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U.S. AGENCY FOR
INTERNATIONAL
DEVELOPMENT

*Office of Energy and
Infrastructure*

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Bureau for Research and Development
U.S. Agency for International Development
Washington, D.C. 20523-1810

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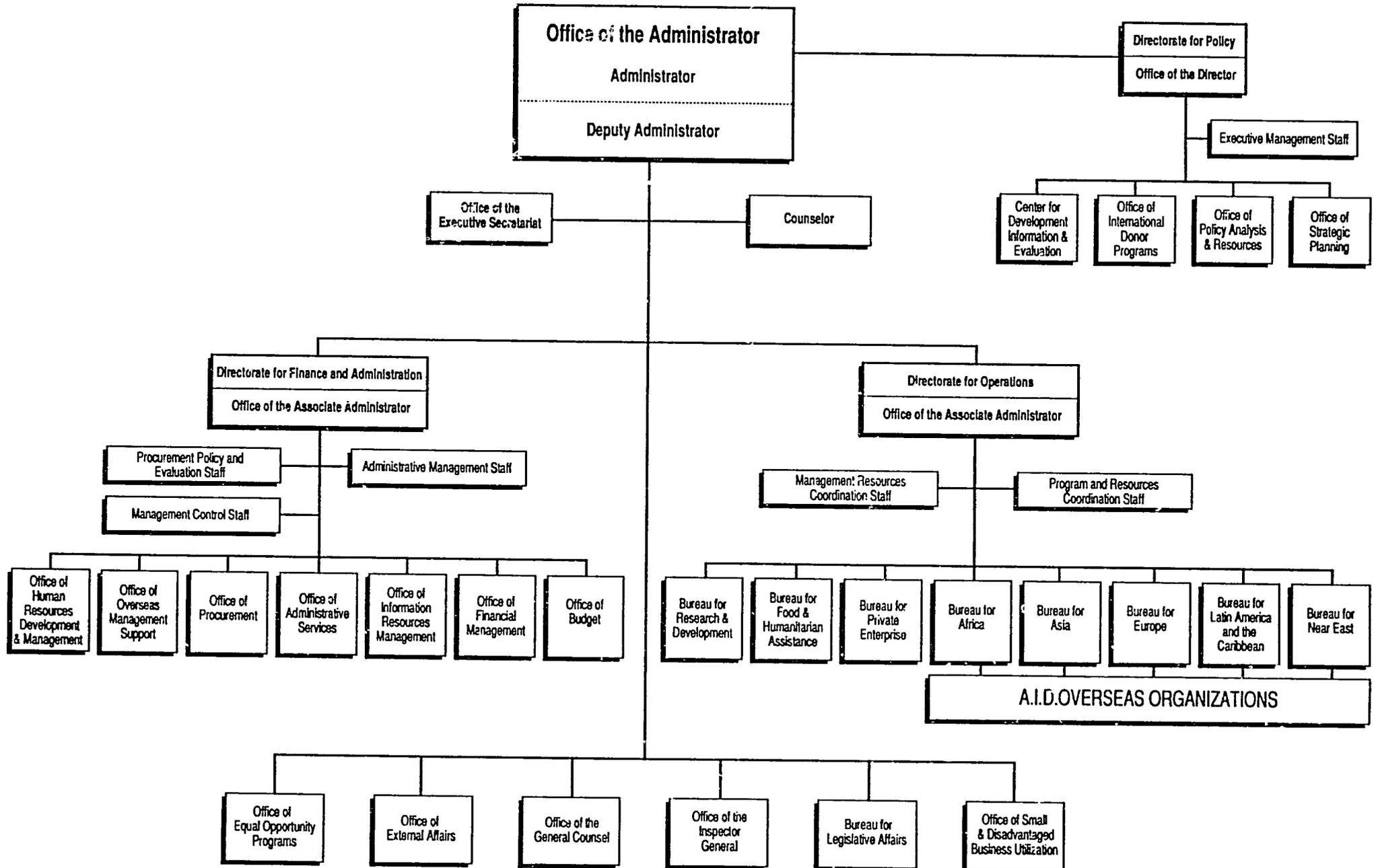
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ACRONYMS AND ABBREVIATIONS

AFR	A.I.D. Bureau for Africa
A.I.D.	Agency for International Development
ASEAN	Association of South East Asian Nations
ASIA/TR	A.I.D. Bureau for Asia, Office of Technical Resources
BEST	Biomass Energy Systems and Technology
DOE	U.S. Department of Energy
DR	Office of Development Resources
DSM	Demand Side Management
ECSP	Energy Conservation Services Program
EEAF	Environmental Enterprises Assistance Fund
EEP	Energy Efficiency Project
EMCAT	Energy Management Consultation Training
EPA	U.S. Environmental Protection Agency
EPDAC	Energy Policy Development and Conservation
EPIC	Energy and Environmental Policy, Innovation, and Commercialization
EPPD	Energy Planning and Policy Development
ETIP	Energy Technology Innovation Project
ETP	Energy Training Program
EUR/DR	A.I.D. Bureau for Europe, Office of Development Resources
GLEEM	Global Energy and Environmental Management
IIEC	International Institute for Energy Conservation
IFREE	International Fund for Renewable Energy and Efficiency
IDEA	International Development and Energy Associates, Inc.

