable agriculture production systems. USAID also pays increasing attention to methods of improving biological diversity in reforested areas, and to monitoring the impact of such programs on remaining natural forests and woodlands.

Figure 3: USAID Funding for Forestry Activities, FY 1995
(by programmatic approach)



- ***Agroforestry.*** Increasing economic returns on lands already under cultivation will potentially reduce the need for communities to clear more forests. USAID supports an array of activities that assist farmers in maintaining or increasing agricultural production, often on marginal lands that serve as buffer zones to surrounding forests, and that promote the adoption of environmentally sustainable practices for both agriculture and forest management in order to reduce timber harvesting and forest loss.

Figure 3 illustrates USAID's FY 1995 funding for forest protection and sustainable management by programmatic approach. Half of this funding, $31 million, is divided equally between support for forest habitat protection and natural forest management. An additional one-fifth of this funding directly supports forestry activities of USAID's programs that address global climate change and energy efficiency.

Table 1: USAID Assistance Funding for Forestry by Region and USAID Mission, Cumulative for FY 1991–95

(funding in millions of U.S. dollars)

AFRICA (23.1%)*	
Cameroon	0.9
Cape Verde	1.1
Comoros	0.1
Congo	3.3
Gambia	0.1
Ghana	4.2
Guinea	2.4
Guinea-Bissau	0.9
Kenya	0.9
Madagascar	28.2
Malawi	2.4
Mali	5.4
Niger	4.9
Rwanda	1.7
Senegal	15.2
Uganda	12.5
Zaire	1.7
Africa Regional	12.9
TOTAL	**$US 98.8 Million**

ASIA/NEAR EAST (28.5%)	
Bangladesh	0.2
Cambodia	0.5
Indonesia	7.9
Nepal	7.5
Pakistan	5.6
Philippines	80.1
Sri Lanka	0.9
Thailand	1.4
Asia/Near East Regional	16.7
Near East Regional	0.2
South Pacific Regional	1.1
TOTAL	**$US 122 Million**

EUROPE AND N.I.S. (2.9%)	
Belarus	0.5
Cyprus	0.9
Georgia	0.1
Kazakhstan	1.2
Kyrqyzstan	0.1
Moldova	0.3
Russia	5.0
Turkmenistan	0.9
Ukraine	1.2
Uzbekistan	0.7
New Independent States	1.5
TOTAL	**$US 12.6 Million**

LATIN AMERICA AND CARIBBEAN (27.1%)	
Belize	3.2
Bolivia	4.6
Brazil	0.4
Costa Rica	3.4
Dominican Republic	1.0
Ecuador	9.9
El Salvador	2.5
Guatemala	11.2
Haiti	20.8
Honduras	8.7
Jamaica	2.4
Mexico	0.6
Nicaragua	6.3
Panama	13.6
Paraguay	0.9
Peru	2.9
Caribbean Regional	1.0
LAC Regional	14.0
Central America Regional	8.5
TOTAL	**$US 116 Million**

GLOBAL PROGRAMS (18.3%)	
Agriculture	11.4
Center for Dev. Info. and Evaluation	0.9
Center for University Cooperation in Development	0.1
Democracy and Governance	0.2
Economic and Institutional Development	3.0
Environment & Natural Resources	33.2
Food for Peace	2.2
International Business Development	0.4
Policy Planning and Coordination	0.1
PVO Cooperation	4.6
Program Management Support Office	6.3
Research	5.0
Support for International Organizations	10.2
U.S.–Israel Cooperation	0.7
Women In Development	0.1
TOTAL	**$US 78.2 Million**

GRAND Total $US 428 Million[1]

** Indicates regional percentage of total funding.*

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Preliminary Scope of Work
Global Climate Change - Forestry
October 1997 to September 1999

Evidence for global climate change continues to grow. The potential risks from climate change have even encouraged the generally conservative insurance industry to initiate programs to encourage governments to take appropriate measures to slow global warming. In response to these trends and concerns, Joint Implementation (JI) pilot programs have been started in over 10 Western countries as mechanisms to encourage private sector funding for climate change mitigation.

While forests have long been seen as important sinks for greenhouse gasses, particularly CO_2, much of the emphasis of global warming mitigation has been on the energy side. As the pilot phase of JI continues, it is clear that if forestry is to remain an important part of the global strategy to slow global warming, reliable information on the technical and economic aspects of climate change forestry must be available. Reliable information is essential to encourage increased private sector funding of forestry activities with positive climate change impacts. While the idea of private investment is critical to the success of JI, relatively little effort has been made to encourage investment in forestry using the additional (marginal) value of carbon credits as a financial incentive.

The work that would be conducted over a two-year period beginning October 1997 would measure climate change impacts and their potential economic value in leveraging private investment in forestry and improved land use. Activities during the project period would use Winrock staff who have been involved in forest carbon monitoring field work, as well as a private sector forest economist to work with investors to determine the value of carbon needed to make otherwise unattractive investments profitable enough to encourage investment.

The attached budget would support enough work to accomplish several important results related to global climate change:

1. To quantify the amount of carbon removed from the atmosphere by USAID and other donor-funded projects in 10 sites through forest carbon inventories. These inventories will use the methods developed with support from G/ENV.

2. To promote private investment in sustainable forestry by identifying potential private sector forestry projects in which carbon credits would improve financial viability and result in actual private sector funding of socially responsible forestry projects.

3. Provide technical support to project developers in the area of forest carbon monitoring and verification.

4. Continue to improve and field test new methods for monitoring and verification for the purpose of reducing transaction costs and improving the reliability and precision of measurement.

Projected status of forest carbon monitoring/global climate change field activities by December 1997

Site name	Country	Forest/landuse type				
		Plantations	Natural forest preservation	Natural forest management/reduced impact logging	Agroforestry	Farm and community forestry
Baggao, Isabela	Philippines				6	6
Jambi, Sumatra	Indonesia				6	
Lee Forest, Washington	U.S.A.			6		
Rio Bravo, Orange Walk	Belize		7	7		
Privately funded projects	TBD	5	5	5	5	5
USAID project sites	TBD	5	5	5	5	5
Cauaxi, Para	Brazil			6		
Portel, Para	Brazil			2		
La Union	Guatemala				6	

Status codes:
1 = planning stage
2 = site selection complete
3 = methods developed
4 = methods testing field work and analysis underway
5 = actual inventory underway
6 = activity completed: methods only
7 = activity completed: including inventory

Projected status of forest carbon monitoring/global climate change field activities by December 1998[1]

Site name	Country	Forest/landuse type				
		Plantations	Natural forest preservation	Natural forest management/reduced impact logging	Agroforestry	Farm and community forestry
Baggao, Isabela	Philippines				5	5
Jambi, Sumatra	Indonesia				5	
Lee Forest, Washington	U.S.A.			4		
Cauaxi, Para	Brazil			7		
Portel, Para	Brazil			7		
Privately funded projects	TBD	5	5	5	5	5
USAID project sites	TBD	5	5	5	5	5

Status codes:
1 = planning stage
2 = site selection complete
3 = methods developed
4 = methods testing field work and analysis underway
5 = actual inventory underway
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7 = activity completed: including inventory

[1] Based on financial support extending beyond December 1997

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FORESTRY ACTIVITIES AND FUNDING ALLOCATIONS FOR 1995

USAID/G/ENV

Contact: Michael D. Benge, MBenge@usaid.gov

[draft 9/12/95; A.Moad]

INTRODUCTION

G/ENV support for forest-related activities in 1995 comprises an integrated results package that collectively stresses: (1) the adoption of new technologies and innovative approaches to natural resources management; (2) the establishment of field demonstration studies on forest management practices that conserve the carbon sequestration potential of forests, such as reduced-impact harvesting; (3) research synthesis and application through the CGIAR system as a means of influencing international research agendas; and (4) regional networking among young scientists, field research sites, forest managers and indigenous peoples. The total funding provided for 1995 is $3,428,000, comprised of $2,800,000 in 1995 non-recurring Global Climate Change (GCC) funds and $628,000 in G/ENV core support for the USFS/Forestry Support Program (FRM-II Project).

Funding is allocated through 11 separate implementors, including FRM-II, DESFIL, two CGIAR Centers (CIFOR and ICRAF), the Tropical Forest Foundation and the Smithsonian Tropical Research Institute. In some instances, funding for a particular activity may be dispersed to one or more of the implementors in order to facilitate the development of partnerships. In addition, many activities are deliberately intertwined with one another to ensure complementarity among the research, demonstration, synthesis and technical assistance components of the overall G/ENV forestry program. Technical assistance to USAID Missions is furnished primarily through the FRM-II and DESFIL projects, or through directed funding of activities at the CGIAR Centers. Numerous opportunities exist for Mission buy-ins and OYB transfers to facilitate program enhancement and to help meet specific Mission needs.

Summaries of the activities funded under this allocation are provided below. The activities are grouped into five categories: (I) FRM-II Project activities; (II) DESFIL Project activities; (III) CGIAR forest-related activities; (IV) support for new technologies and innovative approaches to natural resources management; and (V) support for networking in forest resources management. Additional details on specific projects and funding opportunities can be obtained from Mike Benge, the G/ENV contact person.

I. SUPPORT TO THE FRM-II PROJECT (USFS FORESTRY SUPPORT PROGRAM, FSP)

These funds include salaries for five D.C. staff positions in FRM-II (organized primarily by region), pilot support for a USFS field unit to manage an agro/urban forestry portfolio, applications of remote sensing/GIS in forest monitoring, field research in the Amazon and Central Africa and continuation of several on-going projects. FRM-II continues to be an excellent mechanism for levering the skills of the USFS, including capabilities of the Research, State and Private Forestry, and National Forest System field units.

- Pilot Support for Agro/Urban Forestry

  Funding is provided for a pilot program at the National Agroforestry Center in Lincoln, Nebraska, to manage an international agroforestry portfolio on behalf of USAID, USFS and the Natural Resource Conservation Service (NRCS). A roster of professionals with expertise in agroforestry capable of working internationally will be developed. The program will be co-funded by the Forest Service and the NRCS, and will serve as a data base and catalyst for collaboration with experts and programs in urban and agroforestry throughout the U.S. (including Land Grant and Title XII institutions) as well as those at ICRAF and other international institutions.

- Remote Sensing and Forest Monitoring in Indonesia

  Support is provided to enable USFS experts to contribute to the capabilities of Ministry of Forestry in the area of remote sensing and GIS applications for forest health monitoring. The activity will be carried out in cooperation with CIFOR, to which separate funds are provided (see Section III below). It is intended to augment on-going program (including USAID) development in Indonesia, with the long-term view of providing a replicable model for country-level forest monitoring for potential adoption elsewhere. Additional, more limited funding is also provided to explore the options for technology transfer to Mexico and Central America.

- Natural Forest Management Experiments in the Tapajos National Forest, Brazil

  The USFS and Government of Brazil have agreed to collaborate on natural forest management research in the Amazon, with focus on the Tapajos National Forest. This support will augment on-going studies to ensure that long-term growth response patterns to alternative forms of management can be compared to those at other benchmark sites funded by G/ENV, CIFOR, and the Tropical Forest Foundation.

- CARPE Collaboration

  Funds are provided for USFS support for the activities of the Central Africa Regional Program for the Environment (CARPE), focussing on establishing carbon storage and biodiversity baselines, coordinating geographic information system strategies and technologies in the region, as well as synthesis and dissemination of reduced-impact logging technology.

- U.S. In-kind Support to CGIAR Centers

  Support is given to facilitate collaboration by USFS and other U.S. scientists with CGIAR Environmental Center activities. Emphasis is placed on support for CIFOR's Forest Ecosystem Management project, CIFOR's Criteria and Indicators of Sustainability study and ICRAF's Alternatives to Slash-and-Burn program.

- On-going FRM-II Projects Supported beyond 1995

  Funds will underwrite training in remote sensing and fire management in Indonesia, facilitate biodiversity conservation networks in Africa and collaborate with ICRAF on technology transfer and information dissemination. A buy-in by the Africa bureau will lever Forest Service expertise for design and bridging work for CARPE. In addition, cost-share funding is available for collaboration with missions to respond to short-term technical assistance needs in forestry and natural resources.

II. SUPPORT TO THE DESFIL PROJECT

[NEED TO INSERT DESFIL ACTIVITIES HERE]

III. SUPPORT for CGIAR FOREST-RELATED ACTIVITIES

This allocation will promote partnerships (particularly with NGOs and other underrepresented groups in the CGIAR system), synthesis of existing information on key issues, and training and demonstration as a means of disseminating promising forest management techniques and policies within developing countries. The intent is to direct the Centers' efforts more toward application, training and institution building, in keeping with the recommendations of the "USAID Environment Research Portfolio Review and Plan (May 1995)."

G/ENV support for CIFOR's Forest Ecosystem Management (FOREM) Initiative and ICRAF's Alternatives to Slash and Burn (ASB) Program not only provides an opportunity to help define the focus of two major international initiatives, but also holds potential for leveraging substantial outside resources. For example, G/ENV

support for FOREM and ASB greatly increases the likelihood of obtaining significant GEF funds for these initiatives. Several Missions have already demonstrated or indicated a willingness to provide buy-ins to FOREM and ASB activities within their countries.

A. Center for International Forestry Research (CIFOR)

Support is provided to assist CIFOR with the development of applied research, partnership development, and information synthesis and dissemination activities in nine separate sets of activities.

- Protected and Peripheral Area Management

  This matching grant to CIFOR's Protected and Peripheral Area Management project complements CIFOR funds dedicated to a study of local participation in forest protection in Madagascar. As an element in CIFOR's overall research program on the devolution of forest management to local peoples, it also complements USAID/Jakarta's contribution to CIFOR for similar work being conducted in East Kalimantan and planned in southern Sumatra.

- Extra-Sectoral Influences on Tropical Forests

  This allocation will assist with the development and implementation of CIFOR's planned study of extra-sectoral influences on tropical forests. Training workshops, support for field research, and the facilitation of coordination between CIFOR and other USAID partner organizations, are examples of the types of activities to which these funds will be applied.

- Network development on reduced-impact management

  Funding is provided for the development of CIFOR's applied research program on reduced-impact management of tropical forests, including support for a CIFOR International Forestry Seminar on this topic in cooperation with FAO and other partners. The long-term intent is to help CIFOR establish and support a network of partners concerned with reduced-impact management techniques and policies, develop common objectives and methods, and disseminate results to potential users.

- Synthesis study on reduced-impact management

  This funding complements the above project, providing for a CIFOR-led effort to evaluate current information on reduced-impact management of tropical forests, synthesize this information, determine priority research needs on the topic (including both biophysical and socioeconomic issues) and assess the various methods of widespread dissemination of

reduced-impact management techniques and policies.

- Network development on the devolution of forest management responsibilities and technologies

  This support will promote the development of a CIFOR-led network on the devolution of forest management to local peoples (e.g., participatory forest management), including an international seminar and/or series of smaller workshops on the subject to facilitate the process of network formation.

- Developing networking mechanisms at CIFOR

  Funds will assist with the development of mechanisms for network formation and maintenance, including communication among network members. This includes establishing an electronic communication system for general communication and database management, via the Internet/World Wide Web, among network partners, as well as helping to insure that partners have access to the communication system chosen. Additional possible activities include initiating a small grants program for technical exchange among network partners or other means of promoting communication and exchange among partners.

- Criteria and Indicators of Sustainable Forestry

  Assistance is given for the development and implementation of follow-on activities related to CIFOR's Criteria and Indicators of Sustainable Forestry study. Synthesis and dissemination of existing research results, travel and/or workshops related to planning and initiation of follow-on research, and other efforts to insure the inclusion of CIFOR research results into the current debate surrounding criteria and indicators of sustainable forestry are examples of the uses of these funds.

- Development of forest monitoring systems

  Support is provided to assist the Indonesian Ministry of Forestry, the USDA Forest Service, the NASA Pathfinder Humid Tropical Forest Project and other partners in the development and testing of an integrated (satellite imagery, aerial videography and ground plots) approach to monitoring changes in forest cover, forest health and biodiversity. The overall objective is the development or refinement of combined remote sensing/ground monitoring methods that can be used in Indonesia and elsewhere (e.g., Central America).

- Benchmark site development

  This allocation complements USAID contributions to the development of CIFOR's Indonesia and Brazil benchmark sites,

and will ensure coordination with non-CIFOR demonstration sites in these and other key countries and regions funded separately (e.g., TFF and the USFS in the Amazon, the CARPE Project in Central Africa), complementing the NSF Long-term Ecological Research Site (LTER) program in the US. These funds will further the development of CIFOR's benchmark research and demonstration sites, with emphasis on Central Africa and the Amazon basin. Funds will be used for research design workshops with partners, baseline data acquisition, and establishment of initial study plots and development of coordinated data management systems.

B. International Center for Research in Agroforestry (ICRAF)

These funds will assist the implementation of ICRAF's applied research, partnership development and information synthesis and dissemination activities. Funds will support the implementation of the Alternatives to Slash and Burn (ASB) program, with an emphasis on techniques and policies to promote assisted natural regeneration on deforested lands, training and information dissemination, and the development of partnerships with non-governmental organizations to support the ASB program. These activities are designed to complement on-going Mission-based programs in ASB countries, including Brazil, Indonesia, the Philippines and Central Africa (? may need more editing).

IV. NEW TECHNOLOGIES AND APPROACHES TO NATURAL RESOURCES MANAGEMENT

- Peoples and Forests Program (PFP)

  This activity, a new component of the USAID Biodiversity Support Program (BSP), will: (i) promote methods, including mapping and policy reform, to secure indigenous peoples' rights to forest resources; and (ii) support the development of community-based land use planning. Funding will complement existing activities in the Philippines and Indonesia, where work has already commenced in partnership with several local NGOs, by promoting similar efforts in Guyana and facilitating exchanges between Latin America and Asia on this issue.

- GIS/Remote Sensing Applications in Montane Regions

  Funding is provided to the International Centre for Integrated Mountain Development (ICIMOD) in Kathmandu for enhancing its remote sensing GIS capabilities in support of relevant USAID activities in montane environments in Asia. Current low-level support is being matched by the USAID Nepal Mission.

- Conservation of the Atlantic Coastal Forest (CI)

  Partial support is provided to Conservation International

(CI) and its Brazilian partner, the Institute for Socio-Environmental Studies in Southern Bahia (ISES), to develop practical and economically viable alternatives to forest destruction in southern Bahia, focusing on the area of the Una Biological Reserve. The project will center around an economic assessment of local land-use alternatives, including logging, non-timber forest product extraction, cabruca cocoa cultivation, minor crop agriculture, conservation set-asides and ecotourism. A GIS will be used to identify which conservation strategies might be appropriate in different parts of the study area. Conclusions will include prioritization of future conservation investments in southern Bahia.

V. SUPPORT FOR NETWORKING IN FOREST RESOURCES MANAGEMENT

- The Southeast Asian Sustainable Forest Management Network

  Funds are provided to support this existing NGO network on community-based restoration of degraded forest lands through 1995. Currently there are seven countries involved in the network (including India, Indonesia, the Philippines and Nepal), with one annual meeting of all countries. Site visits, short-term technical exchange programs, and synthesis and publication of case studies and issues syntheses interest are also activities of the network.

- The Global Change SysTem for Analysis, Research and Training (START) Network

  Regional START programs for the exchange of young scientists in the field of forestry and global climate change between developing countries and the U.S. will be supported (via a grant to the NSF) in Southeast Asia, Brazil and Central Africa. START operates in collaboration with the Global Change and Terrestrial Ecosystems (GCTE) Project of the International Geosphere-Biosphere Program (IGBP). Program participants will be selected with input from USAID Missions or Regional Bureaus to regional START committees. Selected participants will be hosted at twinned U.S. institutions for up to six weeks.

- Augmenting a Global Network of Field Sites in Natural Forest Management and Effects of Alternative Management on Forest Carbon Storage

  A network of up to 10 field sites worldwide will be supported so that results will be robust and comparable among all the sites. Initial focus will be on 5 sites in Brazil (TFF, Para), Belize (Rio Bravo N.R.), Indonesia (E. Kalimantan), Mexico (ASB) and India (in conjunction with the Southeast Asian Sustainable Forest Management Network). Secondary sites will include two more sites in Brazil (TFF, mahogany and ASB in Rondonia), a second site in Indonesia

(Jambi), Philippines (CRSP, Mindanao), and an ICRAF/ASB site in Cameroon (with CARPE). Information gathered will be vital to Mission efforts to measure results of forestry projects contributing to global climate change objectives. Four sets of activities will be supported:

- Support to the Tropical Forest Foundation (TFF) to enable replications of field demonstrations of reduced-impact harvesting at two sites in the southeastern Brazilian Amazon, one a typical upland mixed hardwood forest and one focusing primarily on the harvest of mahogany (location tbd).

- Development of a site in Central Africa will be supported through the FRM-II project with CARPE, in conjunction with field studies of CIFOR, ICRAF and the IITA (see FRM-II above).

- Support to the Center for Tropical Forest Science (CTFS) of the Smithsonian Tropical Research Institute (STRI) to ensure that tree growth response measurements at all sites are comparable and robust. Funding is supplied for (i) a workshop to plan collaboration with the U.S. Forest Service, (ii) forest research and monitoring on the regeneration, growth and reduced-impact management of mahogany forest at the Rio Bravo Nature Reserve in Belize, in cooperation with the U.S. Forest Service, and (iii) growth response monitoring in conjunction with the two TFF sites in Brazil.

- Support for the development of a plan by the BEST Program (Winrock International) for constructing baseline carbon storage estimates for all 10 forest management field sites, including carbon storage responses to reduced-impact harvesting and other major interventions as proposed. This will include a workshop (in October 1995) involving USAID, WRI, university and other participants involved with the measuring and modeling of long-term impacts of forest management on productivity and carbon storage in tropical forests.

- Peace Corps

G/ENV has a partnership with the Peace Corps through the FRM-II Project to implement a range of forestry and natural resource related activities. The Peace Corps helps develop and promote reforestation and the use natural resource conservation techniques by training volunteers and their host country counterparts, by expanding the number of volunteers in forestry and biodiversity projects, and by providing material support for forestry, environmental education and biodiversity projects.

GLOBAL ACTIVITIES OF THE ENERGY EFFICIENCY PROGRAM

I. BACKGROUND

The Energy Efficiency Project (EEP), begun in 1992, fosters environmentally sound economic growth by promoting the efficient use of energy in developing countries. A wide-ranging effort across conventional sector boundaries, EEP promotes innovation in energy technology and in policy, financing, information, and institutional responses to the energy challenges facing the power and commercial sectors. The project accomplishes this by integrating public and private problem-solving approaches and by improving private-sector involvement in energy technology worldwide.

Energy production and use contributes more than half of all greenhouse gases. For developing countries, meeting energy demand is integral to achieving goals for economic and social development. However, during the development of much needed industrial energy capacity, many countries risk degrading their natural resources because of poor planning, inadequate policy and institutional frameworks, and lack of financing options. By linking improved investment opportunities with more efficient and environmentally sound technical options, EEP helps create incentives for cleaner and more viable energy systems worldwide.

EEP proceeds through contracts and cooperative agreements between USAID's Energy, Environment, and Technology Office and Hagler Bailly Services (the primary contractor), and cooperative agreements with the International Institute for Energy Conservation (IIEC), the Lawrence Berkeley National Laboratory (LBNL), the World Energy Efficiency Association (WEEA), Oak Ridge National Laboratory (ORNL), the Alliance to Save Energy (ASE), and the Tata Energy and Resources Intitute (TERI). Coordination takes place through biweekly project meetings chaired by USAID, and through personal discussions between USAID and project implementors. Project and activities are funded either directly through the Bureau for Global Programs, Field Support and Research, or through buy-ins from the country Missions.

The Project promotes improved planning and energy efficiency through four types of activities: policy reform and institutional support; technology cooperation and innovation; demonstration and pilot projects; and information dissemination and capacity building. In the following paragraphs, demonstration projects are described in the context of the main activities they support.

II. COMPONENTS OF THE ENERGY EFFICIENCY PROGRAM

■ POLICY REFORM AND INSTITUTIONAL SUPPORT

EEP's greatest impact may be through its dynamic pooling of private and public resources to tackle energy problems faced by countries and industries worldwide. In Brazil, Mexico, India, and the Philippines, interrelated programs on Demand Side Management (DSM) and Integrated Resource Planning (IRP) help contribute to policy decisions by drawing upon experience from the U.S. as well as other developed and developing countries who are pioneering in energy sector reform. For example, to assist regulatory reform in Brazil's power sector, EEP sponsored a week-long study tour of decision-makers from Brazilian government and industry in July 1995. With decision-makers from U.S. utilities and regulatory agencies, they examined a private-power regulatory system in action. A number of other examples are described in the following sections.

☐ Energy Efficiency Financing and Market Development

Market barriers to energy efficiency are disappearing in many developing countries, due in part to the success of EEP programs. Yet developing countries still face numerous challenges in attracting capital, particularly private sector capital, to finance energy efficiency projects. In 1996, EEP completed a comprehensive report, entitled *Strategies for Financing Energy Efficiency*, that defined several strategies to obtain financing for energy efficiency projects. The report, which pulled together numerous case studies of energy efficiency financing experience in developing countries, has subsequently become the foundation for new EEP activities to promote financing of energy efficiency projects, including:

- In Brazil, EEP is currently developing a $20-30 million special-purpose investment fund for medium-sized commercial and industrial energy end-users. The objective of the fund is to overcome the obstacles to investment such as the very high level of interest rates being charged in the market, the lack of medium- and long-term credit, and a general lack of knowledge on the part of bankers on how to evaluate energy efficiency investments. International sources of capital would be directed through Brazilian financial institutions to be made available to local companies undertaking energy efficiency projects.

- A recent workshop in India introduced bankers, businessmen, and energy management professionals to the various financial mechanisms used to finance energy efficiency projects. The workshop was designed to develop the capacity within an Indian development bank to promote and finance energy efficiency projects, thereby increasing the future potential for the bank to attract multilateral financing for energy efficiency.

- EEP is also playing an active role in the development of performance contracting, which is frequently employed in the U.S. to finance energy efficiency projects. To overcome the barriers to performance contracting in developing countries, EEP is implementing a certification program for energy management professionals and

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facilitating the adoption of measurement and verification protocols in Brazil. The certification process can strengthen the credibility of energy efficiency services, helping to introduce standards for both consultants and consumers' in-house programs. In parallel with the certification activity, the North American measurement and verification protocol is being adapted to Brazilian conditions with the objective to improve consumer confidence and reduce project transaction costs.

☐ **Sustainable Cities Initiative**

The Sustainable Cities Initiative is designed to bring to bear sustainable energy services and technologies on a city-wide scale to a number of pilot cities on a demonstration basis. The initiative is a cooperative effort between USAID and the private sector, which through an industry task force is taking the lead in investing in improved energy infrastructure and new energy technologies for these cities. In its first phase, Sustainable Cities undertook programs in Monterrey, Mexico and Kaliningrad, Russia. USAID received additional funding from the U.S. Environmental Agency's (EPA) TIES program to add environmental components in these two cities and to target a third city. Ahmedabad was selected by USAID as the third city in order to gain geographic diversity and because of the potential to leverage existing USAID programs in the city.

In the first phases of the Sustainable Cities Initiative, Hagler, Bailly and the Alliance to Save Energy assembled a group of 20 energy efficiency and clean energy production companies into the Business Coalition for Sustainable Cities. This Coalition has met on several occasion and has demonstrated itself to be a cohesive group committed to pursuing sustainable development in the selected cities, Kaliningrad, Monterrey and now Ahmedabad, India. Working with the Coalition, Hagler Bailly and the Alliance began building local contacts in the cities and identifying possible investment projects. In-kind funding from Coalition members, private foundations and DOE grants to the Alliance to Save Energy have contributed an amount almost equivalent to the EEP funding.

The Sustainable Cities Initiative is aimed at stimulating private investment in energy-efficient and environmentally sound urban infrastructure. Sustainable Cities works primarily with the U.S. energy efficiency business community to increase their interest and investment in energy efficiency projects in targeted cities. The Initiative seeks to improve the climate for energy efficiency investments in selected cities by: building capacity to improve energy efficiency on the municipal level, doing targeted training to address specific needs, mobilizing local, in-country and international financial resources, and developing a local energy planning process.

The rapid growth of the industrial sector in the city of Monterrey, Mexico has significantly increased the demand for energy in the region and has resulted in a wide range of environmental problems related to industrial pollution. EEP is developing a project to demonstrate the benefits of pollution prevention and energy efficiency in Monterrey, Nuevo Leon as a means to address the energy and environmental concerns facing the city and to develop a public-private partnership that will create a sustainable program over the long-term.

This program will entail conducting joint pollution prevention and energy efficiency audits in several facilities in Monterrey in three different industrial sectors to demonstrate the benefits of an environmental strategy that focuses on the prevention of wastes and on energy savings. Under the auspices of this project, there will be various training programs intended to further the capacity of the industrial sector in Monterrey to implement pollution prevention and energy efficiency techniques as well as other outreach programs to disseminate the benefits of pollution prevention and energy efficiency.

In Kaliningrad, preliminary activities have produced economic analyses of heating efficiency and clean power project designs. As a result, the city has funded studies to identify additional projects and has established an energy commission to implement projects with funds from a new energy efficiency fund. These activities involve several U.S. companies and a private foundation which is supporting a Kaliningrad office of Sustainable Cities. The Initiative's success has leveraged well over $100,000 in private funding and attracted $220,000 from the EPA.

Ahmedabad is a city of about 3.1 million people, located in the Western Indian state of Gujarat. Due to rapid urban migration, the city's population growth rate is almost twice as high as the country as a whole. As a result, the city's infrastructure is strained on all fronts. The local privately-owned utility, the Ahmedabad Electricity Company (AEC), cannot meet its demand and must make bulk purchases from the Gujarat Electricity Board, whose supply is unreleiable and costly.

The City of Ahmedabad is administered by the Ahmedabad Municipal Corporation (AMC). The AMC, led by Commissioner K.S. Varma, is responsible for handling a number of energy and environmental problems in the city. On the energy side, the most serious problem is water distribution and supply. Water pumping and drainage accounts for a surprising 93 percent of total municipal energy consumption, in part because the city's pumps are old and inefficient and in part because the region is very dry and water has to be pumped from deep under the ground. The City is looking to implement a water pump retrofit program. The AMC has successfully implemented a number of infrastructure improvements, including road surfacing, tax collection, and privatization of some municipal functions.

■ *USAID's Objectives of Sustainable Cities in Ahmedabad*

The objectives of this Initiative in Ahmedabad are:

(1) to assist the local utility in implementing a major energy efficiency program, utilizing the financing and technical expertise of one or more energy service companies. The program, which can be designed in a way that can be replicated in other Indian cities, will help the utility reduce its peak demand;

(2) to have in-country ESCOs gain experience in designing and financing energy efficiency projects on a large scale;

(3) to develop the capacity of the municipal government to identify and implement energy efficiency projects through the creation of an energy efficiency cell;

(4) to introduce new U.S. clean energy and environmental technologies into the Indian marketplace, particularly in the area of transportation;

(5) to enhance the ability of local textile companies to reduce their impact on the environment by utilizing the experience of the U.S. textile industry in environmental management; and

(6) to build on the work of the USAID/Office of Energy, Environment and Enterprise, USAID/RHUDO, and other USAID funded programs in the city of Ahmedabad.

☐ **Demand Side Management**

Begun in Mexico and India in the fall of 1993, EEP's DSM program uses public and private partnerships to improve industrial energy efficiency and reduce energy demand.

In Mexico, the Energy Conservation Services Program and the Fideicomiso de Apoyo al Programa de Ahorro de Energía del Sector Eléctrico (FIDE), the private-sector conservation commission, prepared a forecast of potential savings that could be obtained from industrial DSM activities. The forecast showed that an active DSM program could reduce growth in expected demand for electricity by over 5,000 megawatts (about 18 percent) in the industrial sector alone by the year 2010.

In April 1993, EEP, in conjunction with four Mexican counterpart agencies, established a three-year, $1 million industrial DSM program. The program involves

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IIEC, Hagler Bailly Services, and LBNL in three activities: (1) a pilot program; (2) development of industrial efficiency standards; and (3) transfer of capabilities for DSM modelling and cost-benefit analysis.

The DSM pilot program targeted several industries for reducing motor fuel consumption through the use of high-efficiency motors, adjustable-speed drives, high-efficiency belts, and other cost-cutting measures such as compressor adjustment. The participating firms were mainly in the food, chemical, textile, and mechanical assembly industries. In the first phase of the pilot project, EEP in cooperation from FIDE, conducted focused audits of industrial motor efficiency in 20 medium-sized industries in central Mexico. Savings of up to 15% of consumption were identified. Currently 9 plants are in the process of purchasing motors and/or variable speed drives. Each plant plans to purchase 5 motors averaging 5 HP each. The average investment per plant is $30,000. A performance database is being developed for 2000 motors. As a direct outgrowth of this pilot program, the national electric utility is designing a 5-year, $80 million program, to promote energy efficiency, and demand savings are expected to be 178 MW.

In a related activity motor repair and maintenance surveys have been completed in 100 industries and surveys have been completed in 40 rewind shops in the Mexico City area. A testing laboratory has been selected, and a draft motor testing protocol has been developed.

DSM assessments provide a focus for transferring modelling capability to Mexican agencies. In the spring of 1995, EEP provided Mexican counterparts with DSManager, a software program to help with demand-side management. In July 1995, a model for DSM cost-benefit analysis, with training in its use, was transferred to the Instituto de Investigaciónes Eléctricas. With integrated resource planning (IRP), these tools help managers plan their energy options.

☐ Reduction of Consumer Demand

The Proyecto de Uso Racional de Illuminación en México (ILUMEX) demonstrates how utility investments in efficient lighting can lower energy costs for suppliers and consumers, and reduce air pollution and greenhouse gas emissions. ILUMEX is helping the Mexican national utility provide 1.8 million compact fluorescent lamps (CFLs) at low cost to residential electric customers in two cities—Guadalajara and Monterrey. High-efficiency CFLs use 75 percent less energy than standard incandescent bulbs; their use will reduce the need for new oil-fired electric plants. ILUMEX involves collaboration among EEP, IIEC, the Mexican national utility, and the World Bank. EEP funded IIEC to plan the project, conduct a pre-feasibility study, and assemble a team involving LBNL, Southern California Edison (the Los Angeles utility), and counterparts in Mexico. From $200,000 of project funds, EEP leveraged

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$23.3 million from donors and investors. Procurement of the CFLs began in March 1995, for sale through the utility's district offices, where customers pay their bills.

Benefits of ILUMEX include lower future investment costs for the utility, lower utility bills for consumers, and reduced greenhouse gas emissions. ILUMEX will result in annual fuel savings of up to 265,000 barrels of oil and annual reductions in emissions of *CO2* (27,500 tons), *SO2* (1,550 tons) and *NOx* (180 tons). More broadly, ILUMEX's unprecedented purchase of CFLs—the largest in the lighting industry's history—will establish CFL technology use in developing countries.

Also in Mexico an industrial steam generation efficiency project has been implemented to support the development and implementation of steam system efficiency standards. Thirty-five statistically representative industrial plants throughout Mexico have been selected for participation in an audit program, and a full time local consultant has been hired to oversee the implementation activities.

A DSM assessment in Morroco estimated that a savings of 209 MW could be obtained in 2003 with a benefit-cost ratio of greater than 2. A DMS pilot program in residential lighting indicates that 119 MW of peak power savings can be achieved by 2003.

☐ Standards for Energy Efficiency

EEP has helped to develop standards for energy efficiency in Mexico. Project staff evaluated cost-effectiveness and helped draft several appliance standards for CONAE (the National Energy Conservation Commission). In 1994, this resulted in standards for electric motors, refrigerators, and air-conditioners. Under the project, LBNL collaborated with CONAE and other Mexican agencies to develop an energy efficiency standard for non-residential buildings. By early 1995, EEP had provided financial and technical support for the completion and approval of building energy standards that would reduce energy loads and the costs of heating and cooling systems. For a new office building constructed following the standard, the project forecasts savings of $8 per square meter in reduced direct energy costs alone, and even greater savings from the purchase of less expensive heating and cooling systems. The standards are now being extended to include residential buildings.

In the Philippines EEP is supporting the development of energy efficiency standards for motor efficiency, and for supporting testing and labeling programs. In addition, EEP is providing assistance to the Department of Energy for the implementation of existing building energy efficiency standards.

☐ Power Sector Restructuring and Privatization

Power sectors throughout the world are either undergoing or are considering restructuring to encourage the private investment of capital. In Guatemala EEP supported the development of a draft Electricity Law. Currently the project is cooperating with the World Bank on the preparation of an overall strategy for electric sector restructuring and development of general regulations and transmission wheeling methodology for the new Electricity Law. In El Salvador EEP is monitoring the progress of a draft power sector law.

☐ Indian Private Power Initiative (IPPI)

Like the DSM activities in Mexico, this project employs private- and public-sector approaches, including IRP. IRP provides a framework for incorporating information on financing, resources, power demand, and environmental impacts into decisions on power supply. Begun in mid 1993, with a $5.3-million buy-in from USAID/Delhi, the three-year IPPI project builds partnerships between U.S. and Indian private energy developers. It also helps the government of India respond to proposals from U.S. firms and build policy that encourages expansion of India's power program. EEP conducts IPPI jointly with the Energy Training Project (ETP). In an early phase, IPPI reviewed the policies that govern introduction of private power companies into India's energy market and proposed guidelines for policy, legal, and financial support. ETP trained officials in the fundamentals of developing a private power sector.

One of IPPI's aims is to help improve the financially weak state electricity boards. Starting with the Andhra Pradesh State Electricity Board, IPPI is developing the state's capability to perform IRP using U.S. and Indian experts. In April 1995, EEP transferred the IRP Manager model software to the state board for Andhra Pradesh, and provided training in its use. Based on this analysis tool, a three-volume *Integrated Resource Plan for Andhra Pradesh* was completed in 1996. The results showed that DSM and T&D modifications could reduce peak demand by 8% (900 MW).

Capacity building in the information area was also addressed under the IPPI project. A state-of-the-art communications center was developed at the Ministry of Power. This activity included the installation of a computer network and an integrated e-mail system, connection to the Internet, and development of an Internet website. This system is being intensively used by the MOP in its daily tracking of the private power development projects, and for rapid response to the Parliament.

☐ Philippines Energy Sector Action Plan

In late 1993, EEP began to help the Philippine government address the serious energy shortages that have plagued the country's economy for years. The collaboration aims to revitalize the country's energy sector by:

- privatizing and restructuring the National Power Corporation;
- implementing DSM pre-assessments and energy information systems, and upgrading computer network systems;
- developing offshore gas reserves; and
- improving mini-hydropower engineering.

EEP has provided Philippine agencies with $100,000 in training and computer equipment, and helped the Philippine government prepare a DSM Action Plan. The plan formed the basis for a $4 million program, funded through the Global Environmental Facility (GEF) of the World Bank and the United Nations.

In August 1994, Hagler Bailly submitted to the Philippine government the final report of a six-month study outlining an action plan for restructuring and privatizing the country's electricity industry. The report laid out a three-phase approach for decentralizing the Philippine National Power Corporation to bring decision-making closer to energy customers. The plan, endorsed by the World Bank, has been taken up by the Philippine Congress.

☐ Central America/Guatemala Restructuring Process

EEP has initiated a new set of activities to support the Central American governments in the establishment of policy and regulatory reform that will increase the participation of the private sector in the electricity subsector. The Central American governments hope that private participation in the electricity sector will ensure reliable service and the rational pricing of electricity. In 1996 EEP assisted Guatemala with the preparation of a national distribution company for privatization. Currently EEP is assisting the government of Guatemala to develop implementing regulations under the recently-approved Electricity Law.

☐ Sustainable Cities: Monterrey

The rapid growth of the industrial sector in the city of Monterrey, Mexico has significantly increased the demand for energy in the region and has resulted in a wide range of environmental problems related to industrial pollution. EEP is developing a project to demonstrate the benefits of pollution prevention and energy efficiency in Monterrey, Nuevo Leon as a means to address the energy and environmental concerns

facing the city and to develop a public-private partnership that will create a sustainable program over the long-term.

This program will entail conducting joint pollution prevention and energy efficiency audits in several facilities in Monterrey in three different industrial sectors to demonstrate the benefits of an environmental strategy that focuses on the prevention of wastes and on energy savings. Under the auspices of this project, there will be various training programs intended to further the capacity of the industrial sector in Monterrey to implement pollution prevention and energy efficiency techniques as well as other outreach programs to disseminate the benefits of pollution prevention and energy efficiency.

☐ Pollution Prevention and Energy Efficiency Border Project

Together with USAID's Environmental Pollution Prevention Project (EP3), EEP developed a 6-month pollution prevention and energy efficiency for the maquilladoras (in-bond assembly plants) in the Reynosa-Matamoros region of the U.S.-Mexico Border. The objective of this project was to work with industrial facilities in the region to develop pollution prevention and energy efficiency programs within their facilities. EP3 and EEP provided training to plant staff on pollution prevention and energy efficiency opportunities and assessment methods and provided technical assistance in identifying and implementing these opportunities. This project culminated in a one-day workshop in Reynosa to disseminate the results of this activity. Panel discussions featured plant personnel that participated in the pollution prevention and energy efficiency programs of EP3/EEP and the conference co-sponsors, The Texas Natural Resources Conservation Commission and the Environmental Defense Fund. Over 150 people from local facilities and institutions attended the workshop.

■ TECHNOLOGY COOPERATION AND INNOVATION

LBNL helped to demonstrate how ultraviolet (UV) light can disinfect water using just a fraction of the energy needed by current methods (UV light purification is 40,000 times more efficient than boiling water on a cookstove). The Orissa Renewable Energy Development Agency (OREDA) and LBNL organized a May 1994 workshop in Bhubaneswar, India to field-test the unit during the monsoon season. The workshop attracted more than 50 national and state officials and non-governmental organization (NGO) representatives, and yielded UNICEF financing to test 41 purification units throughout India. Although USAID support for further testing was discontinued, locally built, easily used UV units could ultimately cost less than $200 and disinfect up to 30 liters of water per minute using the same amount of electricity as a single light bulb.

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☐ U.S.-Asia Technology Cooperation

With the U.S.–Asia Environmental Partnership (AEP) project, EEP in mid-1993 started a Clean Power Initiative to help Asian countries improve the environmental performance of their power facilities using U.S. technologies and services. In the first half of 1994, EEP helped AEP develop a multi-agency strategy for India and Thailand. In India, the strategy identified options for cleaner coal power, including design of a revolving fund for coal-working facilities. In Thailand, it resulted in an action plan for creating a US-Thailand Energy/Environmental Business and Technical Center. EEP has also produced a set of energy sector profiles for South and Southeast Asia.

To improve opportunities for private power provision at the national level, EEP is establishing a state-of-the-art Business/Communications Center for the Indian Ministry of Power's investment promotion office. The center will collect and disseminate information on private power in India and provide the business infrastructure for the government's private energy programs, using local area computer networks and access to Internet resources.

In mid-1995, USAID signed a cooperative agreement with the Tata Energy Research Institute in India, through which EEP obtains the expertise of the Electric Power Research Institute at Berkeley, a world leader in energy efficiency research.

☐ Technical Assistance to the Interamerican Development Bank (IDB)

A three-year collaboration between USAID and IDB began in early 1994 to support IDB's energy efficiency programs in Latin America and the Caribbean. Under the collaboration, EEP sponsored an energy efficiency expert from LBNL to spend three months conducting engineering and marketing analyses of program designs with IDB staff. The project has contributed expertise to joint USAID-IDB missions in Colombia, Costa Rica, El Salvador, and Jamaica to incorporate energy efficiency into power sector loans, including a $25-million loan for increasing energy efficiency in Costa Rica. USAID has complemented this technical assistance with policy activities through, for example, support for energy ministers from seven South American countries to participate in a regional roundtable discussion on natural gas, held in Argentina on March 26-28, 1995.

■ Information Dissemination and Capacity Building

EEP has improved communication on energy efficiency through publications, electronic networking, and important person-to-person linkages.

☐ Intranet Development in the Philippines

A major information system activity was initiated at the end of 1996 in the Philippines. The prinicpal goal is to support imporved decision-making capabilities for the power sector. Six Philippine energy organizations will be linked electronically with a wide area network to allow information sharing and the development of a unified information database for power sector planning purposes. An Intranet website will be developed to host common information. This data will be accessible by the PowerNet organizations, and by the Presidential TOPWEB planning committee.

As an integral part of EEP's global information exchange activities, the World Energy Efficiency Association (WEEA) maintains a database of onoing sustainable energy projects worldwide and establishes electronic linkages among experts and institutions to better solve energy efficiency problems. In an ongoing effort to match these communications channels to people's needs, WEEA organizes working groups to explore better use of databases and networking for problem-solving. WEEA is also supporting Hagler Bailly develop an electronic database containing high quality energy efficiency reports. This information system will have full text search capabilities, and will be available via the Internet.

☐ Global Energy Efficiency Initiative (GEEI)

As part of its strategy for integrating public and private information efforts, EEP provided support to the GEEI, a coalition established in 1990 for international sustainable energy development. The GEEI Working Group consists of 130 representatives from NGOs, universities, research laboratories, companies, and U.S. government agencies concerned with energy efficiency and the environment. IIEC houses the Group's secretariat.

A primary objective of the initiative is to publicize successes in energy efficiency and to increase awareness of its tremendous potential. In September 1995, the first two reports in this series, published in conjunction with IRT/The Results Center, profile successes in Asia. The first presents a full-length analysis of the exemplary Philippines Residential Air Conditioner Standards and Labeling Program; the second provides a compendium of successes in various Asian countries and economic sectors. One of the first channels for distributing these reports was the Asian regional workshop of the U.S. Country Studies Program held in September 1995 in Korea, which included a presentation based on the compendium.

In late 1994, the GEEI secretariat issued the *Sustainable Energy Guide*, a handbook designed to provide international resources for energy efficiency and renewable

energy. The guide describes more than 100 sources of information, training, technical expertise, and financing from public, private, and multilateral sources. Since its issue, copies of the guide have been distributed by USAID's Energy Training Program, WEEA, EPA, and the U.S. Country Studies Program.

☐ **The Global Energy and Environment Networking (GLEEN) Program**

An outgrowth of the 1992 U.N. Conference on Environment and Development held in Brazil, USAID's now finished GLEEN project coordinated exchange of a wide range of information on energy and its impact on the environment. GLEEN also provided training to professionals in developing countries on how to analyze their information needs and then design appropriate systems.

To improve technical capacity for energy efficiency in developing countries, EEP facilitates access to current information on energy and the environment. It has produced a catalog of on-line resources, hosted electronic conferences, and paired groups from developing countries with those in the United States. EEP also provides hardware and software support, training, and assistance in design and pricing of information services, and has refined its understanding of the information needs of NGOs, policymakers, and industrial workers through organizational analyses, which are completed or ongoing in India, Indonesia, Mexico, and the Philippines. The *Internet Energy and Environment Sampler*, published in January 1995, introduces these audiences to the range of energy-related environmental information available on the Internet.

Through seminars and training sessions coordinated by WEEA, the project has created awareness of key topics identified by network members. In 1995, a seminar in Istanbul focused attention on how to finance energy efficiency measures. Over 200 participants joined in sessions on sources of trade and investment finance, USAID's and other international programs, and the role of the private sector in Turkey's energy efficiency programs.

EEP's Best Practices Progam, coordinated by WEEA, improves channels for sharing experience on how to apply principles of energy efficiency. The program: convenes working groups of practitioners, funders, and technical and financial experts to prepare recommendations on major issues; publishes case studies on common problems; and disseminates this information widely through seminars, reports and models, and training programs. In 1995, these efforts focused on the utility sector, particularly district heating, demand side management, and energy service companies.

GLOBAL ACTIVITIES OF THE RENEWABLE ENERGY PROGRAM

I. BACKGROUND

Adequate and affordable supplies of energy are critical for economic and social development. During the past couple of centuries, all nations have relied heavily on fossil fuels to supply that energy. However, the use of those fuels can have significant negative environmental consequences. National utilities often lack the financial and technical resources to extend energy grids to remote.rural regions. In these regions, population growth and the unsustainable use of biomass fuels has led to air pollution and deforestation. The resulting land degradation can further undercut economic growth.

In the last fifteen years, important progress has been made in bringing to the marketplace technically reliable and economically competitive renewable energy technologies. As the costs of those technologies come down, there is an increasingly important role they can play in meeting the demands of economic growth and the delivery of social services. This role comprises both the supply of electricity to central grids for mass distribution and the modular application of renewable energy technologies to off-grid applications. A large percentage of rural people in USAID-assisted countries are not, and will not be for perhaps decades, connected to central grids. Renewable energy technologies are capable of at least partially filling this gap.

II. USAID'S RESPONSE TO THE NEED FOR RENEWABLE ENERGY DEVELOPMENT

USAID's Center for Environment funds global and regional programs for renewable energy development and, when approved by specific Agency field offices, country-specific activities. These USAID in-country field offices also fund core programs. Many of the programs focus on removing obstacles to the use of commercially proven technologies that use wind, solar, biomass, small hydro, and geothermal resources. These programs emphasize information and skills transfer, policy reform, private sector involvement, project identification and design, and identification of financing mechanisms.

As the primary problems of rural energy supply are political, institutional, and financial, not technical, USAID's renewable energy program emphasizes development of local institutions and human resources. The program emphasizes building knowledge and capacity by working with local organizations and individuals to implement specific projects.

February 7, 1997

Focus countries/regions for USAID's renewable energy programs include the Philippines, Indonesia, India, Central America, Brazil, the Dominican Republic, Mexico, and Southern Africa. With the exception of activities in the Dominican Republic and Southern Africa, all programs potentially support all categories of renewable energy. Southern Africa activities are limited to credit programs for rural electrification using photovoltaics (PV). The program in the Dominican Republic focuses on the rural use of PV, micro-hydro, and wind systems.

One of the ways that USAID has been able to facilitate in-country activities has been through the development of a series of Renewable Energy Project Support Offices (REPSOs). Winrock International, one of the Agency's cooperators, began developing the concept of REPSOs in 1991 to stimulate greater understanding of how sustainable energy sources can be better integrated into national and multinational development efforts. Currently there are REPSOs in five countries/regions: Brazil, Central America, India, Indonesia, and the Philippines. All the REPSOs share certain common objectives: building local capacity, improving rural services, and increasing market aggregation.

The REPSOs work primarily with commercially proven renewable energy technologies that could have major impacts in the rural areas of developing countries. Through the development of specific commercially viable projects, Winrock will be better able to identify and remove development barriers. Using local capabilities developed in Central America, Indonesia, India, the Philippines, and Brazil, Winrock will use competitive procurements to help select private projects with which it will share pre-feasibility costs.

A majority of USAID's renewable energy programs are carried out through agreements with Winrock International, the U.S. Export Council for Renewable Energy (US/ECRE), the Environmental Enterprises Assistance Fund (EEAF), and several subcontractors of those organizations. Winrock is the sole cooperator of the Biomass Energy Systems and Technology (BEST) program. BEST was initiated in FY89 and will terminate at the end of this fiscal year. The Renewable Energy Applications and Training (REAT) program is comprised of three cooperative agreements which are managed by US/ECRE, Winrock, and EEAF. REAT has been in place since FY84 and will terminate at the end of the current fiscal year.

Following are descriptions of the REAT and BEST programs and the global activities implemented by each of its USAID cooperators:

III. USAID'S GLOBAL PROGRAMS

■ RENEWABLE ENERGY APPLICATIONS AND TRAINING (REAT)

The purpose of REAT is to continue and expand efforts aimed at developing renewable energy projects in USAID-assisted countries, and enhance education and training activities in these technologies. The REAT agreement will continue to yield substantial benefits. For recipient countries it will:

- increase awareness of the benefits of renewable technologies in providing host-country energy services for rural, agricultural, commercial, industrial or residential applications;
- increase economic and social development;
- expand employment and business opportunities; and
- provide environmentally clean energy solutions that utilize local resources and offset dependence on fossil imports and their deleterious environmental and balance-of-trade consequences.

For the U.S., the project will contribute to:

- enhanced international trade;
- increased employment;
- stronger ties with partner countries; and
- improved linkages between the public, private, and non-governmental sectors.

Most of the work done under the REAT agreement is global or regional in scope, with the bulk of effort focused on Latin America and the Caribbean (LAC) and Asia. In particular, emphasis is placed on encouraging market development and project-specific activities to provide sustainable energy supplies while expanding opportunities for U.S, firms. This has proven to be an extremely productive and beneficial relationship for all developing country and U.S. participants, in the public and private sectors alike.

REAT's global/regional tasks are identified and summarized below according to their associated cooperative agreements and summarized below. Those REAT activities that are area-specific are discussed in the appropriate summary paper on energy activities in that country.

☐ **US/ECRE**

- ***Market Development and Information Dissemination***

A combination of publications and media productions are used to address the role of renewable energy in development and to disseminate information about that subject. Workshops, conferences, trade missions, and reverse trade missions establish dialogue among developing world partners (government, industry, and NGOs) and between U.S. industry and the public and private sector counterparts in USAID-assisted countries.

The objectives of this activity are to:

(1) enhance education and awareness of renewable energy technologies;
(2) enhance linkages between U.S. and local companies by identifying joint project opportunities; and
(3) mobilize innovative financing options for renewable energy technologies.

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Market development and information dissemination activities include:

- market conditioning activities (strengthening U.S.-Asian public and private sector ties in the renewable energy field) leading up to a large renewables conference in Jakarta later this year;
- conducting trade missions of U.S. renewables firms to several countries in Asia, the LAC region, and Southern Africa;
- establishing in-country renewable energy representatives in several countries in LAC;
- conducting a Renewable Energy Project Financing Conference in Denver, CO in 1996;
- assisting four U.S. renewable energy firms in developing business plans for possible projects; and
- preparing a series of technology briefings to be used to provide up-to-date information on renewables and the role they can play in the international marketplace for grid-connected and off-grid applications.

- ***Strategic Assessments***

Strategic assessment activities support efforts to facilitate the introduction and effective adoption of renewable energy technologies in developing countries. These cross-cutting activities will set the stage for longer-term project investments and are critical to seed these decisions. These efforts will focus on the LAC and Asia regions as well as cross-cutting activities, to include global climate change efforts. The purpose of the activity is threefold:

- to expand the renewable energy and energy efficiency project portfolio at the multilateral development banks -- Under this activity, US/ECRE will provide technical support to the multilateral development banks to increase the number of renewable energy projects in their lending portfolios;

- to provide policy support on regulatory reform to open the door for renewables -- US/ECRE will also address policy barriers to the development of renewable energy private power projects in LAC and Asia. This includes: (a) identifying policy and institutional barriers to renewables; (b) providing technical and legal assistance in reforming policy, regulatory, and institutional issues to better accommodate renewables and efficiency; (c) developing a U.S. industry position paper on policy and regulatory considerations for advancing renewables in developing nations; and (d) advising on modifications required to existing resource laws to accelerate large-scale renewable energy deployment; and

- to support Global Climate Change efforts through pilot renewable energy programs -- US/ECRE conducts support for USAID's Global Climate Change Initiative (GCCI) by identifying/developing renewable energy

projects that can demonstrate how more sustainable energy management can be promoted while addressing the risks of global climate change.

- **Winrock International**

- **Non Governmental Organization Renewable Energy Initiative (NGO/REI)**

The mission of the NGO/REI is to increase the availability of affordable energy in USAID-assisted countries and to improve economic development and natural resource management by using clean renewable energy technologies. Specifically, the purpose of the NGO/RE activities is to reduce technical, financial, economic, and institutional risks associated with renewable energy systems in order to encourage public and private sector interests to invest in commercially-proven renewable energy systems.

To accomplish the initiative's objectives, Winrock has assembled a unique network of non-governmental organizations which work in conjunction with the REPSOs. Winrock's partners in the NGO/REI are: (1) the Center for Renewable Energy and Sustainable Technology (CREST), (2) the International Fund for Renewable Energy and Energy Efficiency (IFREE), (3) the Renewable Energy and Energy Efficiency Training Institute (REETI), and (4) Volunteers in Technical Assistance (VITA). All activities fall into one of three categories: REPSO activities (refer to appropriate country profile for details), partner activities, and global activities.

Following is a brief description of both NGO/REI partner and global activities:

- **Partner Activities Under NGO/REI**

  - ***International Fund for Renewable Energy and Energy Efficiency***

One of the major barriers encountered by energy entrepreneurs is the high cost of preparing project proposals for consideration by potential investors, government programs, and partners. IFREE's Pre-Investment Funding Program helps defray the high-risk, front-end cost of preparing such proposals. IFREE fosters environmentally sound energy projects in Brazil and Central America by offering conditional loans of up to $50,000 to support up to one-half of the pre-investment costs of proposed projects. For a project to be eligible for funding, it must utilize a renewable technology, be a commercial enterprise, and be attractive to next stage funders and investors.

  - ***Renewable Energy and Energy Efficiency Training Institute***

REETI's purpose is to promote renewable energy and energy efficiency by developing support for and organizing training events. Training events are primarily conducted by experts from the U.S. renewable energy and energy efficiency industries for interested energy stakeholders in USAID-assisted countries. Training events can be in-country or in the U.S. and can last from one day to several weeks.

Under this activity REETI has a number of tasks such as conducting training needs assessments, developing course materials, creating alumni networks, expanding the trainer database, and developing a distance-based interactive training program.

- ***Center for Renewable Energy and Sustainable Technology***

CREST has three tasks under its current agreement with Winrock. The first is the production of a prototype interactive mulitmedia kiosk on renewable energy applications. The objective is to highlight successful renewable energy case studies through the use of interactive multimedia computer software that integrates text, photos, video, animations, and interactive exercises. The goal is to get the bilingual CD-ROM into the hands of USAID officials, key decision makers, and educators in order to increase the awareness and acceptance of renewable energy technologies for delivering energy services. The second task is to convert the multimedia CD-ROM into the HTML format so it can be posted on the World Wide Web. This process will provide access to the nearly 100,000 visitors a month who reach CREST's home page. Under its third task, CREST will conduct outreach activities by demonstrating its CD-ROM and web site at a couple of key renewable energy conferences.

