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TECHNOLOGY AND ENERGY UNIT,
ANNUAL REPORT 1984 *.

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APPENDICES

LIST OF APPREVIATIONS

($ throughout refers to United States Dollars (US$) unless otherwise specified)

APUA:	Antigua Public Utilities Authority
BMZ:	German Ministry for Technical Cooperation
CAESP	Caribbean Alternative Energy Systems Project
CARICOM:	Caribbean Community
CARIRI:	Caribbean Industrial Research Institute
CDB:	Caribbean Development Bank
CGCED:	Caribbean Group for Cooperation in Economic Development
CIDA:	Canadian International Development Agency
CMI:	Caribbean Meteorological Institute
CTCS:	Caribbean Technological Consultancy Services
DEVCO:	Development Corporation of St. Vincent
DFCs:	Development Finance Corporations
ECLAC:	Economic Commission for Latin America and the Caribbean
GATE:	German Appropriate Technology Exchange
GTZ:	German Agency for Technical Cooperation
IDRC:	International Development Research Centre
kW:	kilowatt
kWe:	kilowatt electrical
LDCs:	Less Developed Countries
m/s:	meters per second
OAS:	Organisation of American States
OECS:	Organisation of Eastern Caribbean States
RBEP:	Regional Biogas Extension Programme
REAP:	Regional Energy Action Plan
SLDB:	St. Lucia Development Bank
TAF:	Technical Assistance Fund
TDP:	Technology Development Programme
TEU:	Technology and Energy Unit
UNDP:	United Nations Development Programme
USAID:	United States Agency for International Development

1. OVERVIEW OF ACTIVITIES AND PROGRESS TO DATE

1.01 At the end of 1984, the Caribbean Development Bank (CDB) had been involved for a period of four and one half years in the implementation of United States Agency for International Development's (USAID's) Alternative Energy Systems Project No. 538-0032. Activities funded under the Technology Component of USAID Project No. 538-0013 came to an end at the end of January 1984, approximately four and one half years after commencement. During the period since the start of these projects, activities have been integrated with other similar CDB projects and have been administered by the Technology and Energy Unit (TEU). The character of TEU's operations over the period has remained substantially unchanged although there have been a number of shifts in emphasis.

1.02 Activities of TEU can now be grouped broadly under three categories - information transfer, technology adaptation/demonstration and sectoral assessments/investment programming.

Information Transfer

1.03 These activities involve the following elements:

(i) generation, collection, recording and storage of information (in the form of documents, textual material and numerical data);

(ii) interpretation of selected information for possible solutions to a given problem; and

(iii) final dissemination of information and application of the knowledge selected and interpreted.

The prime mover in these information-transfer activities is the Caribbean Technological Consultancy Services (CTCS) Network, which has been developed as a mechanism for efficiently delivering knowledge and expertise available within the Region to provide the technical support services needed by industry to solve problems relating to existing operations or development of new productive activity, by means of direct contacts between requesters and resource persons.

1.04 The information-transfer activities of TEU allow CDB and the Development Finance Corporations (DFCs) to be automatically informed of potential projects in the countries they are serving thereby keeping CDB's finger on the pulse of project development in the Region. They are also playing an important role in protecting CDB and DFC investments in industry, many of which are experiencing serious difficulty, by mobilising the pool of technical expertise which has been developed in the Region to solve their technological problems and support CDB's lending programmes. No other banking or development institution in the Region can boast such close liaison and effective collaboration with the Region's scientific and technical community. This is a critical step in the integration of local science and technology and productive sectors.

Technology Adaptation/Demonstration

1.05 These activities involve the following stages:

(i) identification of priority technology needs of CDB's borrowing member countries and new or established techniques which satisfy these needs and which are likely to be highly replicable and suitable under Caribbean conditions;

(ii) design and preparation of pilot projects which will effectively field-test selected techniques, and where appropriate, adapt them to Caribbean circumstances and determine their viability;

(iii) implementation of pilot projects, in situ; and

(iv) investment and dissemination programmes to enable the replication of successful projects nationally and regionally.

About 30 pilot projects, implemented by TEU or by member countries with TEU assistance, are at one or other of the stages in the progression set out above. Unfortunately, because experienced skilled manpower is scarce and technology adaptation is unpredictable, takes time and is inherently problematical, only a few projects have reached Stage (iv). However, a large number are poised to complete Stage (iii) and, within a short time, major dissemination and investment programmes will be needed to capitalise on several successful projects, viz, coconut wood utilisation, 1-ton commercial solar dryers, improved methods of charcoal production and use, clay tile production from local raw materials, wind energy farms, biodigesters for treatment of large accumulations of animal wastes, etc.

1.06 Technology-adaptation projects have not yet resulted in substantial investment activity largely because of the small scale of operation of the systems being tested and the time required to bring projects to fruition. Within a year, several projects suitable for loan financing by DFCs should be successfully completed; however, the benefits from such projects will probably only be realised over a period of years as the recently completed reorganisation of DFCs begins to take effect.

Sectoral Assessments/Investment Programming

1.07 Following the mid-term evaluation of the TEU-administered USAID projects, emphasis has been placed on identifying, promoting and preparing projects for appraisal by means of sector-resource assessment programmes. These activities are intended to forge closer linkages between TEU's activities and CDB's project pipeline by:

(i) rapid diagnosis of major technical problems and analyses of opportunities in a sector or industry;

(ii) evaluation of options for solving problems;

(iii) assessment of investment priorities;

(iv) providing a framework (and programmes) for technical assistance and financing of priority projects identified; and

(v) design and preparation of priority projects.