IIE	Institute of International Education
IQC	Indefinite Quantity Contract
LAC/TR	A.I.D. Bureau for Latin America and the Caribbean, Office of Technical Resources
LDC	Less-developed country
MAGPI	Multi-Agency Group on Power Sector Innovation
MW	Megawatt(s)
NE/DR	A.I.D. Bureau for Near East, Office of Development Resources
NRECA	National Rural Electric Cooperative Association
PACER	Program for the Acceleration of Commercial Energy Research
PASA	Participating Agency Service Agreement
PEET	Project for Environmental Energy and Technology
PRE	A.I.D. Bureau for Private Enterprise
PSED	Private Sector Energy Development
REAT	Renewable Energy Applications and Training
R&D/EI	Research and Development Bureau/Office of Energy and Infrastructure
R&D/ENR	Research and Development Bureau/Office of Environment and Natural Resources
REPSO	Renewable Energy Project Support Office
SEED	Stockholm Initiative on Energy, Environment, and Sustainable Development
TDP	U.S. Trade and Development Program
UNDP	United Nations Development Program
USEA	United States Energy Association
USECRE	United States Expert Council for Renewable Energy

Agency for International Development



A.I.D.

Research &
Development

Office of
Energy &
Infrastructure

Food and Humanitarian
Assistance
(FVA/OFVA)

Private
Enterprise

AFRICA

ASIA

EUROPE

LAC

NEAR EAST

OFFICE PROJECTS

ETIP

PSED

BEST

ETP

REAT

EEP

GLEEM

PEET

PROGRAM OVERVIEW

The Agency for International Development's (A.I.D.) Office of Energy and Infrastructure plays an increasingly important role in providing innovative mechanisms and approaches for solving the growing energy and environmental crisis in A.I.D.-assisted countries. Situated in A.I.D.'s Research and Development Bureau, the Office helps to set energy policy direction for the Agency, while making its projects available to meet the generic and short-term needs of A.I.D.'s field offices in assisted countries.

Three problems drive the Office's programs: high rates of energy demand and economic growth accompanied by a lack of energy, especially power in rural areas; financial problems, including a lack of investment capital, especially in the electricity sector, and growing energy-related environmental threats, especially global climate change, acid rain, and urban air pollution.

To address these problems the Office of Energy and Infrastructure leverages financial resources of multilateral development banks such as the World Bank and the regional development banks, the private sector, and bilateral donors to increase energy efficiency, expand energy supplies, and enhance the role of private power. The Office strategy involves implementing novel energy sector approaches through research, adaptation, and innovation. These approaches include improving power sector investment planning ("least-cost" planning) and encouraging energy sources. Promotion of greater private sector participation in the power sector and a wide-ranging training program also help to build the institutional infrastructure necessary to sustain cost-effective, reliable, and environmentally sound energy systems that are integral to broad-based economic growth.

Much of the Office strategy focuses on abatement of the increasingly severe environmental problems associated with the energy cycle, especially those involving fossil fuels, which pollute land and water during the extraction stage and cause atmospheric degradation--air pollution, acid deposition, and global CO₂ buildup--principally from power plant emissions during the conversion process. The Office's environmentally related assistance efforts have also anticipated and supported recently enacted congressional legislation directing the Office and A.I.D. to undertake a "Global Warming Initiative" to mitigate the increasing contribution of key developing countries to greenhouse gas emissions. This strategy includes the following elements: expanding least-cost planning activities conducted in collaboration with the multilateral development banks to incorporate environmental concerns; increasing support for feasibility studies in renewable energy, end-use energy efficiency, and cleaner fossil energy technologies that focus on site-specific commercial applications; launching a multilateral global energy efficiency initiative; and enhancing training of host country nationals and A.I.D. staff in areas of energy that can help to reduce expected global warming and other environmental problems.

To pursue all of its activities, the Office of Energy and Infrastructure implements the following projects that are described in succeeding pages:

- The Energy Policy Development Conservation Project (EPDAC)
- The Biomass Energy Systems and Technology Project (BEST)
- The Renewable Energy Applications and Training Project (REAT)
- The Private Sector Energy Development Project (PSED)

- **The Energy Training Project (ETP)**
- **The Energy Technology Innovation Project (ETIP)**
- **The Energy Efficiency Project (EEP)**

The following projects are under development:

- **The Global Energy and Environmental Management (GLEEM)**
- **The Project for Environmental Energy and Technology (PEET)**

PROJECT TITLE: BIOMASS ENERGY SYSTEMS AND TECHNOLOGY (BEST)

PROJECT NO: 936-5737
DURATION: 5/89 - 6/30/96

CONTRACTOR: Winrock Internacional
CONTRACT NO: DHR-5737-A-00-9058

SERVICES AVAILABLE: Industry assessments, feasibility studies, technical assistance, field trials, information dissemination.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$22 million **BUY-IN CAPACITY:** \$10 million

BENEFICIARIES: Energy consumers, biomass producers, utility companies/systems, industry planners.

