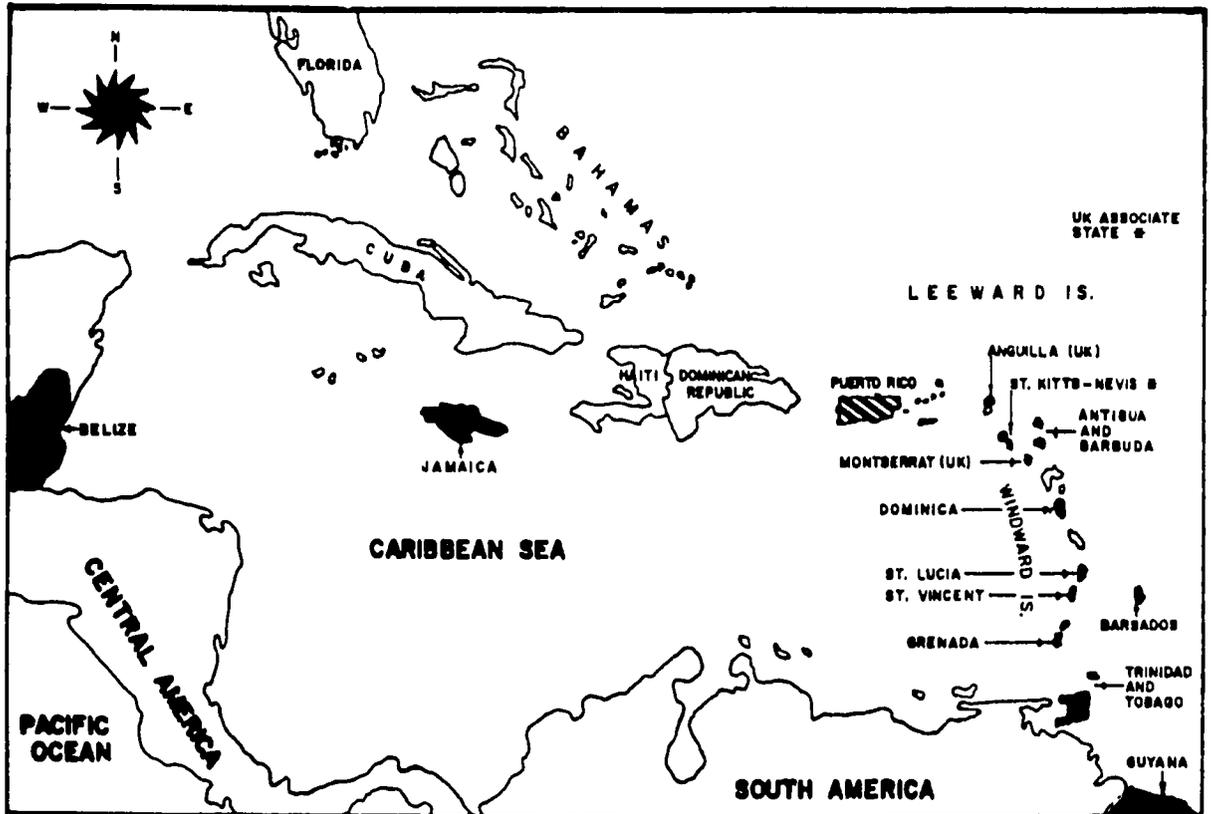


EVALUATION OF THE CARIBBEAN ALTERNATIVE ENERGY  
SYSTEMS PROJECT AND TECHNOLOGY COMPONENT OF  
THE EMPLOYMENT/INVESTMENT PROMOTION PROJECT



EXECUTIVE SUMMARY

SUBMITTED TO  
CARIBBEAN COMMUNITY SECRETARIAT  
GEORGETOWN, GUYANA  
CARIBBEAN DEVELOPMENT BANK  
WILDEY, ST. MICHAEL, BARBADOS, W.I.  
U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT  
BARBADOS, W.I.