These programmes aim to help decision-makers address pressing problems confronting Caribbean economies in a timely, well-focussed and systematic way, and facilitate mobilisation of the human and financial resources required by adopting a regional rather than a piece-meal national approach. This approach should generate more attractive incentives for donors, investors and technical experts to become involved and has been adopted, for example, in the Power Loss Reduction Programme which is being jointly undertaken with Caribbean Community (CARICOM); it has also been pursued in a programme to optimise energy use in sugar factories.

1.08 Both programmes are still being implemented and have identified projects suitable for financing by CDB, two of which have so far resulted in loans.

Regional Energy Action Plan (REAP)

1.09 The REAP which was prepared during 1983 as a joint effort between CDB and the CARICOM Secretariat, is an outgrowth of TEU's Sectoral Assessment/Investment Programming activities. The REAP is, in fact, largely an energy sector assessment and investment programme designed along the lines set out at paragraph 1.07 and is expected to do the following:

(i) reduce energy losses in electric power generation and distribution down to economic levels and establish rational pricing policies in the sector;

(ii) reduce energy wastage in commercial, manufacturing, tourism and commercial sectors by establishing economic levels of efficiency in these sectors;

(iii) develop the commercial/practical use of those alternative energy sources (e.g. wind, bagasse, sawmilling wastes, agricultural wastes, etc.) that are currently economic within the Region;

(iv) rationalise petroleum refining and transport in the Region and promote security of intra-regional supplies and markets of petroleum products;

(v) strengthen the capacity of national and regional institutions and mobilise skilled personnel required to deal with energy development and energy-related issues; and

(vi) establish the petroleum and geothermal potential of the Region and devise mechanisms to encourage their orderly development.

1.10 Progress in attracting financing for implementing the REAP has been slower than expected but several donors have continued to express an interest in providing funding for the programme. A progress report on the implementation of REAP is provided at Appendix 1.

2. REVIEW OF 1984 ACTIVITIES

2.01 The efforts at consolidation of TEU's activities and accelerated completion of on-going projects and studies which were initiated in 1983, continued during 1984 and, in addition, further emphasis was placed on developing more effective linkages with CDB's lending divisions internally. During 1984, the CTCS also continued to play an important role in linking CDB with laboratory-based institutions in the region. Balancing the longer-term perspective of TEU's activities and the near-term pre-investment needs of CDB and reconciling the broader development goals of the Technology Development Programme (TDP) and the investment orientation of CDB continued as important issues which were under constant review during the year. It is nevertheless expected that TEU's functions in Caribbean technological development will be maintained during 1985.

2.02 In addition to work done on on-going studies and projects, about 65% of the programme of new projects, studies and publications planned for 1984 was achieved. Some slippages occurred in the Communications Programme because specialist-staff in communications, for reasons of illness, was not available for the full period. Other slippages occurred in the energy conservation and communications programmes because some contractors failed to complete reports on time and in the case of the electricity distribution loss reduction studies, the failure of computer hardware contributed to the late start, and hence non-completion of the planned activities for 1984.

2.03 During 1984 TEU made major contributions to CDB's lending programme by contributing significant effort in the identification, preparation and appraisal of projects for electricity distribution loss reduction in St. Vincent and
the Grenadines and generation of electricity from surplus bagasse in St. Kitts and Nevis. Fact sheets on On-going and Completed Studies and Projects for 1984 are at Appendix 2.

Communications

2.04 Following on from work initiated in 1983, the Communications Programme continued, during the course of 1984, to include preparation of special bulletins and manuals to publicise the results of TEU's activities and encourage their commercial application. In addition to publishing four issues of the regular newsletter, a publication entitled "Biogas in the Caribbean" has been prepared for publication in the first quarter of 1985, and during 1984 "Wind Energy In the Caribbean" was published. Several displays giving publicity to the work of TEU were also mounted during 1984 and a number of posters and brochures were prepared and printed for dissemination during 1984 and 1985.

2.05 Implementation of the series of national seminars for hotel managers on energy conservation continued in 1984 when the second seminar was held in Antigua to which hoteliers from St. Kitts and Nevis and Montserrat were also invited. The series of National Workshops on the Bio-digestion of Wastes started with the holding of a workshop in St. Vincent and the Grenadines. A regional seminar on the Generation of Electricity from New and Renewable Sources of Energy was also held in Antigua in November 1984, in collaboration with the Organisation of Eastern Caribbean States (OECS) and the Antigua Public Utilities Authority (APUA). This workshop attracted participants from a wide range of electric utilities, sugar manufacturers and operators of sawmills in

the region. During May 1984, TEU, along with the Commonwealth Science Council and Caribbean Industrial Research Institute (CARIRI) co-sponsored a workshop on Energy Information Systems which was well attended by participants from the Region and elsewhere.

2.06 The term of appointment of the Communications Specialist ended on July 31, 1984. The main activities undertaken under the Communications Programme are summarised at Appendix 3.

CTCS Network

2.07 During 1984, the CTCS attracted major funding from the International Development Research Centre (IDRC) of Canada and from CDB's own resources to undertake certain specific activities over the next three years. Additional funding was also provided by the United Nations Development Programme (UNDP). Details of these grants are provided at C, D and E of Appendix 4.