PURPOSE: To identify and reduce the technical, economic, financial, and institutional risks of investments using biomass for the production of electricity and liquid fuels in LDCs.

DESCRIPTION: BEST funds project assessments, applied research and development, and cooperation with private companies in developing countries in order to generate electricity from the residues of common agricultural crops--sugarcane wastes and rice residues--and wood wastes of forest product industries. The project promotes the use of commercial technology and systems developed and proven in the United States.

ACCOMPLISHMENTS: Sugar industry private power generation activities are ongoing in India, Indonesia, Costa Rica, the Philippines, Honduras, Jamaica, Brazil, and Thailand. BEST staff have completed over 12 industry diversification and project investment analyses since 1988. The project is also currently studying the design of electricity pricing and interconnection requirements in Guatemala and Costa Rica. Since 1991, cost-shared feasibility and pre-feasibility studies with private consortia have been the fastest growing area of BEST's energy work in the sugar industry. As a direct result of BEST work, sugar mills in Costa Rica and Thailand are now exporting power produced from sugarcane residues to the national utilities in each country.

Wood waste-to-energy projects are being developed in Indonesia, India, Honduras, and Costa Rica. BEST industry assessment work in the Honduras forest products industry is being followed up by new energy efficiency and electricity project development at least one sawmill operation. Electricity generation from rice residues and municipal solid waste is being pursued in India and the Dominican Republic. Pollution control and energy production from animal wastes are being evaluated at a number of industrial swine and cattle farms in the Philippines.

BEST offers financial assistance to private companies that wish to share the cost of feasibility study for biomass energy investments. In order to address potential in a number of countries leading the market for biomass and renewable energy, BEST has established project preparation offices in Costa Rica and Indonesia, and has plans for other key countries. BEST has co-funded thirteen feasibility and pre-feasibility studies, representing about 120 MW of potential capacity, and has over twenty proposals in nine countries under active consideration.

Lastly, BEST has helped launch a new autonomous not-for-profit investment fund for renewable energy and environmental protection projects, the Environmental Enterprises Assistance Fund (EEAF). With A.I.D. and private donor support, EEAF is established to provide loans, equity, and business planning assistance to environmentally responsible investments in developing countries.

*includes buy-ins

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U.S. Environmental Protection Agency
Princeton University Center for Energy and Environmental Studies
Yale University Tropical Resources Institute
Hawaiian Sugar Planters Association
Biomass Users Network
Inter-American Development Bank
The World Bank
Kasetsart University Research and Development Institute (Thailand)
Rockefeller Foundation
COPERSUCAR (Brazil sugar cooperative)

OTHER COOPERATING A.I.D. BUREAUS AND OFFICES

Research and Development Bureau, Office of Environment and Natural Resources
(R&D/ENR),
Office of the Science Advisor

PROJECT TITLE: ENERGY POLICY DEVELOPMENT AND CONSERVATION (EPDAC)

PROJECT NO: 936-5728

DURATION: 10/82 - 7/92

SERVICES AVAILABLE: Technical assistance, workshops, training.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$37.17 million **BUY-IN-CAPACITY:** \$11.94 million

BENEFICIARIES: Host-country energy planners, utility planners, private-sector suppliers of energy technologies, LDC energy users.

PURPOSE: To help A.I.D.-assisted countries achieve substantial energy savings and accompanying environmental benefits now and to develop a local institutional capability to continue such efforts in the future.

EPDAC is divided into two sub-projects:

1. The Energy Planning and Policy Development Project (EPPD)
2. The Energy Conservation Services Project (ECSP)

EPPD and ECSP are closely interconnected. Currently, they are cooperating on a comprehensive assessment of efficiencies in the power sector in Costa Rica, within the context of least-cost investment planning. These sub-projects are described on the following pages.

*includes buy-in

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Princeton University Center for Energy and Environmental Studies
The World Bank
The Inter-American Development Bank
IIEC (International Institute for Energy Conservation)
Oak Ridge National Laboratory

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Bureau for Asia, Office of Technical Resources (ASIA/TR)
Bureau for Europe, Office of Development Resources (EUR/DR/EI)
Bureau for Latin America and The Caribbean (LAC/TR)
Bureau for the Near East, Office of Development Resources (NE/DR)
Bureau for Private Enterprise (PRE)

EPDAC Subproject 1: ENERGY PLANNING AND POLICY DEVELOPMENT (EPPD)

CONTRACTOR: International Development and Energy Associates (IDEA)
CONTRACT NO: DHR-5728-C-00-9074

CONTRACTOR: Oak Ridge National Laboratory
CONTRACT NO: DHR-5728-P-ER-7008

DESCRIPTION: The major strategic goal of the Energy Planning and Policy Development project is the implementation of solutions and approaches in LDCs that help mitigate environmental impacts of power development, promote least-cost power sector planning, and accelerate the adoption of related energy efficiency measures in power sector supply and end-use sectors. The predominant emphasis is on investment portfolio designs and policy decision-making processes, with special attention given to implementation, as opposed to isolated analyses. Implementation of the project's themes employs a country-oriented power sector strategy.