- ***Volunteers in Technical Assistance***

VITA was created to provide technical information and assistance to individuals and NGOs in developing countries. VITA recognizes that millions of people in developing countries do not receive even basic agriculture, health, education, environment and other information they need to improve their lives. Two of the major reasons for this growing dilemma are the lack of communications infrastructure, and the lack of skills in gathering, managing, and disseminating information.

Under the NGO/REI agreement, VITA is working to explore the nexus between sustainable agriculture and renewable energy by connecting via the Internet key players in a few selected USAID-supported countries (still to be determined) to discuss topic. VITA is working with CREST and REETI to develop a complete program that integrates Internet tools with REETI's distance learning program.

- **Global Programs under NGO/REI**

- ***Multilateral Development Bank (MDB) Policy Initiative***

This activity is a continuation of work begun by Winrock in 1994 to provide technical, financial, institutional, and project preparatory advisory services to MDBs to promote enhanced inclusion of renewable energy services in MDB-financed projects. The initiative is designed to enhance private sector opportunities in biomass and other renewable energy technologies. This activity is also supported by BEST which supports biomass renewable energy ventures.

Currently, Winrock is continuing to address MDB policy barriers including:

- procurement policies,
- guidelines for specification and bid evaluation,
- MDB internal incentive structures favoring conventional approaches to energy supply, and
- hindrances to full information availability in support of the increased use of biomass and other renewable energy technologies.

□ ***Utility Initiative***

This activity links U.S. utilities with host country counterparts to provide an exchange of technical information, training and project preparation assistance leading to enhanced inclusion of clean renewable energy resources for electricity generation. This activity is also supported by the BEST agreement.

Beginning in 1990, Winrock facilitated a collaborative utility exchange on distributed renewable energy applications between a California utility and two Brazilian utilities. Since that time, numerous interactions have been made and communications maintained between Winrock and utilities and Central and South America and Asia. In 1994, the program was expanded with the creation of staff position continue this link; an Advisory Board was also created and prospective members were identified and interviewed.

Current tasks include the creation of an "International Renewable Energy and Energy Efficiency Finance Network," expansion of the Advisory Board roster, and continued REPSO country activities linking host country utilities with U.S. utilities.

□ **Environmental Enterprises Assistance Fund (EEAF)**

Started in 1990 by Winrock International, EEAF was set up to address a major market barrier in the establishment and delivery of renewable energy technical assistance - the inability of qualified private sector renewable energy entrepreneurs to obtain start-up or expansion capital for technically proven renewable energy opportunities in developing countries. EEAF provides loans, equity capital, training, and technical assistance to environmental entrepreneurs in developing countries in an effort to stimulate local, sustainable development efforts emphasizing private sector approaches and mechanisms.

EEAF seeks to channel capital where it is not otherwise available - but in a way that replicates private sector capital sources. In this way, EEAF aims to show local capital markets that renewable energy financing is both safe and profitable and is done on similar terms to other sectors that these institutions are already financing.

EEAF operates in six sectors: renewable energy, energy efficiency, ecotourism, reforestation, recycling, and sustainable agriculture. Financing for a typical project falls into the range of $100,000 - $300,000. EEAF's target areas are Eastern and Central

Europe as well as Central America, Indonesia, and the Philippines. EEAF has established local offices in Costa Rica and Indonesia and the Philippines; the first two reached self-sustainability in 1996. Since 1991 EEAF has financed 21 projects with four additional projects approved and under negotiation. Approximately 30% of approved projects deal with renewable energy.

USAID has supported EEAF since its inception. However this support has only covered EEAF's operating costs not its investment capital. This is raised from foundations and socially-driven investment funds. EEAF anticipates that it will reach financial self-sufficiency in the next year or two, at which point it will no longer require USAID assistance.

■ BIOMASS ENERGY SYSTEMS AND TECHNOLOGY (BEST)

BEST has been implemented by Winrock International since its inception. The goal of the BEST Project is to increase sustainable energy production in USAID-assisted countries and improve natural resource management using biomass wastes for power and liquid fuel production.

Development and implementation of specific projects will be done in partnership with private institutions in target countries. Using local capabilities developed in Central America, Indonesia, India, the Philippines, and Brazil, Winrock will identify promising projects through competitive procurements and will share development costs with private developers. Winrock will seek to add value through the provision of technical advice and, more importantly, by working to create a supportive policy and financial environment for biomass energy.

■ *Cane Energy Development*

Under this task, Winrock will demonstrate and commercialize energy efficient and economically successful systems to produce electric power from sugar cane residue (bagasse) and cane trash at sugar mills in USAID-assisted countries. BEST has been working for several years in developing opportunities for electricity generation from bagasse. Winrock has focused its development effort in four key areas:

- assessing the commercial potential for using sugarcane field wastes to supplement bagasse as a boiler fuel in sugar factories;
- channeling private sector resources by cost-sharing pre-investment studies for cane energy projects;
- bringing together experts and potential users at the 1991 International Conference on Energy from Sugarcane to share information and identify means to overcome key technical and economic obstacles to cane energy development; and
- establishing, in 1993, an International Cane Energy Network to coordinate the research and development and information dissemination efforts of member institutions from several developing countries.

Current BEST activities under this task include the facilitation of the operation of the International Cane Energy Network. BEST also supports development of sugarmill cogeneration projects by providing technical assistance of recognized experts in the field. In addition, BEST is producing an assessment of the "state-of-the-art" biomass cogeneration technologies and is determinimg the feasibility of applying high efficiency gasification and advanced gas turbine systems to produce power from bagasse in rural India.

- ***Carbon Sequestration***

Winrock supports the U.S. Initiative on Joint Implementation (USIJI) on monitoring carbon sequestration in forestry and agroforestry. This includes development of detailed plans for the monitoring of carbon in forestry and agroforestry projects funded by or conducting in collaboration with USAID missions in key global climate change countries. Since 1993, Winrock has responded to the increasing need to monitor the carbon impacts of land-use projects.

The objective of this task is to use a system of cost-effective methods and procedures to monitor and verify carbon in plantations, implement natural forest management and agroforestry projects employing commonly accepted forest inventory, and use soil science ecological survey principles and practices to monitor carbon impacts. Current activities under this task are of two types: (1) support to USIJI on monitoring carbon sequestration, and (2) development of detailed plans for the monitoring of carbon in forestry and agroforestry projects funded by or in collaboration with USAID missions in priority Global Climate Change countries.

GLOBAL ACTIVITIES OF THE CLEAN ENERGY PRODUCTION AND USE PROGRAM

I. BACKGROUND

Global Warming or Global Climate Change (GCC) is a problem of particular concern to the U.S. because of both domestic and international concerns that fossil fuel-based energy production and use is a major cause leading to GCC. Many of these concerns were discussed in the Rio Earth Summit held in June 1992 by numerous international bodies. In December 1992, the U.S. Senate ratified the Framework Convention on Climate Change (FCCC) which establishes new institutional mechanisms for international cooperation and binds the issues of environmental protection and economic development. USAID's Global Climate Change Strategy is designed to support the provisions of the FCCC by contributing to global efforts to stabilize greenhouse gas concentrations and to assist countries to adapt to the adverse effects of climate change while maintaining economic growth in developing countries.

In energy and industrial areas, emissions of carbon dioxide, carbon monoxide, and methane are the primary focus areas of USAID's attention. The major principle underlying the U.S. response to the global climate change issue is an approach whereby energy efficiency, clean energy production and use, afforestation, and a less carbon intensive path towards economic development accelerates growth while reducing local, regional, and global environmental risks.

The availability of energy in all segments in a society is a dire need to foster growth and development. This is especially true in the developing countries where the vast majority of 2.5 billion rural people have no energy services. On the contrary, the average American uses 33 times more energy than the average Indian and 295 times more than the average Tanzanian. The rapid expansion of energy, mostly based on fossil fuels, will be essential for the economic growth of developing countries. USAID's strategy, focused on energy efficiency, cleaner energy production and use, and substitution of high carbon fuels (e.g. coal) with lower carbon fuels (e.g. gas), will achieve a reduction of greenhouse gas emissions. For example, combustion of natural gas instead of coal significantly reduces the amount of carbon dioxide produced per unit of electricity generated. Similarly, certain renewable energy technologies, if adopted on a wide scale, especially in isolated areas, can reduce the overall carbon dioxide.

The Clean Energy Production and Use program of the Office of Energy and Technology, Center for the Environment, fosters economic development in developing countries through the use of cleaner energy technologies for fossil fuel-based energy production and use thereby reducing greenhouse gases per unit of energy production, achieving significant global climate change (GCC) benefits, and instituting energy sector reform and energy efficiency. The program

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accomplishes this objective through the introduction of cleaner energy technologies for wide-scale use in developing countries in a number of ways including the bottom-up approach (designing and implementing effective cleaner energy technology projects) and the top-down approach (providing institutional and policy reform support and training to the decision makers to create greater awareness and a more conducive market environment for the implementation of environmentally sound environmental technologies.

Many of the developing country economies are undergoing rapid growth and during the next twenty years the energy demand in the developing countries to foster the anticipated economic growth is not only expected to surpass the energy demand of the industrialized world but reach approximately three times the project energy demand for the industrialized nations, collectively. Fossil fuel-based energy production will continue to play the most major role in meeting this anticipated energy demand. In many developing countries, fossil fuel-based energy production and use is a major contributor to greenhouse gases. For example, the carbon dioxide production from the use of different fossil fuels to generate energy ranges from 2.7 tons of CO_2 per ton of coal to 3.6 tons of CO_2 per ton of oil, as reported in -- Power in Asia, September 18, 1995.

The social and economic development goals of these developing countries cannot be met without an assurance of the continued supply of energy. At the same time, environmental and health concerns make it necessary that the production and use of the needed fossil fuel-based energy be accomplished in an environmentally sound manner with due regard to GCC effects and health effects. Thus, the Clean Energy Production and Use program of the Center for Environment, has organized its program to specifically assist the developing countries to meet their energy requirements but with the adaptation and wide-scale use of cleaner energy technologies.

USAID has been involved in supporting the economic development process in developing countries worldwide for several decades. It has accomplished this objective through the design and implementation of government-to-government programs aimed at policy reform, institutional building, technology transfer, brokering with the private sector, and leveraging other donor funds. In addition, the Clean Energy Production and Use program has direct working relationships with investment banks, commercial banks, leasing institutions, and the capital markets both in the U.S. and the developing countries which can be brought into the various initiatives at strategic points in their development.

The Center for Environment has extensive knowledge of the institutional structures, policy development process, energy sector supply and demand issues, environmental programs, and economic and sectoral reform processes in all of the key GCC countries.

The Center continues to foster the approach to developing long-term solutions to economic development which are not driven by technology and regulation alone, but offer an integrated solution whereby technology development, public policy, and economic and social reform are accomplished hand in hand. Within the context of the Center's activities, the Clean Energy Production and Use program implements its initiatives through the extensive network in-place in the developing countries. It works with USAID Missions, key public sector decision makers, and the private sector. The program also has extensive access to cleaner energy technologies developed by U.S. industry. These linkages are utilized to broker joint public-private initiatives

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in the developing countries to encourage the achievement of GCC benefits through the demonstration and adaptation of cleaner energy technologies.

The success of the Center's activities arises from the fact that USAID has an on-the-ground support network both within the USAID Missions and the developing country government institutions which are often utilized by other Federal agencies. USAID has developed this support system through long-term relationships and through the implementation of mutually beneficial programs to support the economic development objectives of developing countries worldwide. Through the Agency's access to senior decision makers in the developing countries, USAID has a keen awareness of the macro and micro economic issues, policy framework, country priorities, and social and developmental issues, all of which provide a framework within which the Center for Environment and the Clean Energy Production and Use program design their initiatives to assist these countries in their development process. Specifically, the Center and the Clean Energy Production and Use program have an in-depth understanding of the environmental consequences of economic development as related to the production and use of energy.

The Clean Energy Production and Use program promotes the adaptation of cleaner energy technologies in a number of ways: Policy reform and institutional support to increase the awareness of the significant GCC benefits of cleaner energy technologies; technology transfer through the demonstration of specific technologies; human capacity enhancement and decision maker training; and leveraging of resources and financial support.

II. THE CLEAN ENERGY PRODUCTION AND USE PROGRAM

The Clean Energy Production and Use program conducts a number of activities which include the following:

- **Use of cleaner energy technologies to reduce greenhouse gas emissions**

  The program develops and implements projects which reduce greenhouse gases per unit of energy production such as the replacement of oil-based power generation by gas-based power, conversion of gasoline-and diesel-powered vehicles by electric vehicles, fuel quality improvements, end-use efficiency and availability improvements, efficient power generation, e. g. cogeneration systems, energy facility construction upgrades, etc. The substitution of high carbon fuels by low carbon fuels in the energy generation cycle reduces carbon dioxide and benefits global climate change.

- **Use of new and innovative environmentally sound systems and equipment to reduce pollutants and greenhouse gas emissions**

  This component of the Clean Energy Production and Use Program promotes the use of cleaner combustion systems, cleaner energy cycle systems, fuel cleaning systems, etc. Through the wide-scale use of cleaner equipment and systems, the level of pollutants produced per unit of energy is reduced thereby reducing greenhouse gas effects.

- **Influencing environmental policy to achieve the adaptation of cleaner energy technologies in both a top-down and a bottom-up approach**

  Through the simultaneous implementation of well designed programs at the projects level and dialogue and technical assistance at the decision-maker level, the Program works to alleviate numerous barriers to wide-scale use of cleaner energy technologies. The Program focuses on the most common barriers which include: legislation, regulatory policy, tariff rationalization, human capacity limitations, lack of public awareness and support, technology access, cost rationalization/hidden subsidies, etc. This integrated approach accomplishes the difficult task of focusing on the global climate change issues in the context of energy production and economic development. The removal of the barriers to wide-scale use of cleaner energy technologies, the Program assists the developing countries in adapting an energy expansion strategy which is consistent with the USAID's strategy for global climate change. It also puts a process in place for future energy activities with full regard to the harmful effects of greenhouse gases.

  Through the use of both top-down and bottom-up approach, the Program ensures that the reform of market and restructuring of economic sectors is a more effective way to achieve the adoption of environmentally sound technologies than the traditional approach of isolated demonstration projects.

- **Cleaner energy technology cooperation**

  One of the ongoing activities of USAID is to promote the cooperation between the U.S. and developing country organizations on environmentally sound technologies. The technology cooperation is built upon sound economic conditions, national capacity, assessment of the country's technology status, existence of a sound decision making process, and an environment conducive to private sector participation. Through strategic technology cooperation, the Clean Energy Production and Use Program ensures that technology cooperation is both economically productive and environmentally sound.

- **Environmentally sound technology transfer**

  The Program uses its extensive public and private network both in the U.S. and in the developing countries to broker joint initiatives and enhance private sector participation in wide-scale use of cleaner energy technologies. through the use of cleaner energy technologies and through policy dialogue at the decision-making level, the Program promotes development approached which minimize greenhouse gas effects and result in global climate change benefits.

- **Using training to develop human capacity and effective decision making in the area of energy development with environmentally sound technologies**

  Given the Program's knowledge and experience of the key institutional development issues in the developing countries and the in-place contacts and linkages, the Program develops initiatives aimed at enhancing human capacity and effective decision making to

promote the environmental and health benefits of cleaner energy technologies in terms of a reduction in greenhouse gases. the Program ensures that the training involves senior decision makers who are often responsible for making development choices for specific sectors and programs. In this manner, the Program is able to initiate an approach to policy decision making among senior government officials which maximizes the potential for the implementation of long-term energy production and use strategies consistent with international global climate change initiatives.

- **Mobilizing public and private sector resources to foster cleaner energy production and GCC benefits**

  The Program has successfully mobilized public and private sector resources to implement cleaner energy projects. For example, for the Manzanillo Power Plant project in Mexico, the Program was able to solicit assistance from the Salt River Project for emissions testing and on-site assistance. In another project, aimed at fostering cleaner transport systems, the Program received active participation and matching resources from the Ministry of Science, Technology, and Energy in Thailand. Through the mobilization of public and private resources, the Program creates an environment more conducive to the implementation of cleaner technologies and an enhances GCC and health benefits.

- **Leveraging funds from other bilateral and multilateral donors and private investors**

  In some cases, the Program was able to provide assistance to developing countries which served as a basis for major multilateral development lending for long-term cleaner energy projects. For example the Program initiated an assessment of the greenhouse gas effects of landfill gas and methane flaring in Brazil. As part of this initiative, the Program estimated that as much as 60-130 MW of electricity could be generated by using landfill gas-based methane, thereby resulting in a potential reduction of greenhouse gas emissions and carbon dioxide production. This initiative was launched in concert with a number of environmental activities underway by the World Bank in the country. In another initiative,,the Program focused on the development of measures to reduce natural gas flaring in oil producing fields in Western Siberia, the Program recommended ways to utilize up to 8 billion cubic meters of natural gas which was being flared annually, resulting in both a significant reduction in greenhouse gases and the utilization of an otherwise wasted energy resource. This activity led by the Clean Energy Production and Use Program was coordinated with the World Bank and served as the basis for more than $400 million in World Bank loans. In addition, the cleaner transport technology initiatives and private power activities of the Program have provided the World Bank the momentum to consider major funding initiatives in these areas.

III. ACCOMPLISHMENTS

Manzanillo Emisssions Control in Mexico

Project Objectives

The objective of this project was to utilize technologies to eliminate plume visibility at the Manzanillo Power Station in Mexico thereby achieving not only energy efficiency but also GCC benefits. The project included the retrofitting of one 300 MW unit at the power station with advanced combustion hardware (REACH). Salt River Project donated the resources necessary to conduct emissions testing and provided on-site assistance for the retrofit process.

Results

The retrofit through the use of advanced combustion hardware (I) increased burner efficiency, (ii) reduced fuel requirements, and (iii) resulted in a net reduction in plant emissions. It is estimated that as much as 9,400 tons of CO_2 emissions per year per 300 MW, a key contributor to Global Climate Change, may be reduced as a result of the retrofit project. The project offers an enormous potential for sizeable gains in energy efficiency in Mexico's power sector as well for the reduction of CO_2. The current oil-fired capacity in Mexico is approximately 10,000 MW. If the REACH program were to be used in all of the oil-fired plants in Mexico, the net reduction in CO_2 will be approximately 315,000 tons per year. In addition, the fuel savings as a result of improved energy efficiency will be approximately $10 million per year.

Overall Benefits

The Manzanillo retrofit project not only met but exceeded the results requirements of the Clean Energy Production and Use Program:

- The program resulted in substantial gains in energy efficiency and CO_2 reduction thus providing GCC benefits and it offers the potential for even greater benefits through wide-scale use in the future as indicated above.

- The program involved both public and private partnerships and the leveraging of funds. The partners in the project included The Center for Environment, Comision Federal de Electricidad, Instituto de Investigaciones Electricas, The Salt River Project, Electric Power Research Institute (EPRI), and Electric Power Technologies. USAID was able to leverage $1.20 for every dollar it contributed to the program.

- With the implementation of the retrofit project at one of the oil-fired power plants in Mexico, an enormous new market has been opened for U.S.

firms to retrofit all other oil-fired power plants. Thus, the project offers significant export potential to U.S. exporters.

- USAID's assistance in this project resulted in several additional projects which also offer significant prospects for GCC benefits, energy efficiency gains, opportunities for public-private partnerships, potential for USAID fund leveraging, and U.S. export potential. One of the projects involves cross-border power wheeling between Mexico and the U.S. This project offers the potential for the reduction of greenhouse gas emissions, with the trading of electricity as generators are retrofitted with more efficient energy production technologies. A second project from this USAID initiative is a pilot program at the Manzanillo plant to install innovative pollution control equipment to reduce acid rain emissions. The CFE, EET, and a number of U.S. and Mexican firms are pursuing this project.

- This project demonstrates the success of the USAID approach in transferring an innovative but commercial technology from the U.S. to Mexico which results in benefits to both countries and paves the way for a wide-scale implementation of the technology. The project offers an example of a top-down approach whereby USAID succeeded in involving the National Utility and major policy makers in Mexico to implement a program which will offer prospects for private sector development and technology transfer.

CLEANER TRANSPORT

☐ Project Objectives

The objective of this program was to introduce electric vehicles in Thailand and India in order to both achieve transport fuel use efficiency as well as reduction in pollution and greenhouse gas emissions leading to GCC and health benefits. The project included emissions testing of vehicles and assessed the economic efficiency of conversion of fossil fuel fired powered transport vehicles to electric vehicles.

☐ Results

The demonstration project in the City of Bangkok offers the potential of CO_2 reduction in the amount of 600,000 tons per year during the period 1995 - 2000 if most of the currently fossil fuel-fired transport vehicles are converted to electric vehicles. In addition, sizeable reductions in other emissions such as CO, HC, NO_2, and SO_2 will also accrue as a result of the project. The project was extended to include seven demonstrations in India, including autorickshaws (three wheelers) and scooters (two wheelers). The two-stroke vehicles in India are responsible for the emission of approximately 15 million tons of carbon dioxide per year. Thus India offers the potential

for significant reduction in CO_2 through the conversion of its fossil fuel power vehicles to electric vehicles.

☐ **Overall Benefits**

Both the Thailand and India electric vehicle projects offer significant potential for transport fuel efficiency improvements and environmental and health benefits.

- The Thailand project involved the cooperation of the Ministry of Science, Technology, and Energy, which extensively participated in the project. In addition, EPRI, Keenan Institute, and several U.S. and Thai firms participated in the project with the intent to introduce electric vehicles in the country on a wide-scale. In addition, USAID was able to leverage 50-50 cost sharing from the Thai government and private sector.

- With the demonstration of the electric vehicle program in Thailand, this project has opened an enormous new market for U.S. firms to provide technology and services in joint collaboration with Indian and Thai firms. Thus, the project offers significant export potential to U.S. exporters.

- This project demonstrates the success of the USAID approach in transferring an innovative but commercial technology from the U.S. to key countries in Asia, with the prospect for expansion in other countries in the region. The project offers an example of a top-down approach whereby USAID succeeded in involving the Ministry of Science, Technology and Energy in Thailand, and a major vehicle manufacturer in India to implement a program which offers prospects for private sector development and technology transfer.

CHARACTERIZATION OF BRAZILIAN LANDFILLS AND OPPORTUNITIES FOR THE REDUCTION OF GREENHOUSE GASES

☐ **Project Objectives**

The Clean Energy Production and Use Program initiated a project to visit key landfill sites throughout Brazil which offer the greatest promise for accruing environmental health benefits through the reduction of greenhouse gas emissions resulting from the current practice of gas flaring at the sites. The key objectives of this initiatives were to (I) identify and characterize candidate landfill sites that are representative of major population centers and high secondary growth areas in Brazil, (ii) assess the potential for reducing greenhouse gas emissions and accruing GCC benefits, (iii) identify commercial potential, potential markets, and economic benefits of LFG recovery and utilization, (iv) develop options for private participation in this sector, and (v) identify policy and institutional barriers and make recommendations for policy and institutional changes that will facilitate LFG recovery and commercial utilization, thereby reducing greenhouse gas emissions.

☐ Project Results

Effective management of the nation's municipal solid waste landfills offers Brazil significant opportunities for environmental, health, and economic benefits. Methane is 20-30 times more potent than CO_2 and thus has more adverse health effects. Furthermore, unrestrained flaring of LFG, as is prevalent in Brazil, increases the overall quantity of CO_2 in the atmosphere. Therefore, the extraction and utilization of methane from LFG will reduce the methane-related environmental effects as well as reduce the CO_2. Furthermore, the deployment of effective technologies and management procedures for waste disposal will result in a number of additional environmental and health benefits. These include a reduction in adverse health effects resulting from waste decomposition such as the emissions of harmful gases and the leakage of leachate into groundwater reservoirs. In addition, extraction and utilization of landfill gas will directly contribute to a reduction in CO_2 levels and thus a reduction in greenhouse gases. Hence, there is a net positive impact to Global Climate Change. It should be noted that the health benefits are especially significant to the large populations located in close proximity to many of the landfill sites in the country.

The landfills offer the potential for the generation of 60-130 MW of electricity by utilizing the landfill gas-based methane. Recognizing that 1 MW of power generation requires 1.4 million tons of oil and that 1 ton of oil used for direct combustion to generate power produces 3.6 tons of CO_2, there is potential for a reduction of 300,000-600,000 of CO_2 per year.

☐ Overall Benefits

This project has the potential for resulting in significant environmental and health benefits to the residents of major urban cities in Brazil. The following are some of the key benefits of the landfill gas recovery project:

- The integrated management of the landfill sites has the potential for resulting in both direct and indirect economic benefits to the Brazilian economy. The direct economic benefits include revenues from resource recovery and utilization. Specifically, the direct economic benefits include revenue generation from (I) sale of compost, (ii) use of on-site waste for incineration of hospital and other toxic waste (currently mostly contracted out), and (iii) utilization of landfill gas for generation of heat and/or electricity. All of these direct economic benefits will not only enhance the participation of the private sector but also reduce the fiscal burden on the state and municipal government which must otherwise bear all of the costs of landfill management under tight budgetary constraints.

- The indirect economic benefits include the creation of private industry for composting, waste-to-energy production, recyclables separation, private concessions for the operation of the landfills, etc., all of which will create

new employment in the private sector, greater economic activity in and around the landfill sites, and a more positive income distribution.

- The Clean Energy Production and Use Program has initiated discussions with senior decision makers in Brazil on the adverse environmental effects of the current landfill practices. While a number of environmental and economic opportunities exist there are also a number of potential barriers to achieving the benefits represented by these opportunities. The primary barriers include (I) the existing institutional capacity, (ii) a lack of effective regulations, (iii) a lack of private sector participation, (iv) the perception of the private sector regarding risks associated with investments in waste management projects, and (v) the availability of attractive financing. Through its further efforts, the Program is seeking to assist enhancing the involvement of the private sector in the management of landfills.

- The Program has taken a two-pronged approach to this initiative which involves a top-down approach to affect policy development and decision making and a bottom-up approach to initiate technology cooperation and transfer.

- The involvement by the private sector will increase the prospects for the utilization of new cleaner technologies for leachate treatment, resource recovery, composting, and waste-to-energy generation, all of which will result in GCC benefits, health benefits and significant economic benefits for Brazil.

USAID/World Bank Jointly Sponored Carbon Damage Backcasting Study

Economists have estimated damages from climate change to range from $5 to over $125 per ton of carbon that is emitted into the atmosphere. Energy generation is the primary source of carbon emissions worldwide, and future loans from multi-lateral and bi-lateral institutions to the energy sectors in developing countries will increase these emissions and contribute to climate change damages. Including climate change damage estimates in calculations of the rates of return on energy investments might make those investments economically attractive to lenders. A collaborative research effort led by USAID and the World Bank on this topic will provide global leadership on the climate change issue by encouraging other donor agencies and even developed and developing countries to take concrete steps to address emissions of greenhouse gases.

Recently, distinguished economists and scientists gathered at a meeting sponsored by the American Federation of Scientists to consider whether the World Bank should impose a "shadow price" on carbon emissions from its energy loans to reflect the climate change-related damages associated with the loans. The shadow price (e.g., $5 per ton of carbon emitted) would be included in the economic or benefit-cost analysis of the energy projects funded by the Bank along with other market prices such as the cost of fuel and the prices paid by electricity consumers. The scientists recommended that the Bank conduct a "backcast" study to determine the potential effect of a carbon shadow price on Bank energy loans by applying the shadow price to a sample of recently completed energy loans.

USAID is cooperating with the Bank in this study, which will be completed in March 1997. USAID's primary role has been to conduct the scoping study that developed the key analytical methods that were used in the large-scale backcast study of 50 Bank energy sector loans. USAID is also represented on the study Steering Committee. The USAID-sponsored scoping study showed that even relatively small shadow prices such as $5 or $20 per metric ton of carbon emissions, which are roughly equivalent to 0.1 to 0.4 cents per kilowatt hour of electricity, can increase the costs of fossil fuel power plants enough to make them poor investments. The scoping study also developed methods for comparing the energy loans with alternative investments that have fewer carbon emissions but higher costs. This part of the research will help identify investment opportunities that benefit the global community by reducing carbon emissions.

Attachment I
Current AID/World Bank Cooperative Agreements

Country	Activity & Agreement#	Initiation /End Dates	Funds Obligated	Overall Program Description USAID Project Officer& World Bank Contact
GLOBAL	Energy Efficiency & Renewable Energy w/Global Environmental Facility (GEF)	8/1/93 / 7/31/96	$700K	Increase the level of support for developing country efforts to eliminate waste in energy production and use. USAID Project Officer - Alberto Sabadell World Bank Contact - ($175K w/Carl Jechovtek)
				Apply the incremental cost framework developed under PRINCE to different potential greenhouse gas mitigation projects in Africa in the Energy, Transportation & Capacity Building areas. USAID Project Officer - Carla Koppell ($450K w/ Ian Johnson)
				Contribute to the International Finance Corporation's (IFC) feasibility study on a Renewable Energy & Energy Efficiency Fund USAID Project Officer - Ross Pumfrey ($25K w/IFC)
				Contribute to GEF is development of a large ($30-60M) incentive program to accelerate the development and commercialization of photovoltaic (PV) technology. USAID Project Officer - Ross Pumfrey ($50K w/ Charles Feinstein)

ATTACHMENT II
USAID/WORLD BANK COLLABORATION INVOLVING IIEC & HAGLER BAILLY

Country	Activity & Agreement#	Initiation /End Dates	Funds Obligated	Overall Program Description USAID Project Officer & World Bank Contact
GLOBAL	Energy Efficiency Project/IIEC	9/23/92	$923K	International Institute for Energy Conservation (IIEC) Multi lateral Development Bank Program: Demonstrating Alternatives to Large Scale Supply-Side Projects. IIEC has developed the Snapshot database, which provides current information on energy related projects under consideration for financing by three MDBs, the World Bank, the Inter-American Development Bank and the Asian Development Bank. USAID Project Officer - Alberto Sabadell
GLOBAL	Energy Efficiency Project /EEP Backcasting the Effect of a Carbon Shadow Price on World Bank Energy Loans	6/18/96	$40K	Determine how a $10-20 a ton shadow price on carbon would have affected about 20 to 25 recent World Bank energy loans. USAID Project Officer - Alberto Sabadell

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ATTACHMENT II
USAID - MDB SUPPORT
THROUGH USAID/USECRE COOPERATIVE AGREEMENTS

Country	Overall Program Description & Cooperators	Activity & Agreement #	Funds Expended
Indonesia	$50M Solar PhotoVoltaic (PV) Household Project	Assess institutional/financing sectors in Indonesia - International Fund for Renewable Energy (RE) for Energy Efficiency - (IFREE) FY 94	$30K
Indonesia	$150M Renewable Energy for Small Power Grid-Connected applications (biomass, microhydro, small geo)w/IFREE & Export Council for Renewable Energy (ECRE)	Conducted industry trade mission to Indonesia to identify projects for financing under these loans FY 94	$42K
India	2.5 MW PV component of larger $185M Bank loan w/Winrock	Evaluated Photovoltaic component of Renewable Energy Loan. FY 94	$10K
India	$100M RE loan w/IFREE	Prepared input to renewable energy loan for bagasse cogeneration, solar thermal power, biomethanization, and wind. FY 94	$20K
Central America	Central America region Renewable Energy loan w/IFREE	Initiated discussions with IDB on innovative financing mechanisms in Central America involving the Central American Development Bank (CABEI) FY 94	$5K
LAC Region	Creation of a unit to prepare RE/EE loans/components w/ECRE & IFREE	Participated in the development of a strategy for establishment of an IDB RE/EE unit FY 94/ 95	$30K
LAC Region		Renewable Energy in the Americas (REIA) Conference; participation/sponsorship FY 94	$100K

Country	Overall Program Description	Activity & Agreement Number	Funds Expended
Brazil	$1 million funding over 3 years through Winrock/industry/academia collaboration identifying gas turbines as option resulted in GEF $30 million funding of biomass/aeroderivative gas turbine project (BIG/GT).	MDB Initiative REEP (Renewable Energy and the Environment Program) -Multilateral Development Bank Initiative works with US industry and their government customers to provide techincal, financial institutional and project preparatory advisory services to MDBs to promote enhanced inclusion of renewable energy services in MDB financed projects.	$1M
		The PAPP (Programa de Apoia ao Pequeno Productor – Program of Support for Small Producers) is a program in 10 states in the Northeast specifies allowable inclusion of renewable energy and for which TA is necessary in preparation of projects.	
		Energy Efficiency Loan, administered by PROCEL, may include 3-4 state-sponsored renewable energy projects.	
		Rain Forest Trust Fund that may allow renewable energy tied to other uses (similar to PAPP in that individual equipment funding allotments can be no more than approx. $40,000 and end-users must make the official request for project funding.	
		Possible stand-alone RE loan tied to state utility privatization, for which Winrock has provided short-term TA consultancy. The Winrock-World Bank dialogue, resulting from AID funding, is at beginning of process.	

ATTACHMENT III
USAID - MDB SUPPORT
THROUGH USAID/WINROCK COOPERATIVE AGREEMENTS

Country	Overall Program Description & Cooperators	Activity & Agreement Number	Funds Expended
Africa	Biomass & Energy Systems Technology Project - BEST Program- Objective is to increase energy production in USAID-assisted countries and improve natural resource management by using biomass wastes for power and liquid fuel production.	Provide the World Bank Africa Technical Department with advice in developing and promoting a biomass-related renewable energy strategy for Africa.	$5.5K
India	Renewable Energy Application & Training Project- REAT	In June 94 Winrock participated on World Bank Supervision Mission to assess the stalled PV component of a $450 million loan being administered by the Indian Renewable Energy Development Agency (IREDA). Provided three weeks of staff time and travel (funded by the bank). In March 95 Winrock reviewed project appraisal reports for this program.	$8K
Asia	Biomass & Energy Systems Technology Project	Provide advisory services to the Alternative Energy Unit of the WB's Asia Technical Department including their publication of "The Best Practices Guide for Solar Home Systems	$10K
Latin America/Caribbean	Biomass & Energy Systems Technology Project	Provide consulting to the WB's Latin American Technical Department regarding the inclusion of renewable energy components in rural development loans.	$8K

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Country	Overall Program Description & Cooperators	Activity	Funds Expended
Mexico	RE lending program w/ECRE & Sandia National Laboratory	Providing technical assistance to FIRCO to expand World Bank/FIRCO loan to include productive uses for PV in agricultural applications FY'96	$5K
All Regions	Provide consultants (technology, financing, institutional) for specific loans as World Bank recently requested ECRE/IFREE support for Indonesia loans in development (see Item 1) w/ECRE & IFREE	Increased RE lending FY'96	$100K
India	Funder of MDB loans in India w/ECRE & Trades Industry	Trade Mission to India involving 19 companies; pursued opportunities involving World Bank/ADB loans FY'96	$72K

Cou	Overall Program Description & Cooperators	ctivity & Agreement #	Funds Expended
Brazil	Significant purchases ($1M) of PV systems for community services w/ECRE & IFREE	Worked with existing PAPP-II Loan recipients in NE States to develop small-scale RE projects FY 94/ 95	$50K
LAC Region	Establishment of IFC fund; funding of U.S. projects w/ECRE , IFREE & Winrock	Provided projects to seed pipeline for proposed IFC $200M RE/EE fund FY 95	$5K
Asia Region	Increased RE pipeline in Bank lending	Provide on-site junior staff person (Jas Singh) at World Bank, Asia Alternative Energy Unit (ASTAE) to provide technical/administrative support FY 95 w/ECRE	$10K
All Regions	Increased support by USED at Bank for RE/EE	Participated in briefing with Bank staff (ASTAE, GEF, Solar Initiative) to inform U.S. Executive Director to the World Bank, Jan Piercy, and her staff about renewables, ECRE, Bank activities in the RE area, and next steps FY95 w/ECRE & Trades Industry	$5K
Peru	Working with Bank staff and country to develop RE components to plan Rural Electrification loan	Expected to get funding for renewables (i.e., $5M) however, appears unlikely--seeking other means FY95 w/ECRE	$5K
Argentina	Approximately $90M in Bank lending w/ECRE	Working with Argentina on loan proposal involving RE for rural electrification	$5K
LAC Region	Opened ECRE/Brazil office in Salvador, Bahia	Work with World Bank on expanding RE lending through existing loans (PAPP-II) and new loans w/ECRE & ABEER (RE association in Brazil) FY96	$75K

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Environment Project Profile

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT AND THE GLOBAL ENVIRONMENT FACILITY

Global

Global Warming

Program for Measuring Incremental Costs for the Environment

The Global Environment Facility (GEF) formally began its ***Program for Measuring Incremental Costs for the Environment*** (PRINCE) in May 1993. This three-year program of studies on incremental costs, conducted by the GEF Secretariat, will provide the technical base for GEF's financial policies and project selection criteria. The project addresses the technical and operational issues that have arisen as a result of the GEF mandate to help developing countries comply with the conventions on biological diversity and climate change. PRINCE will concentrate on two of the GEF focal areas, global warming and biodiversity conservation. USAID provided initial start-up funding and technical assistance for PRINCE as part of its parallel financing commitment to the pilot phase of the GEF.

Highlights

- *Produced a work plan outlining project scope and activities.*
- *Generated nine background documents covering the concept of incremental costs as it relates to institution building, ozone depletion, law, climate change, and other concerns.*
- *Proposed 13 methodological studies on climate change, biodiversity, cross-cutting issues, and multi-focus areas.*

Project at a Glance

Total Project Funding: US$850,000
GEF Contribution US$850,000

Project Duration: FY 1994–97

Partner Organization(s):
GEF Secretariat

USAID Project Officer:
Alberto Sabadell / Washington, DC
Tel: 703-875-4047 Fax: 703-875-4639

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Background

Three recent international environmental treaties—the Montreal Protocol, the Framework Convention on Climate Change, and the Convention on Biological Diversity—include provisions for transferring financial resources to developing countries to help them meet the conventions' objectives. The GEF is designed to provide grant or concessional financing to developing countries with economies in transition for the agreed-upon incremental costs of achieving consensus-based global environmental benefits in the GEF's four focal areas: loss of biological diversity, global climate change, pollution of international waters, and ozone depletion (those areas of ozone depletion not covered by the Montreal Protocol activities). The term *incremental cost* in the GEF context refers to the extra costs—compared to a cost baseline—incurred in redesigning an environmental improvement activity aimed at achieving national benefits, in order to address extra-national (global) environmental concerns.[1]

Incremental cost analysis is an economic decision-making tool that was first applied to global environmental costs under the Montreal Protocol. Its application during the pilot phase of the GEF has been criticized on both methodological and policy grounds.[2] As the GEF moves beyond its pilot phase, it needs a clear framework for determining incremental costs and for defining the conceptual, analytical, and operational issues inherent in this approach. Thus, the purpose of PRINCE is to provide an analytical methodology for the calculation and application of incremental costs in the GEF context. This will clarify its application for participating countries, policy makers, and project developers.

The PRINCE project launched its activities in February 1993 through a US$400,000 grant from USAID to the Energy Sector Management Program (ESMAP) Trust Fund, a joint program of the United Nations Development Project (UNDP) and the World Bank. In May 1993, the GEF-participating governments approved PRINCE as a GEF pilot phase project with funding of US$2.6 million. In February 1994, the GEF Administrator's Office signed a cooperative agreement whereby USAID would provide an additional US$450,000 supporting parallel PRINCE activities. Additional financing arrangements with other participating governments will further broaden the project's scope.

Implementation

PRINCE builds on existing work in the phase-out of ozone-depleting substances. The project's early activities will focus primarily on climate change, and to a lesser extent, on biological diversity. It will also study issues common to all of GEF's focus areas. Activities will emphasize project- and sector-level work. When the GEF operational strategy for international waters has been clarified, PRINCE will undertake work in that field also.

PRINCE will develop a framework for measuring incremental costs by means of three activities: methodological studies, case studies or field tests, and dissemination of results. Much of this development will take place at Regional Centers of Excellence (RCEs), which are regional institutions in developing countries involved in GEF work. PRINCE proposes to use RCEs in Nairobi, Bangkok, Dakar, Kuala Lumpur, Mexico City, and Quito, but the project will undertake some in-house research as well.

Project Progress

A work plan, approved in November 1994, outlines project activities and scope. A PRINCE Policy Advisory Group, composed of representatives from GEF donor countries, GEF recipient countries, co-financiers including USAID, the Scientific and Technical Advisory Panel, and the Secretariats of the Conventions on Biological Diversity and Climate Change, will meet twice yearly to suggest policy directions. An Implementation Advisory group will suggest ways of implementing the workplan, identify possible project collaborators, and provide operational feedback.

Methodological studies. These studies will refine procedures and define issues critical to the application of the incremental cost concept. Methodological issues include system boundaries, effect of choice of baselines, quantifying costs, assessing incidental domestic benefits, financial methodology, and incentives. As of May 1994, PRINCE had produced nine background documents covering the concept of incremental cost as it relates to institution building, ozone depletion, law, climate change, and other concerns.

The project has proposed five methodological studies on climate change (including studies on the electric power and urban transport sectors), four in biological diversity (including studies on forests in Mexico and wetlands in Asia), three on cross-cutting issues (capacity building, reaching agreement, and transaction costs), and three in multi-focal areas (carbon sinks, fisheries, and chlorofluorocarbon production). A draft of the study on the potential incremental costs of climate change adaptation was completed as of January 1995, and other studies will be completed during PRINCE's three-year life. As GEF projects continue, the studies will become available as part of training packages.

Case studies. These will apply methodologies to real settings, generally GEF projects, which executing agencies will help identify. The Policy Advisory Group and several participating countries have asked PRINCE to use pilot-phase projects as case study material. The World Bank has suggested the Nigeria Gas Flaring Project, and the UNDP has suggested the Belize

Sustainable Development and Management of Biologically Diverse Coastal Resources. These projects are presently (January 1995) under review. The Mexico case study in biodiversity has reached an advanced planning stage.

Information dissemination. Lessons learned from methodological and case studies will be disseminated through workshops, training programs, and codes of practice. Documents produced as a result of methodological and case studies will be distributed to participating countries and executing agencies.

PRINCE will ask participating RCEs to help conduct regional workshops. UNDP is expected to help with training or capacity building for government and executing agencies involved with incremental costs.

Future Activities

New studies to be initiated in 1995 with USAID funding include studies on electric power, urban transport, renewable energy, transaction costs, and the incremental costs of capacity building.

—Stephanie Joyce, Datex

1/18/95

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[1] Global Environment Facility, *The Pilot Phase and Beyond - GEF Working Paper Series Number 1* (Washington, DC: GEF, May 1992).

[2] Global Environment Facility, *Independent Evaluation of the Pilot Phase* (Washington, DC: GEF, May 1994).

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INTERNATIONAL ACTIVITIES

FINANCIAL RESOURCES AND TRANSFER OF TECHNOLOGY AND KNOW-HOW

I. Introduction

The threat of climate change is a global problem which demands a global response. While the efforts of each individual country to control its own greenhouse gas emissions are important, it is clear that no single country or even group of countries can alone eliminate the threat. So far, the international community has responded energetically, gathering ever more accurate scientific data, striving to achieve the goals set forth in the Framework Convention on Climate Change, and beginning negotiations toward new commitments for the post-2000 period. The United States has played a leading role in these efforts, by actively participating in the Intergovernmental Panel on Climate Change, the Climate Convention's Ad Hoc Group on the Berlin Mandate and the Global Environment Facility. The United States has also used its influence in other multilateral fora, notably the multilateral development banks, the Organization for Economic Cooperation and Development, and the International Energy Agency, to place the climate change issue squarely on the agenda and to foster policies that can help to mitigate climate change.

Perhaps the greatest opportunity for cooperation lies in the assistance developed countries can provide to developing countries and countries with economies in transition. Developed countries have historically had the highest greenhouse gas emissions, but the emissions of other countries are growing rapidly and will likely surpass those of developed countries within the first few decades of the twenty-first century. Developing countries can benefit from the experience of the United States and other OECD countries, which have attained an impressive and continually improving level of efficiency in their energy use.

To foster closer international cooperation on climate change, the United States is engaged in a variety of activities, both bilaterally and multilaterally. Some are designed to encourage the private sector to bring innovative technologies to developing countries and economies in transition, while others provide government-to-government assistance.

The U.S. Country Studies Program described in this chapter has played a major role in facilitating this cooperation by giving developing countries the tools they need to assess their own situations with regard to climate change: their contributions to climate change, their vulnerability to it, and their opportunities to mitigate it. With the additional focus on Support for National Action Plans, the countries benefiting from this assistance will be able to take a further step toward implementing their commitments under the Convention.

The United States is committed to facilitating the commercial transfer of energy efficient and renewable energy technologies that can help developing countries achieve sustainable development. In addition, the United States is engaged in a number of other projects to help countries mitigate and adapt to climate change. This chapter outlines the most significant U.S. efforts in this area, in the hope that our experience may spark further ideas for such cooperation in the wider international community.

II. Technical Assistance and Technology Transfer

The United States provides technical and financial assistance and facilitates the transfer of energy efficient technologies through its Country Studies Program, bilateral mitigation projects, regional mitigation projects, information sharing and trade facilitation, and bilateral adaptation projects.

U.S. Country Studies Program

The Framework Convention on Climate Change requires all signatory countries to communicate a national inventory of greenhouse gas emissions by sources and removals by sinks, and to describe the steps they are taking to implement the Convention, including adaptation and mitigation measures. To help developing countries meet this commitment, and to fulfill in part its own obligations under the Convention to provide additional financial resources to help developing countries meet their obligations, the United States initiated the Country Studies Program in 1992.

The U.S. Country Studies Program (CSP) is now assisting 55 developing countries and countries with economies in transition (the Newly Independent States and Eastern Europe) with climate change studies designed to build human and institutional capacity to address climate change. The program is also assisting 18 of these countries in using their study results to prepare national climate change action plans that will lay the foundation for their national communications required under the Climate Convention. The primary objectives of the CSP are:

- To enhance the abilities of countries and regions to inventory their greenhouse gas emissions, assess their vulnerabilities to climate change, and evaluate strategies for mitigating emissions and adapting to the potential impacts of climate change.
- To enable countries to establish a process for developing and implementing policies and measures to mitigate and adapt to climate change, and for reexamining these policies and measures periodically.
- To develop information that can be used to further regional, national, and international discussions of climate change issues and increase support for the Climate Convention.

Most of the 55 countries conducting country studies with U.S. support have completed their studies and disseminated their results to the international community. The U.S. CSP has issued three major synthesis reports that document the results of these studies:

- *Interim Report on Climate Change Country Studies*, March 1995 (Contains preliminary results from 21 countries)
- *Greenhouse Gas Emission Inventories: Interim Results from the U.S. Country Studies Program*, May 1996 (Contains inventory results from 24 countries)
- *Vulnerability and Adaptation to Climate Change: Interim Results from the U.S. Country Studies Program*, May 1996 (Contains vulnerability and adaptation assessment results from 13 countries)

The U.S. CSP plans to publish a synthesis report on mitigation assessment in 1997. The CSP has also sponsored over 15 regional and global workshops to provide countries with an opportunity to share their results and learn from each other's experiences. These workshops were co-sponsored with other countries and international institutions and proceedings were published for each workshop that document the country results, methods, and common assessment issues.

The U.S. CSP has received wide international recognition as one of the most effective programs of international cooperation on climate change issues. The program has not only improved countries' understanding of climate change, but has also improved their capacity to implement response measures and increased their support for the Framework Convention on Climate Change. The program's synthesis reports and handbooks on climate change assessment methods and steps in preparing climate change action plans have also made important contributions to the work of the Global Environment Facility, the Intergovernmental Panel on Climate Change, and the Subsidiary Bodies to the Convention and other international organizations.

At the first Conference of the Parties, the United States announced a next phase of the CSP termed Support for National Action Plans (SNAP). Under SNAP, the program is currently providing support to 18 countries for the preparation of climate change action plans that delineate specific response measures that countries intend to implement, as well as lay the foundation for national communications required under the FCCC. The U.S. CSP initiated support for the preparation of action plans to 9 countries in 1995 and 9 additional countries in 1996. Most of these 18 countries have already established specific priorities for mitigation and adaptation measures and are currently working with U.S. and international experts on the development of their measures and implementation plans. Over 25 additional countries have requested assistance from the CSP for the preparation of action plans.

In 1997 and 1998, the Country Studies Program will complete technical support to these 18 SNAP countries while awarding support for up to ten new countries. Other goals for these two years include assisting with the design and financing of technology projects, preparing reports for COP-3 and COP-4 on the progress and achievements of the program, and

convening further workshops that highlight country commitments in their action plans, technology transfer, and financing successes.

Ten U.S. government agencies have pooled their resources to implement this program. A Country Studies Management Team, with full-time personnel drawn from five different federal agencies (Environmental Protection Agency, Department of Energy, Agency for International Development, Department of State, and National Oceanic and Atmospheric Administration), conducts the day-to-day operations and oversees projects in conjunction with individual U.S. agency project officers. The U.S. CSP complements global climate change mitigation and sequestration activities implemented by other agencies such as the Agency for International Development and multilateral donors (e.g., the United Nations Development Program, the United Nations Environment Program, the Global Environment Facility, and individual OECD countries). The United States coordinates financial and technical support activities with other donors through several venues, including the CC:FORUM project of the FCCC Secretariat.

Bilateral Mitigation Projects

U.S. bilateral mitigation projects are based on the core principles of the U.S. development assistance strategy. These principles support economic growth and social development that:

- Protect the resources of the host country.
- Respect and safeguard the country's economic, cultural, and natural environments.
- Support the design and implementation of favorable policy and institutional frameworks for sustainable development.
- Build indigenous institutions that involve and empower the citizenry.

The U.S. government is supporting a host of bilateral projects aimed at mitigating climate change by reducing greenhouse gas emissions or sequestering greenhouse gases. In this area, the federal government works primarily through the U.S. Agency for International Development (USAID), but also through other U.S. Government departments and agencies involved in climate change issues, notably the Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Department of Agriculture (USDA). Partnerships among various government agencies, nongovernmental organizations, private industry, and international organizations characterize many of these projects.

Recognizing the global threat of climate change to both developed and developing countries, USAID has made the mitigation of climate change one of two global environmental priorities. The Agency has identified nine "key" climate change countries (Mexico, Brazil, India, Indonesia, the Philippines, Russia, Ukraine, Poland, Kazakstan) and one key region (Central Africa) in which it works that are, or will become, significant contributors to global greenhouse gas emissions. USAID is focusing its climate change specific partnerships in these key countries in order to reduce the rate of growth of net greenhouse gas emissions

through approaches that also contribute to economic growth and local environmental protection. In addition to these specific programs, USAID's broader portfolio of energy efficiency, renewable energy and forestry activities contribute to mitigation efforts in other countries, while numerous other programs build capacity for countries to adapt to the adverse effects of changing climates.

The bilateral mitigation projects described in this chapter include efforts in each of the following general categories:

Energy Demand. Reduce end-user energy demand through conservation and energy efficiency, resulting in reduced fuel consumption and greenhouse gas emissions.

Generation. Increase the efficiency and improve load management of power generation, thereby increasing effective generating capacity without additional fuel consumption. Use clean coal technology, which can cut emissions by up to 25 percent, to achieve significant immediate greenhouse gas emissions in countries where coal is widely used.

Distribution. Reduce losses in transmission and distribution processes, especially in rural networks, thus effectively increasing capacity without additional fuel consumption.

Renewables. Encourage the adoption of renewable energy technologies to replace fossil fuels or to increase capacity without increasing fossil fuel consumption. Many renewable energy technologies are particularly appropriate in rural applications.

Restructuring. Support power sector restructuring, on the assumption that the private sector generally makes more rational use of energy resources than do government-owned or -subsidized monopolies. Open existing power-grid systems to sales from independent power producers to provide a market incentive for the development of unconventional renewable energy resources.

Regulatory Reform. Support regulatory reform practices for the electric power sector in order to improve efficiency and reduce use of fossil fuels.

Clean Air. Reduce air pollution, with the ancillary environmental benefit of reduced greenhouse gas emissions.

Methane. Reduce methane emissions through coalbed methane recovery, landfill methane recovery, reduced flaring of natural gas and other methods. Methane recovery not only reduces emissions of methane, a potent greenhouse gas, but also provides an additional clean-burning fuel source with low greenhouse gas emissions.

Forestry. Enhance carbon sinks through forestry projects that reduce deforestation, or support reforestation or afforestation of degraded lands.

Agriculture. Improve agricultural and livestock practices to reduce emissions of nitrogen from pesticide applications and methane from ruminant animal husbandry.

Following are the descriptions of the projects, along with their time frames, total U.S. funding levels over the indicated time frame, responsible agency or agencies, and host country or region.

Energy Efficiency Project (EEP)
EEP mitigates greenhouse gas emissions through the introduction of environmentally sound, energy efficient technologies and promotion of related policy reforms, investment incentives, and energy management and planning tools in the power and commercial sectors. Specifically, EEP assists host countries to (1) design and implement innovative demand-side management projects and pilot programs; (2) address energy sector policy and institutional reform issues; (3) promote private sector involvement in energy efficiency; (4) expand U.S. technology transfer; and (5) promote energy information dissemination through outreach and training. EEP works cooperatively with groups such as universities, research centers, trade associations and NGOs inside the U.S. and in developing countries and countries with economies in transition.

EEP emphasizes the following three strategic elements: building institutional partnerships; promoting technology cooperation between U.S. and in-country firms; and leveraging financing for energy efficiency projects. To build local capacity, which is critical to sustaining development efforts, all EEP activities involving specific countries have an institutional counterpart to assist in carrying out project objectives. On the technology front, EEP promotes innovative, market-driven technology cooperation between U.S. and developing country organizations. In the financing arena, EEP leverages funding from private and multilateral development banks by providing initial design and start-up efforts that will lead to projects being funded by these institutions.
USAID, $44.9 million from 1992 to 1998, Worldwide

Philippines Demand-Side Management Project
The overall goal of the DSM Project is to eliminate or defer the need for new fossil fuel-based power generation facilities, and to eliminate the need for inefficient back-up systems, thus reducing the corresponding greenhouse gas emissions. The project comprises a three-pronged strategy of (1) assessing the potential for utility demand-side resources; (2) providing technical assistance to help establish legislation, policies and regulations in support of DSM and integrated resource planning; and (3) demonstrating the technical, economic and market viability of DSM through the design and implementation of an industrial-sector DSM pilot program. To maximize the program's impact, USAID and the Asian Development Bank (ADB) are conducting a coordinated effort whereby USAID provides grant-funded technical assistance and technical services, and the ADB provides specialized project finance for Philippine DSM investments.

Estimates of the atmospheric pollutants avoided through the Project's reduction in marginal generation capacity have been estimated by the Philippines Department of Energy to be between 1.5 and 5 million tons of CO_2 annually by 2010. The project was partially supported by a portion of the U.S. funding commitment to support the Global Environment Facility.
USAID, $4.5 million from 1995 to 1998, Philippines

Energy Demand Management Project
The Energy Demand Management Project focused on reducing energy waste and improving the efficiency of energy use in Morocco by introducing energy demand management techniques into important sectors of the Moroccan economy, including agro-industry, construction materials, and hotels. This program combined hands-on energy and environmental audits of 46 large and medium-sized firms in four key industrial sectors, links with Moroccan engineering training institutions, and information dissemination on the benefits and techniques of energy conservation targeted to technical professional sand company/plant managers. The energy and other plant audits recommended measures that led to energy savings worth more than $4 million annually. In terms of greenhouse gas reductions, these audits are estimated to have prevented emissions of approximately 140,000 tons of CO_2 per year. Overall, the EDM project succeeded in developing a demand for sophisticated energy and environmental audits and associated energy efficiency services in Morocco's rapidly growing private industry sector.
USAID, $8.6 million from 1988 to 1996, Morocco

Energy Efficiency and Market Reform Project
This project seeks to (1) improve efficiency and performance in the electricity, refining, industrial, and building sectors; (2) support energy sector privatization and market reform; and (3) reduce safety risks at nuclear power plants. Energy efficiency and demand-side management efforts are underway in Russia, Belarus, Ukraine, Armenia, Kazakstan and Kyrgyzstan in cooperation with the multilateral development banks and through U.S. private sector contracts. These efficiency improvements, using state-of-the-art U.S. technologies, have resulted in annual energy savings of $4.5 million when calculated at world energy prices. The Energy Efficiency and Market Reform Project is also engaged in cooperative efforts to reduce greenhouse gas emissions from natural gas flaring in Russia, rehabilitate gas distribution system designs in four major Russian cities, and develop a strategy for restructuring Russia's electric utility sector.
USAID, $272.5 million from 1992 to 1996, Newly Independent States

Program for the Acceleration of Commercial Energy Research (PACER)
PACER is a USAID/India program to help overcome the energy constraints in India's economic development by promoting the development of new or innovative products or processes relevant to the Indian power sector. The program promotes commercialization of emerging energy technologies; administers a revolving fund for research awards and grants; and encourages Indo-U.S. joint ventures. PACER also provides grant assistance for policy analyses and studies related to energy use in India. Since its inception in 1987, PACER has assisted more than 25 projects in developing and validating energy technologies, including

technologies for renewables and energy efficiency. For example, PACER is providing matching funds totaling $2 million for an Indo-U.S. joint venture in energy efficiency technology with industrial applications. PACER also has ongoing projects in energy efficient regenerative burner development, a 500 KW biomass gasifier-based power generation system, and continuous fluidized-bed furnaces for heat treatment. In addition, the Program for the Advancement of Commercial Technology (PACT), which aims to accelerate technology innovation through U.S.-Indian joint ventures, has helped projects develop energy technologies that reduce greenhouse gas emissions.
USAID, $20 million from 1987 to 1995, India

India Private Power Initiative (IPPI)
The IPPI provides hands-on technical assistance to State Electricity Boards (SEBs) and the Indian Government to build in-country capabilities to evaluate and process the numerous project proposals now pending before the Government, as well as help with formulation of the project contract documentation necessary to attract international financing. Country-wide training on the fundamental aspects of private participation in the power sector has also been provided. Through close work with the Indian Government, the World Bank, the Asian Development Bank, and other lending institutions, IPPI's overall goal is to establish a sustainable, environmentally-conscious private power industry in India. Over $5.5 billion in potential U.S. investments in India's power sector have been facilitated through the successful leveraging of technical assistance and training to the SEBs.
USAID, $3 million from 1993 to 1996, India

Renewable Energy Commercialization Project (RECOMM)
The RECOMM project is designed to commercialize renewable energy systems across a wide range of technologies, applications and services. This activity is specifically intended to (1) catalyze the commercialization for high potential renewable energy technologies; (2) help develop commercially successful, replicable models of renewable energy products and services; (3) improve access to financing and capital for renewable energy development; (4) facilitate renewable energy partnerships between U.S. and Indian companies; and (5) strengthen the overall environment in India for renewable energy. The project also includes funds for rural photovoltaic energy commercialization and for the development of a bagasse cogeneration program, and support for a wind energy mapping activity.
USAID, $3.1 million from 1995 to 1998, India

Energy Management Consultation and Training (EMCAT)
The EMCAT Project promotes a systems approach to improving energy efficiency in the Indian electric power sector. EMCAT has four components: two focused on energy supply, and two on the end-use areas of energy efficiency and renewable energy commercialization. The energy supply components provide technical assistance and training to enable the Power Finance Corporation to effectively utilize MDB funds to modernize, rehabilitate and improve management for existing energy systems and promote a better enabling environment for private power development. The end-use components have provided funds to the Industrial Development Bank of India to study the feasibility of investments to enhance energy

efficiency and private power generation projects.
USAID, $27 million from 1991 to 1996, India

Power Sector Support Program
This program aims to rehabilitate electricity generating capacity, increase efficiency, and stimulate investments in energy efficiency. The program is reducing greenhouse gas emissions through infrastructure investments and technical and policy assistance. The modernization of the Cairo West thermal power station's boilers and turbine generators, as well as the modification of the boilers to burn both natural gas and mazout oil, is expected to increase the plant's capacity from 300 MW to 350 MW, while decreasing its fuel consumption rate from 275 grams/KWhr to 260 grams/KWhr, thereby greatly reducing its greenhouse gas emissions.