2.08 During 1984, the CTCS Network received 108 requests for information and assistance. At the end of the year, the status of these requests was as follows:

Number Completed	-	87
Number Cancelled	-	3
Number On-going	-	18

A detailed analysis and breakdown of the requests received during 1984 is provided at Appendix 5.

2.09 The activities of the two part-time Extension Officers - an experienced industrial engineer and an experienced food technologist - including their scheduled visits to the OECS member countries to monitor and stimulate project development activity in these states, had to be severely curtailed owing to the financial constraints under which the Network operated in the latter part of 1984.

2.10 Five information packages and a select bibliography on energy conservation were prepared for dissemination and a number of posters and brochures were distributed during 1984.

Energy Conservation

2.11 In addition to its communications activities directed at energy conservation, TEU collaborated with the CARICOM Energy Unit in conducting an Electric Power Loss Reduction Study in Dominica. A Loss Reduction Study was also carried out in St. Kitts and Nevis during 1984 using resources from CDB's Technical Assistance Fund (TAF). Both studies are expected to lead to investment projects of about $1 million each. The Loss Reduction Study, carried out in St. Vincent and the Grenadines during 1983, resulted in a loan of $4.5 million for the implementation of the study's recommendations. The development of a pipeline of energy conservation projects among national development banks during 1984 was disappointing although TEU has offered to assist in this effort by providing technical assistance for the evaluation of energy projects. The unhealthy financial climate which prevailed within the commercial, tourism and industrial sectors among the Less Developed Countries (LDCs) during 1984 is largely to be blamed for the lack of progress in this area.

Technology Development Programme

2.12 During 1984, progress in meeting project objectives continued to be critically dependant on technical support in the field and pro-active supervision from TEU, even in cases where provisions have been made for staff and project managers. The need for greater than expected technical support was again largely a consequence of lack of experience in implementing innovative projects, slowness in making technical decisions by some project managers, difficulties with procurement of equipment and materials and poor management by some contractors.

2.13 During 1984, under the joint CDB/German Appropriate Technology Exchange (GATE), Regional Biogas Extension Programme (RBEP) a biodigester system was installed at a large dairy farm in Barbados and digesters were also installed on two farms in St. Vincent. Reaction to the demonstration units in St. Vincent has been very enthusiastic. The construction of one of the digesters was financed through the Development Corporation of St. Vincent's (DEVCO) Agricultural Line of Credit Scheme and it is expected that during 1985 DEVCO will be approving a number of other loans to farmers for the purpose of constructing digesters.

2.14 In Dominica, the stream gauging network in the Eastern District which was commissioned in April 1983 has continued to operate satisfactorily although the delay in providing reports is causing some concern. At the end of 1984, funding was approved for expanding the network by the addition of three gauging stations. These stations will provide information on three of the larger rivers which will provide the basis for increasing Dominica's hydroelectric capacity after 1990. Projects were also approved during 1984 for establishing stream gauging networks in Grenada and Belize. Owing to the difficulties encountered with finding a suitable alternative site for the mini-hydro demonstration (the original site being unsuitable for technical reasons) the project was cancelled during the latter part of 1984.

2.15 The Antigua Wind Turbine Demonstration Project continued to operate satisfactorily and during 1984 was available for about 57% of total time and operated at a load factor of about 13%. Progress in the installation of the Wind Powered Chill Room in St. Lucia continued to be disappointingly slow but it is expected that the equipment will be commissioned early in 1985. Problems have resulted mainly from slow decision-making by the project management.

2.16 The Eastern Caribbean Wind and Solar Energy Resource Assessment Project was completed and data analysis and final reports submitted during 1984. Preparation of a proposal for an expanded wind and solar energy resource assessment programme, including two demonstration wind farms, was completed during 1983 but so far no success has met efforts to secure the approximately $5 million in funding required.

Investment Promotion

2.17 Under pressure of current economic events and a drive to increase lending and reduce costs, more aggressive support was provided by TEU in identifying and preparing productive sector and power sector projects for CDB's portfolio of loans. In responding to the need to follow-through on successful technology adaptation projects and analytic studies, a programme to

expedite commercial application of the results of projects and studies with significant investment potential was followed during 1984. This involved a substantial adjustment in TEU's activities, with a shift of some resources from technology adaptation and demonstration to investment promotion as a major component of staff effort. Greater emphasis was placed on near-term development of loan projects which can be appraised by CDB's lending divisions or national development banks. Technology development projects which have made little progress but created inordinate demands on staff time were therefore abandoned, and the funds diverted to finance projects with a strong orientation towards investment promotion. Such was the case with the Dominica Mini-Hydro Demonstration Project.

2.18 TEU's efforts to integrate more closely with the mainstream activities of CDB were well rewarded during 1984 with CDB's loan portfolio benefiting by approximately $6.7 million from two project loans, both of which resulted directly from TEU's activities in the field. Both projects were appraised by the Infrastructure Division with further assistance from TEU staff, and the first, a loan for approximately $4.5 million, resulted from work completed on an Electricity Distribution Loss Reduction Study in St. Vincent and the Grenadines in 1983. The second, a loan of $2.2 million, resulted from work previously carried out, through the CTCS, which examined the feasibility of generating electricity for the grid from surplus bagasse in St. Kitts and Nevis.

2.19 A Biomass Consultant was recruited during the third quarter of 1984 and has started work in developing further projects to generate electricity from bagasse.