ACCOMPLISHMENTS: EPPD promotes improved donor coordination through the Multi-Agency Group on Power Sector Innovation (MAGPI). Active MAGPI projects include several activities supported by A.I.D./India: the Energy Management Consultation and Training (EMCAT) project, a \$20 million power sector efficiency program that will leverage approximately \$1.2 billion in multilateral development bank loans; a long-term power sector appraisal; and the development of an end-use energy efficiency technology menu. Other areas of collaboration include analyzing environmental impacts of increased coal use and providing innovative ways to finance more efficient and environmentally benign technologies. The project actively supports the Stockholm Initiative on Energy, Environment, and Sustainable Development (SEED), an endeavor that includes key decision-makers in developing countries and representatives from multilateral and bilateral organizations to promote a comprehensive strategy for meeting power demand with energy efficiency as the centerpiece. EPPD is also collaborating with A.I.D. Missions on projects such as the Program for the Acceleration of Commercial Energy Research (PACER), a Mission-funded activity in India to promote research and development of commercial technologies.

The project is developing methods of integrating environmental criteria into energy investment planning through activities such as the development of an environmental manual for power development and least-cost planning methods for use under capital constraints. A comprehensive least-cost investment planning project in Costa Rica is complete, and another project in Guatemala has been initiated. Additional accomplishments include a collaborative study with the World Bank on improving the organizational and management performance of LDC electric utilities and an integrated coal gasification combined cycle feasibility study, expected to lead to a \$35 million demonstration project in India.

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EPDAC Subproject 2: ENERGY CONSERVATION SERVICES PROGRAM (ECSP)

CONTRACTOR: RCG/Hagler, Bailly, Inc.
CONTRACT NO: DHR-5728-C-00-7014-00

DESCRIPTION: The Energy Conservation Services Program (ECSP) works to achieve an immediate and substantial reduction in energy waste in A.I.D.-assisted countries and to improve the efficiency of energy use. By increasing the output produced with the same energy cost input, energy conservation promotes economic efficiency and improves the productivity and competitiveness of energy-consuming enterprises. This improvement encourages and accelerates sustained economic growth and development. Energy conservation is an excellent vehicle for enhancing private-sector development and can alleviate both the growing shortage of power supply and the capital constraints to building new generating capacity and other energy production and transformation units, such as petroleum refineries. Improving the efficiency of energy use also has the important environmental benefit of reducing combustion emissions.

The ECSP strategy is to use the private sector as a vehicle for energy conservation programs and to target initiatives in industry and electric power generation that offer the greatest potential for immediate substantial benefits. Selected ECSP activities will also be carried out in the large building and transport sectors.

Under this project, R&D/EI provides A.I.D.-assisted countries and USAID Missions with eight types of services. These are: 1) Energy Conservation Assessment and Planning; 2) Energy Conservation Policy Analysis; 3) Energy Conservation Program and Project Design and Evaluation; 4) Research and Development; 5) On-site Technical Assistance; 6) Training; 7) Support Services for Financing and Implementation of Conservation Projects; and 8) Information Development and Dissemination.

ACCOMPLISHMENTS: ECSP introduced the concept of comprehensive national energy conservation programming to developing countries. National energy conservation programs were established as a direct result of ECSP involvement in Pakistan (\$15 million), Egypt (\$50 million), and the Philippines (\$5 million). Through ECSP projects, A.I.D. has been at the forefront of private power development in A.I.D.-assisted countries and has helped many countries develop policy frameworks and legislation that promote private power. More recently, ECSP has introduced the concept of demand-side management (DSM) to electric utilities in developing countries and is currently conducting nationwide DSM assessments in Costa Rica, Mexico, Guatemala and Indonesia. ECSP has also been a leader in promoting increased technology cooperation and trade between U.S. firms and developing countries in the areas of energy efficiency and energy-related environmental products and services. ECSP currently operates a data base of over 1,500 U.S. firms exporting or interested in exporting energy and environmental products and services to developing countries.

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Bureau for Latin America and the Caribbean, Office of Technical Resources (LAC/TR)
Bureau for the Near East, Office of Development Resources (NE/DR)
Bureau for Private Enterprise (PRE)

PROJECT TITLE: ENERGY EFFICIENCY PROJECT (EEP)

PROJECT NO: 936-5743
DURATION: 9/90 - 10/92

CONTRACTOR: To be determined.

SERVICES AVAILABLE: Technical assistance, information dissemination, training, and public education and awareness programs, energy audits and feasibility studies, policy development and institutional support, and technology demonstration in developing countries.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$40 million **BUY-IN CAPACITY:** \$20 million

BENEFICIARIES: Local energy consumers, developing country economies, and the global community.

PURPOSE: To implement activities in A.I.D.-assisted countries that will reduce energy consumption and CO₂ emissions and contribute to the reduction in global warming.