CENTER FOR ENERGY AND ENVIRONMENT RESEARCH  
UNIVERSITY OF PUERTO RICO — U.S. DEPARTMENT OF ENERGY

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**December 1981**

**Submitted to**

**Caribbean Community Secretariat  
Georgetown, Guyana**

**Caribbean Development Bank  
Wildey, St. Michael  
Barbados, W.I.**

**U.S. Agency for International Development  
Barbados, W.I.**

## EXECUTIVE SUMMARY

Two years ago, the Caribbean Community Secretariat (CARICOM), the Caribbean Development Bank (CDB), and the United States Agency for International Development (USAID) undertook a joint venture to establish an institutional capability in the Caribbean Region for carrying out energy planning, including conducting country energy needs assessments, and for designing, testing, adapting and disseminating alternative energy technologies. This project, of five years duration, is described in the Caribbean Regional Project Paper-Alternative Energy Systems (AID/CAC/P-027, Project No. 538-0042).

The ultimate goal of the Project is to reduce the dependency on imported petroleum which is hampering the development of the Region. For effective action, solutions to this problem must be sought on both the national and regional levels, not only to compensate for the size of the countries involved but also to take advantage of their close relationships and many mutual interests.

As required by the Project Paper (p. 77), the Project must be evaluated at the end of its second and fifth years. The Center for Energy and Environment Research (CEER) of the University of Puerto Rico was contracted to make the year two evaluation. The following is a summary of the report made by a four-member team from CEER in fulfillment of the contract. The CEER report is based on information gained during visits to nine CARICOM countries including Antigua, Barbados, Belize, Grenada, Guyana, Montserrat, St. Kitts-Nevis, St. Vincent, and to the University of the West Indies in Trinidad and Tobago. Information was also gathered from documents and written communications, from more than 50 interviews, from the Project Paper itself, and from first hand inspections of the different energy projects.

The evaluation covers both the Project as a whole and each of the four components or "programs" into which it is divided, which were analyzed in detail. The Policy program and the Training program are the responsibility of CARICOM; the Technology and Energy program and the Communications and Information program are the responsibility of the CDB. In addition, the Technology Research Fund of the CDB, a separate but related project, was also evaluated by the CEER team.

The chapters dealing with these programs have four major sections. The first section considers progress towards program objectives and comments on the validity of the original assumptions made in the Project Paper. The adequacy of technical and financial inputs for the regional and national constraints on attainment of program objectives are also evaluated. The second section considers the effectiveness of the administrative and operational procedures of the corresponding organization with responsibility for the program. The third section discusses the impact of subprojects and other specific activities under the program. The last section contains specific recommendations to

improve program activities and attainment of program objectives. Brief considerations of the Project as a whole and each program follows.

The countries of the Region obviously have a serious energy problem which can only be solved by an approach which is at once fundamental, long-term, regional and sustained. Moreover, continuous institution building in the energy field, at both the national and regional levels, is an essential part of such an approach.

Conceptually, the Project Paper fully addresses the need for institution building. However, its specific objectives are unrealistic in number and scope. Moreover, funding especially for training, appears to be seriously inadequate. How inadequate cannot yet be determined, since at the time of the evaluation no effective reporting system for the financial management of Project activity by program supervisors existed in either CDB or CARICOM, and CARICOM did not provide the evaluation team with sufficient expenditure data on its Project activities. The existing system of reports is designed only to support requests for reimbursement to USAID and is not suitable for financial management of the project. In addition, all programs are behind schedule in implementation, especially the Training and Communications programs.

Nevertheless, the evaluation team believes that the Project is sound in basic concept, is badly needed by the Region, and is making progress in the face of considerable obstacles in terms of both institution building and the production of intermediate outputs such as assessments, reports and studies. Therefore, the team recommends, among other things, that the Project be continued with funding at least as great as currently budgeted; that communications, training and information activities be accelerated; and that CARICOM'S Energy Unit and CDB'S Technology and Energy Unit be made permanent parts of their respective organizations. Also, an adequate reporting system for Project financial management should be established immediately. With the output of this system, the Project's Energy Advisory Committee should take the lead in restructuring the Project to close the present gap between Project objectives and Project funding. The evaluation team understands the need to increase funding in some areas, but it also sees a need to bring objectives into line with reality by evaluating objectives and timetables. No major decisions should be made in this regard until adequate financial information is available on a regular basis.

Some of the other recommendations relating to the Project as a whole are the following:

(1) Notwithstanding the lack of financial information, it is possible to make the following recommendations as to primary budgetary priorities for the Project, assuming the present overall level of Project funding:

Priority #1

- (a) Energy needs assessments and supporting studies, including

energy conservation studies.