Regional Cooperation and Collaboration

2.20 During 1984, TEU collaborated with several regional institutions in the execution of its work programme. Thus, for example, there was cooperation with the Caribbean Meteorological Institute (CMI) in the preparation and implementation of a number of stream gauging and hydrological assessment projects, and with the OECS in hosting a Seminar on the Generation of Electricity from New and Renewable Sources of Energy. Most notable of the collaborative efforts, however, was the implementation of a number of Electricity Distribution Loss Reduction Studies and Tariff Studies, which were financed by CARICOM but implemented by TEU.

3. WORK PROGRAMME FOR 1985

Support for CDB's Pipeline of Projects

3.01 During 1985, TEU is expected to play a major role in the preparation and appraisal of two projects to generate electricity from bagasse for the Infrastructure Division and will supervise three other studies in the power sector which are expected to identify loan projects for CDB's pipeline. Investment promotion activities, described below, should also identify loan projects for CDB and for national development banks. In addition, the CTCS Network is expected to provide technical support services in the preparation and/or appraisal of project proposals received by CDB and national development banks as well as provide assistance for auditing on-going CDB funded projects.

Communications Programme

3.02 The strategy planned for 1985 will continue to integrate results of all activities of TEU and selectively disseminate the information generated to the regional audience for two purposes:

(i) general awareness to create wide support and interest in viable technology options for the Caribbean and technology-related services available from within the Region; and

(ii) information transfer to select target groups about specific opportunities to which they can respond.

The first purpose will involve production and dissemination of newsletters, audiotapes, videotapes, stickers, posters and photographic displays. The second will involve TEU in the preparation of bulletins, select bibliographies, information packages, manuals, brochures, inventories, workshops and seminars. In order to make more use of the remaining funding which has been approved for conferences and seminars under the USAID Grant, the practice of charging a registration fee to participants at TEU sponsored workshops and seminars, which was begun in 1984, will be continued during 1985.

3.03 General public awareness programmes will continue to be used to encourage the cooperation of, and promote a better understanding by the general public of the need to apply energy conservation measures.

3.04 The Communications Programme for 1985, including CTCS Network activities, is set out at Appendix 6, under Activity Nos. 100-111. The special bulletins will present the findings of TEU projects in a form suitable for review by potential investors and technologists who would expect to implement projects. They will be prepared by TEU staff with the assistance of consultants. It is also expected that select information packages and bibliographies will be prepared with the assistance of experienced Caribbean technologists who are available through the CTCS Network. Workshops and seminars will be used to galvanize select target groups into action and to train technical personnel in the use of biogas resources, techniques for electricity distribution loss reduction and in energy planning methodologies. These seminars will be investment and project-oriented.

CTCS Network

3.05 CDB's success in securing Grant Funding from the IDRC for operating the CTCS Network for the next three years and in securing similar funding from the UNDP will greatly enhance the capability of the Network to deliver services to the region during 1985. The proposed activities for 1985 are shown at Appendix 6 (Activity Nos. 107-111).

3.06 Apart from information repackaging and production of select bibliographies, the basic operations included in the 1985 work programme are:

(i) essential meetings of Network members;

(ii) regular visits of Extension Officers to the LDC member countries of CDB; and

(iii) technical assistance visits.

Also to be prepared and used as a working tool for the Network are a compendium of project profiles, a directory of resource persons available in the region and manuals and information packages.

Energy Conservation (Pre-Investment Studies)

3.07 The electric power sector and the hotel industry will again be the focus for energy conservation efforts in 1985, as in most Caribbean countries these sectors continue to provide excellent opportunities for achieving significant near-term reduction in fossil fuel imports. Attention will also be paid to manufacturing industries such as sugar manufacturers which use fossil fuels but are capable of energy self-sufficiency.

Technology Development Programme (TDP)

3.08 The scale of project preparation activities under the TDP in 1985 will be reduced because of the reduced level of funding available consequent on the drawing down of resources available under USAID Project No. 538-0032. Activities to be funded from this source would have to be completed by December 31, 1985. The main areas of new activities will be the RBEP, which is being implemented with assistance from a GATE team in CDB member countries, and the commissioning of studies to determine the feasibility of generating electricity for the grid from sugar factory and sawmill wastes.

Investment Promotion

3.09 As in energy conservation, the main foci for investment promotion activities will be the electric power and tourism sectors, because excellent returns are possible on investments in energy conservation in these areas. In addition, since the Caribbean remains an essentially agricultural region, utilisation of bio-wastes to displace electricity or diesel by major consumers/ producers such as sawmills and large plantations, is included in the programme. Opportunities for exploring viable co-generation projects will also be explored.

3.10 Many of these investment opportunities are likely to be less than $200,000 and will therefore be financed by national development banks. To encourage and promote such investments, guidelines for appraising small-scale energy projects will be developed in collaboration with these agencies. This activity is being carried over from the 1984 programme. Finally, to encourage full utilisation of available seasonal and intermittent energy sources, such as bagasse, a study on pricing of electricity from intermittent energy sources will be commissioned.

Regional Energy Action Plan (REAP)

3.11 Several areas of the TEU Programme for 1985 implement components of the REAP. These include the RBEP and the Electric Power Loss Reduction Programme. However, the bulk of the funds needed to implement REAP has not yet been mobilised. Several donors continue to indicate interest in the Plan and can be expected to contribute to its implementation in the near future.