DESCRIPTION: Initial U.S. efforts will be used to introduce technologies related to load reduction, load control, and the monitoring of energy consumption. Demonstration efforts will be followed by widespread implementation of national-scale energy management and planning programs. Activities of EEP will be balanced over all four A.I.D. regions, focusing on those countries with the greatest need. Country selections will be based on economic development need, current levels of energy efficiency, level of expertise of counterparts and institutions, greenhouse gas emissions, and level of installed technology. The EEP will serve as a quick-reaction project, immediately responsive to requests for technical assistance from A.I.D. regional bureaus and Missions and host country governments.

CONTRACTORS/GRANTEES

To be determined.

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*Includes buy-ins

PROJECT TITLE: ENERGY TECHNOLOGY INNOVATION PROJECT (ETIP)

PROJECT NO: 936-5741

DURATION: 1991 - 2001

CONTRACTOR: Bechtel Corporation

CONTRACTOR NO: DHR-5741-C-00-1061

SERVICES AVAILABLE: Engineering services, U.S. energy conversion technologies, technology transfer and training, assessments of indigenous energy resources and energy system applications.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$20 million

BUY-IN CAPACITY: UNLIMITED

BENEFICIARIES: Energy and power sector institutions and their industrial, commercial, and residential consumers.

PURPOSE: ETIP and the complementary Energy Technology Innovation Fund (ETIF) have been designed to be independently managed activities that promote public sector energy technology innovation in A.I.D.-assisted countries. ETIP assists developing countries in the implementation of innovative energy technologies and methodologies to help meet increased energy/power sector demand in an environmentally benign and cost-effective manner. ETIF will provide direct assistance for public sector energy project development.

DESCRIPTION: Through ETIP, U.S. energy technology innovations and management approaches are applied to assist countries by: 1) conducting technical assessments and feasibility studies that address technical, economic, financial, and environmental issues related to specific energy projects; (2) providing technical assistance to improve the efficiency and effectiveness of energy sector management and operation; (3) catalyzing technology transfer and investment in energy projects; and, (4) providing guidance on institutional improvement and policy dialogue, particularly from the perspective of the U.S. energy industry, and will provide a vehicle for reducing risks associated with implementing specific public sector energy projects in A.I.D.-assisted countries.

Technologies and methodologies will be chosen on a country-specific basis for their applicability to indigenous energy resources, improvement of existing systems throughout the power sector, minimum impact on the environment, and effect on economic sustainment within the specific conditions of a developing country.

ACCOMPLISHMENTS: Recently established, ETIP's initiative is to provide technical assistance to A.I.D.-assisted countries. In the ASEAN region, seminars and a trade mission, co-sponsored by the Office of Energy and the Department of Energy, are increasing the awareness of operational benefits of Clean Coal Technology (CCT). A natural gas utilization study was conducted in key global warming countries to target the nations most likely to benefit from using natural gas as a source for fuel. Pre-feasibility studies were then conducted to assess commercialization plans for each country. In the Philippines a power plant availability and improvement study identified the potential increase of over 400 MW from existing facilities. In Egypt the uses of shale oil for direct combustion to generate electricity are being assessed. Positive findings may lead to commercial-scale demonstration.

*includes buy-ins

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U.S. Department of Energy
U.S. Department of Commerce
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U.S. Trade and Development Program
U.S.-ASEAN Council for Business and Technology, Inc.
U.S. Chamber of Commerce
U.S. Energy Association

OTHER COOPERATING A.I.D. BUREAUS AND OFFICES

Bureau for Africa (AFR)
Bureau for Asia, Office of Technical Resources (ASIA/TR)
Bureau for Europe, Office of Development Resources (EUR/DR/EI)
Bureau for Near East, Office of Development Resources (NE/DR)
Bureau for Private Enterprise (PRE)

PROJECT TITLE: ENERGY TRAINING PROGRAM (ETP)

PROJECT NO: 936-573
DURATION: 3/87 - 9/30/92

CONTRACTOR: Institute of
International Education (IIE)
CONTRACT NO: DHR-5734-Z-00-7024

COOPERATIVE AGREEMENT: United
States Energy Association (USEA)
COOPERATIVE AGREEMENT NO:
DHR-5734-A-00-009

SERVICES AVAILABLE: Training

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$37 million **BUY-IN CAPACITY:** \$22 million

BENEFICIARIES: Trainees, energy producers and consumers.

PURPOSE: To provide training for energy/environmental professionals from developing countries in how best to identify, utilize, and manage their energy resources.

DESCRIPTION: The Energy Training Program designs energy-related training activities and study tours to meet the specific needs of governmental, parastatal, and private employers in developing nations. Courses range from energy planning to petroleum management to utility engineering and energy efficiency improvement and typically last from two to seven months. A small percentage of Mission-funded trainees pursue Master of Science programs at American universities. The courses emphasize the "hands on" approach in actual work settings. Participants are encouraged to bring data from their own countries to work on so that they may return home with a realistic, workable solution to some aspect of their country's energy problem. Participants are required to return home immediately after completion of their program in order to put their newly gained knowledge and skills to use in their own countries.