The program is also assisting the Egyptian government in its efforts to adopt environmentally sound practices and reduce electricity subsidies that discourage conservation. In partnership with the World Bank, the government developed a national Environmental Master Plan identifying Egypt's environmental problems and outlining an action plan to address them. The New and Renewable Energy Authority (NEA), recently established under the Power Sector Support program, will help carry out the government's action plan and meet future demands for environmentally sound energy by promoting new and renewable sources. The program is also helping to expand the operating data collection capability of the National Energy Control Center, which will enhance the reliability and efficiency of the overall national power system.
USAID, $661 million from 1989 to 1996, Egypt

Energy Technology Innovation Project (ETIP)
The purpose of ETIP is to introduce innovative and environmentally sound technologies and management techniques that promote efficient, sustainable and cost-effective electricity generation, transmission, and distribution in developing countries. ETIP focuses on reducing greenhouse gas emissions from power generation and landfill facilities as well as from the transportation sector. The project has supported such activities as a clean-coal technology mission; technology transfer to the Energy Authority in Thailand to reduce atmospheric emissions at its Mae Moh power station; and an engineering assessment for the Philippines National Power Corporation on the rehabilitation of existing power generation facilities. In Mexico, ETIP has brokered a successful cost-sharing arrangement between a U.S. based municipal utility and a highly polluting power station to reduce smokestack emissions and increase burner efficiency. If successfully replicated throughout Mexico, the annual oil savings could exceed $10 million and annual reductions in CO_2 emissions could reach 315,000 tons.
USAID, $20 million from 1990 to 1996, Worldwide

Energy Training Project (ETP)
This project provides a unique opportunity for qualified energy and environmental professionals and policy makers from developing countries to receive practical hands-on training, either in the United States or in the host country. The resulting increase in local institutional capacity to resolve energy sector problems has led to improvements in energy efficiency, increased deployment of renewable energy technologies, and more effective management of utilities and energy resources while increasing the potential for economic growth. U.S.-based courses are designed to provide mid-level engineers, planners, and other specialists with the skills needed to implement new technologies, policies, or procedures. In-country courses are custom-designed to provide senior level policy makers and executives with the information they need to make informed decisions on new energy and environmental technologies, policies and procedures. A study tour program brings senior-level energy-sector professionals to the United States to observe new energy technologies, policies, and procedures in action. Over 4,000 developing country professionals have participated in the ETP. In addition, ETP's Utility Partnership Program has initiated successful twinning relationships between senior technical U.S. and in-country utility staff in ten countries worldwide.
USAID, $29.5 million from 1987 to 1997, Worldwide

Renewable Energy Applications and Training (REAT)
The REAT program funds global, regional and country specific activities to increase the commercialization of renewable energy. The program focuses on removing obstacles to the use of commercially proven technologies that use wind, solar, biomass, small hydro, and geothermal resources. The program emphasizes information and skills transfer, policy reform, private sector involvement, project identification and design, and identification of financing mechanisms. Focus countries/regions for REAT include the Philippines, Indonesia, India, Central America, Brazil, Mexico and Southern Africa. USAID is funding in-country Renewable Energy Project Support Offices (REPSOs) in the first five countries and regions to provide technical and financial assistance to help identify and evaluate renewable energy projects.
USAID, $34.3 million from 1985 to 1997, Worldwide

Biomass Energy Systems and Technology (BEST)
The purpose of BEST is to reduce technical, financial, economic, and institutional risks associated with biomass energy systems so that public and private sector interests (both U.S. and indigenous) will invest in commercially proven energy conversion systems in target countries. The BEST project has been dedicated to promoting the use of certain biomass fuels (namely, crops and crop residues). For example, biogas technologies can be used to increase the efficiency of energy production, while cogeneration technologies can turn biomass waste products into energy. Both approaches reduce greenhouse gas emissions. In India, BEST conducted a biomass fuel assessment in Tamil Nadu and Maharashtra, focusing on three sugar mills; as a result, one private mill is planning significant investments in cogeneration. BEST also supported a study of cogeneration from sawmill waste in

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Honduras, a cost-shared feasibility study of biogas-fired electric power generation at a swine production and dairy installation in the Philippines, and a two-year biomass energy project in Mexico.
USAID, $13.1 million from 1989 to 1996, Worldwide

Philippines Assistance Support Project, USAID/GEF Renewable Energy Component
This project is a multi-donor effort to help the Philippines government develop economic infrastructure and stimulate investment. Project activities include studies, operational support to the Committee on Official Development, and funding of a private-sector pre-investment facility. The USAID/GEF renewable energy component will help the Philippines demonstrate and test innovative financing approaches for renewable energy in economic development. This program helped to finance projects to supplant some 15-18 MW of fossil energy systems directly and will help with indirect assistance for another estimated 20-25 MW, with corresponding reductions in greenhouse gas emissions.
USAID, $3.75 million from 1990 to 1995, Philippines

Electrification for Sustainable Development, USAID/GEF Renewable Energy Component
This project is designed to improve rural electrification systems by promoting productive electricity uses and new system construction, providing technical assistance in system operation and maintenance, and supporting the creation of a rural electric cooperative finance company. The USAID/GEF component promotes the reduction of greenhouse gas emissions through the use of renewable energy systems in rural areas. The project demonstrates innovative mechanisms for sustainable financing and integration of renewable energy systems in the electrification process of Bolivia. It includes financing for solar, wind, small hydro, and biomass energy projects in order to integrate renewable energy technologies within the broad electrification planning policy in Bolivia.
USAID, $2.5 million from 1991 to 1996, Bolivia

Greenhouse Gas Pollution Prevention Project (GEP)
This collaborative project between USAID/India and the GEF represents a two-part strategy to reduce greenhouse gas emissions from energy generation. Both components are designed to address the major market, financial and institutional obstacles to the introduction of these technologies and thereby to demonstrate their competitiveness with other sources. The first component is a near-term strategy to increase the efficiency of coal use through the introduction of coal conversion efficiency measures and state-of-the-art coal conversion technologies at existing power plants. U.S. technical advisors are assisting the National Thermal Power Corporation and other state utilities in promoting efficiency in thermal power generation and installing advanced environmental monitoring and control techniques to reduce pollution. The second component is part of a longer-term strategy to reduce dependence on greenhouse gas emitting fossil fuels by promoting more efficient bagasse (sugar cane waste) cogeneration technologies, which produce no net greenhouse gas emissions, to exploit currently unused biomass resources. The plants use efficient, high pressure multi-fuel boilers and high-efficiency turbines and rely on supplemental biomass fuel rather than fossil fuels during the off-season when sugar cane is not available. This component will provide

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incremental cost support for six demonstration projects in additional to technical assistance, training, and cost-shared research grants for developing cane trash and other viable biomass fuels.
USAID, $19 million from 1994 to 1998, India

Private Sector Energy Development Project (PSED)
PSED promotes the private ownership, financing, and operation of electric-power facilities in selected developing countries. Because private power developers operate more efficiently than government-owned and subsidized utilities, their operations consume less fuel to satisfy current demand levels, thus reducing greenhouse gas emissions. PSED originally concentrated on familiarizing U.S. companies and foreign governments with the benefits and opportunities of private power sector development. PSED activities now include facilitating participation by private power developers in the development and implementation of environmentally acceptable, economically sound power generation technology.

Private sector participation also helps the power sector utilize its resources more effectively, capitalize on the technical and managerial expertise of private energy companies, and gain access to new sources of capital. This participation helps alleviate the power shortages that restrict economic growth, as well as providing much needed capital infusion and relief of the capital burden placed on governments, freeing up funds for environmental or health programs.

Furthermore, opening existing power-grid systems to sales from private producers is often the most effective incentive for the development of non-conventional renewable energy resources. About 70 percent of the projects approved under the PSED Feasibility Study Fund make use of alternative or renewable fuels.
USAID, $6 million from 1991 to 1997, Worldwide

Regional Energy Efficiency
The Regional Energy Efficiency project provides technical assistance, training, and equipment to accomplish three strategic objectives in the Central and Eastern European region: (1) improve energy efficiency and pricing; (2) support energy sector restructuring, privatization, and modernization; and (3) improve nuclear safety. Through this project, U.S. government agencies and private organizations, in coordination with the World Bank and other donors, are working to improve the climate for private investment in the modernization and increased efficiency of energy systems as well as to establish local private energy service and equipment supply companies.

Specific program components include (1) a grant to the International Energy Agency (IEA) to carry out regional and country-by-country energy policy reviews in Poland, Hungary, the Czech Republic, Slovakia, Romania, and the Baltic countries to improve energy efficiency; (2) regional technical assistance to promote policy and institutional reform within the energy industry, develop rational and environmentally sound energy investment programs, and

enhance the business climate for energy industries and infrastructure in Central and Eastern Europe; (3) an Electric Utility Partnership program that links U.S. electric utilities and industries with counterparts in Central and Eastern Europe to facilitate economic and technical reform of national utility systems, introduce modern management concepts, and expose Central and Eastern European industrial leaders to U.S. energy and environmental technologies and practices with a view to future technology transfer; and (4) a Technology Cooperation program that takes advantage of specific DOE capabilities with respect to renewable energy, energy efficiency, clean coal technology, and nuclear safety.
USAID and DOE, $96 million from 1991 to 1996, Central and Eastern Europe

Improved Public Sector Environmental Services
This project provides technical assistance and training and technology transfer opportunities to improve environmental quality in Eastern Europe and strengthen East European governments' capacity to provide public sector environmental services. Although targeted primarily at industrial and municipal pollution reduction and regulation, and at environment risk assessment, the project has also reduced greenhouse gas emissions and encouraged energy efficiency improvements. Through the application of "low-cost or no-cost" process changes, environmental audits, recycling, waste minimization, and efficient use of raw materials and natural resources, the project is promoting pollution prevention and is installing equipment at specific industrial facilities. Environmental Management Training Centers are being established in Bulgaria and Poland, and a "twinning" program fosters long-term relationships between government ministries and EPA's regional offices in the United States for information exchange and technical assistance.
USAID and EPA, $68.8 million from 1991 to 1996, Central and Eastern Europe

Environmental Policy and Technology, Russian Air Management Program (RAMP)
Part of an overall environmental policy project, RAMP is designed to demonstrate how improved institutions, policies, and practices in air-quality management can help solve air pollution problems in Russian cities. RAMP also aims to identify activities that will reduce greenhouse gas emissions. It has begun by assisting Russian officials in a short-term study of Volgograd's air-quality problems and in identifying low- and no-cost emission-reduction measures. Using experience gained in Volgograd, RAMP will then help Russians define and implement appropriate changes to national, regional, and local approaches to air-quality management. Through training, technology transfer, and policy development, RAMP will assist Russians in drafting air-quality legislation and regulations, establishing standards, and setting emission limits and permit requirements.
USAID and EPA, $35 million from 1992 to 1996, Russia

Coalbed Methane Project in China
In cooperation with the GEF and the Chinese Ministry of Coal, EPA conducted 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.

EPA

Coalbed Methane Projects in Czech Republic, Poland, Russia, and Ukraine
Several ongoing projects reduce emissions of methane from coal mines by identifying and assessing profitable opportunities for coal mines to expand methane recovery in conjunction with coal mining. The efforts include assessments of coalbed methane resources, specific project opportunities, and the applicability of different U.S. technologies for methane recovery under local mining conditions, and establishment of Coalbed Methane Centers to disseminate information about investment opportunities to recover coalbed methane.
EPA, USAID, $2 million from 1990 to 1996, Czech Republic, Poland, Russia, and Ukraine

Polish Coalbed Methane Project
Two U.S. agencies, in cooperation with the Polish Ministry of Environmental Protection, are jointly funding a $1.1 million project to demonstrate a new technology for recovering methane emissions from coal mining operations. The submerged evaporation technology began as a DOE/SBIR effort in the early 1990s and has since led to multiple applications. Phase I field testing has been completed at a Southern Poland mine site. The Phase II field demonstration is scheduled for November-December 1996. This project, upon completion, is expected to significantly reduce coal mine methane emissions as well as providing a source of clean water for this region.
DOE, EPA, $600,000 from 1993 to 1996

GAZPROM Working Group
This Working Group aims to identify and assess project opportunities to reduce methane emissions from Russia's natural gas system through the application of U.S. technologies. Approximately 70 U.S. companies are participating in this effort, together with DOE, EPA, and GAZPROM, the Russian natural gas company. Working group members have identified a number of potentially profitable projects that could improve the efficiency of Russia's natural gas system and reduce methane emissions. Several demonstration projects have been successfully completed. A recent achievement was the first actual measurement of leaks in the Gazprom pipeline system.
EPA and DOE, $200,000 in 1995 and 1996, Russia

Ruminant Livestock Methane Reduction Projects
EPA has conducted studies in several key countries including India, China, Bangladesh, and Nepal to identify cost-effective opportunities for reducing methane emissions from large ruminant livestock. The studies focus on ways to improve the diets of animals, thereby reducing methane emissions per unit of meat or milk produced.
EPA, $100,000 in 1994, India, China, Bangladesh, and Nepal

Natural Resources Management Project (NRMP)
This project provides support for the management of Indonesia's protected areas and forests through technical assistance, training of field staff, and policy analysis. The NMRP is studying major policy and market failures that result in resource depletion, and national

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accounting methods for natural resources. It also supports a pilot effort to develop viable, multi-purpose management approaches for selected protected areas, as well as applied research on priority management needs for natural production forests and protected areas.
USAID, $30 million from 1990 to 1997, Indonesia

CLEAN/Energy Project
USAID/Jakarta has developed the Coordinated Local Environmental Action Networks Project (CLEAN/Energy) to promote renewable energy and energy efficiency. CLEAN/Energy, currently in the initial state of implementation, will achieve its goals through four primary areas of activity: (1) creation of an enabling regulatory environment for energy efficiency and renewable energy; (2) development of cleaner energy supplies through the promotion of renewable energy technologies; (3) improvement in the efficiency of conventional energy generation and transmission; and (4) improvement in end-use efficiency. CLEAN/Energy activities are designed to reduce the growth of greenhouse gas emissions and other pollutants. Assuming that coal is the marginal supply source, the project estimates that potential carbon dioxide emissions could be reduced by as much as 1.2 million tons in the first year.
USAID, $3.2 million, 1997-2002, Indonesia

Environment and Natural Resources Management
This USAID/Philippines project promoted the sustainable management of the Philippines' tropical forests by focusing on policy reforms, natural resource protection, and incentives for long-term stewardship of public lands. It worked with the Government of the Philippines to empower local communities to protect and manage many of the country's forest estates, ban logging of primary forests, and develop and implement site-specific plans to conserve and develop natural forests. The project also promoted economic efficiency in the forest products industry. In this manner, existing natural forests are being managed more productively and sustainably, assuring their continued survival as carbon sinks.
USAID, $125 million from 1990 to 1994, Philippines

Community-based Natural Resources Management
This project aims to improve forest resource management in Senegal through direct participation by rural communities and the private sector in land-use planning and conservation. Building on a 1991 reforestation project in which 43,000 participants planted trees on 1300 hectares of land, the follow-on project includes continued tree planting and forest regeneration activities to instill in the population a sense of stewardship for natural resources. The project aims to work with community groups and farmers to plant three million trees, and to protect and manage natural forest regeneration on 200,000 hectares of land. A related policy and institution-strengthening component will work through Senegal's national environmental plan process to ensure that these gains are sustained.
USAID, $25 million from 1993 to 1999, Senegal

Forest Conservation and Management
This project, known as BOSCOSA, promoted the sustainable development of forest and agriculture resources in the buffer zone surrounding Costa Rica's Corcovado National Park. Activities included the establishment of a research, training, and extension center; regional conservation planning and management; and various subprojects involving local groups. In this way, BOSCOSA helped to develop and demonstrate alternatives to deforestation to a local economy long based on resource extraction.
USAID, $1.9 million from 1990 to 1995, Costa Rica

Forest Resources for a Sustainable Environment (FORESTA)
This project sought to improve forest resource management in Costa Rica's Central Cordillera through conservation, sustainable forestry, and reforestation activities. FORESTA provided support for the development of guidelines and regulations for logging controls, tree harvesting, logging roads, and silviculture practices, encouraged the reforestation of cleared land under a forest management plan, and conducted a feasibility study for a regional timber marketing center to help develop an integrated, sustainable forest industry.
USAID, $7.5 million from 1989 to 1996, Costa Rica

Forestry Support Program II
The goal of this project is to ensure a sustainable forest and natural resource base in developing countries. The project promotes the contribution of trees to sustainable development and strengthens the capacity of institutions that manage forestry and natural resources in developing countries. It provides assistance in four areas: technical assistance, training, private enterprise development, and facilitation of donor collaboration.
USAID, USDA and Peace Corps, $25 million from 1991 to 1999, Worldwide

Environment/Global Climate Change
This project is specifically designed to reduce greenhouse gas emissions in Latin America by promoting policy reforms and encouraging environmentally sound technologies and practices for the sustainable, efficient use of forest and energy resources, especially in Brazil and Mexico. Because the primary source of greenhouse gases in the region stems from the destruction of tropical forests, this project focuses heavily on the sustainable use of forest resources.

In Brazil, the project is providing training, management assistance, and basic infrastructure needs to local nongovernmental organizations (NGOs) in the region. This assistance aims to increase NGO capacity to influence policy by working with government research agencies and carrying out demonstration field projects. To give added value to the existing forests, the project is supporting research and pilot demonstration activities for new non-timber forest products and for improving the cultivation of traditional products, such as Brazil nuts and rubber. The activities also include environmental education, impact assessments, and components to improve timber management and management of protected areas.

Working with NGO partners, the project has used $2 million to purchase and conserve critical forested areas in Belize and Paraguay. In Mexico, the project is helping the government analyze its policies and legal and institutional structures that encourage destruction of tropical and temperate forests. It is also working to consolidate and manage eight protected areas and their buffer zones, covering more than ten million acres in southern Mexico.
USAID, $34.5 million from 1990 to 1996, Latin America (primarily Brazil and Mexico)

Brazil Integrated Environmental Management Project
This project builds upon the Environment/Global Climate Change project in Brazil. The purpose is to increase protection and sustainable use of natural resources in Brazil's critical regions for carbon sequestration and biodiversity, especially the Amazon and the Atlantic Coastal Rain Forest, and to reduce greenhouse gas emissions from deforestation and wasteful energy use. The major components of the project include: (1) policy analysis resulting in policy reform to reduce economic incentives to deforestation; (2) introduction of practices to increase the long-term economic benefits that local people receive from forests; (3) improved conservation in protected areas; (4) demonstration of techniques (e.g. agroforestry) and technologies (e.g. solar power, efficient light bulbs) which provide economic alternatives to deforestation or wasteful energy use; (5) training and research in improved forest management, park protection, environmental law, and modern energy technologies; (6) leveraging multilateral funding for forest protection and clean energy use; and (7) institutional strengthening of nongovernmental organizations.
USAID, $15.5 million from 1996 to 1999, Brazil

Environment/Global Climate Change, Mexico Renewable Energy Component
This USAID project, in collaboration with DOE, is supporting the expansion of the Government of Mexico's nonconventional rural electrification program and other renewable energy activities. It focuses on socially productive uses of renewable energy, including water pumping for potable water supply, livestock watering, and small-scale irrigation. The principal renewable energy technologies will be photovoltaics, wind-power-driven electric turbines, and hybrid systems combining these two technologies. Installation of off-grid renewable energy systems will avoid the greenhouse gas emissions of the equivalent fossil fuel-generated electricity, while providing for sustainable development in Mexico.
USAID and DOE, $4 million from 1990 to 1996, Mexico

U.S.-Asia Environmental Partnership (US-AEP)
US-AEP, a joint effort among eleven U.S. government agencies, trade associations, the Asia Foundation and the Biodiversity Conservation Network, seeks to establish energy efficient and less polluting industrial regimes throughout Asia by mobilizing U.S. environmental experience, technology and practice, and linking them with the needs of private industry and governments in Asia and the Pacific. US-AEP develops these links in a variety of ways, including helping U.S. firms introduce their products, technology and services to the rapidly growing Asian market, providing assistance in waste reduction to industries in six ASEAN

countries, and sponsoring conferences and training workshops on environmental management and pollution prevention technologies. Another creation of US-AEP, the Environmental Technology Fund, awards grants to small and medium-sized U.S. firms to stimulate demand for and facilitate the transfer of energy efficiency and other environmental technologies to Asia and the Pacific. The Partnership's NGO-Business Environmental Partnership awards grants to Asian NGOs working collaboratively with business, public utilities, or local government in addressing environmental problems.
USAID-led, $117.5 million from 1992 to 2002, 35 Asian and Pacific Basin countries

Energy Conservation and Environment Project (ECEP)
ECEP is designed to (a) promote and accelerate the adoption of improved commercial technologies, processes, and practices to increase energy efficiency and (b) enhance Egyptian institutional capability to implement energy efficiency measures. The project is thus demonstrating proven energy efficient technologies which can help private and public-sector enterprises adjust to the higher energy costs that will emerge as the Egyptian government deregulates prices. ECEP focuses on ten different technology applications: cogeneration, waste heat recovery, combustion control, power factor correction, high-efficiency lighting, high-efficiency motors, energy management systems, process controls, solid fuel boilers, and insulation and refractors. Forty demonstrations of these technologies are planned during the life of the project at an equipment cost of roughly $23 million. The remaining funds cover technical assistance, training and promotion.
USAID, $50 million from 1989 to 1998

Ukrainian Clean Coal Power Plant Upgrade
As part of a $2.4 million cooperative U.S.-Ukraine project financed by USAID, DOE's Pittsburgh Energy Technology Center (PETC) is identifying cost-effective ways of burning indigenous, low quality anthracite coal to avoid the need for supplementary imported fuels. In addition, the study is identifying ways to increase the life of existing power plants and increase power output.

The primary goal of this work is to provide alternative supplies of electric power so that the remaining 1800 MW of generating capacity still in use at Chernobyl can be replaced. A PETC study has concluded that coal preparation and circulating fluidized bed (CFB) combustors can be used to increase generation efficiency, thus reducing greenhouse gas emissions. The next step, scheduled for early 1997, includes testing Ukrainian coal in a CFB boiler.

Lebowa Minerals Trust and Southern Africa Coal-Bed Methane Projects
Coalbed methane projects in these areas are important as an alternative fuel for the residential, commercial and industrial sectors. In some areas, where potable water is in short supply, these projects could also supply a source of potable water for household and agricultural use. Its capture and use as a fuel contributes significantly to the reduction of greenhouse gas emissions. Several pre-feasibility studies were completed and submitted to TDA in 1996.

Russian-American Fuel Cell Consortium (RAFCO)
RAFCO is a joint U.S.-Russian consortium that will focus on the development of fuel cell technology both in the U.S. and in Russia. RAFCO will draw on the scientific and engineering expertise of both nations to advance the development of commercially viable fuel cell technologies and promote defense conversion goals. American industry is expected to play a pivotal role in the consortium's projects and has committed to cost-sharing projects. Seven initial projects dealing with key technological impediments to speedy commercialization have already been identified.
DOE, $5-10 million from 1997 to 2001, Russia.

Renewable Energy for South Africa
DOE and USAID have been instrumental in developing business plans for the solar home system market in South Africa, with the initial pilot of 2500 solar systems being installed in late 1996 or early 1997. Approximately 20% of South Africa's rural population is expected to remain unconnected to the electricity grid for at least 20 years. The South African government has elected to shoulder the costs to electrify 2000 clinics and 16,800 schools through photovoltaics, but is seeking long term sustainable solutions for electrifying an estimated 2.5 million homes and 100,000 small businesses. The Renewable Energy for South Africa project, or REFSA, was established to carry out this task..
DOE, USAID $3 million in 1996 and 1997; South Africa

Santiago Clean Cities Project
This project issued from the Hemispheric Energy Symposium and involves collaboration between DOE and the Chilean National Energy Commission to explore the possibility of introducing natural gas buses into the transportation mix for the city of Santiago. The city of Santiago and its stakeholders will form a task force which will develop a strategy for improving the city's air quality.
DOE, $40,000 in 1996 and 1997; Chile

Regional Mitigation Projects

Recognizing the global threat of climate change to both developed and developing countries, USAID identified curbing climate change and protecting biodiversity as its two global environmental priorities. The U.S. is committed to assisting developing countries and countries with economies in transition to reduce the growth of net greenhouse gas emissions through approaches that contribute to economic growth and local environmental protection. USAID places particular emphasis on a set of key countries: Brazil, Central Africa (as a region), India, Indonesia, Kazakstan, Mexico, the Philippines, Poland, Russia and Ukraine.

As part of this effort and as a component of the U.S. contribution to the international Climate Technology Initiative announced by OECD countries in April 1995, USAID developed four new climate change initiatives, totaling over $70 million:

- Asia - Asia Sustainable Energy Initiative ($13.5 million)
- Latin America and the Caribbean - Environmental Initiative for the Americas ($9.7 million)
- Central and Eastern Europe and the Newly Independent States - Environmental Improvement through Increased Energy Efficiency, Market Reform and Improved Natural Resource Management (approximately $50 million)
- Africa - Central African Regional Program for the Environment ($26.5 million)

To support these regional initiatives and to advance the implementation of USAID's Global Climate Change Strategy, an additional $8.5 million was devoted in FY 1995 to a Global Climate Change Initiative. The initiative supports activities in working with USAID missions to support (1) national climate change action planning efforts; (2) climate change technology needs assessments; (3) projects to help countries begin to mitigate greenhouse gas emissions through energy efficiency, renewable energy, transport, and urban infrastructure activities; (4) activities to enhance existing carbon sinks and create new carbon sinks; and (5) outreach, education and institutional capacity building.

The four regional initiatives complement USAID's existing programs and commitments to help countries address climate change issues in the context of their overall sustainable development programs.

Asia Sustainable Energy Initiative (ASEI)
The ASEI is designed to foster the development and implementation of energy production and distribution strategies that reduce greenhouse gas emissions and support economic growth while minimizing economic and environmental costs. The initiative provides a sustainable approach to meeting the growing demand for energy services by supporting (1) increased institutional capacity for integrated resource planning; (2) pilot investment projects in energy efficiency and renewable energy technologies; (3) innovative financing mechanisms for energy efficiency and renewable energy activities; and (4) technology partnerships between U.S. and host country institutions.

The program focuses on three key countries in Asia – India, Indonesia and the Philippines – and has five primary components: (1) placement of resident Sustainable Energy Advisors in the USAID mission in each country; (2) implementation grants to identify and support pilot energy efficiency and renewable energy activities; (3) a training and technical assistance program that will work with representatives from the three countries to build capacity to implement sustainable energy programs; (4) utility partnerships to match senior technical staff from U.S. and in-country utilities for short-term technical assistance; and (5) environmental exchanges to bring senior policy makers and technical representatives to the U.S. for relevant training and course work.
USAID, $9 million from 1995 to 1997, India, Indonesia and the Philippines

Energy Policy Reform in India
This program is assisting Indian efforts at energy policy reform. It builds on earlier demonstrations of sugar cane bagasse cogeneration. Using reform in one State, the program will demonstrate the impact of policy reform in encouraging expanded access to private sector energy sources, opening markets and creating opportunities for the use of new renewable energy technologies. Cogeneration options from biomass and other renewables such as wind, hydro and solar power will also be explored and demonstrated.
USAID, $5 million from 1995 to 1997, India

Environmental Initiative for the Americas (EIA)
The EIA addresses global climate change in Mexico, Central America and Brazil as well as environmental pollution and related issues in the region. The EIA helps disseminate and build markets for U.S. environmental technology in Latin America and the Caribbean (LAC) through partnerships between U.S. and regional governments, private sector companies and NGOs. EIA has four main components: sustainable energy production and use; trade and environmental regulatory integration; urban and industrial pollution mitigation and prevention; and coastal and marine ecosystem conservation. Primary activities include: (1) leveraging multilateral and private sources of capital to facilitate technology investment; (2) establishing on-the-ground advisors to support technical assistance efforts; (3) supporting training and information dissemination to build implementation and enforcement capacity; and (4) promoting institutional policy reform to standardize regulation and policy enforcement levels to encourage more sustainable development.

EIA's global climate change component highlights the links of sustainable energy production and use with the growth of LAC economies, the demand for energy services of rapidly growing urban populations, the need to reduce the poverty of marginalized rural and indigenous peoples, and the need to reduce greenhouse gas emissions from fossil fuel use and unsustainable wood burning. The following approaches are used to address the region's sustainable energy needs:

Energy Efficiency: EIA supports partnerships between U.S. and local organizations that promote transfer of energy efficiency technologies for residential and industrial use, technical exchanges between U.S. utilities and regulatory agencies and LAC public and private energy organizations, and policies that support private production and free market pricing.

Renewable Energy: EIA supports partnerships between U.S. and LAC organizations to promote the assessment, financing, design and use of small-scale renewable energy activities to enable those beyond the electric grid system to receive energy services.
USAID, $9.5 million from 1995 to 1997, Brazil, Mexico, Central America

Central and Eastern Europe and the Newly Independent States
USAID energy assistance programs in Central and Eastern Europe and the Newly Independent States help countries reduce greenhouse gas emissions through improvements in the efficiency of energy production and consumption, and by supporting market reforms.

Technical assistance and limited commodities and training support power sector restructuring, energy efficiency, and nuclear power plant safety. Climate change activities under the Initiative include:

Russian Federation — Approximately $42 million

- $35 million of the equipment to be imported in 1995 under the Energy and Environmental Commodity Import Program will go toward reducing greenhouse gas emissions from oil, coal, gas and heavy industry in dozens of locations around the country.
- Technical assistance to perform the analyses necessary to complete a loan to build a combined cycle, natural gas power station that will introduce a much cleaner power production technology to Russian utilities.
- Activities with regional electric utilities, including partnerships with U.S. utilities, to introduce demand-side management and energy efficiency programs.
- The Russian Far East Sustainable Natural Resource Management Project, which has three integrated components: (1) strengthening policy and institutional frameworks; (2) promoting sustainable forest management in the Khabarovsk and Primorskii Territories; and (3) enhancing protection of endangered species and critical habitat in the Sikhote-Alin Mountain Region.

Poland — Approximately $2 million

- A new regional energy efficiency project to demonstrate demand-side management approaches with distribution companies, including the installation of U.S. energy efficiency equipment in industrial facilities, as part of a cooperative effort with the World Bank.
- A new restructuring and regulatory reform project is supporting market reform of the power sector to promote competition, energy efficiency and environmental retrofit of coal-fired power plants.

Ukraine — Approximately $4 million

- A three-pronged approach to energy efficiency includes: (1) energy audits and energy efficiency equipment installation in six combined power/heat plants which are using coal and gas; (2) industry energy audits and management improvements in five major industrial facilities; and (3) demand-side management demonstrations at two distribution companies designed to lead to multilateral bank funding of expanded activities.

Kazakstan — Approximately $2 million

- Two technical assistance studies are investigating opportunities to improve the efficiency and environmental performance of coal-fired power/heat plants in the country.
- A series of workshops to improve the institutional capability of Kazakstan and its four

neighbors in the region (Kyrgyzstan, Turkmenistan, Tajikistan, and Uzbekistan) to trade electricity, and ultimately other energy commodities on a more internationally accepted commercial basis. Such trading will allow cleaner and more cost-effective fuels to come to the market.

USAID, approximately $50 million from 1995 to 1997, Central and Eastern Europe, Russia, the Newly Independent States

Central African Regional Program for the Environment (CARPE)

CARPE is aimed at reducing deforestation of tropical forests in the Congo Basin by establishing conditions and practices necessary for conservation and sustainable use. Through such activities as testing and demonstration of conservation approaches, capacity-building for key institutions in the region, training, technical support, and information dissemination, the project seeks to improve understanding of the overall ecology and biodiversity of the Congo Basin and develop long-term strategies for addressing climate change and biodiversity problems. The program is also designed to create policy environments conducive to conservation and to develop a cadre of trained African specialists who can effectively impress on governments and the general public in the region the value and importance of conservation.

USAID, $26.5 million from 1996 to 1998, Central African Republic, the Congo, Equatorial Guinea, Gabon, Zaire

Information Sharing and Trade Facilitation

A critical element of technology transfer is making information about available technologies easily accessible to foreign government agencies and private sector firms, and helping them secure financing for beneficial technologies. The benefits of effective information sharing and trade-facilitation programs in promoting the transfer of technologies that can mitigate greenhouse gas emissions are far greater than their relatively modest funding levels might indicate.

Often the only obstacle to successful technology transfer is lack of information. Project planners in developing countries may not have ready access to information about the latest energy efficient or renewable energy technologies. Similarly, U.S. companies, especially smaller firms engaged in developing renewable energy technologies, may lack information about international market opportunities for these technologies. Furthermore, traditional project financing has been geared toward large-scale, new generation projects, rather than toward smaller-scale renewable or demand-side management projects.

Accordingly, the United States has established an array of information clearinghouses aimed at stimulating the flow of information about technologies and opportunities to reduce greenhouse gas emissions, and trade-facilitation programs aimed at promoting the most beneficial of U.S. exports: technologies to reduce emissions of the greenhouse gases that threaten our shared climate.

Committee on Renewable Energy Commerce and Trade (CORECT)
CORECT is an interagency working group that facilitates the use of U.S. renewable energy products and services worldwide by bringing together potential foreign customers and decision makers, funding sources, and U.S. industry.
14 US agencies; $4 million in 1995 and 1996; Worldwide

Americas' 21st Century Program
As the initial implementation of CORECT's regional strategy for the Western Hemisphere, "A21" aimed at building a strong business and industrial capacity through renewable energy products and services. It sought to identify and evaluate project opportunities and technical assistance needs to develop a framework to conduct sustainable energy projects, to provide limited cost-sharing of project expenses, and to aggregate projects into portfolios for financing by multilateral development banks and commercial banks.
14 USG agencies; $3.5 million in 1995; Western Hemisphere

Energy Efficiency and Sustainable Development Centers
This project has established centers in Bulgaria, the Czech Republic, Poland, Russia, China and Ukraine to facilitate the transfer of U.S. renewable energy and energy efficiency technologies. The centers arrange contacts with regional energy decision makers and provide marketing assistance for U.S. business representatives, while serving as local centers of expertise and information. These nonprofit, independent local organizations promote economic policy reform and transfer of technologies through their advocacy work, demonstration projects, sectoral studies, seminars, business partnership events and other activities.
DOE, USAID; $600,000 in 1995 and 1996; Eastern Europe and Newly Independent States

Coal and Technology Export Program
This program helps foreign countries that use coal widely to reduce their greenhouse gas emissions, while continuing to meet their energy needs, by developing efficient, economic, and environmentally acceptable coal projects using U.S. clean-coal technologies. By producing comparable amounts of power using less fuel, these technologies can reduce CO2 emissions by 20-25 percent, while cutting acid-rain emissions that can degrade forest carbon sinks.
DOE, TDA, SBA; $1.9 million in 1995 and 1996; Asia, Eastern Europe, NIS

U.S. - India Cooperation on Energy Efficiency
A Memorandum of Understanding was signed in July 1994 between DOE and the Indian Ministry of Power. Subsequently, DOE and the Government of India agreed to cooperate in the following areas: industrial process efficiency of the pulp and paper, mini-steel, and chlor-alkali industries; utility programs; electric motors and motor systems; cogeneration; transmission and distribution of electricity; energy efficiency labeling, standards, and testing; education and training; finance; and sustainable cities. To execute this cooperation, the U.S. and India agreed to form teams in each of the above areas and to draft action plans. Some team activities are underway, for example, the Electric Motors team is cooperating with the

Indian team in implementation of showcase demonstration projects in India. Successful replication of these demonstration projects will reduce energy consumption and emissions of greenhouse gases.

In India, DOE also sponsored a "United States Workshop on Clean Coal Technologies" in conjunction with the "Energy Summit '96" Conference convened by the Confederation of Indian Industry in Madras. The September 13, 1996 workshop was cosponsored by the Electric Power Research Institute (EPRI). Over 110 registrants participated in discussions of the applicability of clean coal technologies to Indian electric utility and industrial needs with emphasis on the characteristics of high-ash Indian coals. Because of the nature of Indian coals, DOE has provided technical assistance for the erection of a Fuels Evaluation Test Facility (FETF) at Trichy which is the first state-of-the-art pilot scale coal combustion test facility in South Asia. The FETF was inaugurated in 1994 and initial testing of high-ash Indian coal and facility calibration is now underway.

U.S. - China Cooperation on Energy Efficiency

In February 1995, DOE and the China State Science and Technology Commission signed a Protocol for Cooperation in the Fields of Energy Efficiency and Renewable Energy Technology Development and Utilization. The Energy Efficiency Annex to this Protocol was signed in October 1996. The objectives of cooperation under this Annex are to develop strategies to promote sustainable development, to expedite the introduction of technically feasible and cost-effective energy efficiency technologies and to assist China to achieve energy efficiency targets over the next five years. Activities under the Annex encompass energy efficiency policy; information exchange and business outreach; district heating; cogeneration; energy efficient building demonstration; energy efficient motor systems; industrial process control; lighting; energy efficient electrical transformers, and finance. U.S.-China teams have been formed in each area and are refining action plans.

U.S. - Ghana Cooperation on Energy Efficiency

DOE and the Ghanaian Ministry of Mines and Energy began collaborating in Spring of 1995 and signed an agreement on Cooperation in Energy Policy, Science and Technology, and Development. The areas of cooperation under this agreement include energy efficiency and renewable energy; fossil energy, including clean coal technology; environmental management; and independent power project development. In 1996, a Ghanaian delegation visited the U.S., during which time the Ghanaians learned about the operation and management of DOE's Industrial Assessment Center program. In this program, university centers conduct energy and waste assessments in small and medium size companies to reveal opportunities to improve energy efficiency and reduce waste and thereby increase productivity and profits while mitigating negative environmental impacts. Ghana is establishing a similar center at the University of Science and Technology in Kumasi.

U.S.-Mexico Cooperation

On May 7, 1996, representatives from the United States Department of Energy and the Mexican Secretariat of Energy signed an Agreement for Energy Cooperation which will be in

force for five years and may be extended. Among the objectives of the Agreement are to develop a framework for cooperation between the two parties to facilitate the establishment of collaborative activities in the fields of research, development and commercialization to promote improved use of renewable energy and energy efficiency and fossil energy technologies. In the months following the agreement, technical staff members from both agencies began the process of identifying areas for cooperation.

Promoting International Energy and Water Efficiency
The present low level of energy efficiency investments is an important market failure. Barriers to energy efficiency financing include unreliability of energy savings, high transactions costs (because most deals are done differently), and the inability to bundle deals together because there is no standard approach to developing energy efficiency deals.

To overcome these barriers, DOE in 1994 initiated an effort to develop a national and international standard on how to implement, measure and verify efficiency savings. This was done through a public-private partnership involving U.S., Canadian and Mexican industry and energy organizations and several finance firms. Published in early 1996, the Building Measurement and Verification Protocol (BMVP) has been widely adopted in the U.S., Canada and Mexico and is being translated into Russian, Portuguese, French, Spanish and Hungarian. A growing range of governments, businesses and NGOs are joining the protocol development process to refine and extend its application. DOE worked with the World Bank to help structure $350 million in new financing for large scale efficiency projects that require use of the Protocol, with other projects under development.

Low Smoke Fuels Project
On May 29-31, 1996, DOE along with seven U.S. businesses conducted the U.S./Republic of South Africa low smoke fuels workshop in Pretoria, South Africa. Workshop participants generated a set of recommendations for joint testing to implement low smoke fuel alternatives. Prior to this workshop, South Africans visited the U.S. in March 1996 to discuss activities related to low smoke fuels, clean coal technologies with the delivery of energy efficient housing and to learn about U.S. coal bed methane and natural gas research and commercial projects. The South Africans met with over 30 U.S. businesses and nongovernmental organizations to discuss fuel processing technologies for raw coal, waste coal fines, and biomass resources, and low cost, energy efficient housing designs and new construction materials. In March 1996, an energy efficient house was dedicated in Kimberly, South Africa. It is the intent of DOE to integrate low smoke fuel stoves for heating and cooking in this demonstration house and possibly in homes in two other South African townships.

U.S. Initiative on Joint Implementation
The USIJI is a pilot program to reduce greenhouse gas emissions and establish an empirical basis and framework for approaches to joint implementation (JI). The program provides a flexible, nonregulatory approach to encouraging international partnerships in environmentally sound projects that reduce or sequester greenhouse gas emissions. USIJI encourages

partnerships between businesses and nongovernmental organizations in the U.S. and developing countries, offering the potential to achieve greater emission reductions worldwide than would be possible with each country acting alone. The program also spurs technology cooperation by increasing the access of developing countries to energy efficient, renewable energy, and other environmentally friendly technologies.
USIJI: $5 million in 1995 and 1996; Worldwide

PV Manufacturing Facility
The United States, through the Department of Energy's National Renewable Energy Laboratory, helped facilitate the first investment in Suncorp Systems, the sister company of U.S. Suncorp Manufacturing, which intends to sell solar home systems throughout the South and possibly Southern Africa via a network of franchises. A photovoltaic (PV) manufacturing facility was opened in August 1995 in South Africa. The plant has been in a positive cash flow status since November 1995, and when full capacity is reached, it will produce 1.4 MW annually.

Southern African Regional Power Pooling Project
The purpose of this project is to support South Africa and the Southern African Development Community (SADC) in their efforts to provide electric power through an efficient regional power pool. Improving regional access to electric power will yield significant reductions in CO2 emissions and improve the viability of existing sinks by decreasing the rate of uncontrolled burning of fossil fuels, wood, and biomass, which in turn will decrease the rate of deforestation, and improve conditions for afforestation. There is a considerable body of U.S. expertise and "lessons learned" that can be capitalized upon by the twelve nations of the SADC. Initially, the project will be embodied in a regional power pooling workshop, to be convened in southern Africa, to address the governance, institutional, technical, and financial issues that must be resolved.

Renewable Energy for Africa Development Training
In the summer of 1994, DOE and Texas Southern University sponsored training sessions of approximately 25 faculty members from several southern African nations on applied renewable energy technologies. The training was facilitated through the efforts of Renewable Energy for Africa Development, or REFAD, a nongovernmental organization dedicated to the sustainable development of renewable energy technologies in Africa. The program will train cadres of renewable energy trainers to serve as cores of programs in secondary and post secondary education institutions in Africa. The second session was held at Peninsula Technikon in South Africa from June 24 to July 12, 1996.

Capacity Building in South Africa
DOE has been instrumental in sponsoring three other training programs. The Research and Manufacturing Training for South African business owners trained eight South African participants at the DOE Oak Ridge Laboratory in November 1995. The next class is scheduled for September 1996. The U.S. Private Businesses, Utilities and DOE Laboratory Training Program is intended to sharpen and improve the business and technical skills of

South African business people and students. This is a technical exchange program between 50 South Africans, U.S. private businesses, U.S. utility companies and DOE Laboratories. The third program is an educational exchange program between South African's Technikon of Northern Transvaal (TNT) and U.S. universities. Three TNT students have been selected to attend Langston University, Florida A&M University and North Carolina A&T in August 1996. TNT is in the process of selecting two U.S. professors to attend their university.

Bilateral Assistance for Adaptation
Aware of the vulnerability of many developing countries to rising sea levels, drought, increased frequency and severity of storms, flooding, and other effects of climate change, the United States is also engaged in efforts to help countries adapt to these effects. Some of these adaptation programs address current problems, such as flooding in Bangladesh, coral reef degradation, and desertification in the Sahel. These problems are not currently attributable to climate change, but they are likely to become more severe with climate change. The United States is also engaged in a number of research projects aimed at developing drought- or heat-resistant crops to alleviate potential effects of climate change on agriculture. In addition, the U.S. Country Studies Program offers specific assistance to countries seeking to assess and minimize their vulnerability to climate change.

Famine Early Warning Systems
These projects aim to ensure food security in famine-prone African countries by developing a famine early warning system (FEWS) within USAID, improving early warning capacity in host countries, and increasing cooperation among international donors. Institutional capacities being developed, including the development of surveillance and reporting methods, would be important adaptive mechanisms under a changed climate, especially one with lower and less reliable rainfall. The current project will reinforce existing African early warning programs for food and nutrition problems and famine, and develop or expand warning systems in semi-arid and drought-prone countries outside the Sahel. It will also explore ways to link and apply early warning technology and experience to food security and other agricultural development issues.
USAID, $9.2 million from 1990 to 1992 and $40 million from 1993 to 1999, Africa

Sahel Water Data and Management III and IV
This project aims to improve water resources management in the Sahel, which had below normal rainfall in the 1980s and early 1990s. The project supports the regional Agrometeorological/Hydrological (AGRHYMET) program by providing computer hardware and software, technical assistance, and training. With this assistance, AGRHYMET will be able to collect, analyze, and disseminate climatic, hydrologic, and meteorologic information to forecast crop production. The region-wide water resource monitoring, data gathering, and dissemination capabilities built up by this long-term project constitute an important underpinning for observing and coping with future climate change and attendant weather variability. Current areas of concentration are: (1) institutional capacity leading to Sahelianization, (2) new products and applications in famine early warning, agricultural

production, and natural resources management, and (3) pilot activities, especially using geographic information systems (GIS) applications.
USAID, $21.23 million from 1987 to 1994 and $12.82 million from 1994 to 1997, Sahel region

Senegalese Southern Zone Water Management
Lower than normal rainfall in the 1980s resulted in extended tidal flooding of low-lying deltaic rice farms, as the coastal wetlands, which normally were saturated with rainwater and thus kept the sea at bay, absorbed the seawater. This scenario could become widespread in West Africa with sea level rise and, in semi-arid areas, less rainfall. This project, which aims to increase cereal production in southern Senegal by improving farmer recovery of land and use of water for agricultural production includes environmental monitoring, and construction of water retention structures and tidal barrages in cooperation with village water management committees. Activities such as these are what may be required on a more general basis to protect coastal deltas in the face of drier climates and sea level rise.
USAID, $18 million from 1988 to 1996, Senegal

III. MULTILATERAL FORA

Along with its bilateral activities, the United States works within various multilateral fora to address the problem of global climate change. Numerous organizations have integrated climate-related activities into their operations since the Framework Convention on Climate Change entered into force. The United States actively supports this development, recognizing that multilateral efforts are essential in order to achieve progress on the climate change issue. Owing to its heavy technical and financial responsibilities in many multilateral fora, the U.S. plays a leadership role in advancing climate-related objectives in appropriate organizations. This section describes the U.S. role in, and contributions to, some of the chief financial and policymaking bodies relevant to the climate change issue.

Framework Convention on Climate Change

The United States showed its commitment to the objectives of the Climate Convention by promptly ratifying it on October 15, 1992, the fourth country to do so. The U.S. has been a very active player in both Conferences of the Parties as well as in the negotiations under the Berlin Mandate leading toward addressing climate change in the 21st century. The U.S. Initiative on Joint Implementation has received strong support to assist in the development of an international joint implementation program under the terms of the Convention.

Other Relevant Conventions and Agreements

The United States is also a party to several other international agreements that control greenhouse gases:

- The 1985 Vienna Convention for the Protection of the Ozone Layer and its 1987 Montreal Protocol on Substances That Deplete the Ozone Layer
- The Geneva Convention on Long-Range Transboundary Air Pollution and its NOx Protocol
- The U.S.-Canada Air Quality Agreement
- The Commission on Sustainable Development
- The Commission on Environmental Cooperation

Global Environment Facility

The Global Environment Facility (GEF) was established in 1991 as a three-year pilot program to help developing countries meet the global challenges of climate change and ozone depletion, the loss of biodiversity, and the pollution of international waters. In March 1994, negotiations for restructuring the GEF were concluded. A Secretariat was created independent of the three administering agencies which had managed the pilot program (the World Bank, the United Nations Development Programme, and the United Nations Environment Programme). A council of 32 members representing participating countries now convenes biannually to adopt, review, and evaluate the operational policies of the Facility.

The United States believes that the GEF should serve as the financial mechanism for the Climate Change and Biodiversity conventions. To support this endeavor, the United States pledged $430 million (out of a $2 billion total) to the GEF's replenishment covering the years 1995-97. Unfortunately, the U.S. was unable to pay its pledges in full, due to severe domestic budgetary restraints. Nevertheless, the United States is committed to the success of the GEF, and intends to play an important role in the negotiations for the next replenishment.

USAID Parallel-Financed GEF Activities

The U.S. government supported the first three-year Pilot Phase of the GEF with over $150 million in parallel-financed GEF projects managed by the U.S. Agency for International Development (USAID) and with cofinancing of other GEF activities. Parallel-financed projects were developed by USAID, rather than by the GEF, but adhere to GEF guidelines. Six of the parallel-financed GEF projects are in the GEF climate change focal area.

USAID is assisting the Government of India in developing a pace-setting $19 million GEF Greenhouse Gas Pollution Reduction Project to promote efficient coal combustion and to increase the use of renewable biomass in the power sector. In the Philippines, the parallel GEF Demand-Side Management Project will provide technical assistance and financing to

help establish and sustain commercial energy-conservation investments and service mechanisms in the industrial sector. In Ukraine, USAID is helping develop a GEF coal-bed methane project. USAID is also working cooperatively with five Latin American and Asian countries in developing renewable energy projects that catalyze the cooperation of governmental and nongovernmental organizations. These projects are described in further detail in the Technical Assistance section of this chapter.

Core-Funded Projects

In addition to these parallel projects, USAID has worked with the GEF in developing several GEF core-funded climate change projects. **(Need more info on how the core-funded process works)** These include preinvestment assistance for the Costa Rica Grid-integrated Windpower and Mexico Electric Power End-Use Efficiency Projects.

Analytical Support

USAID also provided instrumental start-up funding to the Program for Measuring Incremental Costs for the Environment, which is designed to provide operational guidance on how to resolve a number of methodological issues on incremental costs fundamental to the GEF and to the climate and biodiversity conventions, to which the GEF is linked. The results of this project will provide the technical underpinning for the development of financing policies and project selection criteria for the next phase of the GEF.

Multilateral Development Banks (MDBs)

The United States believes that the multilateral development banks (MDBs) represent a powerful tool for implementing environmental policy goals. The United States has urged the MDB's to reassess the use of their resources with a view toward encouraging sustainable development. Much progress has been made in this area in recent years, as awareness of the necessity that economic growth be sustainable has become widespread.

- The African Development Bank (ADB) focuses on capacity development in borrowing countries to build up the institutional, statutory, and regulatory framework necessary for the implementation of an integrated least-cost planning approach that encompasses energy supply and efficiency, and the environment. The African Development Bank is also working on the development of renewable and alternative energy sources.

- The Asian Development Bank is allocating more resources to focus on energy efficiency and conservation, non-conventional energy resource development, and intensified environmental initiatives. TheAsian Development Bank's policies concentrate on moderating energy demand, improving efficiency in resource allocation, and strengthening institutions for national energy-conservation activities, with greater focus on policy analysis.

- The European Bank for Reconstruction and Development (EBRD)'s energy operations aim primarily at improving energy efficiency, both in supply, by reducing conversion and distribution losses, and in demand. To address these aims, the EBRD promotes pricing reform, improved standards for insulation, and the introduction of more energy efficient technology. Bank assistance will be based on least-cost energy plans or, preferably, an integrated resources planning strategy. The EBRD plans to hire an energy efficiency expert to work solely on expanding Bank efforts in this area.

- As part of its capital-replenishment agreement, the Inter-American Development Bank (IDB) undertook to promote the conservation and efficient use of energy in its projects. The IDB will continue to assist borrowing countries in adopting energy development strategies that are environmentally sustainable by: (1) elaborating on integrated least-cost energy development plans and, where such plans do not exist, supporting the development of such plans; (2) promoting the efficient use of energy in all economic sectors; and (3) developing and carrying out regional energy integration programs.

- World Bank policy states that energy lending will be based on integrated least cost energy plans, with emphasis on energy efficiency, demand side management, and the exploitation of renewable energy sources. The World Bank is also playing a major role in the GEF, where it is responsible for the majority of GEF investment operations to reduce greenhouse gas emissions.

The United States continues to urge the MDBs to increase their lending, and their staff positions in, and emphasis on, the areas of renewable energy and energy efficiency. The United States also encourages the banks to consider the impact of their lending on the global climate through the use of enhanced environmental impact assessments.

International Energy Agency

The IEA is an autonomous body established in 1974 within the OECD framework to cooperate in energy matters. To support its members in their commitments to reduce their greenhouse gas emissions, the IEA is engaged in a growing number of activities related to climate change. These range from a study on transport, energy, and environment for the Intergovernmental Panel on Climate Change to an assessment of comparability of national climate policies for use by the INC. Environmental considerations carry over into the work programs of virtually every sector of the IEA. The United States in the IEA has funded several initiatives under the auspices of IEA and other energy-related fora.

Greenhouse Gas Technology Information Initiative

Known as GREENTIE, this initiative aims to identify energy technologies that mitigate greenhouse gas emissions and have the potential for international deployment, that increase the awareness of potential decision makers and users by disseminating information on those technologies to specific target areas and groups, and that engage the relevant industries in

international technology deployment. The United States contributed $500,000 to GREENTIE in 1995 and 1996.

Center for the Analysis and Dissemination of Demonstrated Energy Technologies
CADDET was established under an IEA agreement to disseminate information on demonstrated energy efficiency and renewable energy technologies among CADDET member countries. U.S. funding for CADDET was $1.5 million in 1995 and 1996.

Greenhouse Gas R&D Program
Sponsored by fourteen countries, this program is currently conducting full fuel-cycle analyses of conventional and advanced power generation systems, sponsoring conferences, and evaluating novel strategies to reduce CO2 emissions. U.S. funding for this program was $200,000 in 1994.

Asia-Pacific Economic Cooperation

APEC is a ministerial-level agreement to promote the economic and social well-being of the Asia-Pacific region through economic cooperation. The United States has the lead in the energy efficiency area, which focuses on workshops and seminars on energy efficiency technologies and practices, and develops programs for mitigating greenhouse gas emissions using energy technology. The emphasis of these programs is training and information exchange, analysis of options and mutually agreed technology research and development. An example of an activity with direct relevance to greenhouse gas abatement is the APEC Joint Multilateral Demonstration Project for the Recovery and Utilization of Coal Mine Gas being carried out in the People's Republic of China. The United States contributed $1.3 million to APEC in 1995 and 1996.

Other Fora

The United States actively participates in the work of numerous other international organizations and agreements related to climate change. The U.S. role in the Intergovernmental Panel on Climate Change (IPCC), which evaluates and assesses the available scientific literature on climate change, is detailed in Chapter 6, Research, together with U.S. contributions to the World Meteorological Organization and the United Nations Environment Programme. Other organizations with climate change activities include the the OECD, the International Atomic Energy Agency, and the United Nations Food and Agriculture Organization.

Box on Sustainable Energy Cooperation in the Western Hemisphere

Sustainable Energy Cooperation in the Western Hemisphere

In follow-up to the 1994 Summit of the Americas hosted by President Clinton, the U.S. Department of Energy and the Venezuelan Ministry of Energy and Mines established a cooperative process to implement the Summit of the Americas energy action plan. The action plan outlines commitments designed to promote increased sustainable energy development in the hemisphere, including increased investment in renewable energy, energy efficiency, and cleaner conventional energy sources. As a first step in this process, DOE and the Venezuelan Ministry of Energy and Mines co-chaired the October 1995 Hemispheric Energy Symposium in Washington, D.C. Symposium representatives from governmental, private, and nongovernmental sectors identified over 40 action items which have been organized into eight working groups, each with a country or organizational lead. These working groups include rural electrification (Chile), regulatory cooperation (Argentina), clean energy (OLADE/REIA), energy efficiency (Brazil), and climate change (U.S.). This cooperation has focused on the development of joint strategies, project development, and information exchange on policies, projects, technologies, and financing availability for sustainable energy development in the Americas.

In order to assess the progress made to date in the Hemispheric energy cooperation, the Government of Bolivia hosted the Hemispheric Energy Ministers Meeting, July 31-August 2, 1996. The ministers provided guidance and developed recommendations for next steps, and agreed to an action plan of items to complete by the December Hemispheric Summit on Sustainable Development. Private sector representatives from around the region provided their comments and suggestions for each of the working groups, and established a list of priority activities by DOE for its cooperation with the governments of the Hemisphere. Next steps include broadening participation, increasing financial resources for the activities and operation, and the potential institutionalization of the hemispheric cooperation.