4. BUDGET

4.01 Budget allocations for various activities and approvals and disbursements (actual and projected) under the various budget sub-heads are presented at Appendix 4. Appendices 3 and 7 list the major activities funded under TEU's programmes and their costs.

APPENDIX I

PROGRESS REPORT ON THE REGIONAL ENERGY ACTION PLAN (REAP) OPERATIONS AND FINANCING NEEDS

I. BACKGROUND

The REAP was adopted at the Fourth Meeting of the Conference of Heads of Governments of CARICOM, in July 1983. At the request of Heads of Governments, the CDB and CARICOM prepared the major programmes in the form of a report for submission to donor agencies at the forum of the Sixth Meeting of the Caribbean Group for Cooperation and Economic Development (CGCED) in February, 1984, to solicit the interest of the donor community in supporting this thrust. The proposals contained in the REAP were also presented at a Special Consultative Meeting for the promotion of Latin American and Caribbean Projects in the area of New and Renewable Sources of Energy, which was convened by the Economic Commission for Latin America and the Caribbean (ECLAC). Discussions have taken place between CDB and the Canadian International Development Agency (CIDA) and between CDB, the Ministry for Technical Cooperation (BMZ) and the Agency for Technical Cooperation (GTZ) in Germany, to identify areas for technical cooperation between these institutions and Caribbean Regional Institutions for implementation of the REAP.

II. OBJECTIVES OF THE REAP

The major objective of the REAP is to alleviate, within the shortest possible time, the adverse impact of the energy crisis on the Caribbean economies, while laying the basis for a more coordinated and rational development of the energy resources of the Region.

The REAP aims to fulfil this objective by developing programmes and policies which -

(i) promote the security of intra-regional supplies and markets of petroleum products;

(ii) develop and promote a major energy conservation programme in the region;

(iii) identify and develop those alternative energy sources that are currently economic within the region;

(iv) establish the petroleum potential of the region and devise mechanisms to encourage its orderly development; and

(v) seek to strengthen the capacity of national and regional institutions to deal with energy development and energy-related issues.

Specific regional action programmes have been devised to address (ii), (iii) and (v) above.

III. ENERGY CONSERVATION

Transport Sector

The CARICOM Secretariat will finance some of the 10 transport sector studies proposed in the REAP, using funds provided under the existing USAID Caribbean Alternative Energy Systems Project (CAESP). A resource gap of about $280,000 exists for this component.

Energy Conservation in Manufacturing, Commercial, Tourism and Public Services Sectors

In February 1984, CDB indicated its willingness to finance the $5 million energy conservation revolving fund. CDB has further elaborated the programme with the assistance of a firm of Consultants and has requested CIDA's assistance in providing 2-3 person-years of the technical support services that will be required to establish a programme which could become self-sustaining within 3 years. CDB's TEU assisted one National DFC in appraising an energy conservation project. This resulted in a loan of $174,000 to a large hotel.

IV. POWER SECTOR

(a) Power Loss Reduction Studies

A resource gap is unlikely to exist for this component. Already three analyses of systems losses have been completed and another is nearing completion with financing provided by CDB and CARICOM. It is expected that the remaining three will be done by CDB in 1985. Following completion of the first loss reduction study, CDB made a loan of $4.5 million to the Government of St. Vincent and the Grenadines to implement its recommendations. CDB is expected to provide loan financing to implement measures identified by the other studies under its Power Sector lending programme.

(b) Long-Run Marginal Cost Tariff Studies

Two studies have been completed by CARICOM in collaboration with CDB under the CAESP. A resource gap of about $360,000 exists for this component to complete the remaining six studies.

(c) Analysis of Valuation and Pricing of Electricity from Intermittent Sources

This will be done by CARICOM under the CAESP.

(d) Feasibility Study of Common Services to LDC Power Utilities

A conference of Eastern Caribbean Utilities took place in St. Lucia in September, 1984. The Terms of Reference for the proposed study where reviewed and the OECS Secretariat has requested CIDA's assistance in implementing the study.

V. STRENGTHENING OF REGIONAL AND NATIONAL INSTITUTIONS

(a) National Institutions

Some support may be forthcoming from the Organisation of American States (OAS), which recently financed a study on Energy Policy/ Programmes Management for the OECS.

(b) Professional Staff in OECS Secretariat

Both OAS and CIDA have expressed interest in providing this assistance.

(c) Specialist Support to Regional Institutions

UNDP has provided an Energy Policy Specialist to deal with pricing of petroleum products and electricity. CDB has obtained the services of a Biomass Specialist for 15 months up to December, 1985 under the CAESP and has requested CIDA's assistance in obtaining the services of an Energy Conservation Specialist for 2-3 years. A funding gap of about $440,000 - $600,000 still exists.

(d) Manpower Development and Training

The OAS has pledged some support to the OECS countries through its scholarship programme and CIDA support may be forthcoming under their existing training programme in the region.

VI. NEW AND RENEWABLE ENERGY RESOURCES

(a) Biomass

CDB has requested BMZ/GTZ support in implementing this component and negotiations are at an advanced stage. GTZ is already collaborating with CDB in implementing the Biogas programme which is going very well and is receiving strong support at the national level from farmers and Ministries of Agriculture. Under the programme, a capital project for generating electricity from surplus bagasse to contribute 20% of power generation in St. Kitts, has already been prepared and appraised by CDB for a loan of $2.2 million.