ACCOMPLISHMENTS: To date, ETP has trained 1,800 participants from 75 countries. A total of 1,236 have graduated from ETP scheduled courses, 152 have received M.S. degrees in a specialized field of energy or environment, 158 from other training institutions, 116 had industrial internships and 138 participated in ETP workshops/forums. An additional 100 participants completed seven study tours in advanced energy technology, utility regulations, and private investment and finance for the energy industry.

During 1991, the program provided training for 343 energy and environment professionals from developing countries.

* includes buy-ins

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U.S. Department of Energy
U.S. Environmental Protection Agency
The World Bank
U.S. Energy Association Members

OTHER COOPERATING A.I.D. BUREAUS AND OFFICES

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Bureau for Europe, Office of Development Resources (EUR/DR/EI)
Bureau for Latin America and the Caribbean, Office of Technical Resources (LAC/TR)

PROJECT TITLE: PRIVATE SECTOR ENERGY DEVELOPMENT (PSED)

PROJECT NO: 936-5738
DURATION: 3/89 - 9/30/94

CONTRACTOR: K&M Engineering and
Consulting Corporation
CONTRACT NO: DHR-5738-C-00-1088-00
CONTRACTOR: Price Waterhouse
CONTRACT NO: DHR-5738-C-00-0097

SERVICES AVAILABLE: Technical assistance, policy dialogue, workshops and seminars, information dissemination

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$15.34 million **BUY-IN CAPACITY:** \$5.58 million

BENEFICIARIES: Private sector energy providers, developing country utilities, energy consumers.

PURPOSE: (1) To remove policy and institutional barriers to private-sector energy development; and (2) to provide direct assistance in energy project development.

DESCRIPTION: Concentrating on electric power, the PSED Program helps selected developing countries create an environment that encourages the private ownership, financing, and operation of energy facilities. The program offers a wide range of technical assistance and information dissemination activities for developing country government and utility officials. These activities include conducting conferences, workshops and study tours, providing experts to solicit and evaluate projects, drafting and negotiating private power contracts, determining the price for privately produced electricity, packaging private power project financing, managing a private power database, publishing a private power newsletter, and providing feasibility study funding.

ACCOMPLISHMENTS: The PSED Program has provided technical assistance to the governments of Indonesia, India, Mongolia, Bangladesh, the Philippines, Morocco, Kenya, Jordan, Costa Rica, Guatemala, Panama, the Dominican Republic, Jamaica, El Salvador, Colombia, and Bolivia. In addition, the PSED Program conducted conferences and workshops for the Latin American/Caribbean and the Asia/Near East regions to facilitate the exchange of ideas and experiences on energy conservation and private power generation and to encourage private sector investments in these areas. Study tours were conducted for delegations from the Philippines, Morocco, Egypt, Pakistan, Indonesia, and El Salvador to provide an overview of the legal, institutional, regulatory and financial requirements of private sector participation by visiting appropriate private energy/power facilities, utilities and regulatory bodies in the United States. The PSED Program has also assisted countries to develop legislation to facilitate private power generation.

The project also assists the private sector through its Private Sector Energy Development Feasibility Study Fund. The Fund assists developers in managing the front-end costs and risks of developing privately owned and operated energy projects by sharing the cost of conducting feasibility studies for those projects. To date, feasibility study funds have been awarded for seven projects in the Dominican Republic, Costa Rica, Turkey, Poland and Jamaica.

*includes buy-ins

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U.S. Department of Commerce
U.S. Department of Energy
U.S. Trade and Development Program
The World Bank

OTHER COOPERATING A.I.D. BUREAUS AND OFFICES

Bureau for Asia, Office of Technical Resources (ASIA/TR)
Bureau for Europe, Office of Development Resources (EUR/DR/EI)
Bureau for the Near East, Office of Development Resources (NE/DR)
Bureau for Private Enterprise (PRE)

PROJECT TITLE: RENEWABLE ENERGY APPLICATIONS AND TRAINING (REAT)

PROJECT NO: 936-5730
DURATION: 7/85 - 9/3/94

CONTRACTOR: International Development and Energy Associates, Inc. (IDEA)
CONTRACT NO: DHR-5728-C-00-9074
CONTRACTOR: U.S. Export Council for Renewable Energy (US/ECRE)
CONTRACT NO: Cooperative Agreement DHR-5730-A-00-0086

SERVICES AVAILABLE: Renewable energy project identification, design, preparation for financing, and development, education and training, economic and technical evaluation, trade mission support, and provision of educational and promotional information on technologies, applications, and U.S. vendors.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *10.2 million **BUY-IN CAPACITY:** \$2.0 million

BENEFICIARIES: Developing country professionals and energy users, including urban electric utilities and rural populations in non-electrified regions, and renewable energy industry in U.S. and host country.

PURPOSE: To promote and assist in the application of economically and environmentally sustainable renewable energy technologies in the developing countries.