In addition to the Hemispheric activities, the Summit of the Americas has strengthened relationships between the United States Government and the governments in the Hemisphere. In addition to the Hemispheric cooperation, bilateral and regional partnerships are helping to lead to policy and regulatory changes to provide a level playing field to more environmentally sound energy technologies, including renewable energy and energy efficiency investments. Increased awareness among countries in the Hemisphere, falling prices of relevant technologies, and greater private sector interest and engagement have all encouraged governmental leadership to promote more environmentally sound energy development.

Joint Implementation Offices

On a bilateral basis, DOE is supporting the establishment of national "joint implementation" offices in Chile and Bolivia. In cooperation with USAID, DOE is supporting the training of

Bolivian and Chilean personnel to establish and operate national joint implementation offices. Office personnel will engage in the identification and marketing of potential greenhouse gas emissions reducing projects, and will be required to evaluate these projects for investment by U.S. firms. DOE and the energy ministries of Chile and Bolivia have signed bilateral Statements of Intent to cooperate on joint implementation, which facilitate our government to government cooperation and the subsequent investments by U.S. firms in cost-effective projects to reduce greenhouse gas emissions and open new and growing markets to U.S. energy technologies.

Increased Investment in the Energy Sector

Under the Hemispheric Energy Cooperation, the World Bank, United Nations Development Program and the Inter-American Development Bank, signed a joint statement at the October 1995 Hemispheric Energy Symposium where these institutions outlined their commitments to support the activities of the Hemispheric Energy Ministers to promote sustainable energy development. As the lead for the financing working group, and at the request of the energy ministers, DOE is in the process of summarizing the available funds for clean energy technologies, so that partner governments can more readily access funding for clean energy projects.

Clean Energy Promotion

In order to ensure that cleaner energy options will be pursued for future energy use, a Hemispheric energy baseline has been prepared according to survey of current and projected energy usage. The survey is under evaluation for recommendations on next steps to promote cleaner and more efficient future energy generation and delivery. In addition, at least 10 fast track projects around the hemisphere have been identified, including renewable energy, cleaner fossil technologies and energy efficiency investments.

Energy Efficiency Standards

Under the energy efficiency cooperation led by Brazil, a framework for information exchange has been established, including a Hemispheric Efficiency Homepage jointly developed by the Brazilian Ministry of Energy and Mines and the U.S. Department of Energy. DOE and Natural Resources Canada have encouraged a focus on standards, labeling, and codes, with potential to move toward harmonization. Canada will host a Hemispheric conference on Harmonization early in 1997 to further the dialogue toward regional cooperation on standards for energy efficiency. Harmonization will facilitate trade and equipment compatibility, and standards are the easiest and least cost first step to increase energy efficiency.

Renewable Energy Training Center

In partnership with the governments of Barbados and St. Vincent, DOE and the National

Renewable Energy Laboratory (NREL) will establish a Caribbean renewable energy training center outfitted with NREL technologies in St. Vincent and host a Caribbean-wide renewable energy workshop and trade mission in Barbados, December 16-19, 1996.

Renewable Energy for Rural Electrification

A Hemisphere-wide survey on status of rural electrification has been completed and is under assessment for recommendations on future sustainable rural electrification. Preparations are underway for the establishment of a rural electrification clearinghouse in Santiago, Chile, to be opened in January, 1997. Over 100 planned and existing sustainable rural electrification projects have been identified for priority financing and/or replication.

Regulators Exchange Program

Under the Hemispheric regulatory cooperation led by Argentina, accomplishments to date include exchanging information for the development of an internet data base that will include: existing regulations in the natural gas and electricity sectors, a listing of training needs, and information on training availability. The Department of Energy and the National Association of Regulatory Utility Commissioners (NARUC) have signed an agreement to provide NARUC Commissioners for international regulatory training. Finally, to promote international energy investment, under consideration is a list of principles to be applied to each nations' regulatory apparatus and to specific international cooperative electricity or natural gas projects in the hemisphere.

USAID ENERGY PROGRAMS:
BRAZIL

I. BACKGROUND

As the largest country in Latin America, Brazil covers almost half of the continent and has 150 million inhabitants. By every indicator it is at the top of the list of countries significant to the U.S. for economic, social, and commercial reasons. Not only does Brazil's trading relationship with the U.S. continue to grow, but it is also an important U.S. diplomatic partner. Nevertheless, the country is plagued by problems in its energy sector: Brazil is expected to show considerable economic growth in the next few years resulting in increased demand for energy throughout the country. In order to support this anticipated growth, Brazil will need over 6,000 megawatts (MW) of additional generation capacity by the year 2000. While Brazil boasts the largest carbon sinks in Latin America, its rainforests are being cut down at an alarming rate, threatening to dramatically alter the world's CO2 balance. Moreover, increased fossil fuel use for industry and automobiles has helped to make Brazil the largest emitter of greenhouse gasses in the area.

Since the 1970s, the United States Agency for International Development (USAID) has been promoting environmentally-sound energy management. The Agency helps countries produce the energy needed for development while minimizing costs to health and environment. USAID focuses its energy activities in Brazil on: (1) fostering the use of commercially proven renewable energy technologies, (2) promoting the adoption of energy efficiency measures, (3) encouraging policy changes that result in increased participation of the private sector in the electricity subsector, (4) training individuals in sustainable energy production and use, and (5) developing and strengthening in-country capacity and institutions in order to ensure the sustainability of USAID's efforts. Generally, these goals are carried out through technical assistance and training/capacity building; however, USAID has also provided assistance with financing options, prefeasibility work, research, technology cooperation and environmental-technology trade promotion. In addition to its energy portfolio, USAID also undertakes energy and environmental technology activities in Brazil in support of environmentally-sound energy management.

Activities in Brazil are cooperative efforts of USAID/Brasilia, USAID's Office of Energy, Environment and Technology (EET) in Washington, the Government of Brazil, and many non-governmental organizations (NGOs) and private organizations. USAID also provides assistance to and leverages funds from the World Bank and Interamerican Development Bank (IDB), which are also active in Brazil's energy sector.

updated February 11, 1997

II. The Environmental Initiative for the Americas (EIA) and its Energy Components

■ EIA

As a result of agreements signed at the Summit of the Americas at which the U.S. agreed to form partnerships with its Latin American neighbors, USAID launched a comprehensive Brazil Energy Program (BEP) in September 1995. The two-year energy program is funded through USAID's Environmental Initiative for the Americas (EIA) with a total budget of $3.3 million. EIA is a joint initiative between the Global Bureau and the Latin America and the Caribbean Bureau; the activities of the USAID's Office of Energy, Environment, and Technology (EET) fall largely under the Global Climate Change mandate of this Initiative.

The aim of the EIA is to build on the Agency's current environmental portfolio in the Latin American and Caribbean region by drawing on expertise that resides in other United States Government agencies and the NGO community. The USAID portfolio consists of projects dealing with sustainable agriculture, watershed management, renewable energy, eco-tourism, and conservation of natural forests and biodiversity. The EIA will also allow USAID to expand its programs to address issues related to industrial and urban pollution, sustainable energy production, and coastal zone management.

The EIA's goal is to promote sustainable energy production and use by:

(1) embracing low cost, reliable, and clean systems,
(2) utilizing conservation principles and renewable energy sources, and
(3) improving management of power utilization and consumption in the urban, industrial, rural, and transportation sectors.

The three components that receive funding through the EIA to implement sustainable energy activites include the renewable energy, energy efficiency, and training programs.

(1) Renewable Energy Activities

The EIA's renewable energy component primarily focuses on:

- strengthening and assisting the Brazilian Energy Trade Association;
- establishing a Brazilian affiliate of the international network of Renewable Energy Project Support Offices (see below for details); and
- establishing a Brazilian affiliate of the international network of the Environmental Enterprises Assistance Fund (EEAF) to identify businesses and projects for investment and to work closely with banks in Brazil and elsewhere in order to leverage funds.

Renewable Energy Project Support Office (REPSO)

Through Winrock International USAID is building a network of NGOs to increase the use of renewable energy in developing countries. Known as 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. REPSOs are sponsored through the renewable energy activities of the EET in USAID's Center for Environment.

A REPSO office opened in Brazil during early 1996 in Salvador, Bahia. Partial funding was provided by the EIA. The REPSO is staffed by Winrock and industry experts of the U.S. Export Council for Renewable Energy (US/ECRE), a consortium of all U.S. renewable energy trade associations) to work with cooperatives, NGOs, and private companies interested in renewable energy projects. The REPSO 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. The four target areas of work are: industry collaboration, financial mechanisms for renewable energy projects, utility scale project identification and partnering, and organizational frameworks for rural renewable energy systems. Some of the REPSO's recent activities include:

(1) launching a solicitation for proposals to share the costs of renewable energy project preinvestment studies;

(2) working with USAID in Brazil to investigate a large bioenergy project in the region dotted with sawmills, as well as ways of integrating such a project into other environmental and development projects in the region;

(3) jointly sponsoring and planning an annual conference for the Associacao Brasileira das Empresas de Energia Renovavel e Eficiencia Energetica (ABEER), the Brazilian renewable energy trade association -- The conference, was held from August 5 to 9 in Salvador, Bahia, and was jointly sponsored by USAID, the Federal Ministry of Mines and Energy, Petrobras, COELBA (the state of Bahia utility), and others. Last year this event was opened by the President of Brazil;

(4) providing training and technical assistance for Brazilian rural electric cooperatives through a subcontract with the National Rural Electriv Cooperative Association (NRECA);

(5) funding a study of productive uses for renewable energy in Brazil;

(6) developing a workshop on the role of gender in productive uses of renewable energy; and

(7) through funding from EET's Biomass Energy Systems and Technology (BEST) project, conducting research into the net carbon emissions of biomass energy systems in Brazil, identifying opportunities for carbon sinks.

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U.S. Renewable Energy Industry Representative

USAID funds an industry representative in Brazil to work with cooperatives, NGOs, and private companies interested in non-hydroelectric renewable energy projects. The industry representative assists coordination of meetings between Brazilian government officials and U.S. government and industry. The representative is also cooperating with, marketing, and supporting the REPSO cost-share program and solicitation. General duties of the industry representative involve industry collaboration, financial mechanisms for renewable energy projects, utility scale project identification and partnering, and role of gender in productive uses of renewable energy. Specific programs of the industry representative are:

(1) **Technical Assistance to PRODEEM for Renewable Energy Services in Rural Markets** With the support of the industry assistance project, U.S. firms recently successfully competed for five of the seven renewable energy projects in the first round of the "Brazil Energy for Social and Rural Development" program (PRODEEM).

(2) **Utility Collaboration** Efforts are underway to link U.S. industry to various on-grid renewables projects, including several biomass energy projects and a large wind farm.

(3) **Brazilian NGO Support** USAID, with the Federal Ministry of Mines and Energy, Petrobras, COELBA (the state of Bahia utility), and others, co-sponsored an International Seminar on Solar, Wind and Energy Efficiency in Salvador, Bahia during 1996. The U.S. industry representative and the REPSO jointly sponsored and planned this annual conference of the Associacao Brasileira das Empresas de Energia Renovavel e Eficiencia Energetica (ABEER), the Brazilian renewable energy trade association. The conference, was held from August 5 to 9 in Salvador, Bahia, and was jointly sponsored by USAID. In 1997 ABEER and the U.S. Export Council for Renewable Energy (US/ECRE) are collaborating on the Renewable Energy in the Americas '97 conference to be held in July 1997 in Rio de Janeiro.

(4) **US Industry Support Trade Delegations** USAID also supported a trade mission to Brazil in August 1996. Thirty representatives from U.S. companies attended the session at which $411 million in potential projects was identified. In addition, US/ECRE-supported study tour in September 1997, in which Brazilian officials visited U.S. renewable energy plants and met with representatives of the World Bank.

Renewable Energy Program

The Renewable Energy Program would provide incentives for private investments to supply essential electricity services to low income rural households. About 100,000 households are targeted for lighting with solar, other Photo-Voltaic, and wind energy applications systems.

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- **Leveraging Funds for Energy Development**

The World Bank provides funds for rural development in Brazil, through the Programa de Apoio ao Pequeno Produtor loan program (PAPP, or Small Producers Support Program). Through the PAPP Loan, renewable energy systems are one option for energy provision to productive end-users. Ten states in the north and northeast are eligible for PAPP project funds, which are limited to $40,000 per project. Ten percent, or $4000, must be paid by the community, and the remaining ninety percent is paid by the Federal government. Through the REPSO and the renewable energy industry representative, USAID has provided funds to assist municipalities in best using these funds to improve their energy services and, in particular, to meet their energy needs with renewable energy sources.

In addition, the REPSO and the renewable energy industry representative are working with the World Bank on a potential $200 million loan for "Integrated Commercial-Social Power in Northeast Brazil" coupled with assistance for utility privatization. A preliminary study has been completed.

- **Biomass Energy Net Carbon Emissions Research**

EET's Biomass Energy Systems and Technology (BEST) program provided funds for Winrock International to conduct research into the net carbon emissions of biomass energy systems in Brazil. Winrock has been active for several years in evaluation of greenhouse gas emissions from forest/agricultural sources, and the capacity of these areas to act as carbon sinks.

(2) <u>ENERGY EFFICIENCY ACTIVITIES</u>

The EIA's energy efficiency component primarily focuses on:

- promoting energy efficient lighting systems;
- improving information dissemination capabilities;
- supporting the development of the Energy Service Company (ESCOs) industry;
- assisting in the establishment of efficiency standards; and
- providing expert support and funding reverse trade missions.

- **Support the Development of Energy Service Companies (ESCOs)**

USAID is playing a significant role in developing a nascent ESCO industry in Brazil. USAID has funds on deposit with the World Bank that will be used to assist and leverage World Bank financing for efficiency work and ESCOs in Brazil. In addition, USAID is providing a broad range of technical assistance including training in performance contracting, the adaptation of the U.S.-developed North American Energy Measurement

and Verification Protocol (NEMVP) to Brazil and training in its use, and the development of an energy auditor certification program through the U.S.-based Association of Energy Engineers. This support is being provided primarily through support to the Brazilian non-profit organization, the Institute for National Energy Efficiency (INEE).

- **Adaptation of the North American Energy Measurement and Verification Protocol (NEMVP) to Brazil**

  Technology transfer and technical assistance for adaptation of the U.S.-developed North American Energy Measurement and Verification Protocol (NEMVP) to Brazil and training in its use.

- **Technical Assistance to the World Bank**

  The World Bank plans a $150 million energy efficiency loan to Brazil, of which 70% is expected to be directed toward utility programs, 20% toward non-utility programs, and 10% toward national programs. Utility programs will include both demand- and supply-side investments, including improved power generation efficiency, DSM, and reduced transmission and distribution losses. Non-utility investments are planned in ESCO promotion, energy efficiency standards, and appliance testing and labelling. Funds will also go toward technical assistance for efficiency program design and management and power sector regulation formulation for Brazil. USAID is currently assisting the World Bank with design of the loan which should be approved by the Bank during 1997.

- **Financing and Market Development**

  The overall objective of the financing and market development activities is to increase the amount of energy efficiency investments made by the private sector in Brazil. USAID consultants are currently developing a special purpose investment fund (target size of $20-30 million) for medium-sized commercial and/or industrial energy end-users. This fund should attract U.S., Brazilian, and multilateral investors. Discussions are under way with Brazilian commerical and development banks, Brazilian government agencies, NGOs, and ESCOs. Potential lenders have been identified and include the US Overseas Private Investment Corporation, US Export-Import Bank, and private sector investment agencies of the multilateral development banks, such as the International Finance Corporation of the World Bank. Several institutions are now considering establishing a fund in response to suggestions from USAID.

- **Manaus DSM Support**

  In Manaus, Amazonas, where electricity consumption grew 8.7% in 1994 and 17% in 1995, USAID is working with PROCEL (Programa Nacional de Conservação de Energia Elétrica, the National Electric Energy Conservation Program) and the local utility, Eletronorte, in support of pilot DSM activities in Manaus. Because of hydroelectric base generation and high thermal generation costs, DSM programs appear to be cost effective

for both load management and energy savings. With the large base of light assembly industries and the tropical climate, well over half the electrical load in Manaus can be attributed to lighting and air conditioning. The USAID support is targeted on the development and start-up of air-conditioning and lighting programs in the commercial and industrial sectors. USAID is working with PROCEL and Eletronorte, to develop a combination of short term measures and long-term programs. The design of the programs will allow for implementation by private sector companies such as ESCOs.

- **Resident Advisor for Energy Efficiency**

  USAID is supporting the one-year residency of a U.S. energy efficiency expert to complement the work of various Brazilian agencies in electrical energy efficiency. As of May 1996, Howard Geller, Director of the American Council for an Energy Efficient Economy, has been operating out of PROCEL offices in Rio de Janeiro. In addition to supporting other USAID programs in the country, the consultant assists a variety of agencies by providing hands-on technical expertise to key Brazilian organizations involved with the national energy management program. The consultants work is focused on four areas: (1) development of market transformation programs for new technologies such as high efficiency motors and lighting systems, (2) support in the training and promotion of private energy service companies (ESCOs) in Brazil, including monitoring and evaluation programs, (3) analysis and advocacy for the development of state and national equipment and appliance efficiency standards and building energy codes, and (4) support for energy efficiency NGOs in Brazil.

- **Assistance in Establishing Efficiency Standards**

  Under the slate of EIA activities in which funding commenced in 1995, USAID assists Brazil with conducting studies on the potential for and design of appliance efficiency standards. USAID will also assist Brazilian energy decision makers in developing strategies to advance building energy codes and to advance energy efficiency in the transportation sector.

- **Energy Efficiency and Conservation (EEC) Project**

  Preliminary steps have been taken to initiate an Energy Efficiency and Conservation project. EEC subproject activities, including project implementation, description, estimated cost, preliminary subproject evaluation, and technical assistance have been reviewed and are the focus of a Mission report.

(3) <u>TRAINING AND CAPACITY BUILDING</u>

The EIA's training component primarily focuses on:

- assessing needs in private and public entities and developing a training plan;
- conducting training programs;

- conducting follow-on activities; and
- establishing connections with the Global Energy and Environment Network and implementing an international conference focusing on selected Brazilian issues.

- **Brazil Energy Training Program**

As part of a comprehensive energy training program, USAID is building capacity among Brazilian energy professionals and high-level decision makers in key aspects of private power, efficiency, and renewable energy. Authorized under the Global Climate Change Initiative and funded under EIA, USAID is implementing a Brazil Energy Training Program. USAID completed a draft training needs assessment for the Brazilian power sector during November 1995, and is using the assessment to prioritize training in resource assessment, renewable energy systems design and installation, integrated resources planning, demand-side management, efficiency standards development, power sector pricing, risk assessment, and other important energy-related areas. To date the project has provided training in stand-alone wind and solar energy project development, integrated resource planning, and demand side management. Under the training program, USAID is also providing technical assistance to the government of Brazil in establishing a regulatory structure using working groups derived from government and industry. The program will also conduct follow-on activities including an evaluation of ongoing training, and support for a training/alumni network.

III. CLEAN ENERGY

- **Reduction of Volatile Organic Compounds from Landfills**

USAID's Center for Environment is collaborating with USAID/Brazil and 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. Currently, landfill methane in Brazil is being emitted to the atmosphere, resulting in the release of a potent greenhouse gas and increased respiratory ailments for residents residing near the 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 and, if fully implemented, would reduce methane emissions of approximately 1 million cubic meters for the next twenty years, while generating about 100 MW. Potential U.S. exports are about $200 million for equipment alone.

- **Feasibility Assessment**

USAID, in collaboration with SEMIG (a Brazilian utility company) and METALSIDER (a Brazilian pig-iron producer), performed a study for USAID/Brasilia to assess the potential of using waste pig-iron blast furnace gas to power internal combustion engine generators for electricity production.

There are 141 pig-iron blast furnaces in the state of Minas Gerais, Brazil that could potentially provide blast furnace gas for this purpose with estimated power generation capacity of 180 MW. This would obviate the immediate need for construction of a similar capacity fossil-fired power plant providing an annual emissions savings of 16,000 tons/year of sulphur dioxide and 840,000 tons/year of carbon dioxide (CO2) and backout CO2 emissions. The study assesses the potential of using blast furnace gas in a standard power generation system design that could be commercialized and replicated at multiple installations.

IV. REGULATORY REFORM , POLICY AND INDEPENDENT POWER

Brazil is expected to show considerable economic growth in the next few years, resulting in increased demand for energy throughout the country. Progress on regulatory reform in Brazil, in part represented by a new electricity law being debated, was a prerequisite to any meaningful progress in Brazil's energy development. USAID and the World Bank are increasing activity in the energy sector and encouraging regulatory reform as well as policy and planning advances to assist Brazil in meeting future energy needs.

- **Brazilian Regulatory Executive Exchange**

Through the U.S. Energy Association (USEA), EET has sponsored study tours and capacity building to assist regulatory reform in Brazil's power sector. During July 1995, for example, USEA sponsored several decision makers from Brazilian government and industry on a week-long exchange on U.S. regulation in the power sector. Two *deputados* (Brazilian parliamentary representatives), seven utilities executives, a representative of the Department of Mines and Energy, and several others toured U.S. utilities and spoke with regulatory bodies and related agencies. The exchange provided an opportunity for Brazilian power sector decision makers to examine a private-power regulatory scheme in action, and have their questions about such systems answered.

A similar executive exchange designed for Brazilian regulators took place in the U.S. in March 1996. Five delegates from Sao Paulo State participated in the exchange, including the Director of the Energy Development Department of Sao Paulo State Energy Application Agency. The 10-day exchange introduced Brazilian decision makers to the U.S. private power experience, and provided U.S. companies with an overview of Brazilian investment opportunities. The delegates also participated in a seminar on restructuring the Sao Paulo

Power Sector. The Sao Paulo government introduced power sector restructuring legislation to create an Energy Commission, and authorize privatization of the three state power utilities and split them into 20 private companies. Sao Paulo State is now leading the nation in power restructuring to meet its staggering energy demand.

- **Energy Efficiency in Power Sector Restructuring**

Brazil is undertaking a comprehensive restructuring and reform of its power sector in order to attract private investment and improve system efficiencies. USAID is providing assistance to the Brazilian government in this process regarding mechanisms for incorporating energy efficiency explicitly into the new regulatory framework. Model mechanisms are being prepared to present and discuss with the Brazilians for later incorporation into the new laws and regulations governing the power sector. As part of this work, a widely circulated paper was prepared entitled "Six Critical Choices in Regulatory Models for Brazil" and presented at the U.S.-Brazil Aspen Forum.

- **Independent Power Study**

USAID sponsored a representative from *Independent Energy Magazine* to produce a study on independent power in Brazil following the Third Workshop on Independent Power Production in Brazil during June 1995. The final report is in draft form, but *Independent Energy Magazine* has already published a shortened version of the report focused on attracting independent power to Brazil. USAID's Energy Efficiency Project provided further support to the Workshop, including participating in a dialogue on policy and regulatory changes to promote independent power.

V. ENVIRONMENTAL TECHNOLOGY

- **Initiative in Environmental Technology**

USAID has a range of programs that support dissemination of environmental technologies. Two programs are particularly focused on building public-private partnerships and involving U.S. industry in environmentally sustainable development. The Initiative for Environmental Technology (IET) was introduced in 1995 to enrich U.S. private sector involvement in fostering environmentally sustainable development with a primary focus on Latin America. Working in partnership with the private sector, the IET focuses development assistance and investment on critical environmental challenges in developing countries. In addition to launching new programs focused on Latin America, the IET helps coordinate globally U.S. efforts to promote clean energy technologies, improve urban infrastructure, and prevent industrial pollution.

USAID is undertaking the IET with several partners:

- **The Environmental Export Council (EEC)** is USAID's prime collaborator under the IET. EEC manages the **Environmental Exchange Program** which coordinates study tours and executive exchanges to bring together public and private sector officials from the U.S. and developing nations to solve problems collaboratively.

- **National Association of State Development Associations' (NASDA) Latin American Fund for the Environment** will encourage U.S. private sector investment in areas of particular concern to Latin American countries. The grants encourage small and medium-sized firms to explore business leads and demonstrate industrial pollution prevention, energy efficiency, and wastewater treatment technologies in Latin America.

- **The Environmental Technology Network for the Americas (ETNA)** is implemented by USAID's Center for Trade and Investment Services through the United Nations Development Program's DEVNET International and the Technology Information Promotion System (TIPS). Through ETNA, USAID is supporting the distribution of information on Latin American trade and investment opportunities to U.S. firms.

- **The U.S.-Latin America Partnerships Program** will pair the Kenan Institute of Private Enterprise of the University of North Carolina with a Latin American partner to build firm-to-firm linkages between U.S. and Latin American companies. The program is being designed in consultation with non-government and private sector organizations and will be implemented in 1996.

The Environmental Exchange Program and ETNA are currently active in Brazil. During September 1995, USAID and the EEC sponsored a study tour to the U.S. for 19 officials from Brazilian cities and 11 representatives from the Brazilian private sector. The study tour was designed to foster dialogue between the Brazilian participants and their U.S. counterparts, and to create an environment that favors long-term cooperation. Discussions focused on financing municipal infrastructure, environmental technologies, and regulatory policy for municipal governance. The tour included site visits to water and sewage treatment plants, presentations by the Brazilian participants to U.S. industry representatives, and discussions with U.S. experts about effective regulation of concessions for municipal services and attracting financing for municipal projects.

COOPERATORS - Energy Programs in Brazil

Agencia para Aplicacao de Energia

American Gas Association (AGA)

American Council for an Energy Efficient Economy (ACEEE)

Associacao Brasileira das Empresas de Energia Renovavel e Eficiencia Energetica

Association of Energy Engineers (AEE)

Banco Nacional de Desenvolvimento Economica e Social (BNDES)

Banco do Nordeste do Brasil (BNB)

Brazil Ministry of Mines and Energy

Bureau for Latin America and the Caribbean

Centro de Pesquisas de Energia Eletrica (CEPEL)

Compania Eletricas de Bahia (COELBA)

Compania Energetica de Sao Paulo (CESP)

Compania Eletricas de Ceara (COELCE)

Compania Energetica de Minas Gerais (CEMIG)

Departamento Nacional de Aguas e Energia Eletrica (DNAEE)

Eletrobras

Eletronorte

Eletrosul

Environmental Enterprises Assistance Fund (EEAF)

Hagler-Bailly, Inc.

Institute of International Education (IIE)

Instituto Nacional de Eficiencia Energetica (INEE)

National Rural Electric Cooperatives Association (NRECA)

Programa de Conservacao Energia Eletrica (PROCEL)

Sau Paulo State Ministry of Energy

USAID/Brasilia

U.S. Energy Association (USEA)

U.S. Export Council for Renewable Energy (US/ECRE)

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Winrock International

World Bank

World Energy Council/ Brazil (WEC/Brazil)

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USAID'S ENERGY PROGRAMS:
CENTRAL AMERICA

I. INTRODUCTION AND BACKGROUND

The U.S. Agency for International Development (USAID) has funded a significant number of energy-sector programs and activities in Central America since the 1950s. The Agency has funded programs at various times in all the countries of the isthmus -- Guatemala, Belize, Honduras, El Salvador, Nicaragua, Costa Rica, and Panama. The USAID presence in Belize ended in 1995 and the Agency presence in Costa Rica ended in 1996.

USAID funding has been allocated through the bilateral USAID Missions in each country, through various regional programs managed by the USAID office in Guatemala, and through USAID's central technical bureau. The bulk of current energy-related assistance is regionally oriented, focuses on the electricity/power sub-sector, and is formally the U.S. implementation of an agreement signed at the Summit of the Americas in December 1994 (see page 2).

Within the energy sector, Central America has suffered periodic crises in the past quarter century. The two oil-price shocks of the 1970s hit the region hard because of its dependence on imported oil. As a partial response to oil prices, the region began to focus on hydro development for electricity and borrowed "petro dollars" in the 1980s to do so. But this strategy made the countries vulnerable to a multi-year drought in the early 1990s, and the heavy borrowing along with subsidized prices that prevented cost recovery resulted in reduced credit ratings and an inability to finance additional expansion. Serious shortages of electricity rocked the sub-region's economies in recent years. As a result of these shortages and in concert with world-wide trends, the countries of the region have been shifting toward much more private sector involvement in the power sub-sector.

Early USAID programs (in the 1950s) focused on rural electrification. In the 1980s larger sums of USAID assistance were allocated to the region in an effort to ameliorate the political instability of the period, and energy-sector efforts during that decade included not only rural electrification but also addressed energy planning, fuelwood issues, transportation, and efficiency in the industrial sector. Programs devoted exclusively to rural electrification wound down in the mid-1990s. Beginning early in the decade attention was increasingly focused on policy reform related to the private sector, promotion of energy efficiency improvements, and increased use of abundant regional availability of renewable energy resources.

This paper offers a summary of the current regional program that began in 1995 and some highlights from USAID-funded efforts of the previous half-dozen years that served as precursors to that program.

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II. THE CURRENT REGIONAL PROGRAM -- CONCAUSA

Nearly all of USAID's energy-sector assistance in the region since 1995 has been a set of programs intended to implement the "Conjunto Centro America y USA" -- CONCAUSA. The CONCAUSA Declaration was signed by President Clinton and the presidents of the seven Central American countries at the Summit of the Americas in December 1994. CONCAUSA committed all signatories to follow-up actions and committed the U.S. to the provision of selected assistance.

In the energy sector,[1] the Declaration focused on (1) policy reform aimed at increased private sector participation in the power sub-sector, as well as price reform that would put that sub-sector on a solid foundation, (2) increased attention to renewable energy, (3) increased attention to energy efficiency, and (4) developing the concept of joint implementation.[2] Significant overlap exists among these four themes, and they are in fact themes on which much of USAID's program has focused throughout this decade.

USAID is the leading funding agency for the U.S. Government in follow-up to CONCAUSA (the Department of Energy, and to a lesser extent the Environmental Protection Agency, have also been funding some energy programs). The Agency has committed more than $2.1 million to the energy program by early 1997. Initial USAID funding of $1.5 million came in 1995 from the Agency's Environmental Initiative for the Americas -- a joint effort of the Bureau for Latin America and the Caribbean and the Bureau for Global Programs' Center for the Environment to add new environmental activities to USAID's portfolio in the hemisphere. Additional funding has been allocated subsequently by the USAID Mission in Guatemala and the Center for the Environment in Washington, and those two units co-manage the program.

The next three pages will summarize the CONCAUSA program by dividing the discussion among the four themes cited above.

■ POLICY AND REGULATORY REFORM: INCREASED PRIVATE SECTOR PARTICIPATION

Prodded by the factors mentioned in the introductory section, the countries of Central America have been moving in fits and starts since 1989 to demonopolize and privatize the generation of electricity. This has meant creating a policy and regulatory framework that would spell out the relative roles of the public and private sectors and learning the practical skills that allow for the two sectors to interact so that this restructuring can occur.

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[1] CONCAUSA addressed two substantive areas in addition to energy: biodiversity; and the improvement and harmonization of environmental regulations. The paper addresses only the energy sector follow-up.

[2] "Joint implementation" refers to parties from two different countries collaborating in project development aimed at displacing the use of carbon-based fuels either through efficiency improvements or the use of alternatives (principally renewable energy). Within the context of international conventions being negotiated regarding a reduction in projected emissions of greenhouse gases, the U.S. has proposed that such projects would justify "credit" being given to both countries, regardless of the site of the project, in the global accounting system.

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In the first half of the 1990s two of the government-owned monopoly utilities in the region -- ICE in Costa Rica and INDE in Guatemala -- began contracting with private companies to generate electricity for the national grid. ICE was in better financial shape and its actions were governed by a governmental decree that offered guidelines for the demonopolization. INDE's financial condition was more precarious and its contracting proceeded on a case-by-case basis, without benefit of a standardized format for negotiating power purchase agreements (PPAs). The lack of transparency and weak policy guidelines in Guatemala increased the risk to both investors and governments and failed to induce confidence in the private sector.

Meanwhile, El Salvador toyed with the idea of privatizing the electricity distribution system and its utility gingerly negotiated a single contract for electricity from a privately owned power plant. Honduras observed these forays into private power and made occasional statements about fully privatising its national utility.

The CONCAUSA Declaration included a commitment by the governments of the region to move forward on the private sector participation in electricity. The Government of Guatemala made the first strong requests to USAID for assistance, and the Agency focused first on that country. In 1997, assistance is being extended to other countries in the region.

- **Guatemala**

  Guatemalan officials began in early 1995 to address the challenge systematically. In January of that year USAID funded a one-week workshop in Guatemala City on the principles of soliciting and contracting for power from independent power producers. Although the majority of attendees were Guatemalan, the workshop was open to the region and participants came from Costa Rica, Panama, and Nicaragua.

  Shortly afterward, USAID sponsored a Chilean consultant to work with the Guatemalan legislature and the Ministry to prepare a comprehensive new electricity law. A draft law was completed by the end of the year that addressed private sector involvement in the generation, transmission, and distribution of electricity. The law demonopolized the energy sector by disagregating distribution, generation, and transmission; establishing a wholesale electricity market for generation; and opening generation to unrestricted competition. The chief legislative sponsor became Minister of Energy in a new administration in January 1996. The law was debated throughout the year, underwent minor modifications, and finally passed in October 1996.

  Meanwhile, USAID funded a two-week workshop in Guatemala in July 1996 that reviewed the various regulatory issues that would need to be addressed in order to implement the expected new law. Guatemalans from both the public and private sectors attended. The workshop was also open to participants from Honduras and El Salvador.

The new Guatemalan law required that implementing regulations be drafted within ninety days, a task on which consultants funded by USAID provided significant input. When the regulations are adopted in spring 1997, a dramatic transformation of the Guatemalan power sector will begin to unfold.

- **Other Countries in the Region**

USAID repeated in **Panama** in January 1997 the workshop that had been run in Guatemala in July 1996 (see above), for interested parties from the public and private sectors in Panama and Nicaragua.

In January 1997, USAID funded consultants to begin working with officials in **El Salvador** and **Nicaragua** on policy and regulatory reform similar to Guatemala. El Salvador passed a new electricity law that established a time schedule for privatizing and unbundling generation and distribution.

During the policy and regulatory workshops held in Guatemala and Panama in 1996 and early 1997, one of the topics on which participants indicated a critical need for more information and training was what is known as "economic dispatch." This term refers to the process by which the manager of the transmission system in any country tracks the hourly fluctuations in electricity demand and makes appropriate and timely decisions regarding which of the available sources of generation facilities to tap. In response, USAID will provide funding for a regional training course on this topic during 1997.

RENEWABLE ENERGY

Central America is rich in all categories of renewable energy resources: geothermal, hydro, solar, wind, and sustainable biomass yields. USAID has provided funding during the 1990s for promotion of all these categories. With respect to biomass, the Agency has focused on residues in the sugar and wood products industries.

In the past few years USAID has funneled its support for renewable energy in the region through Winrock International, the Environmental Enterprises Assistance Fund (EEAF), and the U.S. Export Council for Renewable Energy (US/ECRE), who have in turn cooperated regularly in their programs. The goal of the programs is to accelerate the commercialization of proven technologies. These programs have been addressing four major areas: policy reform; financing; market development; and capacity building. Because Winrock and EEAF have established full-time affiliates in the region, this section of the paper will first describe very briefly those two affiliates, and then summarize the efforts of those affiliates and others funded by USAID in the four subject areas mentioned.

- **Winrock and the Renewable Energy Support Office (REPSO)**

During the 1990s Winrock, with support from USAID, has established a network of five Renewable Energy Project Support Offices (REPSOs) in USAID-assisted countries. One of those countries is Guatemala, and that REPSO is gradually becoming regional. In 1994 Winrock 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 goals of the Fundación are to provide (1) an information clearinghouse for Guatemala and neighboring countries, (2) workshops on selected topics, (3) technical assistance to the private and public sectors, and (4) partial funding of pre-investment studies for site-specific projects.

- **EEAF and its Central American Affiliate EACA**

In 1991 USAID furnished funding to Winrock for the establishment of the Environmental Enterprises Assistance Fund (EEAF), a non-profit investment company. EEAF directs its attention at environmentally progressive businesses and projects and provides both equity financing and loans, typically as part of a consortium of investors that it helps to organize. In 1993 EEAF set up an affiliate in San Jose, Costa Rica, Empresas Ambientales de Centro America (EACA). EACA, with back-up assistance from EEAF, looks for investment opportunities throughout Central America. The CONCAUSA Declaration explicitly called on the U.S. to continue support for EEAF and EECA.

In March 1996 an agreement was approved between EEAF, EACA, and the Multilateral Investment Fund (MIF) to create a $10 million environmental investmen fund for Central America. This fund, the Corporacion Financiera Ambiental, will invest in environmental businesses (including those involved in renewable energy and energy efficiency) in Guatemala, Belize, El Salvador, Nicaragua, Honduras, Costa Rica, and Panama. The focus will be in small and medium-sized businesses with investments ranging from $100,000 to $750,000 in subordinate debt and equity. Capital for the fund comes from a $4.9 million contribution from the MIF as well as money from governments, bilateral donors, and investors. The fund will be managed by EEAF and EACA. Operating expenses have been supported by USAID.

- **Policy**

The U.S. Export Council for Renewable Energy (US/ECRE) provided some critical comments to the Government of **Guatemala** early in 1996 on the draft new electricity law, regarding the possible negative impact of certain elements of the proposed law on renewable energy development. But US/ECRE withdrew from the debate as a courtesy to the GOG's desire to get a comprehensive new law on the books as soon as possible. US/ECRE proceeded with preparation of a global study of trends in power sector restucturing and the issues important to

renewable energy. In 1997 US/ECRE will use the results of that study to revisit the now-passed electricity law in Guatemala.

In mid-1996 US/ECRE furnished consultants to the Government of **Nicaragua** for assistance in writing a geothermal concession law.

- **Leveraging of Financing**

USAID has attempted to leverage increased financing for renewable energy in Central America and elsewhere through three primary means: cost-sharing preinvestment studies for specific projects; core support for the Fundación and EEAF, allowing them to attract other donors and financiers; and encouraging interest at the multilateral development banks (MDBs).

The Fundación Solar/REPSO, as well as a U.S.-based organization called the International Fund for Renewable Energy and Energy Efficiency (IFREE), have provided funds from USAID to help pay the cost of preinvestment studies for renewable energy projects. The awards are considered loans to be repaid if the project proceeds to financial closure, but revert to grant status if the project does not go ahead. Thus the risk to the private developers of these environmentally beneficial projects is reduced slightly. Since January 1995 USAID funding has been provided in **Guatemala, Honduras, and El Salvador**. Although it is common for four or five years to pass beween the initiation of pre-investment studies and the actual implementation of a project, several of those projects have already gone to financial closure and construction begun. Those latter projects include a small hydro site, a wind farm, and a PV project.

By paying some of the core expenses at the Fundación, USAID also has enabled that organization to obtain additional funding for specific projects from the Canadian foreign aid agency, Plan International, World Vision, and the Government of Guatemala. With those funds the Fundación in 1995 and 1996 oversaw the introduction of solar (photovoltaic) home systems in more than six rural villages of Guatemala and additional use of solar energy for more than a dozen village water-pumping installations, schools, and health clinics. More than forty percent of Guatemalan households (most of them in rural areas) have no access to the electricity grid, and the costs of extending the existing system, particularly under the topological conditions of Guatemala, have become largely prohibitive. The Fundación is on the cutting edge of offering new options through the use of small photovoltaic systems.

This expertise in providing rural homes and communities with energy-related services should be particularly timely in the near future in Guatemala. With the Peace Accords signed in December 1996 between the GOG and rebels ending more than three decades of sporadic civil war, many refugees are expected to return from southern Mexico to the rural areas. The GOG and several donors are

interested in maintaining stability by increasing the services available to these areas.

Pursuant to the CONCAUSA Declaration, USAID also has continued funding core operational expenses at EEAF. This has allowed that organization and its Central American affiliate EACA not only to continue idenitifying investment opportunities but to expand their capitalization significantly. In March 1996 EEAF and EACA signed an agreement with the Multilateral Investment Fund (MIF, an affiliate of the Inter-American Development Bank) to create a $10 million environmental investment fund for Central America. This fund -- the Corporación Financiéra Ambiental (CFA) -- will invest in environmental businesses (including those involved in renewable energy and energy efficiency), with a focus on small and medium-sized businesses with investments ranging from $100,000 to $750,000 in subordinate debt and equity. Capital for the fund comprises a $4.9 million contribution from the MIF and a matching amount raised by EEAF from governments, bilateral donors, and private investors.

EEAF/EACA made two investments in renewable energy in 1995-96: (1) a company in **Costa Rica** that sells solar water heating systems; and (2) a 1 MW hydro facility, also in **Costa Rica**. An additional investment in a cogeneration facility at a sugar mill in **El Salvador** has been approved by the EEAF board of directors but not yet consummated. Meanwhile, the CFA (see the previous paragraph) approved its first renewable energy investment, in a 1.55 MW hydro facility in **Costa Rica**.[3]

Through US/ECRE, USAID is providing funds to the Center for Sustainable Development in the Americas (CSDA), which is negotiating with the MIF in Washington to establish an additional fund for environmental investments in Central America, somewhat similar to the CFA. CSDA hopes to capitalize this new fund at a level of approximately $30 million.

One of the commitments in the CONCAUSA Declaration was to encourage the MDBs to become more explicitly interested in renewable energy and energy efficiency. In late 1995 USAID paid for a renewable energy financing expert and an energy efficiency expert to work with the IDB on developing a strategy for investments in those areas. Although the proposals languished for nearly a year, in late 1996 the IDB established an internal unit charged with proactive identification of financing opportunities in renewables and efficiency.

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[3] EEAF and its affiliate also make investments in environmental businesses and projects not related to energy. In 1995-96 investments were made in a tree plantation, a sustainable forestry project, and a water treatment project for a coffee cooperative in Costa Rica, a water and sewer utility in Honduras, and a vetiver production project in El Salvador (vetiver is a grass that reduces soil erosion).

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Finally, in 1995-96 the International Finance Corporation (IFC), with funding from USAID, DOE, and other bilateral donors, prepared a business plan for a global investment fund dedicated to renewable energy and energy efficiency. The business plan is partially based on projections of investment possibilities in Central America, and EEAF is expected to be one of the fund managers when the fund becomes operational in 1998.

- **Market Development**

The Fundación and US/ECRE in 1995-96 funded a number of activities aimed at encouraging awareness of opportunities and exposing U.S. and Central American companies to each other's needs and capabilities:

- a trade guide to renewable energy development in Guatemala (1995),
- a trade guide to renewable energy development in El Salvador (in preparation),
- a primer on biomass cogeneration in Honduras (1995),
- a biomass trade mission to Guatemala and Honduras (1995), co-funded with U.S. DOE, and
- a renewable energy conference in Nicaragua (1996), in which a dozen U.S. companies participated.

In January 1997 the Guatemalan association of municipalities held a one-day workshop at which the mayors reviewed the options for electrifying the unserved areas under their jurisdictions. Staff of the Fundación made a presentation, and USAID paid for a representative of Enersol, a well-known innovative NGO with offices in the Dominican Republic and Honduras, also outlined that organization's experiences.

In addition, US/ECRE through its hemispheric Renewable Energy in the Americas program has continued to identify new project opportunities and nudge developers and financing institutions along in a myriad small ways.

- **Capacity Building**

One of the critical needs within Central America, as in other developing countries, is to encourage the development of the *human* capital that can over time deal with the many policy, technical, institutional, and financial challenges. The establishment and nurturing of both the Fundación Solar and EACA as described above, of course, accomplish that purpose by building local organizations. In addition, USAID provided funding for a regional one-week course on renewable energy applications and development, held in Honduras in mid-1996. This course was co-sponsored by OLADE (the Spanish acronym for the Latin American Energy Development Organization, representing energy ministers).

At the village and household level, many decisions on energy resources and technologies are made by women. To begin to explore the relevance of renewable energy and the need for information and skills, Winrock and the Fundación in mid-1996 organized a workshop in Guatemala on women and renewable energy.

ENERGY EFFICIENCY

USAID decided in 1995 that the approach to, and eventual success of, specific energy efficiency programs in Central America would be dependent on the final formulation of the new electricity laws under development in this transition period for the region. Those laws and their implementing regulations will establish the framework of incentives. For this reason, specific project ideas have been held in abeyance. USAID will fund in 1997 an analysis of the issues in power sector restructuring in Central America that are critical for rational decisions about energy efficiency to be made. This study will be circulated among the governments of the region and specific recommendations will be integrated into the consulting services provided with Agency funding.

The only exception to the decision to delay action on funding energy efficiency-specific programs was made with respect to Costa Rica in 1995. Based on a landmark study of power-sector efficiencies in that country funded by USAID in 1989-90, the IDB in late 1993 had issued an energy-sector loan to Costa Rica that included an energy efficiency component. In 1994 the IDB and the Costa Ricans requested follow-up assistance from USAID for the design of specific programs. USAID provided initial funding for such assistance in 1994-95, but program design got bogged down in financial difficulties being experienced by the national utility and resulting reorganization. With the USAID presence in Costa Rica slated to end in mid-1996, early that year the Agency scuttled the effort.

JOINT IMPLEMENTATION

Since early 1994, the concept of joint implementation (JI) has received strong support from the U.S. Department of Energy in international fora devoted to the work of the International Panel on Climate Change. The first developing country to endorse the U.S. position was the Government of Costa Rica. The CONCAUSA Declaration subsequently included a commitment to follow up region-wide with an exploration of how the concept could be pursued in Central America.

In mid-1995 USAID cooperated with DOE in sponsoring a regional conference in Costa Rica on the topic. There were attendees from both the private and public sector. Partially as a result of that conference, the Government of Guatemala subsequently requested help from USAID in establishing a national office dedicated to identifying and nurturing JI projects. The Agency provided the requested assistance through the Center for Sustainable Development in the Americas (CSDA, also mentioned above; see page 7). CSDA held several workshops. Winrock, which has been engaged in a USAID-

sponsored global program developing a methodology for measuring the sequestration of carbon dioxide in biomass-related JI projects, made presentations at one of the workshops. Based on this experience, CSDA compiled a manual on how to establish and manage a national JI office.

As part of U.S. Government support for the concept of JI, a multi-agency task force in the past two years has recognized a small number of projects that involve U.S. companies in partnership with developing country firms as "model" projects. Several of these had received some form of assistance from USAID earlier in the 1990s, including a geothermal project in Nicaragua and biomass project in Honduras.

III. USAID-FUNDED PRECURSORS TO THE CURRENT REGIONAL PROGRAM

The themes of CONCAUSA are ones to which USAID has been dedicated for the past decade. Although CONCAUSA gave those themes a higher profile and led to an enhanced level of funding, the Agency had been providing funding for related activities consistently. The activities pursued since CONCAUSA are in many cases a direct continuation, and in other cases previous efforts to instigate progressive programs finally began to bear fruit in the post-CONCAUSA period. The balance of this paper offers a summary of those earlier programs.

■ POLICY AND REGULATORY REFORM

USAID became a seminal instigator of increased private sector participation in the power sector with its 1989 report to Congress entitled **Power Shortages in Developing Countries: Magnitude, Impacts, Solutions, and the Role of the Private Sector**. Receptivity to policy reform proceeded slowly, in fits and starts, in the Central American region, hastened by drought-induced shortages in the early 1990s and a worldwide shift in attitudes toward central planning. This transition has reached a crescendo in the last couple of years, but progress before 1995 merits a summary here.[4]

USAID sponsored a regional workshop on the power sector in Central America in San Jose in 1988. Attendees discussed the possibility or likelihood of serious power shortages in the region in the early 1990s, the desirability of increased private sector involvement, and the possibilities for improving efficiencies in gneration, transmission, and end uses that would reduce the imposing needs for new construction of generation capacity.

Costa Rica reacted to the workshop with a decision to formulate new policies that would allow private sector generators to sell to the national utility. USAID provided funding for consulting services for that formulation. A Presidential decree became effective in 1990

[4] A review of the Agency's eight years of policy-related efforts in Central America is contained in a separate paper recently prepared, entitled "A Bridge to the Future: USAID's Role in Private Power Development in Central America."

that allowed for new generation of power to come from the private sector up to a level of 15 percent of the nation's total installed capacity. USAID followed up by furnishing funding for a series of workshops on topics such as the reorganization of Costa Rica's existing regulatory agency (Costa Rica was the only country in the region that had such a functioning agency) and the issues important to PPAs.

Although Costa Rica was clearly the most progressive country in the region at the time on this topic, in retrospect its opening to the private sector has been leapfrogged by some other countries in the region since (Costa Rica did increase the level of private sector contribution to total capacity to 30 percent). A large part of the reason has been the fact that the Costa Rican national utility has in fact been the most well-run and solvent in the region, and that country was least affected by a multi-year drought in the early 1990s. Pressure for greater change thus was muted by existing sophistication.

USAID responded to requests from El Salvador and Panama for technical assistance on various related policy issues, but those countries moved very slowly, as did Honduras and of course Nicaragua. But in fits and starts, the Government of Guatemala requested increasingly serious assistance. A workshop was held in that country in 1989 that brought together Ministry of Energy and utility officials with sugar mill owners who were interested in providing electricity using their process wastes. This resulted in a couple of individually designed PPAs.

In 1991, at the request of the GOG, USAID funded a study that showed the two Guatemalan national utilities how to determine their marginal costs, thereby giving guidance on what prices should be paid to private producers. In 1992 the GOG requested USAID co-sponsorhip of a more broadly based national conference on how to encourage the private sector. This conference ended up occuring, somewhat serendipitously, during a time when serious brown-outs were taking place and rationing imposed. Although the conference called for a systematic policy and regulatory approach, follow-up was limited for the next three years to a continuation of case-by-case and secret negotiation of PPAs with a few carefully chosen private partners. Disillusionment with this approach peaked in 1995 and the drafting of a new law initiated, as described earlier in this paper.

RENEWABLE ENERGY

In varying degrees, USAID was active in Costa Rica, Guatemala, Honduras, Nicaragua, and El Salvador with respect to promoting renewable energy prior to the CONCAUSA Declaration.

Costa Rica

At the time that the Government of Costa Rica was formulating a new policy on private sector involvement in electricity generation in 1989, Winrock was providing some technical assistance to the El Viejo sugar mill. This mill was interested in taking advantage of the imminent policy change and selling electricity

to the national grid. Subsequent to the reform, El Viejo signed one of the first two PPAs in Costa Rica. After additional up-grades, the mill now is generating, beyond its on-site needs, a surplus of 5 MW for sale to the grid.

In 1990-1991, USAID funded through Oak Ridge National Laboratory a pre-investment study for a 12 MW hydro facility on the San Lorenzo River. The study was prepared for a new consortium of utility cooperatives being organized by the National Rural Cooperative Association (NRECA). The individual cooperatives had until then played only a distribution role, but under the country's new Presidential decree they wished to become private generators. Financing for the project was obtained in 1995 through the persistent efforts of NRECA and construction began. The plant is expecting to be on-line in summer 1997.

In 1992 USAID paid for the preparation of a pre-feasibility study for a power plant based on wind energy (a "wind farm") at a promising site in Costa Rica. Prior to the decision to fund the study, the Costa Rican national utility, the GEF at the World Bank, and the Inter-American Development Bank had all expressed interest in pursuing the project if the conclusions of the study warranted follow-up. Subsequently, the GEF made a grant of $3 million and the IDB made a loan of approximately $24 million for a 20 MW windfarm at the site. For various reasons the utility has not yet used that loan to build its own windfarm, but the pre-feasibility study led two U.S. firms to pursue and consummate arrangements with the utility to build privately owned and operated wind farms. One of those plants went on line in mid-1996, operating at a peak generation of 20 MW. This project is the first commercial wind farm in Latin America. The utility signed PPAs for two additional and similarly sized wind farms at the same site, and these are expected to be installed and delivering electricity by 1999.

Meanwhile, the first REPSO was established in San Jose, Costa Rica in late 1991. In 1992 that REPSO made cost-share awards for pre-investment studies for four projects -- one biomass cogeneration and three small hydro projects. PPAs thus far have since been signed for two of them, and Winrock is optimistic that three will be built and in operation by 2000.

Because of the planned closure of USAID/Costa Rica and the desire to work more closely with USAID's regional programs administered in Guatemala, the Costa Rica REPSO was allowed to lapse in late 1993 and a new REPSO was established in Guatemala early the following year.

- **Guatemala**

As mentioned in the discussion of policy reform above (see page 13), USAID organized a workshop in 1989 that brought together government energy officials and sugar mills to discuss the contribution that the latter could make (using bagasse) to meeting national electricity needs. Winrock contributed presentations on biomass cogeneration at that workshop.

Subsequently, Winrock organized a seminal global conference on biomass cogeneration in 1991 in Hawaii and representatives of several Guatemalan sugar mills attended. Within a few short years, those sugar mills were to contributing 43 MW of power to the national grid.

For eight years (1987-1995) the USAID regional office in Guatemala managed a rural electrification program for Central America, implemented by the National Rural Electric Cooperatives Association (NRECA). One of the components of that program was encouraging the exploitation of opportunities for micro-hydro installations. During the last three years of that program, NRECA ran some pilot programs in the use of small solar systems for rural applications (homes, schools, and water-pumping) and a majority of those pilots were located in Guatemala. In addition, NRECA organized a workshop in 1994 in Guatemala focusing on the uses of small wind-electric turbines for agricultural applications and assisted in training some local technicians in how to use anemometers to obtain data on wind speeds over time.

Knowing that the regional rural electrification program was going to ending in early 1995, several Guatemalan staff of the NRECA office decided to create a new non-profit NGO that could continue the work that had been initiated in innovative uses of renewable energy. That NGO was the Fundación Solar became part of USAID and Winrock's international network of Renewable Energy Project Support Offices (see page 4).

- **Honduras**

At the request of a USAID-funded forestry project in Honduras, Winrock in 1992 conducted a study of the potential for that country's sawmills to use their wastes as a resource for cogeneration. At the time, the wood wastes were being burned in the open, creating serious local air pollution, and the mills were using diesel generators both for electricity and to provide heat for timber drying. The study concluded that at the larger mills all on-site needs for electricity and heat could be economically provided by using the wood wastes as a fuel. The process would significantly reduce local air pollution. The study suggested that some surplus electricity could also be sold to the Honduran grid.

A second stage of that study had focused on one sawmill as a case study. Subsequent to the study, the mill owner decided to pursue a cogeneration facility. In 1994, both Winrock and IFREE made cost-share awards to the owner and U.S. developer/partner. A 15 MW facility (using on-site wastes as well as wastes brought in from other nearby mills) is expected to be on line by 1998. This project is one of those recognized as a JI "model" (see page 9).

Partially in reaction to that study and a follow-up meeting between USAID, Winrock, and the president of the Honduran national utility, the Government of Honduras in 1994 requested a study of the country's sugar mills. That study

concluded that in the near future up to 36 MW of power could be generated at sugar mills for sale to the grid. No action has been taken by any of the mills yet.

In 1994 USAID also provided support through IFREE to Enersol, a non-profit NGO that had recently established an office in Tegucigalpa after trail-blazing work in the Dominican Republic. Enersol's specialty was catalyzing markets for household-size photovoltaic systems. Enersol initiated a loan guarantee fund for a rotating line of credit at Honduran banks for three agricultural cooperatives. From these cooperatives, an Honduran family can borrow money for the purchase of a solar home system. Enersol also helped nurture a local retail infrastructure for the systems (sales, installation, and servicing). Fifteen small businesses now address the market, and more than 2000 systems have been purchased and installed.

- **Nicaragua**

  In 1994 USAID provided funding through IFREE for a pre-investment study for a 50 MW geothermal plant. Although progress has not been as fast as the U.S. developer originally hoped, he anticipates overcoming the remaining challenges and having a plant in operation by 2000. This is one of the projects recognized as a JI "model" (see page 9).

- **El Salvador**

  Concerned about continuing electricity shortages and aware of PPAs with sugar mills in Costa Rica and Guatemala, the Government of El Salvador in 1994 requested a study of the potential contribution of local sugar mills to the national grid. Winrock conducted the study and concluded that a measureable contribution was practical in the near future. Simultaneous with the publication of the report, Winrock and a local NGO organized a workshop for the public and private sectors to review what policy, regulatory, and contractual issues were important if PPAs were to be pursued.

  In 1996 the regional REPSO in Guatemala made a cost-share award to an El Salvadoran sugar mill.

- ENERGY EFFICIENCY

In 1989-90, USAID funded a study of the efficiencies in generation, transmission and distribution, and significant uses of electricity in Costa Rica. Several of the study's recommendations were soon implemented by the Ministry of Natural Resources, Energy, and Mines and the national utility. In 1993 the Inter-American Development Bank (IDB) asked USAID to follow up on that earlier study by assisting in program design activities as part of an IDB energy sector loan. The loan, approved by the IDB (December 1993) and the Government of Costa Rica (1994), included a $6 million energy efficiency component. Use of the loan has been delayed by utility reorganization, unfortunately. Because USAID/Costa Rica closed down in 1996, no additional assistance is planned.

USAID ENERGY PROGRAMS:
INDIA

I. BACKGROUND

India is the fifth largest -- and second fastest growing -- contributor to world greenhouse gas emissions. The three largest cities in India are among the ten most polluted in the world in terms of particulate matter. Yet India's need for additional generation capacity is estimated at more than 80,000 megawatts (MW) of power, demanding more than $100 billion in investment over the next ten to fifteen years. The increase will be driven by the fact that India currently has one of the world's lowest per capita electricity consumption rates at just over 300 kwh and hopes to double consumption during that period.

The United States Agency for International Development's (USAID) Mission in India (USAID/Delhi) has two strategic objectives with associated program outcomes focused on promoting a sustainable energy future for India. The first strategic objective is *improved environmental and financial sustainability in the energy sector* with two program outcomes: *increased efficiency in power generation and use in targeted sectors and industries, and increased use of clean power generation technologies.* The second relevant strategic objective is *improved air, water, and land pollution at selected industrial sites and municipalities* and its program outcome is *improved control of air, water, and land pollution at selected industrial sites and municipalities.* Progress in the achievement of each of these objectives and outcomes will be monitored relative to changes in carefully defined indicators.

