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CARIBBEAN ENERGY ACTIVITIES SUPPORTED BY  
THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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DEVELOPMENT

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OVERVIEW OF AID PROGRAMS IN ENERGY

Reflecting President Reagan's Caribbean Basin Initiative, the countries of the Caribbean are a new major focus of the global energy assistance programs of the Agency for International Development. One compelling reason for the priority assigned to energy in this region was recognition that in many Latin American countries and in the Caribbean the price of commonly used fuels, ranging from petroleum imports to wood and charcoal, rose more than 700 percent in the past decade. In 1970 a 60 pound bag of coffee bought 30 barrels of oil. By 1980 it could pay for less than 3 barrels! In many countries of this region the poor in both cities and rural areas often must spend 20 to 50 percent of their average daily wage for fuelwood alone. As a consequence of this growing crisis in energy, A.I.D. established two major objectives for the region: to ease immediate energy constraints to development and to help countries make the difficult transition to a new mix of energy sources that can sustain their economies in the future.

This year worldwide AID expenditures in energy will run about \$90 million. This breaks down roughly into one-third for conventional energy, one-third for new and renewable energy sources, and one-third to support traditional fuel replenishment and development, particularly wood and charcoal. Of this amount, energy projects in Latin American and the Caribbean are funded at \$27.4 million this fiscal year. The figure does not include a substantial component that will be earmarked for new energy activities within the \$350 million supplemental appropriation that President Reagan has requested for this fiscal year and \$900 million for the region that the President last week submitted to Congress for the new fiscal year beginning in October, 1982.

ADDITIONAL RESOURCES FROM THE ENERGY OFFICE

In addition to the \$27.4 million for Latin America and the Caribbean, the central Office of Energy in A.I.D. has a budget of roughly \$10 million this year, some of which will be earmarked for this region. These funds and the institutions which use them

are designed to provide quick-response technical assistance to individual countries and institutions in fields such as exploration and development of new sources of conventional energy (coal, oil, gas, geothermal), experts for energy planning assistance, decentralized hydropower resource assessments and feasibility studies, and provision of technical assistance in other fields of renewable energy such as biomass, wind, and solar including photovoltaics.

In addition, the Office of Energy invests upwards of \$5 million each year in support to three training programs. With our financial assistance the University of Florida at Gainesville offers an intensive 15-week course for 40 developing country participants twice each year, treating a wide range of alternative energy technologies in lectures, demonstrations, laboratory work and field trips. The course is limited to those who have at least a bachelor's degree in science or engineering. We offer a seven-week course in energy planning and management at the Institute for Energy Research at the State University of New York at Stony Brook, Long Island in connection with the Brookhaven National Energy Laboratory. Last year we established a new long-term \$4.5 million training program administered by the Institute for International Education which offers to 100 students annually up to two years of graduate education at U.S. universities or equivalent internships in U.S. industry or research institutes in engineering, management and analytical experience in various fields of conventional energy. Students in this program are now at work in geology and geophysics, petroleum engineering, coal mining engineering, electrical engineering, energy resource planning and management, and hydroelectric power generation.

#### SIMPLE, LOW-COST ENERGY TECHNOLOGIES FOR THE RURAL POOR

The Energy Office also focuses on the provision of low-cost energy technology for the poor in both cities and remote areas through grants to the Volunteers in Technical Assistance (VITA) and the Peace Corps to train volunteers in simple energy technologies. These organizations are working on subjects such as low-cost wood stoves, charcoal kilns, wind-powered pumps, biogas digesters, and micro-hydro installations.

#### CARIBBEAN ENERGY PROGRAMS

The principal focus of AID efforts in energy throughout the Caribbean region is upon national energy planning with special attention to development of alternative energy systems. During the past four years we will have invested nearly \$8 million with the Caribbean Development Bank and CARICOM to conduct national energy assessments, conversion studies and to design, test, finance and distribute information on alternative energy technologies. We have financed projects such as a solar/wind resources study, an assessment of Belize peat deposits, energy assessments in Barbados, Antigua and Guyana,

and organized workshops on solar crop drying and mini-hydropower.

AID has just launched another Caribbean-wide activity involving about 25 separate projects designed to create employment opportunities in both the public and private sector. Much emphasis is placed upon stimulation of private enterprise particularly in the energy field where numerous opportunities exist for both coventures with foreign investors and new small business activities for indigenous entrepreneurs. This project is concentrating upon smaller countries such as Antigua, Dominica, St. Lucia, St. Kitts/Nevis, St. Vincent, Montserrat and Barbados.

AID is channeling technical and financial support through bilateral projects with other states in the region. In Costa Rica we are in the process of setting up a nursery to produce one million fast-growing trees each year. More than 1,000 hectares will be planted in farm woodlots by reforesting steep marginal grazing land. We are also strengthening energy planning in that country and conducting feasibility studies on alcohol fuels, industrial energy efficiency, small-scale hydropower and use of excess capacity.

A National Plan for Energy is being developed in the Dominican Republic with our assistance. The Management and technical skills of the National Energy Commission are being upgraded and short technical courses on energy subjects are offered. An energy information system is being built up. An additional \$11 million is projected for the Dominican Republic to help in formulating national energy investment and pricing plans, to help industry switch to more efficient energy conversion machinery, to exploit small-scale water resources, and to improve the management skills of the Dominican Electricity Corporation.