DESCRIPTION: The REAT project promotes the use of cost-effective renewable energy technologies and applications utilizing hydro, geothermal, solar insolation, and wind resources (biomass powered technologies are addressed by the BEST project), with an emphasis on private-sector participation. REAT assists in the identification of "bankable" commercial schemes and will cost-share pre-investment studies that can leverage project financing and implementation. REAT also works with host-country government institutions, the A.I.D. missions, and private sector interests to design, develop, and evaluate renewable energy projects and programs that will lead to large-scale procurement or application of specific technologies. REAT supports host-country participation in trade missions and training programs in the U.S. and supports U.S. industry trade missions to developing countries. REAT is implemented by R&D/EI staff with the assistance of several contractors and through a Cooperative Agreement with the U.S. Export Council for Renewable Energy, which was formed by U.S. Government agencies and the private sector to assist the renewable energy industry to more effectively reach the international market.

ACCOMPLISHMENTS: During 1991, REAT supported the establishment and financing of various mechanisms for the preparation of project pre-investment studies. These mechanisms include the International Fund for Renewable Energy and Efficiency (IFREE), which will cost-share project pre-feasibility and feasibility studies, the Environmental Enterprises Assistance Fund (EEAF), which provides equity for project development, and the Renewable Energy Project Support Office (REPSO), which will support project design and pre-investment work in Costa Rica and in Indonesia. REAT is cooperating with the national utility in Costa Rica to evaluate a utility-scale wind farm and to prepare a proposal to the World Bank Global Environment Facility for financing of the project. REAT is assisting a U.S./Indian private sector joint venture to develop markets for solar photovoltaic technologies in India and is working with a renewable/diesel hybrid system manufacture to gain access to rural electrification markets in Indonesia. REAT published a case study, including a set of lessons learned, of the implementation of wind electric water pumping project in Morocco.

*includes buy-ins

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Committee on Renewable Energy Commerce and Trade
Volunteers in Technical Assistance
National Renewable Energy Laboratory
National Rural Electrification Cooperative Association

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PROJECT UNDER DEVELOPMENT

PROJECT TITLE: GLOBAL ENERGY AND ENVIRONMENTAL MANAGEMENT (GLEEM)

PROJECT NO: 936-5744

DURATION: 1992 - 2000

SERVICES AVAILABLE: Pre-investment studies, workshops, trade missions and reverse trade missions, training, and technical assistance in energy technology selection, energy sector assessments, and loan portfolio design.

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: *\$40 million (proposed) **BUY-IN CAPACITY:** \$20 million

BENEFICIARIES: This project will benefit private sector institutions as well as industrial, commercial and residential consumers. Developing countries will benefit from reduced debt burdens, improved energy services, an enhanced environment, and a modern productive industrial sector.

PURPOSE: To promote sustainable development through economically sound energy strategies compatible with local and global environmental stability.

DESCRIPTION: Developing nations face a daunting triple-bind in meeting their energy needs for economic development. The capital requirements of \$100 billion annually to meet power demands far exceed the capital available. Many developing country energy institutions exhibit deteriorating financial performance. The local and global environmental impacts of energy projects require innovative technologies, policy, institutional and financing approaches.

GLEEM will promote environmentally sustainable economic growth through:

- Strengthening and expanding donor collaboration
- Adopting least-cost power investment planning approaches
- Promoting sound environmental management practices in the energy sector
- Improving the institutional performance of electric power systems in developing countries
- Developing and strengthening technology innovation and commercialization programs

*includes buy-ins

CONTRACTORS/GRANTEES

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PROJECT UNDER DEVELOPMENT

**PROJECT TITLE: PROJECT FOR ENVIRONMENTAL ENERGY AND TECHNOLOGY
(PEET)**

PROJECT NO: 936-5745

DURATION: 1993 - 2002

SERVICES AVAILABLE: Technical assistance and training, technology cooperation and commercialization, policy and institutional development. For environmental projects that have already been identified, experienced engineers, business and financial analysts and other professionals will conduct cost/benefit analyses, environmental impact analyses, feasibility studies and engineering design studies

GEOGRAPHIC SCOPE: Global

LIFE-OF-PROJECT BUDGET: \$19 million **BUY-IN CAPACITY:** To be determined.

BENEFICIARIES: Direct beneficiaries will be engineers in industry and energy companies, environmental managers in urban government and the private sector, plant managers and policy makers. Local citizenry.

PURPOSE: The purpose of PEET is to establish a program in selected countries to reduce industrial and urban pollution by means of sound environmental programs.

DESCRIPTION: The project will provide assistance through technical assistance and training, technology cooperation and commercialization, and policy and institutional development. Technical assistance and training will be provided to industries and other concerned parties to develop projects that mitigate the environmental effects of industrial processes and urbanization.

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To be determined

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PUBLICATIONS

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Assessment of Integrated Coal Gasification Combined Cycle Technology for India. May 1988. R&D/EI Report No. 88-06. Document No. PN-AAZ-893.

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Electricity and Ethanol Options in Southern Africa. September 1988. R&D/EI Report No. 88-21. Document No. PN-ABB-540.