USAID energy-related projects complement environmental objectives while assisting India's central and state governments in addressing their potentially crippling energy deficits. India is one of USAID's "key countries" for climate change efforts, and USAID energy activities focus on reducing threats from global climate change while increasing energy services through increasing renewable energy use, improving energy efficiency, and increasing sustainable energy use.

Inefficiencies in generation, distribution, and consumption of commercial energy and the overwhelming dependence of the commercial energy sector on non-renewable sources account for most of the greenhouse gas emissions in India. It is estimated that greenhouse gas emissions in India will triple between 1987 and 2010 if there is no change from current practices. Carbon dioxide emissions are expected to double during the same period. In Delhi alone, vehicular traffic (which has increased by 75% in the last decade) creates 400 tons of pollutants daily. In addition, transmission and distribution losses surpass 24 percent, and India uses about twice as much energy per unit of output as does the United States.

updated February 11, 1997

II. INITIATIVES

- **Asia Sustainable Energy Initiative: India**

India, along with Indonesia and the Philippines was chosen to participate in USAID's $9 million Asia Sustainable Energy Initiative (ASEI). The goal of ASEI is to mitigate global climate change and local environmental degradation associated with the generation and supply of electric power on a regional level. The program in India is designed to help the country finance future energy needs and improve planning and decisionmaking processes in the power sector. ASEI focuses on adequate, reliable affordable, and environmentally sound electricity services through Demand-Side Management (DSM), energy efficiency programs, renewable energy, and end-use technologies. The five principal components consist of:

- a Sustainable Energy Advisor (SEA) at the Mission,
- focused technical assistance and training,
- a Utility Partnership Program,
- renewable energy program support, and
- Environmental Executive Exchanges

ASEI promotes active collaborations both between Indian and U.S. organizations, and between U.S., Indian, and other Asian partners. Regional activities may include regional communications and workshops, utility collaborations, support to activities initiated jointly, and technology cooperation.

USAID/India has $250,000 under ASEI for training in energy efficiency and Integrated Resource Planning (IRP). In addition to the training component, USAID through the Energy Management, Consultation, and Training (EMCAT) and Energy Efficiency Projects is preparing technical assistance for energy efficiency planning and implementation capability at Surat Electricity Company (see discussion of activity under EEP). ASEI also includes utilizing Partnership Programs to twin U.S. utilities with several Indian utilities. Tools utilized will include workshops, technology assessment missions, training, and related efforts.

- **India Private Power Initiative (IPPI)**

This $3 million, three-year initiative was developed in response to the 1991 Government of India decision to encourage private investment in the power sector. IPPI provides "hands-on" technical assistance to State Electricity Boards (SEBs) and the Indian Government to build in-country capabilities to evaluate and process the numerous project proposals now pending before the Government (including over 35 U.S. developers), and assistance in the formulation of the project contract documentation necessary for international financing. The project director, based in Delhi, is working with the Ministry of Power to develop regulations, contract procedures, and guidelines for setting up private power companies. Country-wide training on the fundamental aspects of private participation in the power sector is also provided.

This project serves as a conduit to introduce U.S. developers to potential local joint venture partners. By working closely with the Indian Government, the World Bank, the Asian

Development Bank, and other lending institutions, IPPI's overall goal is to establish a sustainable, environmentally-conscious private power industry in India. Over $5.5 billion in potential U.S. investments in India's power sector has been facilitated through the successful leveraging of technical assistance and training to the SEBs. IPPI also includes a training program through USAID's Energy Training Program (ETP), implemented by the Institute of International Education (see the Training and Capacity Building Section below).

Under IPPI's Integrated Resource Planning (IRP) task, a multi-disciplinary team of Indian and U.S. economists and engineers developed an Integrated Resource Plan for the State of Andhra Pradesh. The principal purposes of this task were:

(1) to develop the capability of the Andhra Pradesh State Electricity Board (APSEB), to execute an IRP for the power sector,
(2) to foster institutional changes that will support a favorable investment environment for private sector development, and
(3) to encourage the development of efficient resources.

The team emphasized the process of data collection and development as part of the overall IRP program. The IRP Manager software program was successfully transferred to the Andhra Pradesh State Electricity Board (APSEB) and was used during the planning process. The draft final report is under review by the APSEB and other committee members including the World Bank and the British Overseas Development Agency.

Under the Minimum Lender Requirements task of the Initiative, USAID conducted a series of high level "bankers" meetings in New York for officials from the Investment Promotion Cell of the Ministry of Power (MOP). During these meetings U.S. and other foreign financial institutions articulated minimum lender requirements for IPP development in India. A final report entitled "Minimum Debt Financing Requirements for Private Power Projects in India" has been widely distributed. In addition, two private finance meetings were held in New Delhi and Madras where more than 50 Indian utility managers attended. USAID has also provided the Investment Promotion Cell of the MOP with a communications/business center to help them administer and track new private power projects. A local area network was procured and installed in the MOP. Major goals accomplished were the implementation of an Internet e-mail system, full access to Internet resources, and the development of a Website for the Ministry of Power.

- **Global Climate Change Initiative**

In an effort to help India meet the terms and spirit of the Framework Convention on Climate Change, USAID has begun examining areas in which it can foster the integration of climate change concerns into energy sector planning and activities. In January 1996, USAID helped sponsor the Development Alternative's international conference on Activities Implemented Jointly (AIJ). Over 30 developing nations met in India to discuss the opportunities and concerns related to AIJ. In conjunction with the conference, USAID organized a meeting of India government and non-governmental organization representatives to discuss opportunities for USAID to foster Indian discussion of climate change.

II. RENEWABLE ENERGY ACTIVITIES

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

Through Winrock International, USAID's Center for Environment is building a network of non-government organizations to help facilitate the use of renewable energy in developing countries. Known as 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 Indian REPSO opened in New Delhi in February 1995. It works closely with USAID to evaluate, implement, solicit, and identify projects for cost-share pre-feasibility studies, provide trade and technology cooperation, and facilitate utility collaboration. The REPSO focuses on off-grid rural electrification, especially on projects that demonstrate the commercial promise of renewable energy technologies.

- **Renewable Energy Commercialization Project (RECOMM)**

USAID/Delhi awarded a grant to the India REPSO in October 1995 to implement the RECOMM project to commercialize renewable energy systems across a wide range of technologies, applications, and services. This $3.1 million, three year activity is specifically intended to:

(1) catalyze the commercialization of high potential renewable energy technologies,
(2) help develop commercially successful, replicable models of renewable energy products and services,
(3) improve access to financing and capital for renewable energy development,
(4) facilitate renewable energy partnerships between Indian and U.S. companies, and
(5) strengthen the environment for renewable energy.

The project currently includes $150,000 of financing support to the Solar Electric Light Company (SELCO), an Indian commercial subsidiary of the Washington-based Solar Electric Light Fund. The funds are used for rural photovoltaic (PV) energy commercialization, to provide support to the GOI for a wind energy mapping project, and for the development of a sugar cane cogeneration program.

- **Sugar Mill Cogeneration**

India is the world's largest producer of sugar cane. 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. USAID has also carried out, in Tamil Nadu and Karnataka, sugar mill power plant design studies.

In 1992, USAID/W and USAID/Delhi developed a program to bring together the sugar industry, utilities, and state governments to overcome existing barriers to grid-connected cogeneration. USAID sponsored a team that analyzed investment potential in different power system configurations, organized seminars in Bombay, Madras, and New Delhi, and designed a sample power contract for use between utilities and sugar mills. In June 1993, the State of Tamil Nadu announced a new policy on independent power production based on the recommendations of a joint committee resulting from the USAID-supported program. In January 1994, the Indian Ministry for Non-Conventional Energy Sources (MNES) launched the National Program for Bagasse-based Cogeneration. USAID provided support to this program, including identifying and evaluating site-specific system design options at three sugar mills in Maharashtra and Tamil Nadu. As a result, several private projects are under way.

In April 1995, USAID approved a reimbursable cost share grant to Tazcogen Development, Inc. of Moraga, California to support the technical design of a 10 MW sugar cane cogeneration facility. USAID's work commercializing cogeneration in Tamil Nadu serves as a precursor for the cane cogeneration program under RECOMM (see above) and GEP (see below). In 1996, two cost-shares were granted through the Indian REPSO for additional cogeneration projects. One project will involve the development of a 10 MW cogeneration plant. The other project will involve the construction of a 25 MW bagasse-fired power plant near Ghaziabad, Uttar Pradesh, India. Much of the power will be sold to the local power board, with some steam and power being sold to operate a local sugar mill. Under this phase of project preparation, the project team will refine the work done thus far, and develop letters of intent for agreements on:

- fuel supply,
- steam and electricity supply to the mills,
- power purchase agreement, and
- joint venture agreement with the mill.

This will lead to a feasibility-study phase that will include detailed engineering, finalizing agreements, and financial closing.

- **Greenhouse Gas Pollution Prevention Project (GEP)**

The USAID/Delhi GEP project demonstrates various power generation strategies that result in reduced or eliminated greenhouse gas emissions. GEP primarily targets emissions of carbon dioxide. The project is budgeted at $19 million over seven years, including $12 million to fund demonstration projects and $7 million for technical assistance and training activities. This project is expected to reduce the carbon dioxide (CO_2) emissions by at least four million tons every year. It is funded out of the U.S. contribution to the pilot phase of the Global Environmental Facility (GEF) and embodies the U.S. commitment to being a partner with India in solving global environmental problems. The GEP project is comprised of two components:

(1) The Alternative Bagasse Cogeneration (ABC) component focuses on promoting more efficient sugar cogeneration technologies and biomass fuels for cogeneration at sugar mills.

This component demonstrates and promotes the commercialization of bagasse-based cogeneration technology and encourages the use of biomass fuel on a year-round basis where this makes economic sense for sugar mills. The plants use efficient, high pressure multi-fuel boilers and high-efficiency turbines, and rely on supplemental biomass fuels rather than fossil fuels during the off-season (when sugar cane and thus bagasse, as a by-product of crushing, is not available). This component has funds to provide incremental cost support for six demonstration projects apart from technical assistance, training, and cost-shared research grants for developing cane trash and other viable biomass fuels.

Under the ABC component, six commercial-scale demonstration projects in advanced bagasse cogeneration that use only biomass year-round have been approved for the first round of grants, and will soon be generating over 160 MW of power in three states. Over 90 MW of the total cogeneration capacity installed will be exported to the local grid, off-setting nearly one million tons of carbon dioxide annually by displacing the power generated by fossil fuel. The financial assistance is limited to those that have a minimum capacity of 2500 tcd (tons cane crushed per day) and are willing to invest in high pressure, high temperature, multi-fuel boiler with high efficiency turbines.

Grants are also provided to six organizations to undertake research and development projects in bagasse handling, storage, retrieval, equipment performance improvements, and other related issues which are critical to the development of the advanced bagasse cogeneration systems in India.

(2) The Efficient Coal Conversion (ECC) component is directed at establishing a sustainable technology transfer capacity for improving the efficiency of existing coal-fired power plants, introducing advanced coal conversion technologies, accelerating coal-ash utilization commercialization, improving fuel quality, and encouraging investments in coal benefication.

The ECC component reduces greenhouse gases produced per kilowatt hour of electricity generated by selected coal-fired power plants. U.S. experts from Tennessee Valley Authority (TVA) and Electric Power Research Institute (EPRI) are assisting the National Thermal Power Corporation (NTPC) and other state utilities in promoting efficiency in thermal power generation and installing advanced environmental monitoring and control techniques to protect the environment from resulting pollution.

EEC will provide technical assistance, training, and incremental funding for a pilot demonstration project based on one of the Advanced Coal Conversion technologies. Three NTPC power plants in Dadri, Singrauli, and Talcher, and one Gujarat Electricity Board utility have been selected as showcase plants to demonstrate a complete performance assessment of coal-fired power plants. Tests have already been conducted and the results are being evaluated for arriving at the baseline efficiency and areas for improvement.

- **Biomass Workshop**

The USAID-supported Institute for International Education (IIE) provides exchanges, fellowships, and training in support of renewable energy and energy efficiency activities undertaken by the ASEI. In September 1996, IIE sent University of Florida Center for Biomass staff to Tirupati, India to offer a workshop entitled "India/USA Bioenergy Opportunities to Utilize Bagasse and Biomass Crops for Energy and Industrial Chemicals". In-country participants, including university, business, and government representatives, visited local sugar mills and potential biomass cropping areas as part of the workshop.

- **Other Renewable Energy Commercialization Options**

In January 1995, the United States Export Council for Renewable Energy (US/ECRE) sponsored a trade mission to the International Renewable Energy Exposition in New Delhi. As a result of the trade mission, two U.S. firms signed agreements for 40 MW of renewable energy projects in India. In February 1996, US/ECRE sponsored a second trade mission.

India has the potential for approximately 10,000 MW of small hydro power. In 1996, the REPSO and US/ECRE facilitated the signing of the first power purchase agreement for a small hydro power plant. It is the first agreement of its type in India and can be used as a model for other small hydro power generation agreements.

Additionally, implementation grants have been provided to Indian companies to support the accelerated commercialization of renewable energy technologies in India. A conditional grant of five million rupees was awarded to SELCO, a company incorporated in India by the U.S. NGO, Solar Electric Light Fund (SELF), to expand its operation in an area where the demand for SPV powered small home lighting systems in increasing rapidly. SELCO operates in Indian states of Karnataka, Kerala, and Andhra Pradesh. The first tranche of one and a half million rupees has already been disbursed to SELCO.

The REPSO is also collaborating with various Indian organizations like CII and the Central Board for Irrigation and Power (CBIP) to sponsor promotional seminars in different parts of the country to popularize commercial investments in renewable energy.

- **Policy Workshop on Renewable Energy**

USAID/W and USAID/India cooperate closely on many efforts through various Global Bureau projects. In January, 1995, this support was used to organize a workshop in New Delhi on renewable energy policy constraints and solutions as they relate to utilities. At the workshop, U.S. experts in utility-related renewable energy applications shared their experience with their Indian counterparts. Both the Indian public and private sectors were well represented.

IV. ENERGY EFFICIENCY ACTIVITIES

- **Electric Power Research Institute (EPRI)**

Under a Cooperative Agreement with USAID/W, the Electric Power Research Institute's (EPRI) Customer Services Group is initiating two activities to support Indian energy institutions in their development of energy efficiency capabilities and programs. The first activity is the establishment of a DSM Training Center with the Ahmedabad Electric Company (AEC), building on the work completed to-date under USAID/Delhi's EMCAT project. This training is designed to assist AEC to train others in DSM and IRP and courses will be provided in EPRI's DSManager software and through the development of a Primer on DSM Management Concepts and Lessons Learned.

The second activity under the Cooperative Agreement is the establishment of a set of formal linkages between the EPRI industrial development/transfer information system (staffed by EPRI experts in various key industrial sectors) and energy efficiency resource information systems in India such as those sponsored by CII or FICCI.

- **Energy Management Consultation and Training (EMCAT)**

USAID/Delhi's $27 million, six-year project is promoting a systems approach to improving efficiency in the Indian electric power sector. EMCAT has four components: two focused on energy supply ($16 million) and two on end-use and demand-side energy efficiency and renewable energy commercialization ($11 million). The energy supply components provide technical assistance and training to enable the Power Finance Corporation (PFC) to effectively utilize MDB funds to modernize, rehabilitate, and improve management for existing energy systems and continue the promotion of a better enabling environment for private power development. Further under the power supply activities, EMCAT has completed a model Plant Life Assessment study aimed at increasing the generating capacity of old thermal power plants. It is estimated that about 10,000 MW of additional power capacity could be obtained by implementing modernization programs in the country's 25-30 year-old power stations.

The end-use and demand-side management component has provided $6 million to the Industrial Development Bank of India (IDBI) to study:

(1) the feasibility of investments by electricity end-users in technologies that enhance energy efficiency, and
(2) the feasibility of private power generation projects. In addition, this component provides grants for studies and training related to energy audit, cogeneration, and DSM. (EMCAT's renewable energy activities are described in the section on the RECOMM activity above.)

- **Technical Assistance for a DSM Program**

Surat Electricity Company (SEC) is a privately managed distribution company, which has a peak demand of 280 MW and is expected to grow to 400 MW by the year 2000. The utility buys 100 percent of its electricity requirements from the Gujarat Electricity Board.

It faces severe peak load shortage, compelling it to routinely shed one seventh of its load year-round, and two-seventh of the demand during peak summer season. SEC has identified peak load management as its primary objective for DSM, with the secondary objective being to introduce energy efficiency amongst its subsidized rate customers, thus enabling it to sell the saved electricity to the more paying customers.

In order to develop a feasible DSM action plan for the utility, Hagler Bailly will provide technical assistance to Surat to develop load data for its customers and undertake load data analysis based on which SEC would be able to develop its DSM action plan. A few time-of-use (TOU) electronic meters will be procured and installed at selected customer sites and subsequently load profiles will be developed for these customers. Hagler Baily will provide technical assistance to SEC DSM personnel to analyze the load data through hands-on training. This activity will be coupled with short-term U.S. training co-funded by the ASEI US-AEP exchange program. Assistance will also be provided to SEC for developing publicity and educational material to educate the customers on the energy conservation measures, thus helping SEC develop a better customer-utility relationship.

- **Report on Power Sector Financing Needs**

A recent G/ENV report, *The Financing Capability of Indian Institutions to Provide Alternatives to Sovereign Guarantees*, addresses the problem of the reluctance of the Government of India (GOI) to continue providing counter guarantees for private power development in India. Most of the GOI-suggested alternatives involve transferring credit support to the State Electricity Boards to varying degrees. The bulk of the report focuses on the ability of SEBs and Indian financial institutions to supply this credit. The report concludes that while such alternative measures may work, they will not be able to finance all of India's power needs. Furthermore, until real power sector reform takes place, these alternatives will only be regarded as near-term stopgap measures. The report could be used by developers to determine the availability of financing for private power projects.

V. CLEAN ENERGY

- **Exhaust Emission Technology and Fuel Conservation**

The Energy Technology Innovation Project (ETIP) is working in Pune on improving the engine efficiency of 2- and 3-wheeled vehicles as well as mitigating urban air pollution by bringing together a U.S. engine manufacturer with India's major automobile manufacturer, Bajaj. The U.S. party has developed a cost-effective electronic exhaust emission control that is expecially attractive for developing countries using leaded fuels because exhaust aftertreatment using catalytic converters is technically unworkable. A prototype emission controller has been developed and demonstrated. An initial test on older-model 3-wheeled vehicles show positive results, both in terms of CO emission abatement and improvements in measured fuel economy. This technology could be used to retrofit existing engines as well as be incorporated in the manufacture of new engines. Both parties are continuing to discuss the possibility of more extensive tests.

VI. ENERGY INFRASTRUCTURE AND TECHNOLOGY

- **Support for Environmental Technology Development**

Under the Trade in Environmental Services and Technologies program (TEST), USAID facilitates Indo-U.S. trade and joint ventures in the environmental field. The program is a five-year, $25 million program which provides assistance to potential business partners through access to information, organizing trade missions, and providing financing to support transactions and joint ventures. TEST provides conditional grants for adapting proven technologies to suit specific Indian industrial conditions, and to establish important markets. TEST also provides financing for the purchase of technologies, equipment and services, pollution monitoring, analysis, and testing and enhancing environmental services capacity. Equipment introduced in India through the TEST project will decrease the emissions of sulfur dioxide, nitrogen oxide, total suspended particulates, and other pollutants. To date, TEST has catalyzed investments of more than $6 million in air and water pollution control.

- **Sustainable Cities - Ahmedabad**

The Sustainable Cities Project aims to solve environmental challenges in municipalities by leveraging private sector investments in energy efficiency and environmental technology as an important step toward sustainability. The project will work with the city of Ahmedabad, and will focus particularly on industrial and commercial sector improvements in energy efficiency and environmental effects.

- **Program for the Acceleration of Commercial Energy Research (PACER)**

PACER is a ten-year, $20 million USAID/Delhi program to help overcome the energy constraints on India's economic development by promoting the development of new or innovative products or processes relevant to the Indian energy sector. USAID coordinates the program to assist in identifying and adapting technologies to tap renewable energy, coal conversion technologies, and technologies to improve energy efficiency. PACER provides conditional grants of up to 75 percent of the project cost for technology projects in those areas, subject to a maximum of $3 million, and also provides grants to cover research costs. PACER also provides grant assistance on a case-by-case basis for policy analysis and studies related to energy. A total of 25 consortium projects have been funded for technology development in the energy sector in areas such as:

- coal benefication,
- integrated gasification and combined cycle (IGCC),
- coprocessing of coal and oil,
- coal bed methane recovery, and
- coal-water mixtures.

When commercialized, these technologies are expected to have a significant impact on the Indian energy sector.

- **U.S.-Asia Environmental Partnership (US-AEP)**

  Created through a Presidential Initiative in January 1991, US-AEP is an unprecedented coalition of American and Asian businesses, governments, and community groups working together to enhance Asia's environment and promote economic progress. US-AEP has established Environmental Business Centers in the region to support U.S. and Asian trade and investment. In India, US-AEP provides access to technology databases, financial support for business exchanges, a clean coal program, and pollution prevention initiatives.

  The US-AEP buy-in into the Environmental Exchange program of ASEI is being used to support business exchanges between U.S. and Indian industry, NGOs, government officials, and financial institutions to explore business opportunities and possibilities of U.S. - India joint ventures in areas of renewable energy and energy efficiency technologies. Support is also being provided to complement the activities under the RECOMM and DSM programs.

- **U.S. Electric Vehicle Technology Transfer Project**

  In February 1995, in collaboration with the Steering Committee, USAID co-sponsored a seminar in New Delhi to introduce U.S. electric vehicle (EV) technology to India. The Indian Department of Electronics established a steering committee to explore developing an Indian EV industry. This committee includes representatives from the country's largest vehicle manufacturers, relevant agencies of the Indian government, and NGOs. As a result of other USAID activities, a number of manufacturers of two- and three-wheeled vehicles in India have accelerated their examinations of entering the EV business. In addition, an Indian-U.S. joint venture has announced that India's first electric car will be available on the commercial market starting in December, 1997. This venture was stimulated and encouraged by the USAID seminar and the ensuing government actions. USAID's program facilitates communication, cooperation and joint ventures between manufacturers of U.S. electric vehicle technology and Indian vehicle manufacturers, with particular concentration on two and three-wheeled vehicles. Two joint ventures are currently under consideration.

- **Utility Partnership Program**

  The United States Energy Association (USEA) is implementing the Utility Partnership program, one of the principal components of the ASEI, in India. The program's main objective is to provide a mechanism for the U.S. energy industry to transfer its experience in market-based energy production, transmission, and distribution to its international counterparts, while providing the U.S. utilities with a chance to learn about the energy industry in a given country. Five utility partnerships have been planned for India under this program, covering myriad possibilities for partnership focus, including:

  - utility management and planning,
  - management information systems,
  - transmision and distribution,
  - privatization and restructuring,
  - integrated resource planning,
  - demand side management, and
  - independent power production.

USAID funds of $150,000 to $200,000 are being provided for the partnerships which continue for about two years each.

Five Indian utilities have already been selected for the partnership under this program. The partnership "Memorandum of Understanding" was signed between three of these utilities and their respective U.S. partners in July 1996. USEA will shortly finalize partners for the other two utilities. Another partnership which is in the offing is a "Regulatory Partnership" between the newly formed Orissa Electricity Regulatory Commission and a U.S. regulatory authority.

VII. TRAINING AND CAPACITY BUILDING: ENERGY TRAINING PROGRAM (ETP)

Since 1981 the Energy Training Program (ETP) has provided opportunities for U.S.-based and in-country training for Indian participants. Following are examples of recent training activites that have supported the USAID/New Delhi strategic objectives.

- **India Private Power Initiative Training**

Technical assistance and training provided to private power under IPPI meet several objectives for USAID/India and USAID/W. USAID sponsored a workshop on Environmental Management during early 1996 through a local Indian NGO, Development Associates. In addition, USAID provided assistance to the Power Management Institute for their course on Human Resource Development for the power sector, held in 1996. The program included a sector-wide training needs assessment.

Under IPPI (see above), the ETP is responsible for the design, implementation, and instruction of a training program that presents different aspects of privately owned power plant projects. Training is conducted at the Administrative Staff College of India (ASCI) in Hyderabad, and ASCI collaborates in the content and administration of the courses. Indian utilities and agencies that participate in the training will have a complete team by the end of the training series with capability to make necessary institutional reforms, prepare and plan for private power projects, solicit projects in the international market, evaluate project proposals, and negotiate private power contracts. Each class accommodates 23 - 35 participants, mostly from senior executive levels. The training program uses a "train the trainers" concept, bringing two Indian co-trainers to the United States for two weeks prior to each course. These co-trainers provide input from the Government of India, review the curricula, and learn how to deliver course materials. During training in India, they deliver parts of the course and strengthen India's ability to conduct its own training in the future.

- **Training in Power Sector Restructuring and Regulatory Reform**

ETP organized a joint study tour of senior level policy makers from Indonesia and India to participate in the fourth National Electricity Forum of the National Association of Regulatory Utility Commissioners (NARUC) at Santa Fe, New Mexico.

Five senior level Indian decision makers from the Ministry of Power, Central Electricity Authority, the Orissa Electricity Regulatory Commission (OERC), ASCI, and the Department of Economic Affairs (DEA) met federal and state regulatory agencies and

energy commissions in the U.S with an aim to learn more about power sector regulatory policies and practices in the U.S. To further support this activity, a plan has been developed to provide assistance to the Power Committee of the U.S. India Commercial Alliance to host Indian SEB officials visits to the U.S. to learn more about how the reformed U.S. power sector actually works and meet U.S. manufacturers and project developers. It is expected that such study tours will help create a better understanding of the constraints being faced by the U.S. project developers in India.

- **Appliance Labeling and Standards Training**

  Plans have been developed to support the Consumer Education and Research Center (CERC) in developing its electrical appliances testing laboratory. This will help CERC to strengthen its ongoing role an in eco-labelling program initiated by the GOI. Eco-labelling includes energy efficient electrical appliances. As a first step towards this, CERC, the Bureau of Indian Standards, and the Energy Management Center will participate in a training seminar along with a study tour to the U.S. aimed at developing knowledge of the full range of technical requirements necessary for the implementation of workable, results-oriented, energy efficiency equipment labelling programs adapted specifically to on-the-groung realities in India. This will be a regional program with participation from Indonesia and the Philippines.

- **Human Resource Development (HRD)**

  USAID is supporting workshops on HRD topics related to the organizational changes that are taking place in the power sector. The first was presented in partnership with the Power Management Institute. The second will take place at the new BSES training institute in Mumbai in July 1997.

- **Energy Training Program Alumni Associations**

  The Energy Training Project trains energy professionals worldwide in technologies and applications which will enhance the production, transmission, and use of energy in developing countries. Participants in ETP courses not only bring their skills back to their home countries, but ETP Alumni Associations have been established in many countries that maintain the contacts trainees establish through the program. These associations encourage interaction among alumni, promote information exchange and professional development, and improve the ability of alumni to become agents of change for sustainable development worldwide. The ETP Alumni Association in the India is large and extremely active.

COOPERATORS - Energy Programs in India

Administrative Staff College of India (ASCI)

Agra Environmental Authority

Ahmedabad Textile Industries Research Association (ATIRA)

Alliance to Save Energy

Ankleshwar Industrial Association

Asian Development Bank

Bechtel Corporation

Bengal Chamber of Commerce

Bharat Heavy Electricals Ltd. (BHEL)

BSES Training Institute

Central Pollution Control Board

Confederation of Indian Industries (CII)

Development Alternatives of India (DAI)

Electric Power Research Institute

Electric Power Research Institute (EPRI)

Energy Management Center (EMC)

Environmental Enterprises Assistance Fund

Hagler-Bailly, Inc.

Indian Institute of Technology

Indian Sugar Mills Association

Industrial Development Bank of India Ltd. (IDBI)

Industrial Credit & Investment Corporation of India Ltd. (ICICI)

Institute of International Education (IIE)

International Institute for Energy Conservation (IIEC)

International Resources Group (IRG)

Investment Fund for Renewable Energy (IFREE)

K&M Engineering Consultants

Lawrence Berkeley National Laboratory (LBNL)

Ministry of Environment and Forests (MOEF)

Ministry of Power (MOP)

Ministry of Finance (DEA)

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Ministry of Coal

Morgan Energy Technology Center (METC)

National Association of State Development Agencies (NASDA)

National Bureau of Plant Genetic Resources (NBPGR)

National Thermal Power Corporation (NTPC)

National Hydropower Association

National Productivity Council (NPC)

Oak Ridge National Laboratory (ORNL)

Pittsburgh Energy Technology Center (PETC)

Power Finance Corporation Ltd. (PFC)

Power Manage Institute (PMI)

Resources Management Associates of Madison, Inc. (RMA)

Spectrum Technologies

Surat Electricity Company

Tata Energy Research Institute (TERI)

Tennessee Valley Authority (TVA)

USAID/Delhi

U.S. Environmental Protection Agency (EPA)

U.S. Council for Renewable Energy (US/ECRE)

U.S. Foreign Commercial Service (US&FCS)

U.S. Department of Agriculture

United States Energy Association (USEA)

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USAID ENERGY PROGRAMS:
INDONESIA

I. BACKGROUND

Indonesia is currently undergoing a period of dramatic economic growth, fueled primarily by growth in manufacturing and the service sector. Rapid increases in energy demand to meet this growth have strained the resources of the Indonesian government and the state-owned utility, *Perum Listrik Negara* (PLN), and placed severe pressure on the Indonesian environment. From 1969 to 1994, the country's total installed capacity increased from 652 megawatts (MW) to 21,598 MW -- an average annual increase of 20 percent. Yet despite this high rate of growth in electric generation, only 45 percent of urban and 30 percent of rural households are served by PLN. PLN's failure to meet Indonesia's needs for reliable energy, especially in the industrial sector, has resulted in a captive power market equal to two-thirds of PLN's total production.

Traditionally, Indonesia has relied heavily on its abundant oil supplies to meet its energy needs. However, Indonesia is now diversifying its resource mix through the use of coal, natural gas, and renewable resources like geothermal and hydropower. Despite this shift toward the use of more efficient fuels, Indonesia's energy generation has serious implications for the country's air, water, and forest resources and also contributes significantly to the country's greenhouse gas emissions.

The Ministry of Mines and Energy is the primary agency responsible for Indonesia's energy resources and policies. The Ministry coordinates state enterprises such as *Pertamina* for oil, natural gas, and geothermal resources, *P.T. Tambang Batubara Bulit Asam* for coal resources, and PLN for electricity. In 1994, the legal status of PLN was changed from a public company to a limited liability company, thus giving PLN greater flexibility to conduct business like a business. PLN has two types of operating systems: the largest is the Java-Bali system, comprising 80 percent of total PLN electric generation. The other system consists of "mini-grids" characterized by few generating facilities and marginal interconnections supplied with diesel generators. These small grids service the outer islands.

By promoting the sustainable use of energy through (1) fostering use of renewable energy resources, (2) encouraging energy efficiency, and (3) increasing private sector participation, the United States Agency for International Development (USAID) is able to address the economic and environmental issues in Indonesia. USAID's energy portfolio in Indonesia represents a collaboration between USAID's Office of Energy, Environment, and Technology (EET), and USAID/Jakarta, and includes assistance with regulatory reform, the demonstration of and training in appropriate energy technologies and applications, and support for private sector participation and commercialization of technologies.

In February 1995, USAID conducted an Indonesia Environmental Assessment and Strategy with the goal of evaluating the environmental and natural resource threats Indonesia currently faces. In

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November 1995, USAID/Jakarta conducted an assessment of the Indonesian energy sector as a basis for the design and implementation of the CLEAN/Energy program. The design team's finding and recommendations are contained in the October 1996 report, *Clean-Energy: Results Framework and Results Package.* Since then, USAID/Jakarta has developed the Coordinated Local Environmental Action Networks (CLEAN/Energy) Project to promote renewable energy and energy efficiency. CLEAN/Energy, currently in the initial stage of implementation, will achieve its goals through four primary areas of activity: (1) creation of an enabling regulatory environment for energy efficiency and renewable energy; (2) development of cleaner enegy supplies through the promotion of renewable energy technologies; (3) improvement in the efficiency of conventional energy generation and transmission; and (4) improvement in end-use efficiency in support of the Government of Indonesia's. CLEAN/Energy activities are designed to reduce the growth of greenhouse gas emissions and other pollutants. Assuming that coal is the marginal supply source, the project estimates that potential carbon dioxide emissions could be reduced by as much as 1.2 million tons in the first year.

II. INITIATIVES

- **Asia Sustainable Energy Initiative: Indonesia**

  Indonesia is one of three countries chosen to participate in USAID's $9 million Asia Sustainable Energy Initiative (ASEI). The two-year program is designed to develop collaborative programs between the Global Bureau, the U.S.-Asia Environmental Partnership (US-AEP), and the Indonesian, Indian, and Philippine Missions to mitigate global climate change and environmental degradation.

  Each ASEI country program has five basic components: Sustainable Energy Advisors (SEAs), the Utility Partnership Program, technical assistance and training, Implementation Grants, and Environmental Executive Exchanges. Program activities in each country are designed to promote sustainable energy options through work with governments, non-governmental organizations (NGOs), utilities, industry, and financial institutions. In addition to regional coordination and collaboration, each country's core activities will focus on policy reform, utility planning, and, in the case of Indonesia, the development of bankable energy efficiency and renewable energy projects.

- **Global Climate Change Initiative (GCCI)**

  Confronting the issue of global warming has been a priority since the U.S. signed and ratified the Framework Convention on Climate Change (FCCC) in 1992. Efforts were refocused in early 1996 when the federal government announced that the U.S. supported the establishment of binding targets and timetables for reducing greenhouse gas (GHG) emissions. USAID is helping to lead these efforts to help other countries reduce the rate at which their net GHG emissions are growing. The Agency, which has concentrated activities in ten "key" countries and regions, spends over $200 million annually on activities that promote sustainable development while reducing the negative climate change-related impacts.

Key countries were chosen for the type and quantity of greenhouse gas emissions, the government's willingness to adopt greenhouse gas mitigation strategies, and the degree to which natural sinks are able to absorb greenhouse gases. Indonesia is considered by USAID to be one of the most important of these key countries because of its large population, burgeoning economy, extensive extractive energy industry, and vast tropical forest reserves. USAID global climate change activities in Indonesia generally fall into: activities specifically designated under the United Nations Framework Convention on Climate Change such as National Action Planning, and greenhouse gas mitigation activities such as energy efficiency. USAID climate change activities in Indonesia are summarized in a "Global Climate Change Strategy," available through USAID/Jakarta.

- **National Action Planning (NAP)**
  Under the U.N. Framework Convention on Climate Change, signatories are required to develop national action plans to outline how they plan to mitigate impacts and adapt to changes in global climate. The U.S. government, through the U.S. Country Studies Program (CSP), is providing technical and financial support to the climate change studies of 55 developing countries, including Indonesia. In addition, USAID has provided $450,000 in FY95 ($150,000 each) to support NAP in three key USAID countries -- Mexico, the Philippines, and Indonesia. NAP activities in Indonesia will be managed out of USAID/Jakarta through Natural Resources Management Project (NRMP). The Indonesian Climate Change Action Plan may be included as an additional analytical policy component of the NRMP which is managed by the Ministerial Policy Coordinating Committee. Initial meetings have been held to develop a scope for the plan, and key ministries are preparing policy guidance.

- **Joint Implementation (Activities Implemented Jointly)**
  Activities Implemented Jointly (AIJ) refers to climate change mitigation activities that take place in one country with sponsorship and financing from the private sector in another country. USAID is a participant in the United States Initiative on Joint Implementation (USIJI). USIJI provides information on regional workshops, project review and analysis, identification of potential joint implementation projects and funding sources, and technical assistance to project developers and host countries. In June 1996, the Governments of the U.S. and Indonesia held a 3-day regional workshop on AIJ in Jakarta, for participants from government, NGOs, and the private sector. The conference attracted about 100 participants from 11 countries. Participants, including a large contingent from the Government of Indonesia, deepened their understanding of AIJ and built the foundation for the development of future AIJ projects.

III. RENEWABLE ENERGY ACTIVITIES

- **Renewable Energy Project Support Offices (REPSOs)**

USAID, through a cooperative agreement with Winrock International, is building a network of NGOs to help facilitate the use of renewable energy in Indonesia, India, the Philippines, Brazil, and the Central America region. Known as 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 developers identify and evaluate renewable energy projects. In particular, the REPSOs target four areas of work: industry collaboration, financial mechanisms for renewable energy projects, utility scale project identification and partnering, and organizational frameworks for rural renewable energy systems.

The REPSO in Indonesia, locally known as RENI (Renewable Energy Network Indonesia), is coordinated by *Yayasan Bina Usaha Lingungan* (YBUL), an Indonesian NGO specializing in promoting private sector investment in renewable energy. One of RENI's mandates is to manage and maintain an information resource network regarding opportunities and policy in renewable energy. One of its activities has been to facilitate the creation of an Indonesian renewable energy association. As of November 15, 1996, this association has been established. Additional USAID activities planned for RENI include:

(1) production of a Renewable Energy Technology Trade Guide to assist U.S. project developers and equipment vendors in exploring business opportunities in Indonesia, and
(2) identification of entities that are developing, or are capable of developing, renewable energy projects for cost-share awards.

The REPSO also sponsored a June 1995 trade mission to Jakarta composed of 20 representatives from the U.S. renewable energy industry interested in developing proposals for the World Bank.

- **Implementation Grants**

Under the Implementation Grants portion of ASEI, money is routed through Winrock International to YBUL. A small portion of ASEI funds will be used to develop a revised business plan for YBUL, put the plan into action, and disburse implementation grants (which comprise the majority of the ASEI funds for this task). These grants may be used to set up a loan guarantee fund (since lack of collateral is a problem for many new renewable energy companies), or a revolving loan fund, or funds for feasibility studies and engineering work. The SEA will work with YBUL on programming the implementation grants.

- **Environmental Enterprises Assistance Fund (EEAF)**

  The USAID-supported EEAF also funds YBUL activities. YBUL serves as EEAF's Indonesia representative and has been active in publishing an informational brochure, building a network of private and public organizations interested in renewable energy, and organizing environmental entrepreneurship training seminars in Jakarta. To expand the pipeline of new investments in the Indonesian renewable energy sector, YBUL identified and negotiated the placement of funds from EEAF for several new investments, one of which involves the assembly and marketing of solar photovoltaic home systems and products. YBUL also targeted two local banks to co-finance renewable energy projects (up to $2 million of co-financing). YBUL is currently preparing recommendations for EEAF approval to fund four projects - two focusing on biomass and two on energy efficiency.

- **Asia-Pacific Initiative (API)**

  The U.S. Export Council for Renewable Energy (US/ECRE), with support from USAID, has recently launched an Asia-Pacific Initiative which will culminate in a conference to be held in Jakarta in Fall 1997. Means for accelerating the deployment of renewable energy and energy efficient products/services in the region will be explored at the conference. A Steering Committee for the API has been established and the SEA is an active participant.

- **Renewable Energy Trade Mission**

  A USAID-supported renewable energy and energy efficiency trade mission to Indonesia recently identified nine potential projects in that country. In October 1996, US/ECRE and the USAID-supported Winrock REPSO sponsored a two-day workshop focused on the discrepancy between renewable energy opportunities and the reality of actual project implementation. As part of the workshop, the REPSO set up individualized meetings for delegation members with Indonesian counterparts. In addition, the REPSO organized a study tour to a hydroelectric facility and a rural village which receives electricity from roof-top solar panels.

- **Windpower for Islands and Nongovernment Development (WIND)**

  In cooperation with Winrock International, USAID/Jakarta is supporting a $2.9 million parallel-financed wind power project designed to identify favorable wind areas in Indonesia's eastern islands, and demonstrate the commercial feasibility of wind systems in at least ten, and as many as twenty locations. The WIND Project has already conducted comprehensive wind assesments on several Indonesian islands and installed windmills and power turbines at selected pilot sites. The Project demonstrates the many applications for wind energy in rural Indonesia, including water pumping, battery charging, electrification, and communication. By working with NGOs and community representatives, the WIND Project is teaching local people how to set up and manage small-scale energy activities, operate and maintain wind-powered generating systems, and build self-sustaining local enterprises.

- **Coordinated Local Environmental Action Network (CLEAN)**

  YBUL has organized seminars in 3 Indonesian cities to conduct customer surveys on a USAID/Indonesia-managed program. Known as the CLEAN Program, the Coordinated Local Environmental Action Network focuses on promoting the privatization of urban infrastructure.

- **Biomass Energy**

  USAID, in conjunction with Winrock International and the World Bank, is working to develop at least five viable biomass energy projects that could receive financial support under the Renewable Energy Development Project (RED).

  With support from USAID, the Environmental Enterprises Assistance Fund (EEAF) has provided two loans to an Indonesian company that manufactures and exports non-petroleum-based consumer charcoal. The charcoal, marketed under the brand names *Cococha* and *Ecobrix*, is produced from waste coconut shells collected by villagers, and is also an effective pollution abatement mechanism.

- **Preappraisal Assistance to the World Bank**

  In 1992, the World Bank initiated pre-appraisal work for a second Bank loan to Indonesia for rural electrification - Rural Electrification II. An earlier loan for rural electrification had been issued in the mid-1980s. In 1992, the Bank started preparation of the Renewable Energy Development (RED) loan. Before RED went for final Bank approval, it was decided in 1995 to drop it and create two new World Bank/GEF loans in its place - Indonesia Solar Home Systems (SHS) and Indonesia Renewable Power for Small Power (RESP). SHS is a $45 million loan for household photovoltaic systems and is scheduled for approval in January 1997. RESP, scheduled for approval in March 1997, is a $105 million loan focusing on biomass, minihydro, and small geothermal plants.

  USAID has provided consultative and financial assistance that leveraged more than $185 million in World Bank financing commitments for Indonesian renewable energy projects providing rural electrification. Specifically, USAID has furnished $430,000 in technical and financial support, including:

  - solar and wind assessments performed by the World Bank with funds transferred from USAID,
  - a pre-investment study of a hybrid-renewable energy pilot project,
  - support for analytic work performed by Oak Ridge National Laboratory on small-scale hydropower projects and environmental assessments,
  - project justification work performed by the Investment Fund for Renewable Energy (IFREE) on renewable energy in rural electrification, and
  - analytic work on the potential of biomass.

IV. ENERGY EFFICIENCY ACTIVITIES

- **Demand-Side Management Program (DSM)**

In 1992, USAID initiated a DSM Program consisting of four components:

(1) a DSM Action Plan,
(2) a tariff study on incentives for DSM,
(3) a two-day DSM workshop for 40 persons in Jakarta, and
(4) a two-week U.S. study tour for four key persons on DSM.

The DSM Action Plan laid the foundation for leveraging $10 million from the Asian Development Bank and $4 million from the World Bank for demand-side management

projects. The Asian Development Bank project is being implemented and the World Bank project is currently out for bid.

- **Indonesia Environmental Technologies Export Market Plan**

As part of the Environmental Trade Working Group's Asia Strategy, USAID prepared an Indonesia Environmental Technologies Export Market Plan, to provide U.S. companies with trade assistance in increasing U.S. environmental technology exports to Indonesia. The report provides the following:

- an overview of the most promising Indonesian markets for U.S. environmental technologies,
- an analysis of the current business climate for U.S. companies which produce environmental technologies,
- guidance on how to enter the market, and
- a summary of current U.S. Government programs to facilitate environmental trade between the U.S. and Indonesia.

- **Nusanet Information Assessment Survey**

USAID helped Nusanet, a consortium of energy and environmental NGOs in Indonesia, to survey their informational needs. The survey, conducted by local consultants to USAID/Jakarta, evaluated the informational technologies and needs of the NGOs in Nusanet, their strengths and weaknesses, and their goals. The finished survey was presented to USAID/Jakarta, who will assist Nusanet in implementation of the survey's recommendations.

- **Indonesia Industrial Motor Efficiency Improvement Feasibility Study**

As part of its ASEI activities USAID will work with local institutions, the electric utility, industrial and commercial end users and motor vendors to characterize the electric motor market in Indonesia. The project team will design and carry out an industrial survey to assess motor purchasing habits and motor efficiencies. A small number of motor system

energy audits will provide on-site examples ofmotor system efficiency improvement measures. The cost-effective potential to replace existing motors and new motors with high efficiency motors will be analyzed. The quality of motor rewinds and their effects on efficiency will be addressed. Based on all of this data and a cost-benefit analysis, the team will develop a cost-effective large-scale electric motor efficiency improvement program for Indonesia. As an immediate next step, the team will design a proposed pilot project to test customer response, and vendor commitment to motor efficiency improvement programs.

This study provides an excellent opportunity to train local institutions in the important aspects of motor efficiency, raise awareness in industry about the potential of motor efficiency improvements and work with private vendors to begin a market transformation process toward higher efficiency motors.

V. PRIVATE SECTOR DEVELOPMENT

- **Regulatory Advisor**

In order to respond to the need for ongoing technical assistance caused by the restructuring of the Indonesian power sector, USAID will sponsor a long-term resident restructuring advisor at the Ministry of Mines and Energy (MME). The resident advisor's primary responsibility will be to advise the MME on policies regarding power sector restructuring, as well as how to incorporate energy efficiency and renewable energy in the new regulations that arise from restructuring. The advisor will help determine training needs, which will be filled in part under training programs carried out by the ETP under ASEI and Mission support, as well as US-AEP Environmental Exchange funds.

- **Conference on Private Power**

Soon after Indonesia opened the door to private power, USAID sponsored a private power conference with the World Bank which brought together senior energy officials from eight Asian countries including Indonesia. Participants discussed the policy, regulatory, statutory and financial conditions that would be necessary to attract U.S. and international private power investment to their countries. U.S. private power industry representatives were invited to convey their interest in foreign investment.

- **Clean Coal Technology Mission**

USAID, in conjunction with the U.S. Department of Energy, sponsored a Clean Coal Technology Mission to Thailand and Indonesia in 1992 to develop projects that could reduce emissions of greenhouse gases from coal combustion.

- **Report on Indonesian Power Sector Development**

USAID published a May 1995 report entitled *Review of Indonesian Power Sector Development Issues*. The report is designed to provide assistance to the Indonesian

Ministry of Finance in developing power sector policies that promote energy efficiency and private participation by exploring the following specific issues:

(1) electricity tariffs and subsidies,
(2) design and status of the IPP program,
(3) structural optimization of the electricity sector, and
(4) privatization and sectoral goals.

The report's recommendations were provided in a series of presentations to the Director General for State Owned Enterprises at the Ministry of Finance, who also holds a seat on PLN's Board of Commissioners (comparable to a U.S. Board of Directors).

- **Coal Combustion Laboratory**

USAID helped finance construction of LSDE, a coal combustion lab near the city of Bogor, designed to test cleaner ways to use Indonesia's abundant coal resources.

- **Private Power Technical Advisor**

From 1990 - 1995, USAID provided funds for a resident private power technical advisor to the Government of Indonesia's Ministry of Mines and Energy. This advisor provided technical assistance on DSM, load structuring, and other planning issues as well as providing U.S. power developers with information on market opportunities.

IV. TRAINING AND CAPACITY BUILDING

- **Energy Training Program (ETP)**

Since 1981, Indonesia has been strongly represented in USAID's Energy Training Program (ETP). As of July 1996, 311 Indonesian participants, representing over 100 agencies, institutions, and private sector enterprises, have been trained both in the U.S. and in-country, in various aspects of energy and environmental management. (See attachment B for list of Indonesian participants).

- **In-Country Training**

Two in-country workshops were carried out in 1993 and 1994 to acquaint participants with the economic and environmental rationales for energy planning. The first two-day workshop, held in Jakarta in 1993, was on *Opportunities for Renewable Energy Development*. In 1994, a one-week integrated resource planning (IRP) and DSM workshop was held for senior Indonesian policy-makers. This workshop provided participants with a basic background in IRP/DSM and an introduction to its use in energy planning. This program was followed by a six-week intensive IRP and DSM training course in the U.S.. During June 1996, ETP offered a workshop on *Electric Power Restructuring and Regulatory Reform* that

provided an introduction to innovative restructuring and regulatory reforms developed during the last decade.

Two more in-country workshops were planned for 1996. *Energy Efficiency in Process Industries* (July/August) provided participants with a comprehensive overview of approaches to promoting energy efficiency in the Indonesian industrial environment. In the *Cogeneration/Sugar Industry Project Development* workshop held in November, participants received training in biomass waste-to-energy project design, development, financing, and impacts. Courses in Customer Service Management, Human Resource Development for PLN, Environmental Modeling, and Restructuring / Regulation / Privatization are planned for 1997.

- **U.S.-Based Training**

  Of the 311 Indonesians who have participated in USAID training courses, more than one-third have taken part in U.S.-based intensive courses ranging from four to sixteen weeks in length. These U.S.-based courses are intended to provide mid-level managers with "how to" aspects of energy planning and emphasize project design and implementation. IRP and DSM courses are offered simultaneously so that key overlapping topics are open to all participants. The IRP course is designed for analysts involved in utility resource planning and covers basic principles and practices of IRP for electric utilities. Indonesian participants learn to evaluate the technical and economic benefits of various power generation technologies, implement DSM programs, and integrate these programs using computer modeling. During May and June 1996, Indonesian energy professionals participated in a U.S.-based course in *Private Power Project Financing*, to enhance the financial analysis capabilities of Indonesian utility and government officials and to ensure that quality control standards are established and implemented before Indonesia begins its successful expansion of private power generation.

- **ASEI/ETP Training Activities**

  As part of its training component, ASEI provides support to ETP to implement training programs. Past and future activities include:

  - **Power-Gen/DSM Asia 96.** Environmental Exchange funds were used to send the head of PLN's Engineering Service Center and a high ranking staff member of the GOI's Energy Research Lab to Power-Gen/DSM Asia 96 in New Delhi, India in September 1996. The head of the Engineering Service Center then was joined by two more staff members from PLN to attend a training seminar sponsored by US DOE in New Delhi to learn about U.S.-produced software that can simulate power plant operation to allow experimentation with various efficiency improvement options.

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- **NGO Strengthening.** The CLEAN/Energy design team recommended support for NGO strengthening in order to encourage balanced and community based input into GCC activities. Pelangi is an Indonesian sustainable development analytical NGO, which has done significant work in global climate change and wants to bolster its institutional capacity to do more work in energy. The SEA has worked with Pelangi to define its strengthening requirements, and has proposed and received approval for a series of internships and training costing approximately $50,000 through the US-AEP Environmental Exchange program will be used to support this strengthening. The intern/fellowships will focus on policy ramifications of a range of energy issues, including renewable energy, energy efficiency, nuclear energy, and health/environmental aspects of energy. Pelangi also runs a sustainable development/energy computer bulletin board system. This strengthening includes use of the US-AEP funds to further development Pelangi's technical capacity to implement this system, as well as improve its Internet links. This will leverage a GCCI proposal now under review to updated the physical infrastructure of this information dissemination capability, including improved access to information from the Country Studies Program.

- **Training for Appliance Labeling and Standards.** Funded under ASEI, Indonesian policymakers, senior technical staff, and NGO representatives will participate in an upcoming U.S.-based course training course on appliance labeling and standards. The training course will include a study tour to the U.S. aimed at developing knowledge of the full range of technical requirements necessary for the implementation of workable, results-oriented, energy efficiency equipment labeling programs adapted specifically to on-the-ground realities in the region.

- **Solar Home Systems (SHS) Training.** This is a "train the trainers" program to support the World Bank-assisted SHS project through the Indonesian Agency for the Assessment and Application of Technology (BPPT). The course will focus on training senior technicians of SHS distributors, who will ultimate operate the anticipated 1,000 service centers required to support an installed base of 200,000 SHS. The course will include components on customer service and World Bank reporting requirements. Two U.S. trainers will work with BPPT and its trainers in Jakarta in January 1997 to refine service and user manuals and develop the training course. In March 1997 the U.S. trainers will return to assist in presenting the actual one week course.

- **Support for Interim Regulatory Advisor.** The Interim Regulatory advisor supplied through EEP component to jump-start CLEAN/Energy will be supported by training in an array of subjects as needed. This will possibly include fellowships under the Exchange Program at US regulatory agencies. ETP Program Managers traveled to Jakarta in November 1996 just after completion of a Regulatory Study Tour conducted through ETP Field Support funds. They worked with the USAID/Jakarta to help identify training needs that can be determined even before the interim advisor is in place.

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- **Renewable Energy Project Financing**. PLN has formally implemented the Small Power Program, which emphasizes renewable energy projects and includes a standardized Power Purchase Agreement (PPA). PLN has already held the first round of inviting applications for grid supply projects (30 ME for Java and 15 MW outside Java). In order to successfully respond, small renewable energy developers will need training on how to finance projects. The two week course will cover: factors determining the financing structure (project scale, complexity and risk), financing mechanisms (Build-Own-Operate, Build-Own-Transfer, third party financing, debt equity swap, joint venture, leasing, cooperative or commercial credit), sources of financing (commercial banks, institutional investors, venture capital, private investors, multilateral development banks, regional and national development banks, credit guarantee programs, risk insurance programs), the requirements of project financing (private power legislation, responsive utility and regulatory environment, utility PPA formulation, pricing for utility power purchases, responsive project development regulatory environment), evaluation of various financing structures, implementation of small renewable energy projects, and case studies. This course supports the World Bank Renewable Energy program and is scheduled for mid-1997.

- **Renewable Projects Bid Solicitation, Evaluation and Power Purchase Agreements.** To further support the emphasis on renewable energy as a means to reduce GHG emissions, this two-week course will assist PLN in evaluating and analyzing renewable energy project proposals submitted under the new Small Producer Power Program. The course will cover the preparations and steps necessary for a utility to ensure an efficient, transparent and successful solicitation, including the structure of and planning for evaluation of bids, selection and negotiation. Solicitation steps will be illustrated with examples of the required major documents and contracts. The instructors will present the differing viewpoints of the various involved parties throughout the process and indicate the potential for mistakes or abuse. The course,scheduled for mid-1997, will culminate with class exercises in bid analysis, selection and negotiation.

- **Utility Partnership Program**

This ASEI component is implemented by USEA and includes a balanced set of four partnerships. The Memorandums of Understanding (MOUs), which demonstrate high level management support and pave the way for productive exchanges, have already been signed to formally create the partnerships.

(1) **PLN-SEI.** A partnership between PLN and Southern Electric International (SEI) was formally signed in Washington on September 20, 1996. SEI is a subsidiary of the Southern Company, which will provide access Georgia, Alabama, Mississippi and Gulf Power Companies.

(2) **Regulatory Partnership.** A Regulatory Partnership is planned between the just formed regulatory body within the Ministry of Mines and Energy and a U.S. regulatory agency. The process to match PLN with the partner agency will begin in early 1997 as a follow-up to Regulatory Study Tour conducted under ETP in October/November 1996. This will provide valuable support for CLEAN/Energy, which will focus on regulation in a restructured power sector that is compatible with renewable energy and energy efficiency.

(3) **Gas Partnership.** Negotiations have already been initiated with the Director-General of PGN, Indonesia's national gas utility about forming a partnership with a U.S. gas utility. Gas is playing an increasingly important role in Indonesia's energy sector, including power generation. The Mission looks forward to this first "foot in the door" in the sector, and the partnership is enthusiastically supported by the American Embassy in Jakarta to encourage U.S. involvement in this sector in fulfillment of USG-GOI bilateral discussions regarding establishing such a partnership.

(4) **Outer Island Partnership.** Much of the restructuring activity has focused on Java-Bali. The rest of Indonesia, often referred to as the Outer Islands, offers a different set of opportunities and challenges for power sector reform. This partnership will help address such issues, and will include a special emphasis on integrating renewable energy into the system. Initial discussions for this partnership have been conducted with PLN, and USEA is presently working on arranging an appropriate match.

- **Energy Training Programs Alumni Associations**

The Indonesia ETP also includes a component that will develop the Indonesian ETP Alumni Association's capacity to improve national networks in energy and environment. ETP will assist the Alumni Association in planning and implementing conferences, workshops, and seminars on energy and environmental issues, connecting to Internet sources, advising the government on energy and environmental issues, and keeping relevant entities informed through an Alumni Association newsletter. Two pilot seminars will be prepared and offered as part of the strengthening program.

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Other Training Programs

In addition to the aforementioned programs designed solely for Indonesian participants, USAID has provided training for Indonesians, in conjunction with participants from other developing countries, on a variety of energy topics including:

- ambient air-quality monitoring,
- clean coal technologies,
- economic and financial analysis of energy projects,
- energy planning and policy,
- environmental policy development and implementation,
- general management of electric utilities,
- human resource development and management,
- oil and gas exploration,
- oil and gas reservoir evaluation and development,
- petroleum management,
- power plant operation and maintenance,
- power systems control and protection,
- refinery energy conservation,
- solar electric/photovoltaic technology,
- strategic planning for oil and gas executives,
- wind energy technologies, and
- utility/industry environmental management.

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COOPERATORS - Energy Programs in Indonesia

APEC Inter-utility Group

Asia Alternative Energy Unit (ASTAE) office of the World Bank

Asia Pacific Economic Cooperation (APEC)

Asian Development Bank

Environmental Enterprises Assistance Fund

Hagler-Bailly, Inc.

Indonesian Sustainable Development Foundation (YPB)

Institute of International Education (IIE)

International Institute for Energy Conservation (IIEC)

Investment Fund for Renewable Energy (IFREE)

Lawrence Berkeley National Laboratory (LBNL)

Pelangi

PERTAMINA

Perum Listrik Negara (PLN)

Program for Asian Cooperation on Energy and the Environment

USAID/Jakarta

U.S. Council for Renewable Energy (US/ECRE)

Winrock International

World Bank

Yayasan Bina Usaha Lingungan (YBUL)

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USAID ENERGY PROGRAMS:
MEXICO

I. BACKGROUND

The United States Agency for International Development (USAID) focuses its energy activities in Mexico in the following areas: (1) fostering use of renewable energy resources, (2) promoting energy efficiency, (3) reducing pollution from energy production and use, and (4) assisting regulatory reform and energy policy and planning. Generally, these goals are carried out through technical assistance and training/capacity building; however, USAID has also provided assistance with financing options, prefeasibility work, research, technology cooperation, and environmental technology trade promotion. Activities in Mexico are cooperative efforts of several agencies and organizations, including:

- USAID/Mexico
- USAID's Bureau for Latin America and the Caribbean (LAC)
- Bureau for Global Programs, Field Support, and Research
- Government of Mexico
- non-governmental organizations (NGOs)
- private organizations
- private companies
- U.S. public utilities

USAID provides assistance to and leverages funds from the World Bank and Inter-American Development Bank (IDB), which are also active in Mexico's energy sector. USAID also coordinates funding and programs with other U.S. Government agencies, particularly the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA).