A.I.D.'s overriding concern in Haiti is in agro-forestry and the management of rapidly diminishing natural resources. A new agro-forestry program costing \$5 million has set a target of 9 million tropical trees, including five species--laucaena, neem, cassia, eucalyptus, and casuarina. Tree seedling nurseries are being planted in modern greenhouses. Tree planting is aimed at soil conservation, production of firewood and generation of income for the rural and urban poor. In Haiti this past week we observed an innovative commercial approach to the charcoal problem. Several years ago a Haitian entrepreneur purchased a briquetting machine from Chicago for about \$60,000. He discovered that a mix of 60 percent charcoal dust, which he obtains without charge from kilns near Port-au-Prince, and 40 percent molasses as a binder which he buys cheaply from the local sugar mill, makes an effective briquette which can be sold at about 60 percent of the price of equivalent charcoal. He secures bagasse from of charge to heat the ovens to dry the briquettes. Until this past week, he exported much of his

production to Puerto Rico, but now the Haiti domestic market is absorbing his total production. Since charcoal sells for \$5.00 for a 30 kg bag in Port-au-Prince, he should continue to sell his full production in Haiti and make a reasonable profit.

In Jamaica A.I.D.'s energy sector assistance of \$14 million is aimed at increasing the efficiency of industrial energy use, developing solar water heating, and improving the government's capability to plan and manage energy development. We are also testing species of fuelwood in Jamaica and initiating demonstration and pilot activities in various alternative energy technologies.

A.I.D. funds a number of programs in agro-forestry, rural energy technologies, small hydroelectric power and other renewable energies in Ecuador, Honduras, Peru, Guyana and Panama.

#### NEW RESEARCH FUNDS

Let me touch upon two favorite subjects which I am confident will be of interest-- funds for research and bioenergy program assistance. New A.I.D. funds exist to underwrite promising research work in developing countries. Our Science Adviser's Office in A.I.D. awards several million dollars each year in research grants in a wide range of development areas including energy. We also channel about \$5 million each year to enable the (U.S.) National Academy of Sciences to administer a separate program of research awards. Both programs seek research topics which involve collaborative studies between U.S. and developing country research institutions and universities. Grants have been ranging from about \$35,000 to \$150,000 and usually extend for more than one year.\*

#### CENTRAL PROGRAM ON BIORESOURCES

About \$1 million each year is provided under a Participating Agency Services Agreement to the U.S. Forest Service in our Bioenergy Systems and Technology Program. Its principal objective is to support overseas A.I.D. missions to develop projects. We look upon bioenergy production as the product of an integrated system that involves the identification and production of feedstocks and the design and adaptation of conversion technologies.

\* For further information on the Science Adviser's Program of Research Grants, write to Dr. Irving Asher, Deputy Director, Office of the Science Adviser, A.I.D., Washington, D.C. 20518. For details and information on submission of proposals to the National Academy of Sciences, write to Dr. Michael Greene, Director, Committee on Research Awards, BOSTID, National Academy of Sciences, 2101 Constitution Avenue, N.W. Washington, D.C., 20418.

Let me cite a few examples of Latin American activities sponsored under the bioresources program. In Costa Rica, an assessment of biomass energy options was made including production of ethanol to replace petroleum-based fuels in transportation as well as analyses of biogas, charcoal and gasifiers. In Ecuador our concentration is upon use of fuelwood, crop residues, manures and municipal wastes. In the Dominican Republic we have examine small and large-scale woodfuel planting possibilities as well as charcoal production and gasification. A study was made of the equipment requirements for construction of wood-fueled steam electric generating plant at Yaviza in Panama.

Under our agreement with the U.S. Forest Service a series of 14 state-of-the-art studies were produced which have been collected in a Bioenergy Conversion Handbook for Developing Countries. Ten additional reports are in preparation which can be added to the loose-leaf binder as they are published. Copies of the Handbook should be available for distribution without charge. The bioenergy program is also publishing a new quarterly magazine called Bioenergy Systems Report with technical data and case material. Those interested can ask to be placed on the mailing list.

#### ENERGY STUDIES

Many of you are familiar with the impressive series of publications on technological innovation produced by the Board on Science and Technology for International Development of the National Academy of Sciences. A number of studies on energy and bioresources have been prepared and published in recent years. They include booklets on energy for rural development, including a new supplementary edition, methane generation from human, animal and agricultural wastes; leucaena, firewood crops; microbial processes; food, fuel and fertilizer from organic wastes; producer gas; sowing forests from the air; and the proceedings of a workshop on energy survey methodologies. Several new studies are in process, including the potential of alcohol fuels, and on tree crop species such as acacia mangium, calliandra and casuarina. Those interested in having copies mailed should leave a slip of paper with me with name and address together with title of the studies desired.

The Office of Energy hopes that it will be possible, as it has in the past, to make use of the outstanding technical resources and experience of the Center for Energy and Environment Research, not only for our activities in the Caribbean and Latin America, but in other regions as well. The Center deserves warm congratulations for helping to organize and carry out the symposium and workshop which have attracted an impressive number of high-quality scientific and policy papers. I wish to extend our very sincere appreciation to Dr. Bonnet, Dr. Alexander and other members of the Center faculty and staff who have made our participation so enjoyable and productive.