- (b) Resource assessments, such as wind, solar and biomass, which deal with obvious opportunities,
- (c) Training required to support the above,
- (d) Technology evaluations related to obvious opportunities.

Priority #2

- (a) Policy studies and other activities at a regional and national level, which follow from the energy needs assessments,
- (b) Technology evaluations and energy activities demonstrations recommended by completed studies,
- (c) Training required to support the above,
- (d) Communications and information activities, especially as related to the foregoing.

(2) CDB and CARICOM should continue to insist on an appropriate organizational recognition of energy and on an appropriate resource contribution by each country as conditions of participation in regional energy activities. However, the form of this recognition must vary from country to country. Similarly, agency assistance (by CDB and CARICOM) must continue to be "custom tailored" as well.

(3) Initially, national governments should give priority to the implementation of energy conservation measures:

- (a) Near-term results can be achieved with benefits for organizations and people, countries and governments,
- (b) Large numbers of people can be involved,
- (c) Achievements are within the technological capability of the country in most cases,

(4) Second, national governments should give priority to energy assessments and supporting studies. These documents supply the data base and options which are the foundation of much activity in the areas of policy, training and technological applications.

(5) In countries where assessments have taken place, priorities will shift to policy studies and decisions and to training and technological applications. Communications, information and training activities should be increasingly oriented to supporting the other two.

(6) Where energy prices, including electric rates, do not reflect full economic costs, countries should increase the prices, unless, that is, cost benefit studies demonstrate otherwise. If governments do not

move towards rational pricing structures, energy conservation will not be encouraged, the balance of payments problem will not be solved, and many alternate energy systems will be uneconomic.

(7) To the extent possible, every program and sub-project should have some specific training aspects and objectives, even if it is not a training activity per se.

#### POLICY

An analysis of the Policy Program revealed substantial accomplishments to date, but slow implementations and a gap between Project Paper objectives and funding. Draft energy needs assessments have been prepared for Antigua, Barbados, Guyana and Montserrat and are being discussed with the ministries concerned. In addition, a sizeable number of supporting studies not specifically called for in the Project Paper have been prepared under this program. These include seven energy conservation studies and several assessments of specific energy resources. The quality of this work ranges from acceptable to excellent. Among the recommendations for this program are:

- (1) The preparation of high quality assessments and studies should proceed as fast as national and regional resources permit. Assessments should be made in all countries where adequate interest and cooperation is attained.
- (2) After the assessment has been approved, the CARICOM Energy Unit should shift its emphasis to followup. Specifically, CARICOM should encourage and assist in the development of an implementation plan based on the assessment, on policy studies, and on the incorporation of energy planning into national planning.
- (3) CARICOM should hire two additional persons to work on assessments and two more to work on policy studies.

#### TRAINING

The Training component was found to be lagging well behind schedule both in programs and monetary outlays. Very few activities have actually been conducted and too little money has been spent on training. In the opinion of the evaluation team, expected outputs such as developing a cadre of trained specialists in non-conventional energy technology including design, implementation, maintenance, and field tested research projects are far from being attained. The training coordinator, just recently hired, has prepared a schedule for the coming year, and the team hopes that this component will be strengthened considerably. The evaluation team visited several technical and engineering schools and has identified the potential that these institutions have for contributing to the Project. It is unfortunate that the Project's design has separated the Training component, which is the responsibility of CARICOM, from the Communications component, which is the responsibility of CDB. These two activities are inseparable, and

an effort must be made to have them function as if they had been placed in a single administrative unit.

Specific recommendations for this program include sending the training coordinator to a research center outside the Region for additional orientation, increasing the number of staff members, and delegating to the CDB the responsibility for training personnel associated with CDB field projects.

#### TECHNOLOGY AND ENERGY

The Technology and Energy Unit (TEU) was organized at the CDB in August 1979 and it is responsible for the Technology and Energy component and for the Technology Research Fund component of the Project. Areas in which TEU operations need to be reviewed, improved or strengthened are discussed at length in the report because the team viewed the evaluation as an excellent opportunity to improve the TEU's effectiveness and to enhance the CDB's role in the Caribbean. The team noted, however, that the TEU faces many difficulties of timely field project implementation, some of which undoubtedly stem from the weakness of the Training component. Others stem from the fact that the energy needs and resources assessment, the energy conservation plan, the demonstration, implementation and testing, and other related activities are being done at the same time, without the adequate field personnel and without the adequate technical support to implement the field activities properly. Seven projects are reviewed and specific recommendations for each are included in the chapter.