USAID is involved in a cooperative effort to assist Mexico in its desire to increase energy efficiency and reduce pollution from energy production and use. USAID has worked on energy efficiency, renewable energy, private sector energy development, and energy training programs with Mexico since the establishment of the Alliance for Progress Program in 1961. The collaborative work with Mexico has increased significantly since 1990 as a result of mutual concern about the quality of the environment and the vital role that energy plays in all environmental interrelationships. The Office of Energy, Environment, and Technology (EET) is supporting USAID/Mexico's efforts to ensure that energy programs in Mexico produce quantifiable results that will have a significant impact on Mexican energy efficiency and clean energy activities.

Global Climate Change is important in the Mission strategy, in agreements, and in understandings between the U.S. and Mexico. Therefore, USAID activities in Mexico contribute to Agency and Mission goals to reduce threats from global climate change by reducing greenhouse gas emissions from energy production and use.

II. INITIATIVES

- **Environmental Initiative for the Americas (EIA)**

At the Summit of the Americas, the U.S. agreed to form partnerships with its Latin American neighbors to, among other things, "Guarantee sustainable development and conserve our natural environment for future generations." Specifically, the participating nations agreed to advance and implement the commitments made at the 1992 United Nations Conference on Environment and Development and the 1994 Global Conference on the Sustainable Development of Small Island Development States.

In order to help in carrying out its commitment to this partnership, the U.S. created through USAID the EIA. The goal of the EIA is to build on the Agency's current environmental portfolio in Latin American and the Caribbean by drawing on expertise that resides in other USG agencies and the NGO community. The USAID portfolio consists of projects dealing with sustainable agriculture, watershed management, renewable energy, eco-tourism, and conservation of natural forests and biodiversity. Through the EIA, USAID has expanded its programs to address issues related to industrial and urban pollution, sustainable energy production, and coastal zone management.

EIA works to promote sustainable energy production and use by:

(1) embracing low cost, reliable, and clean systems,
(2) utilizing conservation principles and renewable energy sources, and
(3) improving management of power utilization and consumption in the urban, industrial, rural, and transportation sectors.

III. RENEWABLE ENERGY ACTIVITIES

In the last few years, USAID has funded a number of renewable energy programs in Mexico through both its own cooperators and by passing money to DOE through a Participating Agency Service Agreement (PASA). A majority of the total USAID funding for these renewable energy programs has come from a combination of money put aside by the Agency and money provided for the Environmental Initiative for the Americas. This summary will address the larger program with DOE first.

DOE has passed the USAID money and some of its own funding to Sandia National Laboratories and delegated responsibility to that organization for oversight and coordination of the program. Sandia in turn contracted with the Meridian Corporation for assistance in coordination. DOE has provided some additional funding and complementary support through the National Renewable Energy Laboratory and Battelle Pacific Northwest Laboratories. USAID/Mexico has maintained involvement through periodic briefings and yearly strategic planning sessions.

The program focuses on productive uses of renewable energy, training, capacity building, and institutional strengthening. The program supports NGOs and a number of Mexican federal and state agencies in integrating renewable energy technologies into their ongoing rural development support activities. It focuses on social and economical productive use projects utilizing solar or wind energy. Examples of applications that receive support include potable and agricultural water supply, refrigeration and ice-making, food processing, rural workshops, and aquaculture.

The renewable energy technologies themselves are commercially competitive as providers of energy in these applications, but the USAID funds are applied to upstream demonstration activities necessary to remove institutional and other barriers to the wider use of renewable energy technologies. The use of less costly, off-grid renewable energy systems meets the demand for electricity (more than 80,000 villages in Mexico lack electricity) and serve as an alternative to uneconomic grid extension, with its related fossil fuel emissions. The upstream activities include renewable resource assessment, detailed project identification and preparation activities, pilot/demonstration project procurement, environmental project and program evaluations, policy dialogue, awareness building, establishment of financing mechanisms, and institutional strengthening. Demonstrating productive use applications of photovoltaic, small-scale wind, and micro-hydro power will help expand markets for renewable energy systems. This will in turn reduce the cost of the applications of these technologies, thereby achieving a substantial leveraging effect.

As mentioned above, USAID has also pursued complementary activities through two of its own cooperators, the Environmental Enterprises Assistance Fund (EEAF, a non-profit investment company)[1] and the U.S. Export Council for Renewable Energy (US/ECRE, a consortium of U.S. renewable energy trade associations). The EEAF program in Mexico began in early 1996.

In 1993 US/ECRE, working through the American Wind Energy Association, loaned anemometers for wind measurements to ten villages in Mexico in order to determine the viability of using wind energy for electricity generation in those locations. In 1996, US/ECRE began negotiation of a cooperative agreement with Sandia. Through this agreement US/ECRE and Sandia would use USAID funds to:

(1) identify applications for renewable energy (primarily PV and wind) that could be included in significant numbers in Mexico's World Bank and self financed rural development programs;
(2) provide technical assistance and training to Mexican personnel to enable them to incorporate renewable energy into programs led by FIRCO (a Mexican federal agency under the agriculture/rural development secretariat) and facilitate the identification, evaluation, selection, and installation of pilot renewable energy projects under FIRCO programs;
(3) build linkages to U.S. industry through outreach efforts and cost-share

[1] EEAF provides loans, equity capital, training, and technical assistance to environmental entrepreneurs in developing countries. The goal of EEAF is to stimulate local, sustainable development where funding from traditional, commercial sources is unavailable. The interest and returned principle from loans provide a steady investment fund for future projects. Wherever it operates, EEAF strives to create local environmental investment funds to back entrepreneurs in targeted developing countries.

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funding for project identification trips by US firms; and

(4) provide technical assistance to the MDB's to incorporate renewable energy in their Mexico programs.

IV. ENERGY EFFICIENCY ACTIVITIES

- **Pilot Program to Substitute High Efficiency Electric Motors**

USAID is collaborating with Fideicomisio de Apoyo al Programa de Ahorro del Sector Electico (FIDE) on a pilot program to substitute high efficiency electric motors for standard motors. This program, covering 20 medium-sized industries, is part of an overall industrial demand side management project in Mexico. Through the program, local consultants conduct and evaluate industrial energy audits and secure favorable financing for the implementation of the energy efficient options identified in the audits. Promotional efforts led by the program's Mexican partners make available current information about the advantages of replacing standard motors with energy efficient motors. The program disseminates case studies to demonstrate the economic advantages of energy efficient motors to new industries. The ultimate objective of the pilot project is to design a large-scale national motors program on the national level.

- **Energy Efficiency Motor Rewind Project**

USAID is conducting a pilot study to complement the high efficiency motor pilot project described above. Motor rewinds represent by far the most common cause of motor failure in Mexico. This project is just beginning and has two major components:

- to provide real data on effects of typical rewind practices on motor efficiency, and
- to create a training program for rewind shops and develop and disseminate guidelines for better motor rewind practices.

The long-term goal of the project is to reduce motor efficiency degradation during the rewind process. FIDE and USAID are jointly funding the motor rewind project which builds on the aforementioned USAID and FIDE collaboration on motor efficiency programs.

- **Steam System Efficiency Pilot Project**

Using the motor efficiency programs as a model, USAID began a steam system efficiency program for Mexican industry in September 1996. The program is currently carrying out targeted energy audits of steam generation and distribution systems in 30 to 35 industries. The program is also promoting boiler tuneup and monitoring, the use of new steam trap technology, and the incorporation of process heat recovery into thermal energy systems. Efforts will also include training in boiler efficiency techniques and technology, and instruction on steam leak detection and repair. This program is expected to continue and expand the significant private sector support that the motor efficiency program has generated.

- **Energy Efficient Appliance and Building Standards**

  USAID is working with the Government of Mexico to develop and implement energy efficiency standards for consumer appliances and commercial buildings. Mexico is developing these standards to meet legislatively-mandated deadlines. USAID is providing technical assistance in formulating and implementing standards. Specifically, USAID brings experience in assessing and improving methodologies for designing standards, and evaluating the impact of the standards once they are in place.

- **High Efficiency Lighting (Illumex Project)**

  Illumex is a collaborative effort involving the World Bank, the Mexican national electric utility, the Comisión de Electricidad Federal (CFE), and the Government of Norway. The Illumex project is competitively procuring and installing almost 2 million compact fluorescent lamps for homes in Monterrey and Guadalajara, Mexico. The feasibility work supported by USAID was key to developing the project. General Electric and Phillips won the initial procurement bid, with each company selling approximately 300,000 compact fluorescents. Illumex is expected to reduce carbon emissions by 27,500 tons per year, conserve 78 MW (megawatts) in capacity, and save, per year, both an avoided power generation of 135 GWH, and 265,000 barrels of oil equivalent.

- **Energy and Environment Market Conditions Reports**

  USAID published two reports on Mexico as part of the *Business Focus Series* on promising environmental and energy markets in developing countries. A March 1995 report, "Mexico's Environmental Markets," updates a 1992 USAID report titled "Energy and Environment Market Conditions in Mexico." The new report reflects many important changes to the Mexican environmental market since 1992 (such as Mexico's inclusion in the North American Free Trade Agreement, and includes a market overview of important environmental sectors, regulations, and trends. Sections on water pollution control, solid and hazardous waste, energy efficiency, renewable energy, fixed-source air pollution control, environmental consulting, remediation, and financing provide useful information on market drivers, expected market size, and major players. A February 1995 report titled "Private Power Opportunities in Mexico" focuses on conventional power sector opportunities in the expanding Mexican market. The Private Power report includes information on the power market structure, business and investment climate, recent regional developments, and potential private power opportunities.

- **Sustainable Cities Initiative in Monterrey**

  The Sustainable Cities Initiative is designed to bring sustainable energy services and technologies on a city-wide scale to pilot cities on a demonstration basis. The initiative is a cooperative effort between EEP, USAID/Mexico, and the private sector, which through an industry task force takes the lead in investing in improved energy infrastructure and new energy technologies for these cities. In the first phases of the Sustainable Cities Initiative, Hagler Bailly and the Alliance to Save Energy assembled a

group of 20 energy efficiency and clean energy production companies into the Business Coalition for Sustainable Cities. The cities selected for this project were Ahmedabad, India, Kaliningrad, Russia, and Monterrey, Mexico.

In Mexico, there is a growing interest in the linkage between energy efficiency and environmental management, particularly pollution prevention. Monterrey is one of the most industrialized cities in Mexico, providing a sizable opportunity to demonstrate the benefits of energy efficiency and pollution prevention as a means to promote sustainable industrial development.

The project will use a discrete 9-month technical support effort in selected industries as the basis to foster partnerships between the public and private sectors in carrying out a broader energy and environmental effort in Monterrey. It will attempt to create demand for combined energy efficiency and pollution prevention technologies and services, linking its activities to other on-going programs in Monterrey related to energy and environment building on the successful technical assistance/training activities conducted jointly by EEP and the Environmental Pollution Prevention Project (EP3) to promote pollution prevention/energy efficiency programs in the maquiladora industry along the Mexican Border. Finally, the project will integrate the technical efforts in industrial audits with broader training, study tour and technology demonstration activities, as well as public policy and local government support for information dissemination.

The integrated activities of Sustainable Cities - Monterrey have the following objectives:

- Create demand for energy efficiency and pollution prevention services through demonstration projects combining energy and pollution prevention audits;
- Help create local capacity to meet the demand for energy efficiency and pollution prevention services;
- Help create a market for energy efficiency and pollution prevention technologies;
- Build awareness of the benefits of energy efficiency and pollution prevention in the industrial sector and at the municipal and state levels; and
- Take advantages of resources available through the Environmental Export Council (EEC) and the Alliance to Save Energy (ASE) to promote energy efficiency and pollution prevention technology, support implementation and broaden the knowledge and appeal of the technical approach developed.

V. ENERGY INFRASTRUCTURE AND TECHNOLOGY

- **Private Environmental Investment for the Americas**

USAID is supporting a set of activities to promote public-private partnerships for development in Latin America under its Private Environmental Investment for the Americas Initiative. The Initiative fosters private sector investment in areas of critical environmental need. In Mexico there are several components:

- **USAID Environmental Exchange Program**

  Active in Mexico and Brazil, the Environmental Exchange Program supports Environmental Export Council-sponsored (EEC) exchanges that bring together public, private, and non-governmental sector representatives to jointly solve environmental challenges. In Mexico, the EEC is proposing to use exchanges to spur investment in industrial pollution prevention and energy efficiency. The goal will be to catalyze implementation of efficiency and environmental improvements by bringing together private sector representatives from Mexico and the U.S.

- **U.S.-Mexico Environmental Development Partnership**

  Working with the Kenan Institute of Private Enterprise, this Partnership hopes to broker joint ventures for environmental technology using small matching grants. The goal is to promote technology transfer and formalized partnerships between Mexican and U.S. firms.

- **Pollution Reduction through Power Wheeling with Mexico**

Utilities in both Mexico and the U.S. are interested in increasing the cross-border power trade to reduce the need for new powerplants. The potential for efficiencies and pollution reduction is significant, but cross-border wheeling is complex. USAID, recognizing this effort, has leveraged U.S. public funds for a bi-national Working Group to assess the potential for expansion of power wheeling across the southern U.S. border. Legal, technical, and economic experts came together to monitor and evaluate recent legal, regulatory, and market developments in the power sector of the two countries. In order to assess the aforementioned issues within the context of the inherent uncertainty of developments in the U.S., the power investment options were then examined using a methodology that accounts for different possible outcomes of the U.S. industry restructuring. This analysis also identifies "signposts" that may signal the arrival of the different scenarios, allowing market participants to prepare for those outcomes by building off of the results of this project. Issues that require further research were also identified, with a view to continuing the collaboration established in the Working Group. The findings of the Working Group will be presented in early 1997 at a conference of border utilities power brokers.

- **Pollution Prevention and Energy Audits of Maquiladoras**

USAID supported joint pollution prevention and energy audits of 10 selected Maquiladoras along the U.S.-Mexico border in Reynosa and Matamoros, Tamalipas. The audits provided cost-effective recommendations for both industrial energy savings and pollution reduction. The Environmental Pollution Prevention Project (EP^3), through which this program is implemented, has extensive experience with industrial pollution prevention audits throughout the developing world. The Maquiladoras audits are unique, however, in that they are joint audits of energy and pollution. Experts from the Energy Efficiency Project (EEP) have provided support on the energy side. EP^3 and EEP personnel completed the audits during the second half of 1996. Many of the plants have already begun to implement the experts' recommendations. USAID will conduct follow-up support visits to audited plants to monitor implementation of the recommendations.

- **Mexico City Landfill Gas Utilization**

Landfill methane emissions in Mexico City contribute to global climate change and create an impediment to local property development. Methane generated by landfills could be exploited as a fuel to produce electricity, thereby turning problems into benefits. At Prados de la Montana, a landfill site in Mexico City, USAID is providing technical assistance to the Departamento del Distrito Federal (DDF) to explore the feasibility of landfill methane for energy production. The Energy Technology Innovation Project (ETIP) conducted an initial investigation of leachate collection and treatment options at the landfill and identified technically feasible options for reducing the levels of leachate in the landfill and disposing of the extracted leachate. The landfill is already capped with methane vented through chimneys, but currently the methane is flared. The results of the feasibility study will provide a forecast for methane generation from the landfill; which will then be used to determine the economic feasibility of constructing a plant at the site.

- **Mexico Emissions Control Project**

In 1994, Mexico's Instituto de Investigaciones Electricas (IIE) requested assistance from USAID to reduce smoke stack emissions at the Manzanillo Power Station (MPS). The emissions at MPS cause local pollution, particularly highly visible plumes that adversely affect one of Mexico's prime tourist locations. The oil-fired boilers at MPS also are a significant source of greenhouse gas emissions. USAID identified high levels of particulate matter and sulfates as the primary reasons for the plumes' opacity. Based on these findings, USAID recommended that Reduced Emissions and Advanced Combustion Hardware (REACH) technology be installed at MPS. REACH is a U.S.-developed combustion equipment that increases burner efficiency, thereby improving power plant efficiency and reducing emissions.

In an effort to leverage funds, USAID welcomed technical support and emissions-monitoring equipment from the Salt River Project (SRP), a municipal utility based in Arizona. The $150,000 in cost sharing funds contributed by SRP demonstrates the relevance of this activity to the U.S., particularly to U.S. utilities bordering Mexico.

USAID is currently working with SRP to develop an emissions testing program, which will measure both pre- and post-REACH emissions to determine the full impact of the technology. The installation of REACH was completed in September 1996. The final testing was successfully completed in January 1997.

The project's net effect is a reduction in greenhouse gas emissions that contribute to global climate change. If successfully implemented, the solutions identified for Manzanillo could be replicated on most of Mexico's 10,000 megawatts of oil-fired capacity. If successfully replicated throughout Mexico, the annual oil savings could exceed $10 million and annual reductions in CO_2 emissions could reach 315,000 tons.

- **Private Power Opportunities in Mexico**

USAID has published a report that focuses on the main economic characteristics and regulatory framework of the Mexican power sector (see above, "Energy and Environment Market Conditions"). The report covers:

Power Market Structure:
- Supply and Demand
- Tariff Structure and Levels
- Fuel Availability and Price

Business and Investment Climate:
- Macroeconomic Trends and Policies
- Investment and Regulations

Recent Regional Developments:
- Domestic Developments
- International Developments

Potential Private Power Opportunities:
- Independent Power and Cogeneration Possibilities
- Financing Options and Constraints

VI. TRAINING AND CAPACITY BUILDING

- **Mexico-U.S. Energy Training Partnership**

Jointly funded by USAID/Mexico and EET, the Energy Training Program (ETP) has trained over 350 Mexicans in several areas, including:

- energy efficiency in buildings,
- environmental management,
- wind and photovoltaic powered water pumping,
- energy conservation in process industries,
- improving photovoltaic project development, and
- renewable energy options for protected areas management.

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- wind and photovoltaic energy for productive applications,
- renewable energy options for protected areas management,
- energy efficiency in the transportation sector,
- energy efficiency standards for commercial buildings, and
- environmental management in the industrial sector.

A buy-in has been negotiated to continue the Partnership.

Joint development of the courses with ETP staff and local counterparts assists the Mexicans to replicate both the success of the training, and the local capacity to implement energy and environmental projects. This includes working with Mexican counterparts to develop a distance learning model for energy efficiency which they can implement once this effort is completed.

COOPERATORS - Energy Programs in Mexico

Battelle Pacific Northwest Laboratories

Comision Nacional para el Ahorro de Energia (CONAE) - National Commission for Energy Conservation

Departmento Uso de Energia Electrica, Instituto de Investigaciones Electricas (IIE)

Environmental Export Council (EEC)

Fideicomisio de Apoyo al Programa de Ahorro del Sector Electrico (FIDE) - Trust in Support

Hagler-Bailly, Inc.

Inter-American Development Bank

International Institute for Education (IIE)

International Institute for Energy Conservation (IIEC)

Lawrence Berkeley National Laboratory (LBNL)

Meridian Corporation

Mexico Professional Association (PAESE)

Mexico Professional Energy Association (ATPAE)

National Ecological Institute (INE)

Oak Ridge National Laboratory (ORNL)

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USAID ENERGY PROGRAMS:
PHILIPPINES

I. BACKGROUND

The United States Agency for International Development (USAID) has a long history of energy activity in the Philippines. The Philippines is one of USAID's ten "key countries" for climate change efforts, and most energy activities focus on reducing threats from global climate change through: (1) increasing renewable energy use, (2) improving energy efficiency, and (3) increasing sustainable energy use. USAID has provided the Filipino energy sector with technical assistance in moving towards privatization of the power sector, and USAID energy training programs and capacity building activities in the Philippines have been a particular success.

Electricity supply in the Philippines is dominated by the state-owned National Power Corporation (NPC). The Philippine government's objectives for the power sector focus on reducing oil imports for electricity generation (including tapping the potential of the domestic natural gas industry) and restructuring the power sector. The government is also aggressively promoting the private development of power projects to attract additional capital and to provide relief from the country's chronic power shortages.

Power shortages are a serious problem in the Philippines. These shortages have tremendous environmental costs as well, since most businesses and industries have purchased backup diesel generator sets which are highly polluting energy sources. After a serious power supply crisis during 1993, increased privatization of the power supply coupled with strict government attention to the problem have greatly improved power sector reliability. NPC is in the process of privatizing its power generation facilities into 14 subsidiaries. An omnibus power sector restructuring bill is currently under consideration in the Philippine Congress.

II. INITIATIVES

- **Asia Sustainable Energy Initiative (ASEI): Philippines**

  The goal of ASEI is to mitigate global climate change and local environmental degradation associated with generation and supply of electric power in the Philippines, Indonesia, and India. In the Philippines, the program is designed to help finance future energy needs, strengthen the technology base, and improve planning and decision-making processes in the power sector. The five principal components of the program in the Philippines are:

  - a Sustainable Energy Advisor (SEA) at the Mission;
  - parallel support for the GEF's Industrial Efficiency Program in the Philippines;
  - a Utility Partnership Program;
  - focused technical assistance and training in motor, building, and appliance standards; and
  - Environmental Executive Exchanges.

updated February 11, 1997

ASEI focuses on adequate, reliable, affordable, and environmentally-sound electricity services by promoting (1) integrated resource planning (IRP), (2) Demand-Side Management, (3) energy efficiency, (4) renewable energy, and (5) end-use technologies. Under the ASEI's utility partnerships, a twinning relationship has been established between U.S. utilities and several Filipino utilities, and a Sustainable Energy Advisor for USAID/Manila has been assigned. The program will promote active collaborations both between Filipino and U.S. organizations, and between U.S., Filipino and other Asian partners.

- **Global Climate Change Initiative (GCCI)**

Confronting the issue of global warming has been a priority since the U.S. signed and ratified the Framework Convention on Climate Change (FCCC) in 1992. Efforts were refocused in early 1996 when the federal government announced that the U.S. supported the establishment of binding targets and timetables for reducing greenhouse gas (GHG) emissions. USAID is helping to lead these efforts to help other countries reduce the rate at which their net GHG emissions are growing. The Agency, which has concentrated activities in ten key countries and regions, spends over $200 million annually on activities that promote sustainable development while reducing the negative climate change-related impacts.

Key countries were chosen for the type and quantity of greenhouse gas emissions, the government's willingness to adopt greenhouse gas mitigation strategies, and the degree to which natural sinks are able to absorb greenhouse gases. USAID's Office of Energy, Environment and Technology (EET) is supporting the Country Studies Program (CSP) under the GCCI by providing funding to seven GCC countries, Mexico, Indonesia, Ukraine, Bolivia, Bangladesh, Kazakstan, and the Philippines, and helping those countries with develop National Action Plans to address global climate change. EET has also worked to get the Philippines' CSP representatives on-line in order to better communicate with their peers in other countries.

- **National Action Planning (NAP)**
  Under the U.N. Framework Convention on Climate Change, signatories are required to develop country-specific action plans to outline how they plan to mitigate impacts and adapt to changes in global climate. The U.S. government, through the U.S. CSP, is providing technical and financial support to the climate change studies of the Philippines and other developing countries. USAID has provided $150,000 towards the NAP process in the Philippines. The Philippines Department of Environment and Natural Resources and the Department of Science and Technology will co-manage national action planning in the Philippines with technical assistance from the CSP.

* **Markal Training**

  USAID is providing intensive training and technical support to the Government of the Philippines (GOP) in the use of the MARKAL model to determine the climate change impacts of various energy efficiency, renewable energy, and other energy programs and policies, and to improve the institutional capability of the GOP to analyze the greenhouse gas mitigation impacts of their programs.

III. RENEWABLE ENERGY ACTIVITIES

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

Through Winrock International, USAID's Center for Environment is building a network of non-government organizations to help facilitate the use of renewable energy in developing countries. Known as 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. Ongoing REPSO activities include project development assistance, identification and monitoring of projects, provision of technical assistance, and the linkage of local developers with U.S. counterparts for project proposals. The Philippines REPSO also gives cost-shared pre-feasibility studies for renewable energy development opportunities; the Renewable Energy Financing and Technological Assistance project then provides the opportunity for start-up financing for promising projects through the REPSO.

The REPSO in the Philippines is continuing to work on preparing and evaluating proposals for their pre-investment cost-share program. The most recent solicitation for bioenergy proposals closed in September 1996, and the REPSO is currently evaluating the solicitations. Past grants for pre-feasibility studies include a biomass project in Batangas and a run-of-the-river hydropower project. Several interesting unsolicited proposals have been received by the REPSO and are under consideration.

Current REPSO activities include the coordination of a Philippine National Wind-Mapping study. The purpose is aimed at assessing the overall economic wind resource potential in the country. The output will be a wind resource atlas that will be of great use to wind energy developers. The REPSO has also been providing policy assistance to accelerate government approvals for renewable energy projects. There has been an ongoing dialogue between the REPSO and the National Power Corporation (NPC) regarding standard power purchase agreements and a call for bids.

- **Renewable Energy Financing and Technical Assistance (REFTA)**

The REFTA project is being conducted through USAID/Manila, utilizing funding from the United States' commitment to the Global Environment Facility. In November 1994, Winrock International signed a two year cooperative agreement with USAID/Manila to implement the REFTA project, and a sub-agreement with Preferred Energy Investments (PEI) to manage the financial component of REFTA (see below, under financing renewable energy). The objective of REFTA is to increase energy production in the Philippines in an environmentally sustainable manner through use of renewable energy technologies. The project also aims to reduce the technical, financial, economic and institutional risks associated with renewable energy development and to use proven mechanisms to encourage public and private sector interests to invest in commercially viable renewable energy projects in the Philippines. Total cost of the REFTA project is $4.125 million, of which $3.75 million is funded by USAID and $375,000 from Winrock.

- **US/ECRE Sponsors Renewable Energy Trade Mission**

  In October 1996, the U.S. Export Council for Renewable Energy (US/ECRE) sponsored a trade mission to the Philippines. Fifteen U.S. firms, representing several renewable energy technologies, spent five days in the Philippines participating in individual meetings with potential partners as well as group meetings with relevant government, utility, and financial sector officials. Twenty-four potential projects and sales, representing a possible 777 megawatts (MW), were initiated or finalized during this mission. Technologies involved in these agreements include hydropower, geothermal power, solar electricity, and solar thermal power.

- **Power Trends 2000+ and Powertech International Conferences**

  The Philippines Department of Energy (DOE), the NPC, and the Institute of Integrated Electrical Engineers of the Philippines sponsored the Power Trends 2000+ Conference in November 1995 in Manila. Power Trends 2000+ coincided with the 2nd International Business Forum on Energy and Power Generation, or Powertech Philippines 1995. The REPSO/Philippines helped the organizers of the events with sessions on Renewable Energy Sources by identifying speakers and possible exhibitors. REPSO/Philippines also staffed a US/ECRE booth at the conferences, and REPSO/Philippines personnel moderated the session on renewable energy at Powertech.

- **Guide for Foreign Investors**

  The REPSO has completed work on a trade guide for foreign investors in the Philippines. Entitled *Renewable Energy Trade Guide for the Philippines*, it contains: (1) a brief profile of the country, (2) a profile of the energy sector, (3) the outlook for renewable energy technologies, (4) registration procedures, (5) available incentives, (6) local rules and regulations, and (7) key contacts and organizations. This document was distributed to U.S. firms that travelled to the Philippines in October 1996 for the US/ECRE-sponsored trade mission.

- **Micro-Hydro Training Course**

  The REPSO co-sponsored three local NGO representatives to attend the international training course on micro-hydro held in Cebu City. The three participants were from the Montanosa Research and Development Center , the Caramoan Peninsula Development Project, and the Sadlakang Dabaw Development Foundation. All three organizations have plans to actively pursue micro-hydro development.

- **Leveraging Funds for Renewable Energy Development**

  USAID supports the Environmental Enterprises Assistance Fund (EEAF), a non-profit organization established to identify environmental businesses that could benefit from loan or investment capital. EEAF has acted as an advisor to Winrock's REFTA program, to support its renewable energy support activities, primarily at the investment fund level. In addition, EEAF is actively looking for additional climate change-related financing activities in the Philippine private sector, and in December 1996 committed to finance an air-quality monitoring company in Manila. EEAF is considering the establishment of its own

representative office in the Philippines to further its financing activities on behalf of environmentally beneficial private sector companies there.

IV. ENERGY EFFICIENCY ACTIVITIES

- **Demand-Side Management (DSM) Project**

USAID/Manila is funding a $4.5 million, three-year DSM project utilizing a portion of the United States' commitment to the Global Environment Facility. The project will be implemented through a coordinated technical assistance and pilot program approach including: (1) assessment of the potential of DSM in the Philippines, (2) technical assistance to help establish DSM regulatory frameworks, and (3) pilot programs in the industrial sector to test findings, demonstrate tangible project benefits, and establish proven and replicable models. An important goal of the program is to coordinate existing projects in DSM and Integrated Resource Planning (IRP) being conducted by various donors in cooperation with different agencies of the Philippine Government and different electric companies. The program has already produced an IRP/DSM Action Plan for the Philippines, which lays out the costs and benefits of possible courses of action with specific recommendations for first steps, pilot projects, and collaboration and coordination.

- **Restructuring and Privatization**

Since 1993, USAID has been providing technical assistance to the Filipino Government to support its Energy Sector Action Plan (ESAP). The immediate goal was to provide emergency technical assistance on privatization to the Philippines Department of Energy (PDOE), but USAID also assisted the Philippine NPC in formulating appropriate privatization policy. Technical assistance has focused on:

- privatization and market liberalization (including privatization of the state-owned energy companies),
- institutional development,
- efficiency,
- environment,
- renewables,
- economic cooperation, and
- trade promotion.

USAID's policy work, technical assistance and training/capacity building culminated in PDOE's mid-1994 Action Plan for restructuring and privatization for the electricity industry in the Philippines. USAID then assisted PDOE in gaining support for this restructuring plan by co-funding with the World Bank and PDOE a series of workshops to solicit feedback on the plan. The final plan was sent to the Philippine legislature at the end of 1994.

- **IIE Sponsors DSM Workshops**

With support from USAID, the Institute for International Education (IIE), which provides exchanges, fellowships, and training in support of energy efficiency and renewable

activities undertaken by ASEI, has sponsored several workshops focused on the development and implementation of DSM projects in the Philippines. In October 1995, senior officials from CEPALCO visited utilities in California and Washington state to research how these utilities develop and cary out DSM projects. In March 1996, four participants from the Philippine public and private energy sector traveled to Thailand to attend an APEC meeting on DSM and to explore the program at the DSM Office of the Electricity Generating Authority of Thailand (EGAT).

Additional USAID-supported tours have included a June 1996 trip in which senior level energy officials from the Philippine public and private sector traveled to the U.S. to learn about U.S. energy efficiency and energy conservation practices. In September 1996, participants from MERALCO, CEPALCO, and NPC traveled to Thailand to meet with EGAT.

- **Information Management and Exchange: PowerNet**

The major government organizations involved in power sector planning and development, restructuring, and regulation have formed an ad hoc group called PowerNet to enhance communications and information flow amongst themselves. The main intent of PowerNet is to develop a consistent set of information to be used by the President's office for national planning activities. USAID is providing support through the PowerNet information technology assistance project. The major goals will be to link the six agencies electronically through a wide area network (WAN), and to implement an Intranet-based information system. USAID assistance will be provided for the design and installation of a WAN using leased data lines, fundamental design of an information system, implementation of an Intranet-based system, and collection of raw data and conversion to other formats as required. Assistance will also include training in the areas of network administration, Internet technologies, and systems analysis and design.

- **Philippine Motor and Building Standards Enhancement Project**

As part of its technical assistance support under ASEI, USAID has initiated a task to provide technical assistance in the development of two areas of energy efficiency standards: (1) the development of a motor efficiency testing capability, a program to provide energy labels on motors, and an energy standard for new motors; and, (2) assistance in developing a procedure and materials for compliance with the energy efficiency standards for new buildings.

More specifically, USAID, through LBNL, will help characterize the motors market in the Philippines by conducting a market survey of the suppliers, the characteristics of the various models of motors that are sold in the Philippines, and the uses of these motors. LBNL will provide technical assistance to the PDOE's Fuels and Appliance Testing Laboratory to aide in the development of their motor efficiency testing capability. In addition, USAID will help with the formation of an Advisory Committee to involve stakeholders in the development of motor efficiency standards.

In the buildings sector, LBNL will assist the PDOE in the characterization and implementation of an energy efficient design/permit/building process for commercial buildings in the Philippines. The project will help PDOE develop and field test compliance

protocols in order to provide data for the Philippine Department of Energy to development of forms, guidelines, and tools.

- **Philippine Green Malls Initiative**

USAID/W, through a cooperative agreement with the Institute for International Energy Conservation (IIEC) will begin work to demonstrate the benefits of using high-efficiency technologies in shopping malls in the Metro Manila area. Drawing on its experience adapting voluntary energy efficiency programs in other developing countries, IIEC will help MERALCO design a voluntary program targeted specifically at shopping malls with large electricity loads. The work will be targeted in the following technology areas:

- commercial air-conditioning equipment;
- commercial control systems, including lighting controls and building automation systems;
- energy services and engineering consulting;
- high-efficiency motors and compressors; and
- cogeneration systems and design services.

- **Philippine Transportation Initiative**

USAID/W, through a cooperative agreement with the Institute for International Energy Conservation, will begin work to create a policy and regulatory framework for the Philippine transportation sector, in collaboration with the Department of Transportation and Communications and other key stakeholders, using the Integrated Transportation Planning model process. This initiative is targeted at mitigating greenhouse gas emissions and local environmental problems associated with the transportation sector in Manila. Subsidiary activities within the project will include the development of a public involvement campaign to raise awareness about the negative impacts of current transportation policies and outreach to local NGOs, community groups, and government agencies to help stakeholders prioritize a plan of action for developing a transportation policy.

- **Utility Software and Training**

USAID/W, through a cooperative agreement with the Electric Power Research Institute, is providing customized EPRI Integrated Resource Planning (IRP Manager) and Hourly Electric Load Model (HELM) software and training modified for the Philippines electricity market, to MERALCO and NPC.

V. ENERGY INFRASTRUCTURE AND TECHNOLOGY

- **Support for Environmental Technology Development**

In January 1995, the USAID-supported EEAF began disbursing a $250,000 loan for start-up production of a horticultural growing medium ("cocopeat") from coconut husk waste. The product will be exported as a substitute for sphagnum peat moss, which is strip mined from fragile wetlands. Sphagnum peat bogs store more carbon than rain forests, and thus

help to counter global warming. Before this technology was developed locally in the Philippines, coconut husk wastes from coconut processing were burned.

- **Natural Gas Field Development**

Through its energy efficiency program, USAID/Manila is assisting sound development of the Malampaya/Camago offshore gas fields. A multi-agency Filipino task force comprised of PDOE and National Petroleum Company officials received technical assistance on negotiating production contracts with developers and operators for the gas fields resource. Aspects of production to be negotiated and initiated included underwater production platforms, an underwater gas transmission pipeline, and a beach terminal receiving facility. USAID also provides technical assistance and support to natural gas development by funding an electronic conference between U.S. and Filipino natural gas experts. Development of natural gas represents a significant source of clean, indigenous energy for the Philippines, and will play an important role in Philippine energy independence.

VI. TRAINING AND CAPACITY BUILDING

- **Training for Appliance Labeling and Standards**

Funded under ASEI, Filipino policymakers, senior technical staff, and NGO representatives will participate in an upcoming U.S.-based course training course on appliance labeling and standards. The training course will include a study tour to the U.S. aimed at developing knowledge of the full range of technical requirements necessary for the implementation of workable, results-oriented, energy efficiency equipment labeling programs adapted specifically to on-the-ground realities in the region.

- **Utility Partnerships Program**

ASEI provides support to the U.S. Energy Association (USEA) to conduct a Utility Partnerships Program. The purpose of this activity is to bring together U.S. and Philippine utilities to exchange information on various aspects of utility management as well as market opportunities in Philippine energy sector.

Currently three partnerships are underway with two more planned in the near future. The first is between NPC and Georgia Power Company. Executives from the two utilities have met three times so far and are collaborating in the areas of corporate communication, activity-based accounting, and cost-of-electricity management. A spring 1997 visit by the NPC President is in the works.

The second partnership is between Cagayan Electric Power and Light Company (CEPALC0) and Sacramento Municipal Utility District (SMUD). Two executive meetings between the two utilities have taken place so far with the issues of renewable energy and demand side management resources discussed. The next meeting is set for March, 1997.

The third partnership is between Manila Electric Company and Central and South West Services. The cooperation agreement between the two was signed in November, 1996.

Two exchanges have taken place so far with utility management and customer service being discussed.

- **Energy Training Program (ETP)**

Over 400 Filipino energy professionals since 1990, both in U.S.-based courses and in-country training have received instruction through the ETP. Practical training has played an important role in USAID's energy activities by creating a core of professionals with the skills to implement new technologies and techniques. For example, ETP hosted a seminar on the Build, Operate, Transfer (BOT) method for privately financing energy projects during April 1994 in Manila. Fifty-four officials from Filipino government agencies attended the seminar, which included case studies and panel discussions of BOT. Other ETP courses have focused on:

- DSM,
- energy economics and finance,
- energy efficient buildings,
- environmental management,
- IRP,
- energy conservation,
- wind energy conversion, and
- air pollution technologies.

Under USAID's ASEI program, ETP will sponsor several events in 1997, including courses and study tours in Electricity Sector Restructuring and Regulatory Reform, Product Labelling Training, Tariff Structure and Ratemaking, Management of a Distribution Company, and IRP.

- **Energy Training Program Alumni Associations**

Through the Energy Training Project energy professionals worldwide are trained in technologies and applications that will enhance the production, transmission, and use of energy in developing countries. Participants in ETP courses not only bring their skills back to their home countries, but ETP Alumni Associations have been established in many countries that maintain the contacts trainees establish through the program. These associations:

- encourage interaction among alumni,
- promote information exchange and professional development, and
- improve the ability of alumni to become agents of change for sustainable development worldwide.

The ETP Alumni Association in the Philippines is large and extremely active. The Alumni Association conducted a one-day, USAID-sponsored seminar on electric industry restructuring during February 1995, and planned a conference on the future of electric power in the Philippines for November 1995. The Alumni Association is strengthening its relationship with USAID/Manila, and plans to hold its first annual convention during December 1995. In the future the Philippines ETP Alumni Association plans to seek

accreditation as a private voluntary organization, which will allow the Association to seek project funds to implement development activities.

- **Wind Energy Applications and Training Course**

Each year the American Wind Energy Association holds a week-long wind energy course for developing country energy officials, called Wind Energy Applications and Training (WEATS). Officials from developing countries are brought to the U.S. for lectures on all aspects of wind energy, and also tour wind farm sites in California. During 1996, USAID's Renewable Energy Applications and Training (REAT) project and the Energy Training Program (ETP) provided funds for Filipino energy professionals to attend WEATS for training. They will also attend the Wind Power Conference during July in Denver, Colorado.

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updated February 11, 1997

SO 1.5 A More Economically and Environmentally Sound Energy System

1. The Results Framework

Development Hypotheses

The energy sector in Russia has been viewed internationally as an inefficient and even reckless provider of a commodity (energy of all sorts) for customers with highly-inefficient and energy-intensive consumption habits. USAID assistance to the energy sector was designed to help the Russian Government to develop options for providing energy more safely, efficiently, and with less pollution. On the basis of selected options, USAID was to be prepared to support implementation of restructuring plans in the basic energy industries (coal, natural gas, oil and electric power) and to facilitate the transition from all-powerful, state-owned and -controlled ministries to more environmentally-acceptable, privately-owned, market-oriented, competitive enterprises.

A successful transformation of the energy sector is essential to lay the foundation for long-term sustainable growth of the economy, increased employment, and higher living standards in Russia. Given Russia's substantial natural resources, the energy sector was, and is, the prime mover for the rest of the economy. At the same time, it is capable of generating needed foreign capital.

The baseline situation in the energy sector at the beginning of USAID's program could best be described as "alarming." Prices for energy did not reflect actual costs of production. Industry tariffs subsidized residential and commercial customers. Recovery of natural resources was inefficient and the sector was a main polluter of the environment. The technology employed was outdated and inefficient with a high percentage of production facilities approaching design-life. Funding for maintenance and replacement of outdated facilities was not available, even given the relative economic power of the energy sector in the state-controlled system.

The USAID programs in the energy sector initially attempted to address all energy enterprises. It soon became evident that the gas and oil sectors would not be significantly influenced by our relatively modest programs. USAID phased out of most activities in FY 95; USG involvement is maintained through the Department of Energy. In the coal sector, a very successful program led by a U.S. PVO, Partners in Economic Reform, on behalf of USAID, addressed many of the social and safety issues in the mining industry. Several opportunities were identified and promoted

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with the World Bank which is now preparing a loan for this sector. The current USAID funding supports the finalizing of this World Bank loan. Only limited USAID assistance supporting labor management relationships and business development will continue in the two primary coal basins of Komi and Kuzbass and will phase out in early FY98.

USAID has, however, focussed on one energy subsector in which substantial progress has been made. The electric power sector includes most of the district heating plants supplying heat as well as the regional generating plants and transmission and distribution systems that provide heat, electricity, and light to residents and commercial enterprises -- affecting the lives of almost every citizen of Russia. It is estimated that over a million persons are directly employed in this sector alone but millions more depend on its continued operation.

Thus, while the statement of the SO includes the energy sector as a whole, it is the electric power sector system which will receive the preponderance of USAID support in the future.

Critical Assumptions

To carry on with the impressive program in the power sector, it is assumed that there will be continued support from various enterprises in the sector.

- The federal and regional energy commissions must become functional and be able to exert their authority with independence of outside influence.

- Major capital investment must flow into the sector for rehabilitation and new facilities to sustain the sector's capability to supply electricity and heat. This requires sector enterprises to develop an understanding of the requirements of open financial reporting and investment promotion.

- Decision makers in government and industry must be prepared to set the climate for investment that sends the right signals about pricing policies and settlement practices.

- Improvements in efficiency in generation and end-use of power and heat must occur both for cost of production and environmental reasons. Private capability to supply energy efficiency services must develop.

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Causal Linkages

Four principal intermediate results are posited to contribute to SO 1.5, a more economically and environmentally sound energy system.

IR.1.5.1, market and competitive forces introduced in the power sector, implies the creation of a restructured, regulated, private commercial enterprises in which participants compete for business and profits. Experience elsewhere says that competition in the sector will lead to lower real prices. For this IR to be achieved, four elements must be in place:

IR 1.5.1.1 Principles and policies for power sector restructuring must be promulgated.

IR 1.5.1.2 Regulatory systems at national and regional levels must be functioning.

IR 1.5.1.3 Commercially viable private power sector must have the capability for production and distribution of power.

IR 1.5.1.4 Wholesale market in electric power formed and operating.

The second Intermediate Results (IR 1.5.2) on which the program will focus is increased local and foreign capital investment in the energy sector. The economic soundness of the sector relies on much needed investment. Estimates on investment requirements, depending on the economic growth scenarios, range from $32 to $81 billion by 2005.

IR 1.5.2.1 In order for this investment objective to be met, both public and private sources for specific projects will need to be mobilized. Projects will be promoted to multilateral lending institutions and commercial financing entities as well as strategic investors.

IR 1.5.2.2 Development of power sector financial reports using International Accounting Standards will be used to promote investment opportunities in the sector and will promote another means of financing -- equity sales through ADR listings of stock on major exchanges.

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Strategic Objective 1.5
A More Economically and Environmentally Sound Energy System

Time Frame: April 1999
Development Partners:
World Bank, EU, GOR Ministry of Fuels and Energy, RAO EES Rossii

IR 1.5.1
Market and Competitive Forces Introduced in the Power Sector

Time Frame: May 1999
Development Partners:
World Bank, RAO EES Rossii, Ministry of Fuels and Energy

IR 1.5.1.1
Principles and Policies for Power Sector Restructuring Promulgated

Time Frame: May 1999
Development Partners:
RAO EES Rossii, Inter-ministerial Task Force,

IR 1.5.1.2
Regulatory Systems at national and Regional Levels Functioning

Time Frame: December 1998
Development Partners:
FEC, RECs, World Bank, Inter-ministerial Task Force

IR 1.5.1.3
Commercially Viable Private Power Sector Capability Developed for Production and Distribution of Power

Time Frame: May 1999
Development Partners
RAO EES Rossii, USEA, Selected Energos

IR 1.5.1.4
Wholesale Market in Electric Power Formed and Operating

Time Frame: December 1998
Development Partners:
RAO EES Rossii, AO Energos, Gencos, FEC, RECs

IR 1.5.2
Increased Local and Foreign Capital Investment in the Energy Sector

Time Frame: January 1998
Development Partners:
World Bank, DOE, EU, RAO EES Rossii, Kubanenergo

IR 1.5.2.1
Private and Public Financing Mobilized for Specific Investment Projects in the Energy Sector

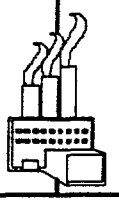
Time Frame: September 1998
Development Partners:
RAO EES Rossii, Selected AO Energo, World Bank, Private Sector Investor

IR 1.5.2.2
Open and Transparent Accounting Reports Developed for Selected AO Energos and Gencos

Time Frame: September 1997
Development Partners:
RAO EES Rossii, AO Energos, Gencos

IR 1.5.2.3
Elements of Capital Investment Decision Making Addressed by Regional Enterprises

Time Frame: September 1997
Development Partners:
Selected AO Energos and Gencos



SO 1.5.3
Improved Energy Efficiency and Demand Side Management Programs Developed and Replicated in Sectors

Time Frame: July 1997
Development Partners:
World Bank, EBRD, UNEC-EBRD, IEA-OECD, EU

IR 1.5.3.1
Energy Efficiency Programs Demonstrated

Time Frame: July 1997
Development Partners:
CENEf, Energy Mangers Association, EBRD, EU-Tasis, IEA-OECD

IR 1.5.3.2
Commercially Viable Private Sector Capability to Provide Energy efficiency and Environmentally Sound Services and Equipment

Time Frame: January 1997
Development Partners:
CENEf, VTI,

SO 1.5.4
Improved Natural Resources and Environmental management Techniques in the Energy Sector

Time Frame: January 1998
Development Partners:
USGS, MMS, API, RPI, Tymun Oil & Gas Center, Ministry of Fuel and Energy

SO 1.5	A More Economically and Environmentally Sound Energy Systems	Energy provided on least cost basis to wholesale market and consumers	Definition: energy dispatched using economic dispatch principles Unit: economic dispatch principle in use	1995	0	0		1 (June)							
SO 1.6		Energy provided on least cost basis to wholesale market and consumers	Definition: generators, including combined heat and power plants, provided energy on competitive basis Unit: generators with competitive energy supply	1995	0	0				405 (Dec.)					
IR 1.5.1	Market and Competitive Forces Introduced in the Power Sector	Presidential Decree or Government Instruction on restructuring recommendations for Electric Power Sector issued	Definition: Inter-Ministerial Task force, drafted and forwarded decree or instruction formalizing approval of revised power sector structure Unit: decree forwarded	1995	0	1 (Sept.)									
IR 1.5.1		Agreement reached on power sector restructuring plans	Definition: Inter-Ministerial Task force transition implementation plan for the electric power sector adopted Unit: plan	1995	0	1 (Oct.)									
IR 1.5.1.1	Principles and Policies for Power Sector Restructuring Promulgated	Financial Settlement function and procedures for the Wholesale Market instituted	Definition: specification of equitable settlement procedures incorporated into the Wholesale Market Rules Unit: settlement procedures incorporated	1995	0	0		1 (April)				1			
IR 1.5.1.1		Financial Settlement function and procedures for the Wholesale Market instituted	Definition: installation of the approved settlement procedures fully installed for pilot Wholesale Markets Unit: settlement procedures in pilot	1995	0	0				1 (Dec.)					

Note: No USAID supported activity is foreseen beyond the latest year with data.

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SO 1.5 A more economically sustainable and environmentally sound energy sector

I. Results Frameworks

Transition Hypothesis/Underlying Rationale

The energy sector weighs heavily on the economic stability of the country -- both from the standpoint of international debts which are based significantly on imported fuel, and also in terms of industrial capacity -- which is quite dependent on a weak-functioning power sector. Consequently, the sector is an important contributor to ENI Strategic Assistance Area 1: Economic Restructuring. In addition, in Ukraine, given the impact of the Chernobyl disaster on public health and the economics of energy, concern for environmental soundness competes in importance with concern for economic growth.

The energy sector under State control developed inefficiencies which, combined with low cost delivery to customers, made it a net drain on the economy. Ukraine is highly dependent upon imported fuel -- in particular, oil and gas -- for generators and is in arrears on its payments. Domestic coal is an option for part of the fuel needs, but costs are high as the industry was a State monopoly. Poor distribution systems amplify the problem and the net result is a very unpredictable fuel supply for generators. The power delivery system will improve the financial sustainability of the system and in turn, to date, has not been profitable without State subsidy. Despite restructuring and introduction of market forces significant work remains on improving financial systems and payments, as well as restructuring old debt.

Power sector policy changes combined with a regulatory commission to implement market rules will improve the financial sustainability of the system. Although, to date, this has not encouraged private investment, it is expected that reduced costs through competition will result. Policy changes have begun the process of establishing customer prices for energy to provide revenues to replace State subsidies. In terms of fuel resources, the GOU introduced policy changes to restructure the Coal sector; much work needs to be done to implement these changes. Optimally, both policies and prices will begin to influence the consumer toward greater efficiency as well as the energy investor towards environmentally sound, more efficient technologies. Part of any energy strategy in Ukraine must include the final solution to the Chernobyl nuclear problem, while mitigating the consequences of closing it down. Efficiency in consumption to reduce the demand of energy, protection against environmental hazards and employment adjustments will lessen the environmental, economic and social consequences of putting it to bed in its sarcophagus.

Ukraine needs energy at competitive prices for industry to compete in international markets. Through the right policy and regulatory environment, private investment can bring efficiency and competition to the sector in order to lower prices. The same strategy applies to the fuel

supply as to the power delivery system because both contribute to lower costs. The transformation to a sustainable, market supported industry must evolve within an environmental framework in which external environmental costs no longer accumulate into economic and social disasters.

Critical Assumptions

a) The independent regulatory commission will successfully avoid the liability of nepotism, applying technical over political criteria in its implementation of market rules. It will also be sufficiently independent of government influence to gain the respect and trust of private investors.

b) There will be sufficient momentum from market forces, and sustained political will, to overcome the current payments problem in the sector, chronic throughout the economy, specifically there must be an environment in which State bodies that fail to pay, are penalized.

c) The World Bank with additional donor support and GOU sponsoring will be successful at addressing the most critical problems of coal restructuring, and in particular, more closures.

Causal Linkages

Achievement of SO 1.5 will be measured by conformance to international environmental standards. As the sector approachers profitability it becomes more sustainable. As the sector comes into conformance with G-7 requirements for addressing the Chernobyl problem, self-imposed environmental standards of private multinational companies, and/or nationally defined State standards for environmental protection, the sector becomes more environmentally sound.

There are three Intermediate Results required to achieve the SO: 1. There must be an independent, financially sustainable power delivery system (IR1.5.1), 2. There must be a more stable supply of fuel (IR1.5.2), and 3. The environmental, economic and social consequences of Chernobyl closing must be mitigated (IR1.5.3). An independent, financially sustainable power delivery system, given a more stable fuel supply adds up to a sustainable energy sector. The focus on Chernobyl will leverage changes in industrial and household energy consumption toward efficiency, environmental protection and the merger of economic and environmental priorities.

IR1.5.1: Independent, financially sustainable power delivery system. There are five intermediate results that will improve the delivery system.

1. An improved regulatory policy framework will increase investment. Included in that framework will be the authorization and regulations governing the establishment of an independent electricity regulatory commission. Other policies governing controls or lack of

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controls over private sector investment operations must be spelled out. (IR 1.5.2.2)

2. A national electricity regulatory commission must have sufficient power to implement market rules within the power sector so that subsidies are eliminated and real costs bring real prices into line. It must define and apply the rules governing competition so that prices drop to market levels (IR1.5.1.1)

3. Electric generating companies must be independent and competitive. Regardless of ownership, the State subsidy must dissolve into a competitive environment in which Regional Dispatch Companies and local energy companies have the freedom to solicit bids among competitors for generation contracts. (IR1.5.1.2)

4. Local, electric supply companies must be commercially viable. Local companies must have a customer base that produces revenue in excess of costs (IR1.5.1.3).

5. Increased capital flow into the power system. In order for the energy sector to achieve commercial viability and long term economic sustainability, there must be additional investment in the sector. The greater the percentage of that investment that is private, the greater the probability that the sector is approaching sustainability (1.5.1.4).

IR1.5.2: A more stable fuel supply will be measured by the average percentage of a 30 day reserve requirement available at the 17 primary generating plants in the country. That level of stability in fuel supply will be created by four intermediate results as follows:

1. Improved fuel supply at the source and improved distribution. Often the problem is that the petroleum or coal is simply not available because of management, quality or technical problems at the source or in the distribution system (IR1.5.2.1)

2. Improved regulatory policy framework to increase investment. This result is as necessary on the fuel supply side of the results tree as on the power delivery side. Policies must expose the State monopolies to competition on an equal footing with the private sector in order to attract private investment (IR1.5.2.2).

3. Improved financial terms for fuel purchase. Ukraine has aging fuel purchase contracts that are out of date and out of line with current market prices. The GOU is in arrears and the financial cost of the debt needs to be restructured to a more rational basis (1.5.2.3).

4. The coal sector is reformed to increase competition. The World Bank is addressing this issue to break the State monopoly and lower costs through introducing private sector competition. Coal is a domestic source of fuel that could contribute to reduced dependence on foreign fuel, reduce fuel costs, and produce a stable supply.

IR1.5.3: Environmental, economic and social consequences of Chernobyl closing reduced. This result will be measured by containment of environmental threats, compensation in

energy efficiency for the loss of the generating load, and reducd social impacton plant personnel and community. There are three intermediate results necessary to achieve that:

1. The first is environmentally friendly efficiency in energy consumption (IR1.5.3.1.) This IR will produce a drop in energy demand to compensate for taking Chernobyl off line. IR1.5.2.2: Improved regulatory policy framework to increase investment will promote investment in environmentally friendly technologies that consume less energy. IR1.5.3.1.1 through IR1.5.3.1.4 all contribute to the efficiency result. Increased public awareness and increased domestic production of energy efficient technologies, increased public and private efficiency in consumption will produce a drop in energy demand.

2. The second is that the environmental hazard of Chernobyl must be reduced. (IR1.5.3.2). The two necessary results are IR1.5 which involves building the sarcophagus for enclosing it to ecologically sound standards as defined by the Memorandum of Understanding (MOU) between Ukraine and the G-7 countries, and , IR1.5.3.2.2 decommissioning of the nuclear power plant as per the same G-7 MOU.

3. The third is that the social impact of closing Chernobyl is lessened through, for example, re-employment of Chernobyl Nuclear Power Plant employees.

II. Overall Progress to Date

The Ukrainian power sector is one of the largest in Europe -- 54,000 installed megawatts -- and is critical to the industrial capacity and economy of the country. Ukraine inherited inefficient industries from the former Soviet Union that require enormous energy consumption. Fully 60% of all energy produced is consumed by industry. Given severe financial, management and resource allocation problems from the old command system, the sector was in poor condition and without working capital to pay its employees and fuel suppliers. The development and implementation of a market structure for the generation and sale of electricity is critical to address these problems and is currently well underway. Since 1993, USAID has been providing critical assistance to transform the power sector to a market system under a major multilateral technical assistance and loan program coordinated by the World Bank and the Ministry of Power and Electrification (Minenergo). For this program to be successful, the substantial debts of the sector must be restructured, appropriate financial management and accounting systems must be introduced, and the problems of non-payment (both historical and current) be addressed.

Ukraine depends heavily on foreign fuel sources, particularly Russia, importing more than 80% of its gas and more than 95% of its oil, and it has built up over $1.7 billion in energy debts since independence. Those debts have been financed almost entirely by using credits from international donors. Additional foreign aid and well over half of the country's hard currency reserves go to maintain imported fuel levels. The power sector consumes a substantial portion of these fuels. Domestic sources of oil and gas are not substantial enough

for self-sufficiency, and their potential has not been fully explored in large part due to a less than optimal investment climate. Ukraine also has imported large amounts of coal despite sizeable deposits in-country because of poor delivered quality and inefficient distribution mechanisms. The coal sector, probably even more so than the power sector, is suffering from the effects of a command economy and requires significant restructuring, including the closing of many mines and a substantial divestiture of non-productive social assets. Recently, the Government of Ukraine has introduced a policy for restructuring in concert with the World Bank. Much technical assistance and financial support will be needed in this area, and the work has not yet begun.

Nuclear power holds great potential as an energy source, but it is problematic due to the Chernobyl accident. Chernobyl is a prime example of resource mismanagement that has resulted in environmental degradation and significant economic costs. In collaboration with the EU and Ukraine, USAID is providing critical technical expertise and consulting advice as part of an intensive program to develop an Action Plan to address the impact of the closure of the Chernobyl Nuclear Power Plant. The social impact of the closure is a high priority for Ukraine.

Energy assistance is coordinated in Ukraine by the World Bank, with assistance from the British Know How Fund, the EU, EC/TACIS, Switzerland, the Netherlands, Canada, Japan, and the U.S. USAID is the primary provider of assistance to restructuring the power sector.

Results to date include:

- Ukraine's eight vertically integrated regional monopolies which controlled power generation, transmission and distribution were broken up into 33 joint stock companies with a common high voltage network.

- The wholesale electricity market began operation on April 10, 1996, making Ukraine the only country in the region with a competitive market under the structure of an independent regulator.