(b) Hydro Power

CDB is expected to provide $300,000, under the CAESP, to finance the establishment of additional hydrological data stations in Belize, Dominica and Grenada, and establish the database necessary to plan the development of the hydro potential of these countries. CIDA is considering providing bilateral assistance to Grenada when the necessary data becomes available for a hydro power feasibility study of selected river basins and detailed design studies for specific sites.

c) Geothermal Energy, Wind Energy and Solar Energy

Little progress has been made in mobilising the $9.2 million required to implement these components.

VII. SUMMARY AND CONCLUSIONS

Prospects are good for mobilising about 50% of the $22 million of financial and technical assistance resources required to implement the REAP. The major part of this resource gap (80%), is accounted for by the Wind and Geothermal components. Work is well underway in implementing areas of other component programmes and follow-up actions in areas of the REAP programmes which have been completed are already being undertaken. CDB and DFCs are expected to make loans totalling $6.9 million by December 1984, for implementation of projects identified. In one case, a project to generate electricity from surplus bagasse is expected to contribute 20% to gross electric power generation in one country by January 1987.

APPENDIX II

FACT SHEETS ON STUDIES AND PROJECTS ADMINISTERED BY TEU WHICH ARE ON-GOING OR WERE COMPLETED DURING 1984

PROJECT: The Testing and Demonstration of the Use of a Solar-Powered Photovoltaic Pumping System in Irrigation

COUNTRY: Antigua

(a) TOTAL APPROVED FUNDING: US$45,624

(b) DISBURSEMENTS TO DATE: US$36,947

(c) PURPOSE: To test and demonstrate a solar-powered photovoltaic pump.

(d) EXPECTED OUTPUTS: Determination of the performance characteristics of the pumping system and its suitability for small-farm irrigation in the Caribbean.

(e) PROGRESS TO DATE: Caribbean Agricultural Research and Development Institute (CARDI) has proposed relocating photovoltaic panel and pump to new location where water is available.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Use of system is presently impeded by lack of significant amounts of rainfall in Antigua and irrigation pond has run dry.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: CARDI has suggested re-locating the pumps at a better site.

(g) REPORTING DATES: Quarterly (February 28, May 31, August 31, November 30)

(h) FUNDING SOURCE: USAID Project No. 538-0013 - Technology Research Fund

(i) EXECUTING AGENCY: CARDI

(j) BENEFICIARY: CARDI and Diamonds Farm, Antigua

(k) DATE APPROVED BY CDB: March 31, 1981

(l) DATE AGREEMENT SIGNED: April 14, 1981

(m) (i) SCHEDULED COMPLETION DATE: January 31, 1984

(ii) LIKELY COMPLETION DATE: June 1986

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: New location to be identified.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 5

(ii) FROM DATE AGREEMENT SIGNED: 4

PROJECT: Wind Power Demonstration Project - Antigua

COUNTRY: Antigua

(a) TOTAL APPROVED FUNDING: US$271,850

(b) DISBURSEMENTS TO DATE: US$233,383

(c) PURPOSE: To test and demonstrate the technical feasibility of grid-connected WTGs in the Caribbean.

(d) EXPECTED OUTPUTS: A report summarising the experience of the APUA in operating the WTG in the grid-connected mode in Antigua, an evaluation of the maintenance and other costs of operating a WTG in that context, measures of the component and overall system efficiencies and training of APUA staff in operation of WTGs.

(e) PROGRESS TO DATE: System operating, but there appears to be a control system fault causing abnormally long shutdowns. FloWind are planning a maintenance visit in early 1985.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Difficulties in obtaining a suitable machine.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: A 120 kW vertical axis wind turbine was supplied by FloWind Corporation of Washington State, USA.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: 538-0032 - Technical Programme - Field Tests and Applied Research and Development

(i) EXECUTING AGENCY: Antigua Public Utilities Authority

(j) BENEFICIARY: Antigua and Regional Utilities

(k) DATE APPROVED BY CDB: May 1981

(l) DATE AGREEMENT SIGNED: December 1981

(m) (i) SCHEDULED COMPLETION DATE: October 1984

(ii) LIKELY COMPLETION DATE: March 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Dissemination of final report on project in the Region. Wind farm project for Antigua is under consideration but is to be held in abeyance depending on financial position of Antigua Government

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 9

(ii) FROM DATE AGREEMENT SIGNED: 9

PROJECT: Testing of Solar Collectors - Barbados National Standards Institution (BNSI)

COUNTRY: Barbados

(a) TOTAL APPROVED FUNDING: US$16,000

(b) DISBURSEMENTS TO DATE: US$13,000

(c) PURPOSE: The project is to set up a solar heating panel testing facility and prepare draft standards for solar water heating panels.

(d) EXPECTED OUTPUTS: Draft standards "Method of Thermal Testing of Flat Plate Solar Collectors" and "Standard Code of Practice for the Installation of Solar Heating Systems for Domestic Hot Water".

(e) PROGRESS TO DATE: Project completed.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: BNSI staff time could not be devoted full time to the project. Difficulties in obtaining solar collectors from suppliers outside Barbados.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: An engineer from the French Technical Mission in Barbados was used through the Ministry of Finance and Planning to implement the project. Jamaica Bureau of Standards contacted for assistance in obtaining collectors from Jamaican manufacturers.