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James B. Sullivan - Director

Dr. James B. Sullivan is Director of the Research and Development Bureau's Office of Energy and Infrastructure. Dr. Sullivan joined A.I.D. in 1982 as an energy consultant in Pakistan and assumed his present position in 1986. Previously he was with the U./S. Environmental Protection Agency and joined the U.S. Office of Technology Assessment, working on energy technology and environmental issues. Dr. Sullivan founded the Center for Science in the Public Interest and served as co-director from 1970 to 1976, directing projects on a variety of energy and environmental issues. Dr. Sullivan graduated from Manhattan College with a degree in Civil Engineering. He holds a master's degree from New York University and a doctorate in geophysical fluid dynamics from the Massachusetts Institute of Technology.

Alberto J. Sabadell - Deputy Director

Mr. Alberto Sabadell worked with the MITRE Corporation on advanced fossil fuel technologies and with AeroChem Research Labs on combustion research and air pollution instrumentation prior to joining the Office of Energy and Infrastructure in 1983. Mr. Sabadell was a professor of fluid mechanics at the National University of Buenos Aires in Argentina. Mr. Sabadell has more than 30 publications to his credit, including two patents, and currently serves on a National Academy of Sciences engineering panel. He holds a Chemical Engineering degree from the National University of Buenos Aires and an Aerospace Sciences degree from Princeton University. He is fluent in Spanish, French, Italian, and Catalan.

David J. Jhirad - Chief, Energy Resources and Planning Division

Dr. Jhirad directs programs on international energy, environmental policy and planning, and renewable energy applications and training. He received a bachelor of science degree in Physics and Applied Mathematics from Delhi University, B.A. and M.A. degrees in Physics from Cambridge University in England, and a doctorate in Physics from Harvard University, where he received the Bowdoin Prize for excellence in research. He has held senior scientific appointments at Brookhaven National Laboratory, the Jet Propulsion Laboratory, and the IBM Research Center and has taught courses in energy and the environment at Boston University and the University of Massachusetts. Dr. Jhirad chairs the Multi-Agency Group on Power Sector Innovation (MAGPI), co-chairs the Energy Working Group of the Indo-U.S. Science and Technology Subcommittee, serves on the Editorial Board of the Annual Review of Energy and Environment, and is a member of the Consultative Group for the World Bank (UNDP) Energy Sector Management Assistance Program. He is co-author of "Energy Strategies: Toward a Solar Future" and has written over 50 technical papers on energy and environmental policy, technology innovation, and advanced power technology.

Carolyn Kiser - Program Operations Specialist

Mrs. Kiser assists the program analyst in monitoring the administrative and budgetary functions of the Office. Specifically, she maintains the Project Control System computer database, and assists with the preparation of budget and program documents. Prior to her present position, Mrs. Kiser was secretary to the deputy director of the Office of Energy and Infrastructure and secretary to the director of the Office of Engineering. She is presently working toward an undergraduate degree in business management.

Ross Pumfrey - Energy Systems Analyst

Mr. Pumfrey concentrates on the office's renewable energy projects and on energy efficiency activities in Central America. He earned a bachelor of arts degree in Political Science from Occidental College, a master's degree in Energy and Resources from the University of California at Berkeley, and a master's in Latin American Studies from the Johns Hopkins University. He currently is improving his fluency in Spanish. Mr. Pumfrey has done energy policy analysis or development analysis for Oak Ridge National Laboratory, the Renewable Energy Institute, the International Institute for Environment and Development, and the Institute for Governmental Studies at the University of California at Berkeley. Prior to his involvement with energy development, he worked for several years as a political organizer, legislative aide, and administrator for non-profit advocacy groups.

Samuel Schweitzer - Chief, Energy Innovation and Private Sector Division

Dr. Schweitzer directs programs in energy technology innovation and serves as the Office's focal point for energy/environment activities in Central Europe. Prior to joining the Office of Energy and Infrastructure in 1984, Dr. Schweitzer worked at the U.S. Department of Energy where he managed a number of bilateral programs in renewable energy. He holds a bachelor's degree in Agricultural Engineering from the Massachusetts Institute of Technology and a doctorate in Thermal Sciences from Stanford University. Dr. Schweitzer has served on the faculty of Stanford University, the University of Pennsylvania, and Tel-Aviv University, where he established the School of Engineering. He has co-authored over 50 technical papers on Thermal Sciences and Technology. During 1987-1990, Dr. Schweitzer served as the Deputy Director of the Office of Energy and Infrastructure Technology and R&D at the International Energy Agency in Paris where he also headed the Energy Technology Studies Division.

Shirley A. Toth - Chief, Administration and Program Division

Ms. Toth has been a member of the office since its inception in 1978 and is currently responsible for overall management, supervision, and coordination of all administrative and programming elements of the office. This entails working closely with the technical staff in all phases of project development to ensure that the needs of the office, as well as those of the Regional Bureaus and Missions, are met. She also advises the Office Director and Deputy Director on solutions to budgetary and program-related problems and clears all actions pertaining to these areas before they are submitted for approval or action. In addition, she advises the Office Director and Deputy Director on the implications of changes in Agency policies and procedures in the office's portfolio.

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