- There are now four joint stock generating companies competing with one another for the wholesale market, as well as 27 local joint stock electricity companies (LECs) which must compete on the retail end to distribute and sell electricity to consumers.

- A national electricity regulatory commission (NERC), the first of its kind in the region, has been created to oversee fair competition among the newly created companies and to ensure reasonable tariffs to customers and producers.

- A power "Energomarket" electricity pool has been organized to act as a central, financial clearing house and national dispatch center for the allocation of energy and payments.

- The overall efficiency of the eight largest fossil fuel power plants in Ukraine has been increased by 3-5% per year through the provision of equipment and technical assistance, representing $48 million in potential savings.

- The capacity of the city of Kiev's primary power plant that provides steam for heating and industrial production has been doubled through the provision of critical resources no longer available in the NIS economy.

- Ukraine and the G-7 have signed a comprehensive plan for the closure of Chernobyl Nuclear Power Plant by 2000.

- In the Donbass region, U.S. coal management and labor specialists are introducing new western technologies in management, coal production and clean coal utilization projects.

- Ukraine's State Committee on Geology was provided with hardware and software to facilitate information exchanges with potential western investors on natural gas and oil deposits .

- Select coal mines have been provided with assistance on better techniques for marketing their coal, including model contracts.

Key issues impeding progress include: (1) A chronic problem throughout the economy, including the power sector, is that payments are often made by barter instead of cash, they are frequently late, and sometimes they are not paid at all. This undermines the ability of the system to collect cash to sustain itself, and has caused the energy debt to grow. (2) Currently, almost half of retail electricity consumers are entitled to some sort of subsidy regardless of actual need. A more targeted subsidy is required. (3) Continued political support is necessary to ensure the independence of the local electricity entities from local oblast governments and to see the embodiment of the current systems and policies into formal legislation. (4) In order for foreign firms to succeed in setting up joint ventures in the oil and gas sectors, legislation is needed to define exploration rights in oil and gas fields, protect profits, define royalties, and divide responsibilities. (5) A government policy has been introduced for the fundamental restructuring of the coal industry, which will necessitate shutting down the most non-productive mines, reorganizing the viable ones and opening the sector to world market economic forces. Significant support in terms of funding and know-how are critical to maintain political will, particularly in view of the power of the miners' union and its resistance to change. (6) A rationalized fuels market is essential to making power generating companies competitive, and must be developed concurrently with the wholesale electricity market. Strategic Objective 1.5: A more economically sustainable and environmentally sound energy sector

III. ENI's Significant Contributions

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In concert with the Ministry of Power and Electrification, the World Bank, and other donors, USAID developed a multi-faceted energy program for Ukraine. Of particular note are the achievements to date in the power sector. USAID's assistance has helped transform it from a vertically integrated monopoly to a market system, with separate, competing components, a national regulatory body to set tariffs and grant licenses in response to market costs and efficiencies, and a national dispatch center to oversee power distribution based upon financial bids. USAID's direct assistance to the Generating Companies, to the NERC, and to twelve of the 27 LECS, has been a primary factor in reforms to these entities and in their ability to function under the new market rules. More specifically, we have worked with the GENCOs in their corporatization process (i.e., developing their corporate charters and corporate governance principles) and assisted them in the introduction of prudent financial and management information systems. We have worked with the NERC to strengthen their regulatory functions and to develop the capacity to carry out their independent role in the market (developing licenses and tariffs). Our work with selected LECs is more recent, but already instrumental in identifying the parameters of their non-payment problems with customers as a preliminary step to introducing better collection procedures. Our work with the national dispatch center has been less pervasive, but has nonetheless been instrumental in identifying problems in the payment system and has led to the development of a $300 million loan from the World Bank which will help fund the purchase of fuel and spare parts for the GENCOS.

In terms of developing a more stable supply of energy resources, this work has been is at an earlier stage. Owing to the absence of a comprehensive policy on coal sector restructuring by the government, which has been developed recently, we had not committed significant resources to this area. We have had successes in the area of coal cleaning, which is extremely important for increasing efficiency and environmental benefits to the restructured sector. We have also just begun work in coal marketing and coal bed methane development; where we hope to show significant contributions this year.

IV. Expected Progress in 1997 and 1998

- Domestic fuel development will continue through the application of market principles, particularly in the area of improved private contracting for coal. Additionally, we expect substantial private investment in the coal bed methane area which will not only provide safety and environmental benefits, but should be an alternative energy source.

- Investment in oil and gas will be promoted through introduction of new policies and laws favorable to private investment that encourages participation of investors and international partnerships and exchanges.

- The NERC will be operational, with Consumer Councils functioning in all 25 Oblasts in Ukraine to ensure consumer rights protection.

- The wholesale market will effectively substitute for the current command economy structure so that electricity will be freely bought and sold in Ukraine in accordance with market principles, and the power sector will be self-sustaining.

- Generating companies will begin functioning as independent, investor-owned utilities operating within a market context.

- The local electricity companies will become fully restructured to function as independent, profitable and consumer-oriented companies.

- Both the generating and local electricity companies will begin the process of privatization, with adequate capital for needed investment.

- The power sector will increase efficiency through competition strengthened by better supply and demand mechanisms, such as demand side management to rationally reduce peak electricity demand.

- Progress toward reducing the environmental, economic and social consequences of the Chernobyl accident will be achieved through a comprehensive program to increase energy efficiency in municipalities, in industry, and through the exploration of alternative energy sources. Programs to increase citizen awareness and efficiency in consumption, and to advance the domestic production of energy efficient technologies will continue, as will programs to improve energy efficiency in industry and the public sector. Implementation of the Action Plan to reduce the social impact of the closure of Chernobyl will proceed. Other activities undertaken as part of the G-7 MOU will include efforts to reduce the environmental hazard of nuclear waste and the construction of an ecologically sound sarcophagus around Reactor Number 4.

U.S. Assistance to the Czech Energy Sector

The Czech Republic Government is restructuring and privatizing the Energy Sector to improve efficiency, obtain domestic and foreign capital, achieve Western standards for air emissions and nuclear energy, diversify energy sources and meet requirements for full integration with the West European electricity network.

U.S. assistance focuses on restructuring and privatization of the power sector, developing a private sector market for energy efficiency services and enhancing the safety of Czech nuclear power plants.

Over $7,102 million was directed to energy projects in the Czech (and former Czechoslovak) Republic during 1990 - 1993. These projects were managed by U.S. organizations in collaboration with their Czech counterparts.

Emergency Energy Project and Energy Efficiency Center

U.S. assistance began in 1990 with the Energy Emergency Program. This program focused on industrial energy efficiency improvement and pricing policy reform. **The Resource Management Associates of Madison, Inc.** provided energy audits, identified cost effective (i.e. low-cost, no-cost) energy efficiency improvements and installed energy saving equipment in eight Czech and Slovak sites. In several cases return of investment for energy efficiency equipment was excellent. The evaluation of this project conducted in 1993 revealed that the project results were very highly regarded. It was greatly appreciated by the companies where the energy saving equipment was installed. For example, at Pragolaktos, a Prague dairy company, a system controlling energy consumption at the administrative building was installed. Energy savings covered the investment in two months. The results were publicized at two workshops held in Prague and Bratislava.

The Resource Management Associates of Madison together with ICF Resources collaborated on a study of energy pricing reform for the Ministry of Economy. The study concentrated on the development of price reform, analysis of the effect of energy pricing on industrial restructuring and macroeconomic consequences.

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The Czech organization SEVEn participated in the Energy Emergency Program. The U.S. Department of Energy established in 1991 an energy efficiency center, SEVEn. In three years, it developed into a respected institution with good contacts within the industry and government. In addition to involvement in energy efficiency projects, energy labelling, collaboration in Integrated Resource Planning, SEVEn organized annual international conferences called the "Energy Efficiency Business Week". This conference contributed to the relationships between U.S. and Western Energy companies and their Czech counterparts. SEVEn has developed into a company that in 1994 works independently without any additional U.S. funding.

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  Tel: (422) 256 104, 253 435, 258 556
  Fax: (422) 258 556

Restructuring and Privatization of Energy Sector

A.I.D. provides training and technical support for the Ministry of Industry to develop a new energy regulatory law and to establish new energy pricing. Assistance is provided through electric power system contractors Bechtel and Electrotek and the Utility Partnership Program with the U.S. Energy Association (USEA). A seminar on energy regulation was held in Prague in June, 1993, followed by another seminar and training in Vienna (this action was prepared in collaboration with the World Bank). Five Czech government officials were briefed on the U.S. state utility regulatory system during their visit to the U.S. in October, 1993.

Contact:
- Ministry of Industry and Trade of the Czech Republic
  Milan Cerny
  Deputy Minister
  Na Frantisku 32, Praha 1
  Tel: (422) 285 2280
  Fax: (422) 285 2343

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- United States Energy Association
  Utility Partnership Program
  Eric Haskins
  Program Manager
  Tel: (202) 331 0415
  Fax: (202) 659 0578

- Bechtel
  Roger Griffin
  Project Director
  Tel: (415) 768 2671
  Fax: (415) 768 0503

- Electrotek Concepts, Inc.
  J. Charles Smith
  Tel: (415) 941 2986
  Fax: (415) 941 7092

Utility Partnership Project

The U.S. utility partnership Houston Lighting and Power and the Czech utility CEZ collaborate together on management and technical advisory missions, executive exchanges and seminars targeted at Czech utility issues (financial management, utility rates and regulation, environmental issues, public relations).

This partnership is part of a very effective program establishing long-term "sister-utility" relationships between U.S. and Eastern European Utilities. The U.S. Utility executives volunteer their time on a cost-shared basis. They provide invaluable experience and knowledge to their Czech colleagues.

Contact:
- Houston Lighting and Power
  Raymond J. Snokhaus
  Senior Vice President
  Tel: (713) 629 3232
  Fax: (713) 629 3065

- Czech Power Board (CEZ)
  Petr Karas
  Chairman of the Executive Board
  Jungmannova 29, Praha 1
  Tel: (422) 2408 2201
  Fax: (422) 2408 2440

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Energy Performance Contracting

The National Association of Energy Service Companies (NAESCO) under subcontract from RCG/Hagler, Bailly, is working on legal/policy and financial and technical issues related to energy service company investments and in energy saving measures. The results will be distributed to interested U.S. energy service companies, lenders, investors and presented at seminars in Prague and Washington in the first quarter of 1994.

Contact:
- National Association of Energy Services Companies
  Thomas K. Dreesen
  Tel: (713) 849 3558
  Fax: (713) 849 2827

- RCG/Hagler Bailly
  David Keith
  Tel: (703) 351 0300
  Fax: (703) 351 0342

Energy/Environment Pilot Projects in Plzen, Cesky Krumlov, Ostrava

Since 1992 A.I.D., Department of Energy (DOE) and the Czech municipalities have solved energy development problems relating to environmental limits and environmental impacts. Sites selected for the projects are Plzen, Cesky Krumlov and Ostrava. DOE contracted with Gilberth Commonwealth, Tecogen, and PNL Batelle who brought U.S. experience on supply and demand side of energy systems and related implications for city planning. DOE subcontractors used local companies Energoprojekt, Ryan, Energosteel and SEVEn to participate in studies and provide data collection. The projects for Plzen and Cesky Krumlov have been completed and the project for Ostrava will be finished in the first quarter of 1994. Based on the results of these projects and the American assistance in Poland, an international conference on "Pollution Control from Coal-Fired Low Emission Sources" will be held in Plzen in April 1994.

Contact:

- Gilberth/Commonwealth, Inc.
  Lynn Rubow
  Project Manager
  Advanced Technology Service
  Tel: (215) 775 2600
  Fax: (215) 775 2670

Mestsky urad Cesky Krumlov
Antonin Princ
Deputy Mayor
Tel: (0337) 3711
Fax: (0337) 4802

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- TECOGEN Inc.
  Andrew Popelka
  Program Manager
  Tel: (617) 622 1400
  FAX: (617) 622 1336

- PNL Batelle Memorial Institute
  William Chandler
  Tel: (202) 646 5242
  Fax: (202) 646 5233

Magistrat mesta Plzne
Zdenek Prosek
Deputy Mayor
Nam. Republiky 1,
Plzen
Tel: (4219) 2163

Energo-Steel, Ltd.
Venanc Walder
Ostrava
Tel: (4269) 593 471

Nuclear safety

American assistance to the Czech nuclear energy sector focuses on nuclear safety improvements. The U.S. Nuclear Regulatory Commission (NRC) works with the Czech State Office for Nuclear Safety to conduct safety reviews and safety evaluation reports. The reviews concentrate on Westinghouse instrumentation and control and fuel fabricated for the Temelin VVER-1000 plant. Through NRC funding, the Czechs participate in several international programs related to nuclear safety. This portfolio includes Code Assessment and Maintenance Program, Cooperative Severe Accident Research Program, International Piping Integrity Research Group and Saphire Program. The NRC also supports short-term and long-term nuclear safety training of nuclear experts and inspectors.

Contact:
- U.S. Nuclear Regulatory Commission
  Hans Schechter
  Tel: (301) 504 2775
  Fax: (301) 504 2395

- State Office for Nuclear Energy
  Jan Stuler
  Slezska 9, Praha 2
  Tel: (422) 254 624
  Fax: (422) 2417 2467

Operational Nuclear Safety

Operational nuclear safety projects are provided by the U.S. Department of Energy (DOE) and Brookhaven National Laboratory. The projects focus on improvements in the nuclear power plant at Dukovany. The U.S. companies are involved in the build-up of the equipment maintenance database. DOE will assist in the accident localization system improvements and expedite the development of symptom-based emergency operating procedures.

Contact:
- Jaderna Elektrarna Dukovany
  Ing. Vladivoj Reznik
  Tel: (42509) 9231 ext. 203, 922111
  Fax: (42509) 922111

CDI Energy Business Development

The project provides a bridge between Central Europeans and U.S. companies by becoming involved in the entire process of capital, know-how and technology transfer. The majority of effort of the Regional Business Development Officer (RBDO) was spent on Poland, with secondary emphasis on the Czech Republic, and tertiary effort placed on Hungary.
RBDO assisted in the Czech Republic in the commercial development of the Czech Coal Bed Methane sector, and on the development of a viable manufacturing project for fiberglass insulation.

Contact:
- USAID - CDI/Energy
  Thomas Sherwood
  U dubu 13
  147 00 Praha 4
  Tel/Fax: (422) 464651

Maguire Group Inc. has been awarded a grant to conduct a Feasibility Study for Landfill Gas/Electricity Generation in the Czech Republic. The proposed project, located in Prague would produce between 2 and 10 MW of electricity for sale to the Czech Electric Company (CEZ). The Feasibility Study will evaluate the available quantities of methane generated from several landfills in the Prague area and in 1994 will be completed :

- Phase I Site Examination Report
- Phase II Preliminary Analysis
- Phase III Project Design/Financial & Final Report

Contact:

- Maguire Group Inc.
  Robert A. Watts
  Vice President
  225 Foxborough Blvd
  Foxborough, Ma 02035

Novion Inc.
Joe W. Cumpelik
President
55 Gate Ridge Road
Easton, CT 06612

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Tel: (508) 543-1700
Fax: (508) 543-5157

Tel: (203) 374 7398
Fax: (203) 374 2478

Fuel Research Institute
Ing Frantisek Straka
190 11 Praha 9 - Bechovice
Tel: (422) 627 4174
Fax: (422) 74 12 40

Contacts for overall assistance:

- U.S Agency for International Development
  Energy and Infrastructure
  Bureau for Europe and NIS
  Robert Ichord
  Tel: (202) 647-8274
  Fax: (202) 647-6962

- U.S. Agency for International Development
  Representation to the Czech Republic
  Jim Bednar/Jan Pisko
  Tel: (422) 24510758 or (422) 24510847
  Fax: (422) 24510340/1

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USAID ENERGY PROGRAMS:
OTHER COUNTRIES

I. BACKGROUND

The projects described below are based on the core principles of the U.S. development assistance strategy, which supports economic and social growth that:

(1) protects the resources of the host country;
(2) respects and safeguard the country's economic, cultural, and natural environment;
(3) supports the design and implementation of favorable policy and institutional frameworks for sustainable development; and
(4) builds indigenous institutions that involve and empower the citizenry.

The U.S. government is supporting a host of bilateral projects aimed at mitigating climate change by reducing greenhouse gas emissions or sequestering greenhouse gases. In this area, the federal government works primarily through the U.S. Agency for International Development (USAID), but also through other U.S. Government departments and agencies involved in climate change issues, notably the Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Department of Agriculture (USDA). Partnerships among various government agencies, nongovernmental organizations, private industry, and international organizations characterize many of these projects.

Recognizing the global threat of climate change to both developed and developing countries, USAID has made the mitigation of climate change one of two global environmental priorities. The Agency has identified nine "key" climate change countries (Mexico, Brazil, India, Indonesia, the Philippines, Russia, the Ukraine, Poland, Kazakstan) and one key region (Central Africa) in which it works that are, or will become, significant contributors to global greenhouse gas emissions. USAID is focussing its climate change specific partnerships in these key countries in order to reduce the rate of growth of net greenhouse gas emissions through approaches that also contribute to economic growth and local environmental protection. In addition to these specific programs, USAID's broader portfolio of energy efficiency, renewable energy and forestry activities contribute to mitigation efforts in other countries, while numerous other programs build capacity for countries to adapt to the adverse effects of changing climates.

II. RENEWABLE ENERGY ACTIVITIES

USAID recognizes the role that clean renewable energy technologies like solar and wind power can play in providing needed services, especially in rural and peri-urban areas. Improved literacy, decreased infant mortality, and reduced urban migration rates are directly associated

with access to energy in rural communities. In the past, however, many rural households have been unable to afford the high up-front cost of renewable energy systems.

- **Rural Solar Energy Home Systems for Namimbia**

  In Namibia, a USAID cooperator, Renewable Energy for African Development, (REFAD) has leveraged $70,000 in funds from the Government of Namibia (GON) with its $30,000 contribution to a revolving credit fund to enable rural households to purchase solar home systems. Just underway, it is thought that this program will initially enable 200 households to purchase solar systems.

  Namibia is potentially a lucrative market for solar energy for rural homes. Namibia's rural population is so scattered that connecting villagers to the national grid is prohibitively expensive. Solar insolation levels in Southern Africa are among the highest on Earth; Namibia records 327 statistical sunny days a year.

  The systems will be distributed in three villages in northern and eastern Namibia. The USAID funds will not be used to make direct loans. It will instead serve as a loan guarantee for the lending organization in case of loan defaults thus insulating the lender from any default risk.

- **Electrification for Sustainable Development in Bolivia**

  This project is designed to improve rural electrification systems by promoting productive electricity uses and new system construction, providing technical assistance in system operation and maintenance, and supporting the creation of a rural electric cooperative finance company. The USAID/GEF component will promote the reduction of greenhouse gas emissions through the use of renewable energy-systems in rural areas. The project will demonstrate innovative mechanisms for sustainable financing and integration of renewable-energy systems in the electrification process of Bolivia. It will include financing for solar, wind, small hydro, and biomass energy projects in order to integrate renewable-energy technologies within the broad electrification planning policy in Bolivia.

- **Loan Fund for Rural Electrification in South Africa**

  USAID is supporting a renewable energy based rural electrification pilot project in South Africa that will provide credit for the purchase of solar home systems. In a 1995 Memorandum of Understanding with the US Department of Energy, USAID pledged $1 million in support of this Binational Commission activity. The South African Government created Renewable Energy for South Africa (REFSA) to implement the project. Over the next decade, REFSA will use renewable energy technologies to supply electricity to a projected 2.5 million rural households. This will offset nearly 90,000 tons of coal a year in South Africa, enhancing environmental quality while improving social conditions in rural areas.

REFAD, a U.S. non-governmental organization established with USAID support, is administering the U.S. contribution and providing programmatic assistance to REFSA. REFAD and REFSA are working together to develop the innovative end-user credit program that makes renewables affordable and strengthens economic opportunity. Local community development organizations and small entrepreneurs help community members obtain renewable energy loans from commercial lenders. Because the cost of the system is spread out over several years, loan payments are comparable to what customers previously paid for fuel, candles, and batteries. A partial loan guarantee from REFAD and REFSA reduces the risk to the lenders and encourages them to extend credit in rural areas. As loans are repaid the fund revolves, and facilitates the purchase of even more systems.

III. Energy Efficiency Activities

USAID's Energy Efficiency Project (EEP) mitigates greenhouse gas emissions through the introduction of environmentally sound, energy efficient technologies and promotion of related policy reforms, investment incentives, and energy management and planning tools in the power and commercial sectors. Specifically, EEP assists host-countries to (1) design and implement innovative demand-side management projects and pilot programs; (2) address energy sector policy and institutional reform issues, (3) promote private sector involvement in energy efficiency, (4) expand U.S. technology transfer, and (5) promote energy information dissemination through outreach and training. EEP works cooperatively with groups such as universities, research centers, trade associations, and NGOs inside the U.S. and in developing countries and countries with economies-in-transition.

EEP emphasizes the following three strategic elements: building institutional partnerships; promoting technology cooperation between U.S. and in-country firms; and leveraging financing for energy efficiency projects. To build local capacity, which is critical to sustaining development efforts, all EEP activities involving specific countries have an institutional counterpart to assist in carrying out project objectives. On the technology front, EEP promotes innovative, market-driven technology cooperation between U.S. and developing country organizations. In the financing arena, EEP leverages funding from private and multilateral development banks by providing initial design and start-up efforts that will lead to projects being funded by these institutions.

- **Energy Demand Management Project in Morocco**

  The Energy Demand Management (EDM) Project focused on reducing energy waste and improving the efficiency of energy use in Morocco by introducing energy demand management techniques into important sectors of the Moroccan economy, including agro-industry, construction materials, and hotels. This program combined hands-on energy and environmental audits of 46 large and medium-sized firms in four key industrial sectors; links with Moroccan engineering training institutions; and information dissemination on the benefits and techniques of energy conservation targeted to technical professionals and company/plant managers. The energy and other plant audits recommended measures that led to energy savings worth more than $4 million annually. In terms of greenhouse gas

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reductions, these audits are estimated to have prevented emissions of approximately 140,000 tons of CO_2 per year. Overall, the EDM project succeeded in developing a demand for sophisticated energy and environmental audits and associated energy efficiency services in Morocco's rapidly-growing private industry sector.

- **Energy Conservation and Environment Project (ECEP) in Egypt**

USAID/Cairo supported ECEP is a ten-year project designed to promote and accelerate the adoption of improved commercial technologies, processes, and practices to increase energy efficiency and enhance Egyptian institutional capability to implement energy efficiency measures. The project is thus demonstrating proven energy efficient technologies which can help private- and public-sector enterprises adjust to the higher energy costs that will emerge as the Egyptian government deregulates prices. ECEP focuses on ten different technology applications:

- cogeneration,
- waste heat recovery,
- combustion control,
- power factor correction,
- high-efficiency lighting,
- high-efficiency motors,
- energy management systems,
- process controls,
- solid fuel boilers, and
- insulation and refractors.

Forty demonstrations of these technologies are planned during the life of the project at an equipment cost of roughly $23 million. The remaining funds cover technical assistance, training,and promotion.

IV. CLEAN ENERGY

- **Infrastructure Privatization in Sri Lanka**

USAID is collaborating with USAID/Colombo and various government ministries and agencies in Sri Lanka to provide technical assistance infrastructure privatization. USAID is providing specialists to support and guide this element of the Sri Lankan effort to move forward in the global economy. The privatization tasks have been targeted at specific government projects and include:

- assisting in the negotiations for the first independent private power project in Sri Lanka,
- performing a wastewater treatment program for the city of Kotte,
- performing an environmental assessment of various roadways in and around Colombo,

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- assisting in negotiations with privatizing a portion of the port of Colombo,
- identifying the most cost-effective options for a toll road between Colombo and the Katunayake Airport, and
- providing privatization strategies to the Government of Sri Lanka for a variety of other infrastructure projects.

- **Power Sector Support Program in Egypt**

This program, supported by USAID/CAIRO, aims to rehabilitate electricity generating capacity, increase efficiency, and stimulate investments in energy efficiency. The program is reducing GHG emissions through infrastructure investments and technical and policy assistance. The modernization of the Cairo West thermal power station's boilers and turbine generators, as well as the modification of the boilers to burn both natural gas and mazout oil, is expected to increase the plant's capacity from 300 megawatts (MW) to 350 MW, while decreasing its fuel consumption rate from 275 grams/KWhr to 260 grams/KWhr, thereby greatly reducing its GHG emissions.

USAID/Cairo is also assisting the Egyptian government in its efforts to adopt environmentally sound practices and reduce electricity subsidies that discourage conservation. In partnership with the World Bank, the government developed a national Environmental Master Plan identifying Egypt's environmental problems and outlining an action plan to address them. The New and Renewable Energy Authority (NEA), recently established under the Power Sector Support program, will help carry out the government's action plan and meet future demands for environmentally sound energy by promoting new and renewable sources. The program is also helping to expand the operating data collection capability of the National Energy Control Center, which will enhance the reliability and efficiency of the overall national power system.

V. Training and Capacity Building

- **Energy Training Program**

USAID's Energy Training Program (ETP) provides a unique opportunity for qualified energy and environmental professionals and policy makers from developing countries to receive practical hands-on training, either in the United States or in the host country. The resulting increase in local institutional capacity to resolve energy sector problems has led to improvements in energy efficiency, increased deployment of renewable energy technologies, and more effective management of utilities and energy resources while increasing the potential for economic growth. U.S.-based courses are designed to provide mid-level engineers, planners, and other specialists with the skills needed to implement new technologies, policies, or procedures. In-country courses are custom-designed to provide senior level policy makers and executives with the information they need to make informed decisions on new energy and environmental technologies, policies and procedures. A study tour program brings senior-level energy-sector professionals to the United States to observe new energy technologies, policies, and procedures in action. Over 4000 developing country

professionals have participated in the ETP. In addition, ETP's Utility Partnership Program has initiated successful twinning relationships between senior technical U.S. and in-country utility staff in ten countries worldwide.

- **Environment/Global Climate Change project in Latin America**

Since 1990, USAID has provided $34.5 million to support this project. Specifically designed to reduce greenhouse gas emissions in Latin America, the project promotes policy reforms and encouraging environmentally-sound technologies and practices for the sustainable, efficient use of forest and energy resources, especially in Brazil and Mexico. Because the primary source of greenhouse gasses in the region stems from the destruction of tropical forests, this project focuses heavily on the sustainable use of forest resources.

In Brazil, the project is providing training, management assistance, and basic infrastructure needs to local nongovernmental organizations (NGOs) in the region. This assistance aims to increase NGO capacity to influence policy.by working with government research agencies and carrying out demonstration field projects. To give added value to the existing forests, the project is supporting research and pilot demonstration activities for new non-timber forest products and for improving the cultivation of traditional products, such as Brazil nuts and rubber. The activities also include environmental education, impact assessments, and components to improve timber management and management of protected areas.

Working with NGO partners, the project has used $2 million to purchase and conserve critical forested areas in Belize and Paraguay. In Mexico, the project is helping the government analyze its policies and legal and institutional structures that encourage destruction of tropical and temperate forests. It is also working to consolidate and manage eight protected areas and their buffer zones, covering more than ten million acres in southern Mexico.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-01: Behavioral aspects of natural resources management

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy Analysis, Research, and Technical Support)

Contact 1: Philip Jones
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320 21st Street, NW
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Contact 2:
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Implementors: World Wildlife Fund
World Resources Institute
The Nature Conservancy

Keywords: behavioral science, natural resource management, workshops

Abstract: Behavioral aspects of natural resources management practices. - Analysis of Behavioral Motivations in Integrated Conservation and Development, designed to provide better understanding of the motivations affecting the adoption of sustainable natural resource management practices .

Phase I - analysis of the present state of knowledge about behavioral motivation and modification

Phase II - design and development of workshops, to be conducted in Africa, aimed at understanding and influencing behavior as it pertains to usage of natural resources

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-02: Characterizing and monitoring seasonal forest

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research, and Technical Support)

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Contact 2:
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Implementors: University of Maryland
NASA/Goddard Space Flight Center

Keywords: biodiversity, deforestation, forest management, tropical forest, land use

Abstract: Characterizing and monitoring seasonal forest (Central Africa) - Used satellite data (AVHRR) to map the distribution of the seasonal forests and savannas of Central Africa. Research provides baseline data for key management issues.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-03: Greenhouse gas measurement from biomass burning

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research and Technical Support)

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nplementors: University of Zambia
U.S. Forest Service

Keywords: biomass, biomass burning, carbon dioxide, energy, fuel, land use, research, wood, wood conversion

Abstract: Estimating greenhouse gases and dust (Zambia) - Classification of vegetation by woody biomass structure and assessment of wood use and conversion of wood to charcoal on a national basis. Data are being used to provide estimates of emissions from burning biomass in southern Africa.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-04: Land tenure and natural resources management

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research and Technical Support)

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Contact 2:
Address:
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Email:

Implementors: Land Tenure Ctr., University of Wisconsin

Keywords: buffer zones, conservation, conservation behavior, forest management, land tenure, protected areas, land use

Abstract: Land tenure. - studies of the relationship between the lack of tenure over land and natural resources and attitudes and behavior regarding biodiversity conservation; includes identification of the kinds of incentives appropriate for encouraging participation of residents of protected area buffer zones in conservation of forests and other natural resources.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-05: Tenure and agroforestry, East and Southern Africa

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research, & Technical Support)

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Contact 2:
Address:
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Implementors: Land Tenaure Ctr. (U. of Wisconsin)
International Ctr. for Research in Agroforestry

Keywords: agroforestry, forest management, land tenure, land use, workshops, research, policy

Abstract: Research on the role of tenure in the adoption of agroforestry technologies, carried out in three regions of Uganda, four communes in Burundi, two regions ambia, and one region of Malawi. Workshops were held in conjunction with this research and its findings. The workshops focused on policy responses to the research.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-06: Common propety and buffer zones

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR, USAID/Uganda (Policy, Analysis, Research, & Technical Support)

Contact 1: Philip Jones
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Contact 2:
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Email:

Implementors: Land Tenure Ctr. (U. of Wisconsin)
Makere Institute of Social Research

Keywords: buffer zones, land tenure, land use, protected areas, workshops, research, national parks

Abstract: Common property and buffer zones in Uganda: Research into a) pastoralist land use, and enclosure processes in particular; b) land tenure and land use planning in buffer zones around Uganda's natinal parks and reserves; and c) conflict of resolution ove land and other natural resources. Later work focused on indigenous management of common lands; specifically, of ungazettted forest.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-07: Land tenure and natural resource management

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/Afr, USAID/Guinea (Policy, Analysis, Research, and Technical Support)

Contact 1: Philip Jones
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Contact 2:
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uplementors: Land Tenure Ctr. (U. of Wisconsin)

Keywords: forest, forest management, land tenure, land use, research, land codes, workshops, policy

Abstract: Research carried out on how land tenure issues affected the implementation of the Fuuta Jalon Natural Resource Management project in Guinea. Case studies completed on tenure regimes in project watersheds; field study completed of the Nialama Classified Forest. Effort also recommended ways to establish a co-management system between Guinean forestry service and local communities.. Review conducted of Guinean environmental laws and their relation to existing land code.. Conducted a returns-on-investment study examining constraints and opportunities for adoption of sustainable ag/sustainable forestry technologies.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-08: Tenure and management of forest, wildlife, and other reserves

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research, & Technical Support)

Contact 1: Philip Jones
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Contact 2:
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Phone:
Fax:
Email:

Implementors: Land Tenure Ctr. (U. of Wisconsin)

Keywords: biodiversity, forest, forest management, land tenure, land use, research, workshops, policy , protected areas, nature reserves

Abstract: Research into how tenure affects land use in areas in or near natural parks and other reserves and protected areas. Key issue examined was relationship between population dynamics and tenure change and role of customary and indigenous rights systems in promoting better local land management and restricting immigration into vulnerable areas.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-09: Tenure and common property resources

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research, & Technical Support)

Contact 1: Philip Jones
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Implementors: Land Tenure Ctr. (U. of Wisconsin)
Makere Institute for Social Research

Keywords: forest, forest management, land tenure, land use, research, policy, nature reserves

Abstract: Research into tenure as a factor affecting management of common property resources , including natural forest systems.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-10: Research/technical assistance in support of Niger's Rural Code

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR , USAID/Niger (Policy, Analysis, Research, & Technical Support)

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Implementors: Land Tenure Ctr. (U. of Wisconsin)

Keywords: forest, forest management, land tenure, land use, land codes, research, policy,

Abstract: Research in support of ongoing process of development and institutionalization of a Rural [land] Code in Niger. Issues researched included tree tenure on the individual holding, community natural resource management, herder/farmer interaction, and disputre resolution mechanisms.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-11: National park management

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research and Technical Support)

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nplementors: World Wildlife Fund

Keywords: education, forest management, protected areas management, research, tropical forest, land use

Abstract: National park management (Central African Republic) - Created a research and education division within the Dzanga-Sanha Dense Forest Special Reserve and the Dzanga National Park's management structure for data collection on the forest and the effects of human uses. Data analysis provides information to develop and modify reserve management plans.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-12: Natural regeneration - tropical forest

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, (Policy, Analysis, Research and Technical Support)

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Implementors: National Science Foundation

Keywords: afforestation, biology, Collaboration, conservation, research, tropical forest, land use

Abstract: Tropical forest regeneration (Rwanda) - Investigation of the consequences of seed dispersal by fruit-eating animals on tree regeneration sites in the Nyungwa Forest (application of the theory of conservation biology and its application to tropical forest management)

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-13: Policy Analysis Research and Technical Support

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $1136, FY95 Planned= $1659, FY96 Proposed= $1680

Sponsor: USAID/Africa Regional , (Policy, Analysis, Research and Technical Support)

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nplementors: World Wildlife Fund
World Resources Institute
Winrock International Environmental Alliance
U.S. National Science Foundation
U.S. Forest Service Forestry Support Program

Keywords: Biodiversity, communication, deforestation, desertification, forest management, land use, modelling, policy, research, tropical forest

Abstract: PARTS is designed to support the USAID Africa Bureau's objective of achieving sustainable increases in incomes and/or productivity in sub-Saharan Africa through better management of natural resources and of national economies, strengthening competitive markets, and improving food security. PARTS aims to realize these objectives by developing more effective strategies, policies, and programs in key agricultural and natural resource areas.

Specific PARTS activities focus on research and analysis related to sectoral, cross-sectoral, and synthesis studies and impact evaluations, including biodiversity conservation research, analysis, and demonstration activities. PARTS supports mitigation of and adaptation to global climate change to the extent that its varied activities support conservation and sustainable management of forests and natural resources.

Through USAID's Biodiversity Support Program, PARTS funds such regional programs that are directly relevant to USAID's global climate change objectives. Thse include "Biodiversity Analysis for Africa," "Africa Global Climate Change," "Protected Area Conservation Strategy," and "Analysis of Behavioral Motivation/Integrated Conservation and Development."

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: AFR-14: Staff skills improvement for protected area management

Country: AFR

Start Date: 1992 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/AFR (Policy, Analysis, Research and Technical Support)

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Implementors: World Wildlife FUnd
World Resources Institute
The Nature Conservancy

Keywords: education, information dissemination, protected areas, training, training techniques development, workshops , land use

Abstract: Staff skills improvement. - Protected Area Conservation Strategy seeks to increase effective management of protected areas in eastern, central, and southern Africa where inadequately trained staff often have complex development and conservation-related responsibilities.

Phase I - assessment of the needs, skill levels, training requirements/opportunities, constraints and priorities required to improve staff performance in protected areas
Phase II - dissemination of Phase I findings; development of in-country training plans and processes; implementation of field testing of innovative training techniques; provision of cross-regional workshops to exchange training experiences; faciliation of dissemination of information documenting field-tested training techniques

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ASI-01: Asia Forestry Training Database

Country: Asia and Pacific

Start Date: 1991 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ANE, USAID/G.ENV (Forest Resources Management II)

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Implementors: U.S. Forest Service (International Forestry organization), FAO, FORSPA

Keywords: forest management, forestry, land use, training

Abstract: Asia Forestry Training Database - development of a PC-based database of short-term forestry training courses and other types of training of particular interest to individuals in the Asia and Pacific region; developed in cooperation with FAO and FORSPA

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-13: Brazil-U.S. Energy Training Program

Country: Brazil

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV, USAID/Brazil, (Energy Training Project)

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Implementors: Institute of International Education

Keywords: biomass, DSM, energy, energy efficiency, IRP, regulation, renewable, solar photovoltaic, small hydropower, training

Abstract: Brazil-U S. Energy Training Program (BETP) - BETP is the technical training component of USAID's Environment & Global Climate Change (E/GCC) project in Brazil. BETP incorporates training whose aim is to assist Brazil to revamp its reguatory structure regarding electric power enerati9n, transmission, and distribution. Once BETP gets underway, engineers, managers, and other professionals in Brazil will receive training in such areas as tariff structures and analysis, regulatory reform, power sector restructuring, and courses in energy efficiency such as Integrated Resource Planning, Demand Side Management, and Line Loss Reduction.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-14: *Low-impact timber harvesting*

Country: Brazil

Start Date: 1991 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV, USAID/Brazil , (Forest Resources Management II)

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Keywords: forest management, land use, tropical forest, rainforest, carbon dioxide, greenhouse gases, mitigation

Abstract: USAID supported the development of a model for low-impact timber harvesting, using demonstration plots, which is being replicated in at least eight areas of the Brazilian Amazon. This set of timber extraction techniques has served as a model for adoption by private timber association members, and has generated wide-spread interest at universities, international research centers, and at the World Bank, which redesigned a new $18.1-million activity in forest management as a result.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-15: Education of policy-makers, biomass burning

Country: Brazil

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Brazil , (Environment and Global Climate Change)

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Keywords: forest management, land use, tropical forest, rainforest, carbon dioxide, greenhouse gases, mitigation, NGOs, deforestation, trans-border, particulate matter

Abstract: Helped advance the political visibility of extensive fires in the Amazon through its work with Brazilian NGOs and the Brazilian government, and by sponsoring a study by the U.S. Forest Service in conjunction with Brazil's Environmental Protection Agency, IBAMA, which linked smoke problems in Bolivia with burning in Brazil.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-16: Measurement of carbon sequestration

Country: Brazil

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV, USAID/LAC, USAID/Brazil , (Environment and Global Climate Change)

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Implementors: Winrock International

Keywords: carbon dioxide, forest management, greenhouse gases, land use, mitigation, rain forest, tropical forest

Abstract: USAID's Center for Environment in the Global Bureau is sponsoring a study of methods for measuring carbon sequestration under a low-impact logging scenario, using research sites in Brazil.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-17: Protected areas management partnership

Country: Brazil

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Brazil , (Environment and Global Climate Change)

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Keywords: forest management, land use, tropical forest, rainforest, carbon dioxide, greenhouse gases, mitigation, NGOs, national park

Abstract: Promoted the first partnerships between Brazilian NGOs and IBAMA, Brazil's Environmental Protection Agency, to manage the Jau National Park, a 2-million hectare flooded forest in Amazonia, Brazil.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-18: Re-forestation

Country: Brazil

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Brazil , (Environment and Global Climate Change)

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Keywords: forest management, land use, tropical forest, rainforest, carbon dioxide, greenhouse gases, mitigation, aforestation, national park agriculture

Abstract: 190 hectares of cleared area have been planted with improved agroforestry systems. Two parks have adopted management systems, 3,117,000 hectares of forested areas are under approved management, and 123 families are adopting improved agroforestry systems.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-19: Sector studies, greenhouse gas emissions

Country: Brazil

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Brazil , (Environment and Global Climate Change)

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Keywords: forest management, land use, tropical forest, rainforest, carbon dioxide, energy, greenhouse gases, mitigation, training, workshop, country studies

Abstract: In May 1995, the Brazilian Ministry of Science and Technology signed an agreement with the US Country Studies Program that will dedicate $400,000 ($350,000 from USAID core funds) for sector studies of greenhouse gas emissions in Brazil. USAID/Brazil has also identified Brazilians for training courses and workshops sponsored by the USIJI program.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: BRA-20: Environment and Global Climate Change

Country: Brazil , Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= $2900, FY96 Proposed= $4000

Sponsor: USAID/LAC, USAID/Brazil USAID/Mexico , (Environment and Global Climate Change)

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Implementors: U.S. NGOs and host Country NGOs

Keywords: Agroforestry, capacity building, deforestation, energy, energy efficiency, forest management, joint implementation, land use, policy, technology transfer, training, tropical forest, cogeneration, commercial, DSM, emissions inventory, industrial

Abstract: The E/GCC project addresses global climate change--particularly in Brazil and Mexico--through broadly-based, multi-faceted activity programs working simultaneously at the local, state, and regional levels.

In Brazil, grants totalling $17.5 million support 20 activities by 14 U.S. government and non-governmental organizations working with Brazilian counterpart organizations, including NGOs. Program focus is on sustainable uses of the Amazon rainforest (including establishment of extractive reserves); on policy analysis; and on environmental education, supplemented with institutional strengthening, training, and research.

In Mexico, the project is working especially to consolidate and manage protected areas of tropical and sub-tropical forests, efforts which emphasize the involvement of local communities whenever possible. Exploring viable ways to limit production of greenhouse gases from fossil fuel use is also a key objective. This includes, for example, $4.64 million to support renewable energy projects, including pilot project activities in off-grid productive applications, and a pilot project for co-generation of electricity from steam produced in sugar processing. A training component through USAID's Energy Training Project provides instruction in hands-on aspects of energy conservation.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: CAM-08: Central African Regional Program for the Environment

Country: Cameroon, CAR, Congo, Equatorial Guinea, Gabon, Zaire

Start Date: 1995 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95=$4900, FY96 Proposed=$6027

Sponsor: USAID/AFR, (Central African Regional Program for the Environment)

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Implementors: World Wildlife Fund, World Resources Institute

Keywords: Biodiversity, deforestation, policy, tropical forest, land use

Abstract: The goal of the CARPE project is to help reduce the rate of deforestation of tropical forests of the Congo Basin by preparing the groundwork for large-scale conservation efforts. It proposes to do this by establishing the conditions and practicies required for the conservation and sustainable use of natural resources in the region; specifically, through (1) testing and demonstration of conservation approaches; (2) capacity-building, training, and technical support for government and non-government institutions in the region; (3) analysis and information dissemination; and (4) regional planning and donor coordination.

Some of the key accomplishments of CARPE will include:

- the development and implementation of natural resource management plans for key protected areas and adjacent (buffer) zones;
- the identification and pilot-testing of ecologically sustainable income-generating forest-based activirties; and
- the completion of detailed biological and socio-economic surveys and assessments and cross-cutting analytical studies on issues relevant to conservation in the region.

CARPE is unique among USAID projects in that all field activities will be carried out by U.S. PVOs and NGOs under cooperative agreements or grants.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: CON-01: Congo Forest Conservation Project

Country: Congo

Start Date: 1991 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $700, FY95 Planned= $700

Sponsor: USAID/AFR , (Congo Forest Conservation Project)

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Implementors: Wildlife Conservation Society
Ministere des Eaux et Forets et de la Peche/Congo

Keywords: Capacity-building, communication, forest management, information dissemination, land use, policy, training, tropical forest

Abstract: This project aims to protect the northern rain forests of the Congo through a combination of approaches. The first of these supports a series of management activities in the core and buffer zones of Nouabale-Ndoki National Park. Activities have included developing a legal framework to officially establish the park; building base camps for park management and research; conducting baseline ecological studies; and incorporating local communities into management activities. The second approach supports conservation initiatives at the national level to strengthen the Congo's environmental policies and related institutional capacities, such as training for local scientists, publicizing environmental management issues, and supporting nascent NGOs concerned with environmental issues.

Originally designated as a 4-year project, this was extended for 6 years in July 1996.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: CON-02: Policy and national institutional strengthening

Country: Congo

Start Date: 1991 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $700, FY95 Planned= $700

Sponsor: USAID/AFR , (Congo Forest Conservation Project)

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Implementors: Wildlife Conservation Society
Ministere des Eaux et Forets et de la Peche/Congo

Keywords: capacity-building, communication, environmental management, policy, training, tropical forest, land use

Abstract: Policy and National Institution Strengthening - Training for local scientists, publicizing of environmental management issues, and support of local NGOs concerned with environmental issues in the interests of conservation initiatives at the national level to strengthen the Congo's environmental policies and related institutional capacities.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: CON-03: Protected areas management

Country: Congo

Start Date: 1991 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $700, FY95 Planned= $700

Sponsor: USAID/AFR, (Congo Forest Conservation Project)

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Implementors: Wildlife Conservation Society
Ministere des Eaux et Forets et de la Peche/Congo

Keywords: capacity-building, communication, community participation, ecological studies, forest management, land use, legal work

Abstract: Protected Areas Management - In the core and buffer zones of Nouabale-Ndoki National Park, CFC helped develop a legal framework to officially establish the Park; built base camps for park management and research; conducted baseline ecological studies; and incorporated local communities into management activities.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-01: Demand side management and integrated resource planning

Country: ENI Regional

Start Date: 1991 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ENI (Regional Energy Efficiency Project)

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Implementors: RCG/Hagler, Bailly, Inc.
U.S. Energy Association
Bechtel
Electrotek Concepts, Inc.

Keywords: DSM, commercial, electric utilities, energy, energy efficiency, IRP

Abstract: The Regional Energy Efficiency Project is introducing Demand Side Management and Integrated Resource Planning to major electric utlilities throughout the region

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-03: Energy Efficiency and Market Reform

Country: Kazakhstan , Russia, Ukraine

Start Date: 1992 **Status:** In progress

Duration: 5 years

Cost: Obligations in thousands: FY94 Actual= $2522, FY95 Planned= $2645, FY96 Proposed= $1100

Sponsor: USAID/ENI, (Energy Efficiency and Market Reform)

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Implementors: Resource Management Associates
RCG/Hagler-Bailly
International Resources Group.

Keywords: energy, energy efficiency, industrial, policy, privatization, training

Abstract: The objective of the EEMR project is the restructuring of the energy sectors of the countries of the former Soviet Union so that they better reflect market-based principles. The project aims to assist in this restructuring by providing selective assistance to achieve the broader, systemic market reforms required.

The project has the following five components:
- rationalizing energy prices and developing sound national energy policies;
- improving energy efficiency and reducing low-level emissions of pollutants from industry and municipal heating systems;
- restructuring and privatizing of specific sub-sectors, such as electric power, oil, and natural gas;
- increasing the safety of Russian-designed nuclear reactors; and
- promoting energy trade and energy integration with Western European and international energy markets.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-04: Energy pricing and energy tariffs

Country: ENI Regional

Start Date: 1991 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ENI, (Regional Energy Efficiency Project)

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Implementors: RCG/Hagler, Bailly, Inc.
U.S. Energy Association
Bechtel
Electrotek Concepts, Inc.

Keywords: electricity, energy, energy efficiency, pricing, training

Abstract: The Regional Energy Efficiency Project is providing technical assistance and training in the realm of energy pricing and tariff regulation

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-06: Energy services demand development

Country: ENI Regional

Start Date: 1991 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ENI, (Regional Energy Efficiency Project)

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Implementors: RCG/Hagler, Bailly, Inc.
U.S. Energy Association
Bechtel
Electrotek Concepts, Inc.

Keywords: commercial , energy, energy efficiency, training

Abstract: The Regional Energy Efficiency Project is working with local, private companies to develop demand for energy-related services and equipment through training and business development support

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-07: Regional Energy Efficiency Project

Country: ENI Regional

Start Date: 1991 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $18404, FY95 Planned= $15963, FY96 Proposed= $8498

Sponsor: USAID/ENI, (Regional Energy Efficiency Project)

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Implementors: RCG/Hagler, Bailly, Inc.
U.S. Energy Association
Bechtel
Electrotek Concepts, Inc.

Keywords: Assessment, DSM, electricity, energy, energy efficiency, IRP, industrial, information, policy, privatization, training

Abstract: The Regional Energy Efficiency Project for Central and Eastern Europe is working to improve the efficiency and environmental performances of energy systems in the the region.
The project has five major objectives, which include:
- rationalizing energy prices and developing sound national energy policies
- improving energy efficiency and reducing low-level emissions from industry and municipal heating plants
- restructuring and privatizing specific energy sub-sectors, such as electric power, and production, refining, and distribution/sale of petroleum and natural gas.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: ENI-08: Environmental Policy and Technology

Country: Kazakhstan , Russia, Ukraine

Start Date: 1993 **Status:** In progress

Duration: 4 years

Cost: Obligations in thousands: FY94 Actual= $1513, FY95 Planned= $1300, FY96 Proposed= $760

Sponsor: USAID/ENI , (Environmental Policy and Technology)

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Implementors: Harvard Institute for International Development,
Institute for Soviet & Amercian Relations (ISAR)
U.S. Environmental Protection Agency
CH2MHill

Keywords: biodiversity, capacity-building, energy, energy efficiency, forestry, industrial, land use, policy, technology transfer, training

Abstract: The objectives of the EPT project are to ensure that economic development in the countries of the former Soviet Union is linked to sound environmental and natural resource management; to increase public participation in decision-making on environmental and natural resource management isues; to help reduce major environmental health threats from urban and industrial pollution; to assist in improving natural resource management and biological diversity conservation; and to selectively address global environment issues.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-04: Biomass Energy Systems and Technology

Country: Global

Start Date: 1989 **Status:** In progress

Duration: 14 years

Cost: Obligations in thousands: FY94 Actual=$2900, FT95 Planned=$1505,FY96 Proposed= $1138

Sponsor: USAID/Global/ENV, (Biomass Energy Systems and Technology)

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Implementors: Winrock International

Keywords: assessment, biomass, energy, information exchange, renewable, technology transfer, training, workshop

Abstract: The purpose of the BEST project is to identify and reduce the technological, economic, financial, and institutional risks associated with investing in biomass-fueled power production in USAID-assisted countries.

BEST conducts industry-wide resource and project assessments, technology adaptation activities, workshops, technological exchanges, and various project support activities for private developers, including cost-sharing project pre-investment studies. The project focuses primarily on the generation of electricity from agricultural residues, such as crop wastes from sugar, rice, and wood waste production. It promotes the use of commercially proven technologies and systems adapted to developing country conditions. BEST works with in-country institutions to act as a catalyst for legislative, regulatoryland other policy changes that will facilitate the development of renewable--and particularly biomass-based--energy.

BEST has worked extensively to stimulate the development of expanded sugar industry power generation in Latin America and Asia. Assessments of industry potential, avoided-cost electricity pricing, and power system inter-connection requirements, conducted in varying degrees in each country, have helped provide a framework for expanded sugar factory cogeneration in Costa Rica, Guatemala, Honduras, El Salvador, India, Indonesia, and Thailand. BEST has also worked to bring a promising new fuel--sugar cane trash-- into commercial use by conducting field-recovery trials in Brazil, India, and Thailand, and by developing data collection protocols for related recovery and boiler tests.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-06: Conservation of Biological Diversity

Country: Global

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= $1695, FY95 Planned= $1213, FY96 Proposed= $650

Sponsor: USAID/Global/ENV, (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservancy
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: Aforestation, agroforestry, assessment, biodiversity, conference/workshop, deforestation, forest management, information dissemination, information exchange, land use, tropical forest, vulernability

Abstract: Conservation of Biological Diversity (CBD) is designed to improve the capacity of public and private institutions to recognize the critical need for conserving biological resources and the economic potential of conservation regulations and policies. CBD consists of four components. The major one is the Biodiversity Support Program (BSP), a consortium of the World Wildlife Fund, The Nature Conservancy, and the World Resources Institute. The three others are:
- the International Cooperative Biodiversity Groups program,which aims to facilitate the discovery of medicines from tropical plants and other natural products to make conserving endangered habitats economically viable;
- the Consultative Group on Biological Diversity, a coordinating secretariat for private donor foundations supporting biodiversity activities; and
- the Biodiversity Rapid Assessment Program, which sponsors biological inventories by Conservation International to aid in the identification and management of potential conservation areas.

The specific goals of the largest of these four programs, BSP, are to develop and support efforts with far-reaching impacts in biodiversity conservation by testing new approaches, answering critical research questions, and building indigenous capacity and knowledge. BSP achieves its goals through a varied range of technical assistance, training, information dissemination, encouraging of information networks, supporting small applied conservation research projects through grants, and pilot project demonstrations. Some BSP activities pertain directly to global climate change.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-08: Development Strategies for Fragile Lands

Country: Global

Start Date: 1986 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $90, FY95 Planned= $319, FY96 Proposed= $123

Sponsor: USAID/Global/ENV, (Development Strategies for Fragile Land)

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Implementors: Chemonics International
Rodale
Abt Associates
Datex Inc.

Keywords: aforestation, agroforestry, conference/workshop, forestry, forest management, land use, policy

Abstract: DESFIL improves national, regional, and local strategies for economic development in areas where natural resources are subject to rapid degradation: dry lands, erosion-prone lands, humid lowlands, and disaster-prone areas.

The project helps USAID country missions and regional bureaus collect, manage, and analyze information for programming, project planning and monitoring, and impact assessment. It promotes the participation of local resource users, both men and women, in the sustainable management of fragile lands. It also works to strengthen agencies and NGOs in host countries that are involved in sustainable agriculture and natural resources management.

DESFIL's most important contribution to development efforts on global climate change is The Green Book. This three-volume reference document is based on detailed analysis of natural resource policies in Belize, Costa Rica, El Salvador, Guatemala, and Honduras. It presents a set of principles designed to facilitate broad participation in (1) the development and implementation of forestry and other natural resource policies; and (2) policy-making and policy implementation for forest management.

Through a series of workshops with USAID missions and NGOs in Latin America, DESFIL is using The Green Book to promote policies conducive to forest conservation, reforestation, agroforestry, and the conservation of soil organic matter.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-09: Energy Efficiency Project

Country: Global

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= $6608, FY95 Planned= $9918, FY96 Proposed= $5165

Sponsor: USAID/Global,/ENV/EET (Energy Efficiency Project)

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Implementors: RGC/Hagler Bailly, Inc.
International Institute for Energy Conservation
Lawrence Berkeley National Laboratory
Alliance to Save Energy

Keywords: DSM, electricity, energy, energy efficiency, industrial, IRP, lighting, modelling, technology transfer

Abstract: EEP is working to improve the efficiency of energy use through wide-ranging activities in Agency-assisted countries. EEP promotes innovation in energy technology for both producers and end-users.

It improves energy planning and promotes energy efficiency through policy reform and institutional support; technology cooperation and innovation; demonstration projects; and information dissemination and capacity-building. It places particular emphasis on problem-solving that involves both the private and the public sectors.

- Through its Sustainable Cities Initiative, it is bringing U.S. energy service and technology firms together with officials of Monterrey, Mexico and of Kaliningrad, Russia, to plan for the incorporation of energy efficiency measures into electricity generation, and into energy use by industry and for space heating in institutional and residential buildings.
- It has implemented or is implementing programs in demand side management and in integrated resource planning in Brazil, India, Mexico, and the Philippines.
- It has installed 2 million compact fluorescent lamps in Guadalajara and Monterrey, Mexico, which will reduce carbon dioxide emissions by 100 million kg and save up to 265,000 barrels of oil annually.
- It has worked with national agencies to develop energy efficiency standards for electric appliances and for non-residential buildings in Mexico.
- It supports the Global Energy Efficiency Initiative, a coalition of industry, universities, NGOs, research laboratories, and government agencies that works for sustainable production and use of energy worldwide.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-11: Energy Efficiency/Assistance to U.S.-Asia Environmental Partnership

Country: Global

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors: Lawrence Berkeley National Laboratories,
CFE,
World Bank,
Global Environment Facility,
Government of Norway

Keywords: energy, energy efficiency, energy services, technology transfer

Abstract: Assistance to U.S.-Asia Environmental Partnership of USAID and other U.S. government agencies to develop strategies for involvement in India and Thailand centered on the use and application of U.S. energy-related services and technologies.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-13: Energy Technology Innovation Project / greenhouse gas emissions

Country: Global

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= $2772, FY95 Planned= $2130, FY96 Proposed= $2477

Sponsor: USAID/Global?ENV/EET
(Energy Technology Innovation Project)

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nplementors: Bechtel Corporation

Keywords: energy, energy efficiency, particulate matter, privatization, technology transfer

Abstract: ETIP is focussed on the reduction of greenhouse gas emissions from a variety of major sources in 17 USAID-assisted countries, largely through the introduction of technology-based solutions. The project simultaneously attempts to identify and open new markets for U.S. technology and services.

Note: Additional, country-level records exist for this project.

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Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-16: Energy Training Project

Country: Global

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= $3200, FY95 Planned= $6649, FY96 Proposed= $2276

Sponsor: USAID/Global/ENV/EET, (Energy Training Project)

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Implementors: Institute of International Education

Keywords: Capacity building, commercial, conference/workshop, DSM, electricity, energy efficiency, fuel switching, information dissemination, IRP, modelling, renewable, training

Abstract: The Energy Training Project is a diversified effort to improve the skills of energy and environmental professionals in developing countries so that they are better-equipped to reduce the environmental impact of conventional energy use and to exploit renewable energy resources.

ETP develops management and technical courses in conjunction with the U.S. energy and environmental services industry and makes these courses available to appropriate candidates, often through collaborative efforts with training and other institutions in host countries. Course material covers the full range of conventional and alternative energy options, with an emphasis on energy efficiency, the environment, renewable energy, and privatization of power generation, transmission, and distribution.

ETP's management-level training provides short-term, in-country workshops for senior managers and policy-makers; these are designed to increase the understanding ofand build support for energy issues (conservation, privatization, etc.) and environmental issues (effective regulations and enforcement) among key decision-makers. U.S.-based courses provide more in-depth, practical training.