(g) REPORTING DATES: Quarterly (March, June, September, December)

(h) FUNDING SOURCE: USAID 538-0032 - Field Tests and Applied Research and Development.

(i) EXECUTING AGENCY: BNSI

(j) BENEFICIARY: Barbados and Region

(k) DATE APPROVED BY CDB: February 1981

(l) DATE AGREEMENT SIGNED: March 31, 1981

(m) (i) SCHEDULED COMPLETION DATE: December 1982

(ii) COMPLETION DATE: August 1984

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Draft standards on testing of solar panels to be published by BNSI.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 11

(ii) FROM DATE AGREEMENT SIGNED: 11

PROJECT: Field Testing of Red Mud Plastic Bio-digester Bags

COUNTRY: Barbados

(a) TOTAL APPROVED FUNDING: US$27,000

(b) DISBURSEMENTS TO DATE: US$26,249

(c) PURPOSE: To demonstrate and field test the use of "Red Mud Plastic" bio-digesters as a low-cost alternative to concrete digesters.

(d) EXPECTED OUTPUTS: Solution to pollution problem faced at site of project and demonstration of the feasibility of operating large-scale bio-digesters of the bag-type in the Eastern Caribbean.

(e) PROGRESS TO DATE: CDB/GATE Biogas Team monitoring the performance of the digester.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Change of ownership of farm, reduction and change of feed used for pigs, cessation of use of cooker, replacement of staff originally trained to operate digester.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Management and operation of digester system discussed with new owners. New staff trained. CDB/GATE Biogas Team visit site regularly.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Field Tests, Applied Research and Development

(i) EXECUTING AGENCY: Barnwell Farms (formerly V & B Farms)

(j) BENEFICIARY: Barnwell Farms and biogas technology regional know-how.

(k) DATE APPROVED BY CDB: January 12, 1982

(l) DATE AGREEMENT SIGNED: January 20, 1982

(m) (i) SCHEDULED COMPLETION DATE: April 30, 1985

(ii) LIKELY COMPLETION DATE: June 30, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Promoting use of bag digesters for waste treatment if they prove durable and effective.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 11

(ii) FROM DATE AGREEMENT SIGNED: 6

PROJECT: Hoad Dairy Farm Bio-Digester

COUNTRY: Barbados

(a) TOTAL APPROVED FUNDING: US$36,600

(b) DISBURSEMENTS TO DATE: US$25,000

(c) PURPOSE: To design, construct, commission and field test a bio-digester system which will reduce on-farm pollution by utilising the cow manure as feedstock for the system.

(d) EXPECTED OUTPUTS: To produce biogas for domestic and on-farm use, bio-fertiliser for use in the liquid form on the farm's grass cultivation fields and when dried, by horticulturalists.

(e) PROGRESS TO DATE: The bio-digester system has been commissioned and biogas is being used in the household and in the milking parlour. Liquid effluent is being used to fertilise and irrigate the grass-lands and drying of the slurry has now commenced. Monitoring of the system will start in January 1985.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: No significant delays occurred.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: -

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Field Tests and Applied Research and Development

(i) EXECUTING AGENCY: CDB's TEU

(j) BENEFICIARY: Dairy farms in the Region

(k) DATE APPROVED BY CDB: March 26, 1984

(l) DATE AGREEMENT SIGNED: April 7, 1984

(m) (i) SCHEDULED COMPLETION DATE: February 1985

(ii) LIKELY COMPLETION DATE: December 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Market tests on dried effluent are being carried out.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: At least weekly

(ii) FROM DATE AGREEMENT SIGNED: - do. -

PROJECT: Study of Biodigestion Characteristics for Chicken Litter, Bagasse and Chicken Litter/Pig Manure and Solar Drying of Sludge from a Cow Manure Digester.

COUNTRY: Barbados

(a) TOTAL APPROVED FUNDING: US$5,000

(b) DISBURSEMENTS TO DATE: US$1,370.25

(c) PURPOSE: To determine whether chicken litter, bagasse, pig manure and mixes thereof can be used successfully as a feedstock for anaerobic biodigestion. To determine the various mix ratios, biogas production rates, digester retention times and digester sludge characteristics for the various feedstocks used and generally to collect data which could assist in the design of a poultry farm or integrated poultry and pig farm waste disposal/energy production system and the solar drying characteristics of sludge from a cow manure digester.

(d) EXPECTED OUTPUTS: Data on the performance of chicken litter, bagasse, pig manure and mixes thereof when used as feedstocks for anaerobic digestion and on the drying characteristics using solar energy to dry sludge from a cow manure digester.

(e) PROGRESS TO DATE: Study completed.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: NIL

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Nil

(h) FUNDING SOURCE: USAID 538-0013 EIP-I, Technology Research Fund

(i) EXECUTING AGENCY: CDB/GATE

(j) BENEFICIARY: Region

(k) DATE APPROVED: February 1984 (Retroactive Approval)

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: January 1984

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Data being used in Regional Biogas Extension Programme to design biodigester systems.

(o) NO. OF SITE VISITS: (i) FROM START OF PROJECT: N/A

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Stream Gauging and Hydrological Assessment

COUNTRY: Belize

(a) TOTAL APPROVED FUNDING: US$116,400

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To assist the Government of Belize in undertaking stream gauging and rainfall measurements.

(d) EXPECTED OUTPUTS: To report on flow duration curves for streams studied and rainfall data.