A major recommendation is to review the program objectives for the next three years' activities and to establish priorities for each country, based on the energy needs assessment studies and the energy resources assessment studies already done. Options for accomplishing this are either to reduce the scope of the overall program by setting up clear priorities in a few selected areas of energy activities in each country on the basis of the existing budget and timetable, or to follow up the existing scope under a new larger budget with an extended timetable for overall program implementation. Since the program is much needed in the Region and in each country, both options assume continuing work on the projects while restructuring the overall program.

Other recommendations include some of the following:

- (1) Increasing the authorization funding level allowed for both the Head of TEU and Project officers, in relation to activity budgets.
- (2) Establishing an orientation program for newly hired TEU officers.
- (3) Shortening the life cycle of individual project implementation.
- (4) Assigning financial documentation duties to a financial officer of TEU employed specifically for this purpose to

assure that the guidelines of the CDB procedures are followed and to coordinate reports from the project supervisors on a monthly basis.

- (5) Expanding the TEU technical staff concerned with field implementation activities. This staff should have institutional expertise.

#### COMMUNICATION AND INFORMATION

The Communication program is part of the Alternative Energy Systems project, but the Information program is part of the Employment Investment Promotion project. Since the two components are both administered by the TEU and since they are so closely connected, they were evaluated together by the CEER team. The goal of establishing a network of information and research resources for alternative energy development has not been completely met, and two important goals dealing with the identification of various interest groups and information gaps were not analyzed completely. The team decided that an infrastructure capable of taking practical advantage of a communications network did not exist in the Region, and that this absence has hampered the communications officer from achieving the objectives of the component. Three seminar/workshops have been held, but the average cost has been much higher than anticipated. The team noted that the recent administrative reorganization of the Information component had improved its effectiveness and stated that an operational review was needed to assure a close interaction between the three components to avoid duplication of efforts.

Specific recommendations for this program include the encouragement of a strong effort to coordinate activities of the Training component which is the responsibility of CARICOM with the Communication component of CDB. In addition, steps should be taken to expedite the computerized information system of CDB and to serve as a basis for a separate proposal for the establishment of a computerized time sharing network.

#### TECHNOLOGY RESEARCH FUND

Concerning the Technology Research Fund (TRF), the team commented extensively on the eight projects underway with TRF support, but noted that several of these projects should have been funded from other sources. The CEER team proposed that there be a restructuring of the TRF objectives to avoid duplicating TEU efforts, and vice versa. About 20 projects must be funded and managed during the next two years, and the TEU will have to add several project officers to handle TRF activities.

The failure of directors of the project activities to turn in quarterly reports that are well-documented, informative, and on time hampered the team's efforts to evaluate each activity thoroughly. The team recommended that the TRF activities be refinanced and continued and that more efforts be concentrated on technical activities in the field countries.

It is strongly recommended that the TRF project continue into the second phase beyond September 1982 in a form reconstructed according to the comments of the evaluation team. The TRF activities are useful and very much needed in the Caribbean countries and the regional development and their financing should be continued by USAID and other organizations.

#### CONCLUDING REMARKS

Generally speaking, the team was impressed by some of the accomplishments made to date but disappointed by the overall failure to meet the timetable and to keep adequate financial records and documentation on each undertaking. The Technology and Energy Unit (TEU) of CDB and the Energy Unit (EU) of CARICOM are on the verge of establishing strong foundations in a number of energy fields, and their accomplishments in the next three years will hopefully compensate for the delays and technical weakness up to this point. The disappointments of the past can easily be overcome and the general optimism that is now emerging can be maintained if closer working relationships between the major agencies can be developed. The Energy Advisory Committee can become the vehicle for this coordination, perhaps through a Steering Committee comprised of the USAID representative and the heads of the TEU and the EU.

In conclusion, this summary is based on a much longer, carefully detailed report submitted by the evaluation team. It is not meant to replace the more comprehensive document, but rather to allow the reader to obtain an overview of the Project. The team wishes to encourage all readers to examine the report carefully to understand the progress of the particular components and the Project as a whole.