EPT has developed and is implementing country-specific training programs in countries that include Brazil, Egypt, Ghana, India, and Mexico.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-18: Environment and Natural Resources Policy and Training Project

Country: Global

Start Date: 1991 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $694, FY95 Planned= $582, FY96 Proposed= $475

Sponsor: USAID/Global/ENV, (Environment and Natural Resources Policy and Training Project)

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Implementors: Winrock International Environmental Alliance
University Midwestern Consortium for International Assistance

Keywords: Assessment, conference/workshop, forestry, forest management, industrial, information dissemination, land use, policy, rain forest, technology transfer, training

Abstract: EPAT aims to identify and highlight the links between economic, environmental, and natural resources policies on the one hand, and environmentally sustainable development on the other. The purpose is to help policy-makers in developing countries promote environmental protection and sustainable use of natural resources. By identifying the underlying policy constraints the lead to environmental degradation, and by supporting local capabilities--both technical, and in terms of human resources--EPAT assists in the development of policies that remedy pollution and achieve economic development that is environmentally sustainable and also equitable.

EPAT conducts policy research, provides technical expertise, gathers and disseminates information, facilitates policy dialogue between USAID missions and host country governments, and works to strengthen host country institutions relevant to environmental and economic policies and their implementation. Through training activities, it is also involved in human capacity development.

EPAT has done much of its work related to global climate change in the realm of policy analysis and research. One research initiative is examining the role of NGOs in implementing natural resource management projects; one aspect of this focuses on tropical forest management in Latin America, while the other focuses on forests, primarily in Africa and Asia. To date, this research has resulted in guidelines for encouraging effective working relationships between donor organization, government agencies, and local NGOs. An EPAT feasibility study on integrating environmental and natural resource accounting in Africa has been followed by a buy-in from the Initiative for Southern Africa to launch an environmental accounting pilot project in Namibia.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-19: Environmental Education and Communication

Country: Global

Start Date: 1993 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $301, FY95 Planned= $220, FY96 Proposed= $105

Sponsor: USAID/Global,/HCD (Environmental Education and Communication)

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Implementors: Academy for Educational Development, Chemonics International, Global Vision Inc., North American Association for Environmental Education, The Futures Group, Porter/Novelli, PRC Environmental Management, Inc., World Resources Institute

Keywords: Capacity building, communication, information dissemination, training

Abstract: GreenCOM promotes the adaptation, use, and replication of state-of-the-art environmental education and communication methods to help modify peoples' attitudes and beliefs on environment-related issues, and encourage individual behavior that is better for the environment. Examples of methods used by GreenCOM, derived from the fields of communications and the social sciences, include applied behavioral research, community mobilization, and social marketing.

Through its activities, which include education through formal and informal channels, surveys, and studies of the effects of education-based interventions, GreenCOM aims to help institutions in host countries develop a public agenda for the environment and the impetus for environmental action and change. It also aims to legitimize environmental policies and programs in these countries.

GreenCOM has made significant efforts to date in The Philippines. In addition, the project's Environmental Education and Communication Information Exchange Center houses environmental education curriculae, case studies and other unpublished literature, periodicals, and examples of educatinal materials. These are available for use in GreenCOM-sponsored efforts in all host countries.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-20: Forest Resources Management II

Country: Global

Start Date: 1991 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= $2048, FY95 Planned= $2718, FY96 Proposed= $740

Sponsor: USAID/Global,/ENV (Forest Resources Management II)

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Implementors: U.S. Forest Service, U.S. Peace Corps, World Wildlife Fund

Keywords: Aforestation, agro-forestry, biodiversity, conference/workshop, deforestation, forest management, forestry, land use, tropical forest

Abstract: FRM II supports biodiversity and forest conservation activities in all regions of the world that receive USAID assistance. It is a collaborative effort among USAID, the U.S. Forest Service's International Forestry Organization, and the U.S. Peace Corps.

The project provides a wide range of technical assistance, information, and training to personnel in USAID missions, and to Peace Corps volunteers, PVOs, and NGOs. Activities are implemented in three program areas: technical assistance, private enterprise initiative, and the Peace Corps. FRM II has also encouraged donor coordination in the forestry areas and provides a wide range of services and support through an international skills roster. FRM II also averages from seven to 10 seminars a year on a wide range of forestry-related topics.

As of mid-1996, FRM II had completed hundreds of technical assistance activities in Africa, Asia, the Near East, Latin America, the Caribbean, Central and Eastern Europe, and the countries of the former Soviet Union.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-21: Forest Resources Management II

Country: Global

Start Date: 1991 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/Global/ENV, (Forest Resources Management II)

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Implementors: U.S. Forest Service (International Forestry organization), FAO, ICRAF

Keywords: agroforestry, forest management, land use, workshop

Abstract: Imperata Grassland Rehabilitation Manual - The International Workshop on Agroforestry Innovations for Imperata Grassland Rehabilitation was held in January, 1995, in Indonesia. The FRM II project in particular made specific contributions to the workshop manual, along with ICRAF and FAO.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-22: Global Climate Change for Africa II

Country: Global

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= $1695, FY95 Planned= $1213, FY96 Proposed= $650

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
World Resources Institute
The Nature Conservancy

Keywords: biomass, biomass burning, deforestation, forest managment, impact measurement, tropical forest, land use

Abstract: The Global Climate Change for Africa II project, which has the principal goal of improving expertise and skills among Africans in solving the problems of deforestation and biomass burning, and in identifying and measuring the impacts of these activities on the environment. The purpose of GCC/Africa II is to enable sub-Saharan countries to manage their forests and other natural resources more effectively.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: GLO-23: Renewable Energy Applications and Training

Country: Global

Start Date: 1985 **Status:** Completed

Duration: 12 years

Cost: Obligations in thousands: FY94 Actual= $3165, FY95 Planned= $6458

Sponsor: USAID/Global?env/EET (Renewable Energy Applications and Training)

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Implementors: U.S. Export Council for Renewable Energy
Environmental Enterprise Assistance Fund

Keywords: commercial, conference/workshop, deforestation, energy, financing, geothermal, hydro, information dissemination, renewable , solar photovoltaic, wind

Abstract: The REAT project helps developing countries use renewable energy resources to meet their energy requirements. REAT emphasizes information exchange, private sector involvement, and economic sustainability for the development of viable renewable energy projects; these include wind, solar, biomass, micro-hydro, and geothermal. REAT also encompasses energy efficiency. The project assists selected countries with research, training, pre-investment studies, strategic asssessment, and the implementation of renewable energy projects. Project components include strategic assessments and planning and design assistance, information dissemination, market development, and project development and implementation. REAT operates under two cooperative agreements; one with the U.S. Export Council for Renewable Energy and another with the Environmental Enterprises Assistance Fund, a venture capital fund. The former provides technical assistance and marketing support for U.S. renewable energy goods and services. The latter mobilizes grant funding and private capital to support small- and medium-scale renewable energy enterprises.

Accomplishments of REAT as of June 1996 include numerous conferences and publications and the implementation of design, pre-investment, or financing for numerous renewable energy activities in more than a dozen countries, including Brazil, India, Indonesia, Mexico, and the Philippines.

The project's Renewable Energy Project Support Offices (REPSOs), which provide assistance in identifying, evaluating, and implementing renewable energy activities, have been particularly successful. As an example, the REPSO for Central America provided cost-sharing for a pre-investment study of a wind energy program in Costa Rica, which led to a $20-million loan from the Interamerican Development Bank for development of a 60 MW wind-based generating project. When completed, the project will constitute about 2 percent of Costa RIca's entire generating capacity.

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-14: Assistance for procurement of energy-saving technology

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: electricity, energy, energy efficiency, financing, industrial

Abstract: EMCAT is identifying high-cost ($500,000+) improvements aimed at promoting energy efficiency, and the technologies and equipment required to achieve these efficiencies, among industrial power users; specifically in the cement, pulp and paper, chemical fertilizers, and iron industries. The Industrial Development Bank of India will consider financing the recommended technology and equipment upgrades. This component of the EMCAT project is expected to eventually be expanded to other segments of Indian industry.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-15: Biomass-based energy production

Country: India

Start Date: 1995 **Status:** Completed

Duration: 1 year

Cost: Obligations in thousands: FY95 Planned= $19000

Sponsor: USAID/India , (Greenhouse Gas Pollution Prevention)

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Implementors: (India) National Thermal Power Company's Centre for Power Efficiency and Environmental Protection
U.S. Department of Energy
Industrial Development Bank of India

Keywords: cogeneration, energy

Abstract: One of the GEEP project's two strategies is to exploit the energy potential of currently unused biomass through the introduction of bagasse cogeneration technology.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-16: Demand side management India

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: DSM, electricity, energy, energy audits, energy efficiency, industrial

Abstract: Demand side management - EMCAT is working with two utilities, Ahmedabad Electricity Company (AEC) and Bombay Suburban Electric Supply, to identify opportunities for demand-side management. One such pilot project has already been established at AEC for the purposes of conducting energy audits for industrial applications with high energy consumption. The project is also offering financial incentives to encourage local dealers to sell energy-efficient equipment, and will provide industrial power consumers with information on financing sources.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-17: Distillery-related co-generation investments

Country: India

Start Date: 1987 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Planned=

Sponsor: USAID/India , (Program for Acceleration of Commercial Energy Research)

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Implementors: Government of India: Ministry of Energy, Department of Non-Conventional Energy Resources
Industrial Credit and Investment Corp. (India)

Keywords: cogeneration, energy

Abstract: Construction of a distillery to combine treatment of spent wash from sugar distilling with co-generation of steam power for the distillery.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-18: Energy Management Consultation and Training

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= $2384, FY95 Planned= $2089, FY96 Proposed= $400

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: coal, DSM, electricity, energy, energy efficiency, financing, information dissemination, policy, training

Abstract: EMCAT aims to improve India's technological and managerial capabilities in both the supply and use of electric power.

In conjunction with $600 million in loans from other development institutions, EMCAT is providing a broad range of services and material--technical assistance, training, and equipment--to improve the management of public utilities; increase the availability of reliable, efficient energy; and help promote related policy reforms, including market-level energy pricing.

EMCAT is also helping commercial energy customers to obtain equipment and adopt techniques that will improve the efficiency of their power usage. This includes introduction of demand-side management, establishment of energy service companies, improvements in energy audits of plants and buildings, development of loan packages that enable commercial users to finance upgrades for greater energy efficiency, and dissemination of information on energy efficiency to Indian industry.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-19: Energy efficiency measures in coal-based power plants

Country: India

Start Date: 1995 **Status:** Completed

Duration: 1 year

Cost: Obligations in thousands: FY95 Planned= $19000

Sponsor: USAID/India , (Greenhouse Gas Pollution Prevention)

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Implementors: (India) National Thermal Power Company's Centre for Power Efficiency and Environmental Protection
U.S. Department of Energy
Industrial Development Bank of India

Keywords:

Abstract: One the GEEP project's two strategies is to increase efficiencies in the use of coal through the introduction of efficiency measures in coal-fired power plants, and the introduction of state-of-the-art coal conversion technologies.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-20: Energy services companies

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: electricity, energy, energy audits, energy efficiency, industrial

Abstract: Energy Service Companies (ESCOs) - EMCAT is establishing three ESCOs as joint ventures between Indian and U.S. utilities.. These ESCOs will assist industrial power users in India to perform energy audits and surveys and help these customers implement and finance any modifications or additions to existing plant equipment and/or processes.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-21: Greenhouse Gas Pollution Prevention

Country: India

Start Date: 1995 **Status:** Completed

Duration: 1 year

Cost: Obligations in thousands: FY95 Planned= $19000

Sponsor: USAID/India , (Greenhouse Gas Pollution Prevention)

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Implementors: (India) National Thermal Power Company's Centre for Power Efficiency and Environmental Protection
U.S. Department of Energy
Industrial Development Bank of India

Keywords: Bagasse, biomass, coal, cogeneration, electricity, energy, energy efficiency, financing, joint implementation, renewable, training

Abstract: The objective of the GEEP project is to reduce production of greenhouse gases associated with commercial energy production in India. This objective is being met through a variety of technical assistance and training, as well as financing through the incremental costs of qualifying bagasse cogeneration and advanced coal conversion projects.

The investment and technical assistance planned for the first–and longer term–of these components could by itself result in reductions of atmospheric emissions of carbon dioxide of as much as 260,000 tons annually.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-22: Improved management and technology for electric power industry

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: electricity, energy, energy audits, energy efficiency, industrial, lighting, motors

Abstract: Power supply - EMCAT is assisting India's Power Finance Corporation Ltd. (PFC) to help India's state electricity boards (SEBs) to improve their financial and technical management and plan investments in more efficient technologies. Through technical assistance, PFC is helping the SEBs prepare operational and financial action plans. It will also help with pre-investment and feasibility studies for construction or rehabilitation of power generation, transmission, and distribution facilities. PFC has also sanctioned 35 pre-investment studies at various SEBs on improvements such as purchasing new equipment, renovation of old equipment, measures to increase efficiency, and enhanced process controls. Investments will include lending by Indian and international banks, contingent on the completion and approval of the actions plans, as well as strengthened ties with the U.S. technology and manufacturing sectors for system improvement.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-23: Liquid fuels processing

Country: India

Start Date: 1987 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Planned=

Sponsor: USAID/India , (Program for Acceleration of Commercial Energy Research)

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Implementors: Government of India: Ministry of Energy, Department of Non-Conventional Energy Resources
Industrial Credit and Investment Corp. (India)

Keywords:

Abstract: Pilot project for the co-processing of Assam coal and refinery-derived residual into clean liquid fuels.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-24: Policy studies , commercial energy and energy technology

Country: India

Start Date: 1987 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Planned=

Sponsor: USAID/India , (Program for Acceleration of Commercial Energy Research)

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Implementors: Government of India: Ministry of Energy, Department of Non-Conventional Energy Resources
Industrial Credit and Investment Corp. (India)

Keywords: policy

Abstract: Eight policy studies were carried out in the early years of the PACER project to identify areas of India's energy sector which offered the greatest potential for investment by consortia of manufacturers, research institutions, and energy end-users. As of April 1995, approval had been granted to 25 consorta projects, including venture capital projects and eight research studies involving a total of $17 million in PACER funding.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-25: Program for Acceleration of Commercial Energy Research

Country: India

Start Date: 1987 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $2209, FY95 Planned= $500 . FY96 Planned=$0

Sponsor: USAID/India , (Program for Acceleration of Commercial Energy Research)

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Implementors: Government of India: Ministry of Energy, Department of Non-Conventional Energy Resources
Industrial Credit and Investment Corp. (India)

Keywords: biomass, coal, cogeneration, commercial, conference/workshop, methane, policy, solar photovoltaic, training

Abstract: PACER promotes the development and commercialization of technological innovations in India's energy sector through the development, introduction, and testing of market-oriented models.

PACER works through shared commercial ventures and conditional grant disbursements and specifically emphasizes energy conservation, renewable energy, and clean coal technology.

The project supports the development and testing of new technologies and products, the design of new manufacturing methods, policy analysis, short-term technical assistance, and information dissemination. To support this, the program provides financial assistance of up to $3 million per project to consortia of manufacturers, research institutions, and end-users.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-26: Solar cell manufacture

Country: India

Start Date: 1987 **Status:** In progress

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Planned=

Sponsor: USAID/India , (Program for Acceleration of Commercial Energy Research)

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Implementors: Government of India: Ministry of Energy, Department of Non-Conventional Energy Resources
Industrial Credit and Investment Corp. (India)

Keywords: energy, renewable, solar photovoltaic

Abstract: Production of cadmium-based solar cells with an approximate capacity of 700 kilowatts

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-27: Training for managerial staff in electric power industry

Country: India

Start Date: 1991 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/India , (Energy Management Consultation and Training)

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Implementors: Bechtel Corporation,
Industrial Development Bank of India
Pittsburgh Energy Technology Ctr. (U.S. Dept. of Energy)
Resource Management Associates

Keywords: electricity, energy, energy efficiency, industrial, information dissemination, training, workshops

Abstract: One hundred officers of India's Power Finance Corporation Ltd. and of the state electricity boards have received training in the U.S. in analystical and planning techniques. About 160 officers have received in-country training in other aspects of utility management, both technical and financial. EMCAT has organized a series of workshops and seminars to share U.S. experience in utilities management. The topics covered included metering, billing and computerization, transmission and distribution loss reduction, and private power development.

In addition, EMCAT is training Indian companies and energy consultants in the methods for conducting energy audits of industrial power users.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-28: India Private Power Initiative Training Program

Country: India

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/IG/ENV/EET, USAID/India, (Energy Training Project)

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Implementors: Institute of International Education

Keywords: Electric power, energy, private power production, training

Abstract: India Private Power Initiative Training Program - Under USAID's Private Power Initiative (IPPI) in India, ETP designs and delivers courses on varying aspects of private sector-based electric power capacity-building, generation, transmission, and distribution. The program is based on the concept of "train-the-trainers." Indian co-trainers are brought to the U.S. for instruction in course delivery, and also to provide useful input from the Indian government and to review curricula. In addition, the program offers study tours in the U S. to give selected participants more intense exposure to U.S. concepts of private electric power.

Examples of specific course offerings include Tariff Structure and Analysis; Bid Solicitation, Project Evaluation, and Negotiation; Financial Analysis; Project Finance; and Utility Regulation.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-29: Power sector/pollution prevention workshops

Country: India

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET, USAID/India, (Energy Training Project)

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Implementors: Inst. of Int. Education

Keywords: Energy, energy industry, pollution prevention, power sector, regulation, training, workshop

Abstract: At the request of USAID/India, ETP offered three in-country workshops in 1995 and 1996 in the following areas:

+ Power Sector Regulation and Re-structuring (Nov. 6-16, 1996)
+ Pollution Prevention in Industry (June 1-14, 1996)
+ Human Resource Development for the Energy Industry (Aug. 5-11, 1996)

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-30: Viable renewable energy projects

Country: India

Start Date: 1985 **Status:** Completed

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= $3165, FY95 Planned= $6458

Sponsor: USAID/India, (Renewable Energy Applications and Training)

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Implementors: Environmental Enterprises Assistance Fund

Keywords: energy, financing, renewable

Abstract: Cooperative agreement signed with government of India to look at financially feasible renewable energy projects.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-31: Identification of national priorities for biodiversity conservation

Country: India

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservance
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: biodiversity , conservation, policy

Abstract: Development of a participatory methodology to identify national priorities in biodiversity conservation.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: IND-32: Asia Sustainable Energy Initiative

Country: India, Indonesia, Philippines

Start Date: 1996 **Status:** In progress

Duration: 2 years

Cost: Life of Project $9 million

Sponsor: USAID/G/ENV/EET, USAID/India, Indonesia, Philippines , (Asia Sustainable Energy Initiative)

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Implementors:

Keywords: assessment, cogeneration, deforestation, DSM, electricity, energy, energy efficiency, financing, information dissemination, information exchange, IRP, policy, private power production, privatization, renewable, technology transfer, training

Abstract: ASEI is designed to develop collaborative programs between USAID's Global Bureau, the Agency's US-Asia Environmental Partnership, and the USAID missions in India, Indonesia, and the Philippines to mitigate global climate change and environmental degradation associated with the generation and transmission of electric power.

Each ASEI country-based program will have five basic components: sustainable energy advisors (SEIs), a utility partnership program, technical support, and implementation grants. Program activities in each country will promote sustainable energy production and use through work with governments, NGOs, electric power utilities, industry, and financial institutions. Substantively, each country's core activities will focus on policy reform, utility planning, and in the case of Indonesia, the development of "bankable" energy efficiency and renewable energy projects.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-09: CLEAN/Energy

Country: Indonesia

Start Date: 1996 **Status:** In progress

Duration: not available

Cost:

Sponsor: USAID/Indonesia , (CLEAN/Energy)

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Implementors:

Keywords: Energy, energy efficiency, renewable

Abstract: The objective of CLEAN/Energy is to reduce the level of pollution emitted in power generation while meeting demands for increased electric power. This will be accomplished by:
-assistance in restructuring Indonesia's state electric utility
-promoting energy efficiency
-support for development of renewable energy

The design for the CLEAN/ Energy project began development in July, 1996.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-10: Higher education for host country nationals

Country: Indonesia

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/Indonesia , (Natural Resources Management in Indonesia)

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Implementors: Associates in Rural Development, Inc.
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Agency for Forest Research and Development (AFRD)
P.T. Alas Kusuma

Keywords: conservation, forest management, land use, natural resources management, seminars, training

Abstract: Training. - NRMP supports the pursuit of advanced degrees in the U.S. by Indonesian nationals in subject areas relevant to its overall goal of improved natural resources management and forest protection, NRMP's training component also includes conducting seminars on critical findings of NRMP-funded research, and on-the-job training .

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-11: Natural Resources Management in Indonesia

Country: Indonesia

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= $900, FY95 Planned= $2530, FY96 Proposed= $1925

Sponsor: USAID/Indonesia , (Natural Resources Management in Indonesia)

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Implementors: Associates in Rural Development, Inc.
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P.T. Alas Kusuma

Keywords: biodiversity, communication, conference/workshop, ecotourism, deforestation, forest management, forestry, land use, policy, training, "traditional" forestry, tropical forest, vulnerability

Abstract: NRMP seeks to strengthen the ability of selected Indonesian institutions to identify natural resource management constraints to sustainable economic growth and to design and implement policies and practices that mitigate these constraints.

The project has two components: (1) policy analysis for sustainable economic development, and (2) pilot field programs that address the management of forests, protected areas, and industrial pollution. To secure environmental sustainability, the project design incorporates strong private sector involvement, institution-building capability, and community participation.

Guided by the Indonesian Ministry of Forestry, NRMP is testing management systems for natural production forests and for protected areas, and has published a number of technical reports in these areas.

NRMP's pilot programs are supported by on-site research at two major protected areas, the Bunaken and the Bukit Baka-Bukit Raya National Parks, and at various production forest sites.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-12: Policy analysis

Country: Indonesia

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/Indonesia , (Natural Resources Management in Indonesia)

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Keywords: deforestation, forest management, land use, natural resource management, policy, policy recommendations, policy studies, tropical forest

Abstract: Policy analysis. - NRMP supports analysis of a wide array of policy issues within four broad topics: incorporating natural resources in long-term economic planning, urban environment, forest management, and nature conservation. Numerous policy studies have been completed under NRMP and numerous policy recommendations made pertaining to natural resource management.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-13: Protected areas management

Country: Indonesia

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/Indonesia , (Natural Resources Management in Indonesia)

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Keywords: deforestation, forest management, land use, "traditional" forestry, tropical forest,

Abstract: Protected areas management - Bukit Baka-Bukit Raya National Park.NRMP assisted the Indonesian Ministry of Forestry to develop a management plan that includes administraion, conservation, community development, recreation, research, monitoring, and public relations. One priority area for NRMP is biodiversity surveys for delineating management zones and identifying priority management activities. Another priority is applied research on traditional use of forests by local communities as a means of developing a legal form of forest extraction. The project is also assisting the Indonesian Ministry of Forestry in developing a competiive award system for funding applied research into production forestry.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-14: Protected areas managment

Country: Indonesia

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/Indonesia , (Natural Resources Management in Indonesia)

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Implementors: Associates in Rural Development, Inc.
Directorate General for Forest Protection/Indonesia
Nature Conservation (PHPA)
Agency for Forest Research and Development (AFRD)
P.T. Alas Kusuma

Keywords: deforestation, forest management, land use, "traditional" forestry, tropical forest

Abstract: Protected areas management - Bunaken Marine National Park. Under NRMP, more than 25 studies have been carried out leading to policy and management recommendtions. Current activities also include mapping, study tours, park awareness, and site-specific research.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-15: Wind Power for Island Nongovernmental Development

Country: Indonesia

Start Date: 1991 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $821, FY95 Planned= $20

Sponsor: USAID/W, USAID/Indonesia , (Wind Power for Island Nongovernmental Development)

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Implementors: Winrock International
National Renewable Energy Laboratory
Alpha Omega
Dian Desa

Keywords: Assessment, commercial, energy, renewable, technology transfer, training, wind

Abstract: WIND is being funded by USAID as part of the Agency's parallel-funded contribution to the pilot phase of the Global Environment Facility (GEF). The project has a dual objective: to introduce wind power tecnology in the eastern islands of Indonesia; and to involve local NGOs on these islands in the work of providing for local power needs, primarily through technology transfer.

WIND is conducting baseline studies to identify local power needs and the concomitant potential for cost recovery for wind-based electricity generation and transmission projects. It has mapped wind power resources and installed wind monitoring equipment at 10 test locations. Once reliable data from these monitoring efforts is secured, WIND will begin establishing wind power demonstration projects at 20 sites. The project is also exploring possible commercial applications for wind-based energy in the geographical areas under focus.

WIND is also increasing the ability of local NGOs in the eastern islands to develop and put in place small, wind-based power generation and transmission installations. This component stresses classroom- and field-based training for NGOs, members of local communities, and local technical people.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-16: Energy efficiency and cogeneration workshops

Country: Indonesia

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET, USAID/Indonesia, (Energy Training Project)

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Implementors: Institute of Int. Education

Keywords: Biomass, Cogeneration, Energy, energy efficiency, training, workshop

Abstract: ETP Field Support - At the request of USAID/Indonesia, ETP offered the following (and other) workshops in Indonesia in 1996:

+ Energy Efficiency in Process Industry - management-level training for participatns from the public and private sectors; offered in cooperation with the Center for Energy Studies at University of Indonesia
+ Cogeneration/Sugar Industry Project Development - to provide skills required for biomass waste-to-energy project development in the sugar industry; e.g., in bagasse as a fuel supply, characterization, heating value combustion issues, environmental impacts, and project design and financing

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-17: Energy-related training, Indonesia

Country: Indonesia

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET, USAID/Indonesia, (Energy Training Project)

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Implementors: Institute of International Education

Keywords: Courses, DSM, financing, power sector, regulation, sector restructuring, training, workshop

Abstract: At the request of the USAID/Indonesia Mission, ETP provided in 1996:

+ a U.S.-based course (May-June) to Indonesian utility and government officials to improve the technical capabilities of participants in financial analysis, to improve their ability to evaluate energy projects and to select appropriate financing for private power projects

+ an Indonesia-based five-day workshop in electric power restructuring and regulatory reform, emphasizing restructuring and regulatory reforms introduced in the last decade that have been successful in the electric power sector s of other countries

+ strengthening of the Indonesia chapter of the alumni association of ETP courses, workshops, and training

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-18: Environmental business expansion loan

Country: Indonesia

Start Date: 1985 **Status:** Completed

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned=

Sponsor: USAID/G/ENV/EET, USAID/Indonesia, (Renewable Energy Applications and Training)

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Implementors: Environmental Enterprises Assistance Fund

Keywords: energy, financing, renewable, pollution abatement

Abstract: A $180,000 expansion loan for Indonesian company, P.T. Envitech, which is designing and constructing facilities for wastewater pollution in Java.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-19: Environmental business start-up loan

Country: Indonesia

Start Date: 1985 **Status:** Completed

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned=

Sponsor: USAID/G/ENV/EET, USAID/Indonesia, (Renewable Energy Applications and Training)

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Implementors: Environmental Enterprises Assistance Fund

Keywords: Energy, renewable, pollution abatement, waste management

Abstract: Start-up loan of $50,000 for an activated charcoal manufacturer whose product is sold to refineries for pollution abatement.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-20: Pre-investment studies, renewable energy

Country: Indonesia

Start Date: 1985 **Status:** Completed

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned=

Sponsor: USAID/G/ENV/EET, USAID/Indonesia, (Renewable Energy Applications and Training)

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Implementors: Environmental Enterprises Assistance Fund

Keywords: biomass. energy, renewable, solar photovoltaic

Abstract: Cost-shared pre-investment studies for a photovoltaic project and two biomass-based energy projects.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-21: Remote sensing technology for tropical forest preservation

Country: Indonesia

Start Date: 1991 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR, (Forest Resources Management II)

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Implementors: U.S. Forest Service (International Forestry organization)

Keywords: forest management, land use, tropical forest

Abstract: The Indonesia Remote Sensing program has undertaken the following activities:

- use of remote sensing for estimating forest biodiversity levels (Ecological classification and mapping)
- completion of an ecological map of Indonesia
- development of a forest cover database (Forest Health Monitoring)
- establishment of forest health monitoring plots (Forest Health Monitoring)
- use of aerial video to support monitoring of forest health

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: INDO-22: Policy strengthening for biodiversity protection

Country: Indonesia

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservance
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: biodiversity , conservation, policy

Abstract: Strengthening of policy to protect biodiversity by helping indigenous people to map and manage their traditional territories. Supporitng the rights of local peoples to manage their natural resources with the support of local and national government.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: LAC-01: Parks in Peril

Country: LAC

Start Date: 1990 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= $4.6 FY95 Actual= $0, FY96 Proposed= $4.6, FY97 Proposed=

Sponsor: USAID/LAC Regional , (Parks in Peril)

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Implementors: The Nature Conservancy

Keywords: aforestation, assessment. capacity-vuilding, conservation, deforestation, financing, forest management, land use, national parks, protected areas, training, tropical forest

Abstract: PiP is an effort to help Latin American governments and private organizations in Latin America identify areas with significant biological diversity for designation as protected areas; to improve the functioning of new and existing protected areas; and to place these areas on a firm financial basis long-term. The project has three strategic objectives: on-site protection and management, compatible use and economic development, and long-term financial sustainability.

The present agreement aims to install basic protection infrastrucutre in 25 to 50 protected areas. A strategic tenet of the project is that park managers, The Nature Conservancy, government agencies, and NGOs will work to find sources of funding other than USAID over the liffe of the project.

Most of the 28 sites selected to date for project efforts contain significant forested areas. Seven of the project sites are in Mexico, of which six are funded through the Global Environment Facility (GEF).

Note: Additional, country-level records exist for this project.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: LAC-02: Environmental Support Project

Country: LAC

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $162, FY95 Planned= $60, FY96 Proposed= $60

Sponsor: USAID/LAC , (Environmental Support Project)

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Implementors: Various U.S. and local NGOs

Keywords: Biodiversity, capacity-building, country study, forestry, land use, policy, research, tropical forests

Abstract: The objective of ESP is to strengthen the capacity of government and non-governmental agencies and organizations in Latin American and Caribbean countries to evaluate the environmental implications of proposed development strategies, and to protect forested areas and biodiversity. It aims to accomplish this objective through a combination of technical assistance and biodiversity/environmental pilot studies.

ESP has two major components:
- placement of long-term technical advisors to assist in the design, implementation, and evaluation of USAID mission and host-country natural resource management activities
- support for pilot projects and studies related to biodivesity conservation.

As of mid-1996, ESP has awarded small grants to numerous biodiversity conservation pilot projects that demonstrate replicable solutions to environmental problems. The grants generally range between $45,000 and $150,000. Pilot studies supported have included conservation efforts in Sonora and Chihuahua, Mexico, and the Columbian Choco, and a study of land use and economics in the Peruvian Amazon.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-24: Integrated conservation and development program

Country: Mexico

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/W, USAID/Mexico

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Implementors: World Wildlife Fund

eywords: conservation, deforestation, land use

Abstract: Design of an integrated conservation and development program to help decrease deforestation in southern Mexico.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-25: Capacity-building, energy efficiency organizations

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: Capacity-building, energy, energy efficiency, information exchange

Abstract: Information management and exchange - Support to the chief energy efficiency organizations in Mexico to improve their information management and exchange capabilities

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-26: Tracking of land use changes

Country: Mexico

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservance
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: land use

Abstract: Design and implementation of monitoring systems at four sites to track changes in land use.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-28: Consumer assistance for purchase of CFLs

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors: Lawrence Berkeley National Laboratories,
CFE,
World Bank,
Global Environment Facility,
Government of Norway

Keywords: Carbon dioxide, energy, energy efficiency, greenhouse gases, financing, lighting, minigation, residential,

Abstract: ILUMEX - The Proyecto de Uso Racional de Illumincion en Mexico (ILUMEX) is demonstrating utility investments in efficient lighting . As a pilot project, ILUMEX has helped the Mexican national electric utility provide 1.5 million compact fluorescent lamps at low cost to residential electricity customers in two cities--Monterrey and Guadalajara. A trust fund subsidized the prices of these lamps to interested consumers. Procurement of the lamps began in March, 1995 for sale through the utility's district offices, where customers pay their bills.

Benefits of ILUMEX include lower future investment costs for the utility and lower utility bills for consumers. ILUMEX will result in annual fuel savings of up to 265,000 barrels of oil and annual reductions in emissions of carbon dioxide (27,500 tons), sulphur dixide (1,550 tons), and nitrogen oxides (180 tons).

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-30: Demand side management Mexico

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: Country study, DSM, energy, energy efficiency,

Abstract: Demand Side Management program in Mexico included:

- Identification of rebates and incentives in industrial, residential, and commercial sectors with maximum energy savings potential

- Transfer of EPRI computer models; development of modelling capability; collection of data for use in models; to improve analytical capability

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-32: Development of building standards for energy efficiency

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

.eywords: Energy, energy efficiency, residential, standards

Abstract: Building standards - Continue supporting passage of commercial building standards (currently answering objections raised during public comment period) and begin support of a residential building standard for energy efficiency

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-34: Energy efficiency audits, industrial/commercial

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: Energy, energy efficiency, industrial

Abstract: Combustion and steam efficiency - 30-35 audits in small and medium-sized facilities in northern and central Mexico

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-36: Improving combustion efficiency of heavy-oil based generating plant

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Technology Innovation Project)

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Implementors:

Keywords: Energy, efficiency, electricity, technology transfer

Abstract: Pollution retrofit at Manzanillo power station - At a 1900-MW heavy oil-based power plant on Mexico's west coast, plant burners are being upgraded through Reduced Emissions and Advanced Combustion Hardware (REACH), which will improve burners' combustion efficiency and reduce emissions of particulate matter. This effort also includes tests to verify benefits of REACH and to promote the technology among Mexico's other heavy-oil based power plants, totalling more than 10,000 MW of capacity.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-38: Industrial motor efficiency

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: DSM, energy, energy efficiency, industrial, motors, standards

Abstract: Industrial motor efficiency - In April 1993, in conjunction with four Mexican counterpart agencies, EEP established a three-year, $1-million industrial DSM program. The program involves three activities: (1) a pilot program; (2) development of industrial efficiency standards; and (3) transfer of capabilities for DSM modelling and cost-benefit analysis. The pilot program targets several industries for reducing motor fuel consumption through the use of high-efficiency motors, adjustable speed drives, high-efficiency belts, and other cost-cutting measures, such as compressor adjustment. This pilot program is to be followed by the design for a program to be carried out on a national scale.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-40: Integrated resource efficiency audits

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project and Environmental Pollution Prevention Project)

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Implementors:

Keywords: Energy, energy efficiency, industrial

Abstract: Integrated resource efficiency audits - Combined energy efficiency-pollution prevention audits in maquiladores along Mexico-U.S. border.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-42: Landfill methane recovery

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: energy, landfill, methane, renewable, waste-to-energy

Abstract: Prados de la Montana landfill methane recovery - ETIP is collaborating with the Departamento del Distrito Federal (DDF) the authority responsible for waste disposal in Mexico City, in planning and executing a feasibility study for landfill methane gas recovery and utilization, including a field test and analysis of test data.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-44: Mexico-U.S. energy training partnerhsip

Country: Mexico

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Training Project)

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Implementors:

Keywords: Energy, energy efficiency, renewable, solar photovoltaic, training, wind

Abstract: Mexico-U.S. Energy Training Partnership - This program offers technical training workshops in Spanish for energy, engineering, and other professionals in energy efficiency, renewable energy, and environmental management. Existing and future offerings include the following: Energy Efficiency in Buildings, Energy Efficiency in Process Industry, Water Pumping for Productive Applications (using various forms of renewable energy), and Urban Environmental Management.

The program was developed in support of the USAID/Mexico mission's strategic objective to reduce greenhouse gas emissions in Mexico, as well as support private sector development and support implementation of the NAFTA treaty. So far, 256 professionals have participated as trainees.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-46: Motor efficiency improvement

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: Energy, energy efficiency, industrial, standards

Abstract: Motor rewind program - Evaluations, measurements, development of standards, design of a long-term program to improve rewound motor efficiency in central Mexico

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-48: Sustainable Cities Initiative

Country: Mexico

Start Date: 1992 **Status:** In progress

Duration: 7 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/EET (Energy Efficiency Project)

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Implementors:

Keywords: Capacity-building, energy, energy efficiency, industrial,

Abstract: Sustainable Cities Initiative (SCI) - EEP's SCI, which includes the city of Monterrey, is fostering public-private partnerships for energy efficiency; increasing the capacity of municipal governments by sponsoring energy efficiency advisors; and promoting opportunities for U.S suppliers of energy efficiency services and equipment who participate in Sustainable Cities as business coalition partners.

In Monterrey, EEP supported a survey of opportunities for introducing energy efficiency practices in the industrial sector From this survey, several U.S. companies identified potential projects for implementation. The government of Monterrey has supported the creation of a commission to recommend and monitor energy-saving programs.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-50: Buffer zone management for protected areas

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= $4.6 FY95 Planned= $4.6 FY95 Actual=$0 FY96 Planned= $4.6

Sponsor: USAID/LAC, USAID/Mexico (Parks in Peril)

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Implementors: PRONATURA,

Keywords: communication, forest management, land use, NGOs, national parks, tropical forest,

Abstract: Buffer Zone Management - Baseline studies of Calakmul Nature Resrve, buffer zone management, related institutional support, related NGO communication network

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-51: Climate change policy studies

Country: Mexico

Start Date:

Status:

Duration:

Cost:

Sponsor: USAID/LAC, USAID/Mexico(Environment & Global Climate Change Project)

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Email: jlanda@usaid.gov

Contact 2:

Address:

Phone:

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Email:

Implementors: Environmental Law Institute

Keywords: Policy, training

Abstract: Climate change policy studies - Comparative studies of environmental law, training of NGO and Mexican government personnel in legal matters. Support policy and legal reform.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-52: Debt-for-nature swap

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC. USAID/Mexico (Environment & Global Climate Change Project)

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Implementors: Conservation International

Keywords: Capacity-building, nature reserve, forest management, land use, training, tropical forest

Abstract: Conservation International Debt-for-Nature Swap (Montes Azules Biosphere Reserve) - planning, management, and training in connection with the legal owners of Montes Azules area, the Lancandon Maya people

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-53: Envionmental micro-enterprise

Country: Mexico

Start Date:

Status:

Duration:

Cost:

Sponsor: USAID/Mexico

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Implementors: Ecosolar,

Keywords: ecotourism, forestry, forest management, land use, training, workshop

Abstract: Mazunte Community Development - Supplying equipment for a small environmental enterprise; providing training and technical expertise to seven communities; and holding a workshop on ecotourism.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-54: Environmental education and re-forestation

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico (Environment & Global Climate Change Project)

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Implementors: World Wildlife Fund, Nature Conservancy, World Resources Institute

Keywords: forestry, forest management, land use, aforestation, nature reserve

Abstract: Re-forestation of 3,000 acres of Monarcas Butterfly Reserve in Michoacan by planting Oyamel trees; tree environmental education

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-55: Establishment of Casas Grandes Reserve

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico (Environmental Support Project)

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Implementors:

Keywords: forest management, land use, montane temperate forest, reserve

Abstract: Establishment of the Casas Grandes Reserve for the Protection of Biodiversity in the Northern Chihuahua Desert, Chihuahua. - This project supports ecosystem surveys and the collection and aggregation of existing biological, cultural, and socio-economic data for an area within the Chihuahua desert, prairie, and montane temperate forest ecosystem. A USAID grant of $63,000 will serve as seed money to secure a biosphere reserve there. Plans for the reserve include an integration of the needs of the local human populations with the maintenance of natural habitat.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-56: Financing of environmental enterprises

Country: Mexico

Start Date: **Status:**

Duration:

Cost:

Sponsor: USAID/Mexico, Environmental Initiative for the Americas (EIA)

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Washington, DC 20521-8700 **Address:**

Phone: 525-211-0042 **Phone:**

Fax: 525-207-7558 **Fax:**

Email: jlanda@usaid.gov **Email:**

Implementors: Environmental Enterprises Assistance Fund (EEAF)

Keywords: Financing

Abstract: EEAF operations in Mexico - Financial support to EEAF to begin operations in Mexico to fund environmental enterprises

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-57: Forestry policy and sustainable forestry

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico (Environment & Global Climate Change Project)

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Implementors: Environmental Law Institute

Keywords: deforestation, forest management, land use, training, workshop

Abstract: Studies of government policies that encourage deforestation; workshop on sustainable forestry practices; training of environmental enforcement officials; case studies.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-58: Greenhouse gas vulnerability assessments and emissions inventories

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico , (Environment and Global Climate Change)

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Implementors: INE, UNAM

Keywords: assessments, capacity-building, greenhouse gases, mitigation, vulnerability

Abstract: Support to Mexican institutions preparing emissions inventories, vulnerability assessments, mitigation assessments, and a National Action Plan.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-59: Mexico Conservation Fund

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico (Environmental Support Project)

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Implementors:

Keywords: community groups, conservation, financing, funding mechanism, NGOs

Abstract: In 1993. the Environmental Support Project provided $75,000 for a pilot project, the Mexico Conservation Fund. Between November 1993 and September 1995, there was a participatory process to set up the Fund and establish its priorities (six regional meetings with 450 participants total from 250 NGOs and community groups). This helped to "regionalize" priorities; local experts will evaluate proposals. The goal is much stronger regional control over the grant-making process.

The Fund subsequently received multimillion-dollar funding as a project of the Global Environment Facility (GEF).

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-60: Parks in Peril

Country: Mexico

Start Date: 1990 4 **Status:** In progress

Duration: 8 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/LAC, USAID/Mexico (Parks in Peril)

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Implementors: The Nature Conservancy,

Keywords: Capacity-building, NGOs, training

Abstract: NGO Capacity-building - Institutional development of conservation NGOs through training, technical assistance, and protection of key ecosystems through core zone protection, database development, and environmental monitoring.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-62: Productive uses project

Country: Mexico

Start Date: 1994 **Status:** In progress

Duration: 3 years

Cost:

Sponsor: USAID/LAC, USAID/Mexico, U.S. Dept. of Energy

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Implementors: U.S. Dept. of Energy, Sandia National Laboratories, FIRCO

Keywords: Energy, financing, renewable, solar, technology transfer

Abstract: Renewable energy for productive uses - Grants, financing, and technical assistance for renewable energy for off-grid productive uses (primarily water-pumping for agriculture and livestock)

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-63: Renewable energy project development support

Country: Mexico

Start Date:

Status:

Duration:

Cost:

Sponsor: USAID/G/ENV/EET, USAID/Mexico, Environmental Initiative for the Americas (EIA)

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Email:

Implementors: US/ECRE, IFREE, Sandia National Laboratories, EEAF

Keywords: Assessments, energy, financing, policy, renewable

Abstract: Renewable energy project development support - Resource assessments, pre-investment studies, finance promotion, legal/policy work

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-64: Protected areas management

Country: Mexico

Start Date: 1990 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= $162, FY95 Planned= $60, FY96 Proposed= $60

Sponsor: USAID/Mexico

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Implementors: Centro Ecologico de Sonora

Keywords: communication, information dissemination, land use, protected areas, public education

Abstract: Program for Conservation Planning and Establishment of a System of Protected Areas (Sonora) - Activities include the selection and establishment of high-priority sites for protected areas management. This will involve the coopeation of local and national government agencies, and include the development of an education and outreach campaign using media (radio, television, printed materials) on the importance of protecting critical habitats in Sonora.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-65: Studies, trans-border power wheeling issues

Country: Mexico

Start Date: **Status:**

Duration:

Cost:

Sponsor: USAID/G/ENV/EET, USAID/Mexico, Environmental Initiative for the Americas (EIA)(Energy Efficiency Project)

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Implementors: Price-Waterhouse, CFE, Salt River Project

Keywords: Electric power sector, energy, restructuring, trans-border issues

Abstract: Study of trans-border regulatory issues - Study of trans-border power wheeling issues under possible future restructuring of power sectors in both Mexico and U.S.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-67: Support to national energy regulatory commission for regulatory reform

Country: Mexico

Start Date:

Status:

Duration:

Cost:

Sponsor: USAID/G/ENV/EET, USID/LAC, USAID/Mexico, Environmental Initiative for the Americas (EIA)

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Implementors:

Keywords: Electric power sector, energy, restructuring

Abstract: Support for regulatory reform - Support to national regulatory commission (CRE) in the context of potential restructuring of the electric power sector

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: MEX-69: Youth conservation corps

Country: Mexico

Start Date: 1990 **Status:** in progress

Duration: 7 years

Cost:

Sponsor: USAID/LAC, USAID/MexicoEnvironmental Support Project)

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Implementors:

Keywords: Conservation, natural resources, training

Abstract: Youth conservation corps - Establishment of model corps in 10 states and provision of training in natural resource conservation.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-01: Policy strengthening for biodiversity protection

Country: Philippines

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservance
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: biodiversity , conservation, policy

Abstract: Strengthening of policy to protect biodiversity by helping indigenous people to map and manage their traditional territories. Supporitng the rights of local peoples to manage their natural resources with the support of local and national government.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-02: Non-timber forest projects-based enterprises

Country: Philippines

Start Date: 1988 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/ENV/ENR (Conservation of Biological Diversity)

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Implementors: World Wildlife Fund
The Nature Conservance
World Resources Institute
U.S. National Science Foundation
Consultative Group on Biological Diversity
National Institutes of Health
Conservation International

Keywords: biodiversity , conservation, forest. deforestation, land use

Abstract: On the island of Palawan, the community-based Conservation and Enterprise Program for Indigenous Communities involves collaboration among the World Wildlife Fund and five Philippines-based NGOs. Project is developing small enterprises based on new, non-timber forest products, in order to help reduce deforstation.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-10: Demand Side Management Philippines

Country: Philippines

Start Date: 1995 **Status:** In progress

Duration: 3 years

Cost: Obligations in thousands: FY95 Planned= $77 (both REFTA and DSM projects together)

Sponsor: USAID/Philippines, USAID/G/ENV (Demand Side Management)

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Implementors: Philippines Dept. of Energy
Philippines Energy Regulatory Board
Resources Management International, Inc.

Keywords: bagasse, biomass, commercial, DSM, energy, energy efficiency, geothermal, lighting, renewable

Abstract: The DSM project is (1) assessing the specific potential for demand-side management, both nationally and for specific sectors of the Philippines economy; (2) providing technical assistance for the development of regulatory frameworks that will stimulate the incorporation of DSM into the practices of electric utilities; and (3) designing and implementing a pilot DSM program for the industrial sector, to demonstrate benefits, costs, and working models for follow on development and replication. The Philippines DSM project aims to defer the construction of some 40-50 MW of fossil fuel-based generating capacity. Corresponding benefits from greenhouse gas reduction are estimated at 160,000 to 200,000 tons of carbon dioxided per year.

DSM is being funded as part of USAID's parallel-financed committment to the Pilot Global Environment Facility (GEF).

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-11: Renewable Energy Financing and Technical Assistance

Country: Philippines

Start Date: 1994 **Status:** In progress

Duration: 2 years

Cost: Obligations in thousands: FY95 Planned= $77 (both REFTA and DSM projects together)

Sponsor: USAID/Philippines , USAID/G/ENV(REFTA)

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Implementors: Philippine Department of Energy
Winrock International

Keywords: commercial, electricity, energy, energy efficiency, financing, renewable

Abstract: REFTA is reducing the technical, financial, and other risks associated with development/exploitation of renewable energy, by capitalizing a private investment mechanism that will be a limited source of high-risk loans and equity funds for sound renewable energy projects. Through this mechanism, REFTA is providing cost-sharing funds for the pre-investment costs of renewable energy projects that appear commercially sound, but which require incremental cost assistance to complete "bankable" project feasibility studies.

REFTA is being funded as part of USAID's parallel-financed committment to the Pilot Global Environment Facility (GEF).

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-12: Rural Electrification

Country: Philippines

Start Date: 1988 **Status:** Completed

Duration: 6 years

Cost:

Sponsor: USAID/Philippines , (Rural Electrification)

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Implementors: National Rural Electric Cooperative Association
Philippines National Electrification Administration
Institute of International Education

Keywords: Capacity-building, energy, energy efficiency, information, policy, private power production, technology transfer, training

Abstract: This project was designed to rehabilitate and strengthen, both technically and managerially, the system of rural electric cooperatives in the Philippines. It aimed specifically to make these cooperatives more operationally efficient through institutional development and through reduced system losses. It also aimed to restore the cooperatives' financial viability.

This project targeted a number of institutional weaknesses, as well as technical and other operational deficiencies in individual cooperatives, and in the cooperatives' central service organization. Reducing system losses also required procurement of commodities to rehabilitate physical systems of selected cooperatives, as well as legislative reforms that provided various incentives for the cooperatives to operate more efficiently.

In terms of the institutional strengthening component, one of the project's most important achievements was the development and implementation of a set of standard accounting, financial, and other periodic reports for the cooperatives major administrative functions. This was made possible through introduction of PCs and LANs, whose implementation also improved monitoring of the cooperatives' financial and operational performance by their central service organization. .

Project efforts to reduce system losses and improve operating efficiency centered on assesments of the cooperatives' existing operations and management programs. Deficiencies were identified and rehabilitation efforts centered on procurement of distribution equipment, meters, and specialized vehicles, and on extensive training of cooperative engineers and other technical personnel. The project realized an across-the-board reduction of system losses for the 35 recipient cooperatives, from an average of 23.1% in 1989 to 20.72% in 1992. However, this second figure is still higher than the project's targeted average of 15%.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-13: Export product replacement program

Country: Philippines

Start Date: 1985 **Status:** Completed

Duration: 10 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned=

Sponsor: USAID/G/ENV/EET, USAID/Philippines, (Renewable Energy Applications and Training)

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Implementors: Environmental Enterprises Assistance Fund

Keywords: carbon dioxide, energy, financing, greenhouse gases, mitigation, renewable

Abstract: Investment of $250,000 to finance the startup of Unicoir, a Filipino company that processes coir dust for export as a replacement for sphagnum peat moss.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-14: Integrating institutional aspects of NRM public education campaign

Country: Philippines

Start Date: 1993 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/HCD, USAID/Philippines, (Environmental Education and Communication)

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Implementors: Academy for Educational Development
Chemonics International
Global Vision, Inc.
North American Association for Environmental Education
The Futures Group
Porter/Novelli, PRC Environmental Management, Inc.
World Resource Insititute

Keywords: public education, natural resources

Abstract: Silliman University Interpretive Program-Has a five-person team at Silliman University in Dumaguete, Negros Oriental, working with Silliman staff to develop an environmental education program that will thematically unite the campus sites involved with public education related to local culture and history; marine and coastal resources; local endangered species; and upland resource management. Silliman is a leader in addressing environmental issues for the country as well as the southern region of the Visayas. The design and creation of a unified environmental approach for use in their educational sites will increase their ability to reach the public and tourists with environmental messages.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-15: National strategy-building for environmental communication

Country: Philippines

Start Date: 1993 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/HCD, USAID/Philippines, (Environmental Education and Communication)

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World Resource Insititute

Keywords: communication, land use, forest management, public education

Abstract: National Communication Strategy-Has been working with the Department of the Environment and Natural Resources (DENR) and USAID's projects on industry, natural resources, and coastal resources to help them develop their communication components and to create a national strategy for environmental communication. GreenCOM completed a draft of "Assessment of Forestry Resource Management IEC and Social Marketing" for the NRM Project. To date, has helped all the projects refine their communication components; the campaigns noted above will provide input into the creation of a national, integrated communication strategy.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: PHI-16: Public education on natural resources management

Country: Philippines

Start Date: 1993 **Status:** In progress

Duration: 6 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/G/HCD, USAID/Philippines, (Environmental Education and Communication)

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Porter/Novelli, PRC Environmental Management, Inc.
World Resource Insititute

Keywords: capacity-building, land use, tropical forest, training

Abstract: Pilot Awareness Campaigns-In the process of developing 3 pilot campaigns for San Vicente, Plawan, Olango Island, Cebu, and Malalag, Mindanao with the focus being on helping government leaders, community influentials, and the general community learn how to use the Local Government Code (under the government's devolution policy) to protect and manage local environmental resources. The campaign in Palawan will promote the management of both coastal and upland (i.e., forestry) resources. In addition to collaborating with the USAID Natural Resource Management Project, GreenCom may also work in Palawan with the Tropical Forest Protection Project ($17 million), funded by the European Union.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: POL-15: Krakow Clean Fossil Fuels and Energy Efficiency

Country: Poland

Start Date: 1991 **Status:** Completed

Duration: 3 years

Cost: Obligations in thousands: FY94 Actual= $2250

Sponsor: USAID/ENI, USAID/Poland , (Krakow Clean Fossil Fuels and Energy Efficiency)

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Implementors: Office of Fossil Energy, U.S. Dept. of Energy,
Brookhaven National Laboratories
Batelle Pacific National Laboratories
Electrotek Concepts, Inc.
Krakow Development Office, (BRK)

Keywords: Coal, conference/workshop, energy, energy efficiency, financing, fuel switching, residential, technology transfer, training

Abstract: In Krakow Clean Fossil Fuels, USAID and the U.S. Department of Energy are collaborating with municipal authorities of the southern Polish city of Krakow and Poland's private sector to introduce energy efficiency and pollution abatement approaches and technologies to the city's large central heating plants, its nearly 3,000 small coal-burning domestic boilers, and 100,000 individual coal-burning domestic stoves.

Drawing on $14.5 million in start-up funds supplied by USAID, nine different partnerships between U.S. energy efficiency and pollution abatement services/equipment firms on the one hand, and Polish entities on the other, are broadly implementing a variety of technical and operational approaches to improving the efficiency of energy use for space heating in both residential and institutional buildings and to the pollution problems associated with the widespread use of high-sulfur coal.. These range from insulating buildings to the application of thermostatic controls.

As envisioned by USAID and DOE, these partnerships are spawning Polish-based firms that are beginning to successfully market energy and pollution abatement services on their own.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: RUS-02: Energy efficiency Russia

Country: Russia

Start Date: 1992 **Status:** In progress

Duration: 5 years

Cost: Obligations in thousands: FY94 Actual= $2522, FY95 Planned= $2645, FY96 Proposed= $1100

Sponsor: USAID/ENI [Energy Efficiency and Market Reform]

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Implementors: Resource Management Associates
RCG, Hagler/Bailly
International Resources Group

Keywords: energy, energy efficiency, industrial, policy, privatization, training

Abstract: Under the EEMR project, USAID has undertaken activities such as the following in Russia:

- Provided expertise for a comprehensive energy policy review performed by the International Energy Agency
- Improved the efficiency of district heating systems in certain Russian municipalities
- Cooperated with local industries to improve energy efficiency through replacement of inefficient electric motors, energy audits, etc.
- Developed a proposal in cooperation with the Russian government for future development of the electric power sector on a market-oriented basis; proposal addresses pricing, sector organization, legal and regulatory frameworks, investment promotion, and management training

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: RUS-06: Sustainable natural resources management program

Country: Russia

Start Date: 1993 **Status:** In progress

Duration: 4 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ENI

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Implementors: Harvard Institute for International Development
Institute for Soviet & Amercian Relations (ISAR)
U.S. Environmental Protection Agency
CH2MHill

Keywords: biodiversity, capacity-building, forestry, forest management, land use, training

Abstract: In the Russian Far East, the Environmental Policy and Technology project is developing a sustainable natural resources management program aimed at promoting multiple-use forest management and biodiversity protection. The program includes such components as forest and habitat protection, forest fire prevention, catastrophic fire management, and forest rehabilitation.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: RUS-10: Energy and Environment Commodity Import Program

Country: Russia

Start Date: 1993 **Status:** In progress

Duration: 5 years

Cost: Life of Project $70 million

Sponsor: USAID/ENI, USAID/Russia , (Energy and Environment Commodity Import Program)

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Implementors: Burns & Roe Engineering
Joint Russian-American Steering Committee, with partners form the Russian Bureau for Humanitarian an International Assistance, Ministry of Environmental Protection and Natural Resources, Ministry of Fuel and Energy, Ministry of Finance, and the State Customes Committee.

Keywords: Energy, energy efficency, lighting, policy, technology transfer

Abstract: The Energy and Environment Commodity Import Program aims to transfer specific U.S. technologies to Russia that will help to improve energy efficiency in an environmentally sound manner and to improve the functioning of environment agencies of the Russian government. Equipment and materiel imported under the program must meet the following eligibility criteria:
- They must enhance the efficiency of energy production, transport, or use; lower emissions of pollutants from industry; or improve the capabilities of government agencies involved in environmental protection.
- They must not currently be in general use or widely available in Russia.

The project awards grants for purchases based on the solicitation for bids among U.S. equipment and services suppliers. The purchased technology, supplies, etc. are then awarded to Russian non-profit organizations and businesses on a cost-sharing basis.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: RUS-11: NIS Energy Training Program

Country: Russia

Start Date: 1987 **Status:** In progress

Duration: 9 years

Cost: Obligations in thousands: FY94 Actual= FY95 Planned= FY96 Proposed=

Sponsor: USAID/ENI, USAID/Russia, (Energy Training Project)

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Implementors:

Keywords: Courses, energy, energy industry, private power sector, training

Abstract: ETP has developed the NIS Energy Training Program, which has three areas of emphasis: privatization and market reform; energy efficiency; and healthier and safer environment. Training programs in Russia are developed and offered jointly by specialized Russian and U.S organizations. The program also offers study tours in the U.S., specialized U.S.-based courses, and exchange programs for outstanding Russian energy professionals . These aim to provide an opportunity to learn about the U.S. energy industry firsthand.

Global Climate Change Initiative
Overview of USAID Funded Activities in Key Countries

Activity: UKR-03: Energy efficiency

Country: Ukraine

Start Date: 1992 **Status:** In progress

Duration: 5 years

Cost: Obligations in thousands: FY94 Actual= $2522, FY95 Planned= $2645, FY96 Proposed= $1100

Sponsor: USAID/ENI (Energy Efficiency & Market Reform)

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Keywords: DSM, energy, energy efficiency, industrial, policy, privatization, training

Abstract: The EEMR project has undertaken activities such as the following in Ukraine:
- Procured critically-needed resins for a combined heating and power plant
- Improved the efficiency of district heating systems in certain Ukrainian municipalities
- Worked with the World Bank and the European Bank for Reconstruction and Development to prepare loans for rehabilitation and improvement of power plant efficiency
- Introduced demand side management (DSM) concepts
- Played a critical role in financing the initial development of the competitive bidding system for a formal energy market mechanism created as part of a comprehensive restructuring of the Ukrainian energy sector.