(e) PROGRESS TO DATE: Project approved on December 13, 1984. Grant Agreement to be finalised.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: N/A

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support.

(i) EXECUTING AGENCY: Caribbean Meteorological Institute

(j) BENEFICIARY: Government of Belize

(k) DATE APPROVED BY CDB: December 13, 1984

(l) DATE AGREEMENT SIGNED: Not yet signed

(m) (i) SCHEDULED COMPLETION DATE: November 30, 1985

(ii) LIKELY COMPLETION DATE: December 31, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Data will be passed to Government of Belize for use in future hydro development programmes.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT:

(ii) FROM DATE AGREEMENT SIGNED:

PROJECT: Micro Hydro Demonstration Project

COUNTRY: Dominica

(a) TOTAL APPROVED FUNDING: US$101,100

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To demonstrate and test the operation of a grid-connected mini hydro generating system.

(d) EXPECTED OUTPUTS: Data on annual energy production, operation and maintenance costs, outage rates, etc., and a report on the feasibility of this and similar grid-connected systems.

(e) PROGRESS TO DATE: Project cancelled. Funds channelled towards expansion of the existing stream gauging project to the Western District of Dominica.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Technical difficulties with selected site and since then other events, mainly the fall in real price of oil have suggested that this project may not be the best use of funds in support of Dominica's hydro programme.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Project cancelled and funds diverted to more useful project for Dominica.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support

(i) EXECUTING AGENCY: Dominica Electricity Services Co. Ltd.

(j) BENEFICIARY: Dominica and Region

(k) DATE APPROVED BY CDB: December 10, 1981

(l) DATE AGREEMENT SIGNED: March 16, 1982

(m) (i) SCHEDULED COMPLETION DATE: September 1984

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: N/A

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 3

(ii) FROM DATE AGREEMENT SIGNED: 3

PROJECT: Stream Gauging and Hydrological Assessment - Eastern District

COUNTRY: Dominica

(a) TOTAL APPROVED FUNDING: US$87,300

(b) DISBURSEMENTS TO DATE: US$25,000

(c) PURPOSE: To collect streamflow and rainfall data in the Eastern District of Dominica which will be necessary for the design of mini-hydro installations in that part of the island.

(d) EXPECTED OUTPUTS: Flow duration curves for streams and rainfall data.

(e) PROGRESS TO DATE: Data gathering completed. Final report to be submitted.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Delays in satisfying conditions precedent led to delay in implementing project.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS:

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support

(i) EXECUTING AGENCY: Caribbean Meteorological Institute

(j) BENEFICIARY: Government of Dominica

(k) DATE APPROVED BY CDB: December 10, 1981

(l) DATE AGREEMENT SIGNED: March 16, 1982

(m) (i) SCHEDULED COMPLETION DATE: September 1983

(ii) LIKELY COMPLETION DATE: July 31, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Stream flow and rainfall data to be submitted to Government of Dominica for use in their Hydro Development Programme.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 3

(ii) FROM DATE AGREEMENT SIGNED: 3

PROJECT: Stream Gauging and Hydrological Assessment - Western District

COUNTRY: Dominica

(a) TOTAL APPROVED FUNDING: US$100,000

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To provide data on the relationship between rainfall and streamflow in the three catchment areas and permit precise assessments of hydroelectric potential to be made.

(d) EXPECTED OUTPUTS: Report on project activities to include flow duration curves for each stream; rainfall data for the various catchments, and correlations between streamflow data and rainfall data. Information will also be useful in studies of flood control measures, and assessment of water availability for irrigation and domestic uses.

(e) PROGRESS TO DATE: Project approved by CDB's Board of Directors. Grant Agreement signed.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: N/A

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support

(i) EXECUTING AGENCY: Caribbean Meteorological Institute

(j) BENEFICIARY: Government of Dominica

(k) DATE APPROVED BY CDB: October 25, 1984

(l) DATE AGREEMENT SIGNED: December 20, 1984

(m) (i) SCHEDULED COMPLETION DATE: November 1985

(ii) LIKELY COMPLETION DATE: December 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Data will be submitted to Government of Dominica for use in their Hydrological Development Programme.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: None

(ii) FROM DATE AGREEMENT SIGNED: None

PROJECT: Stream Gauging and Hydrological Assessment

COUNTRY: Grenada

(a) TOTAL APPROVED FUNDING: US$100,000

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To assist Government in undertaking stream gauging and rainfall measurements in the basins of the Great River, the St. Francis River and Antoine River.

(d) EXPECTED OUTPUTS: To provide data on relationship between rainfall and streamflow in the three catchment areas, and permit precise assessments of hydroelectric potential.

(e) PROGRESS TO DATE: Project approved on December 13, 1984 - Grant Agreement to be finalised.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: N/A

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support

(i) EXECUTING AGENCY: Caribbean Meteorological Institute

(j) BENEFICIARY: Government of Grenada

(k) DATE APPROVED BY CDB: December 13, 1984

(l) DATE AGREEMENT SIGNED: Not yet signed

(m) (i) SCHEDULED COMPLETION DATE: November 30, 1985

(ii) LIKELY COMPLETION DATE: December 31, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Data to be passed to Government of Grenada for the design of the future hydroelectric developments planned for the three rivers, and will be useful in studies of flood control measures and assessment of water availability for irrigation and domestic uses.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: None

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Solar Drying of Chilli Peppers

COUNTRY: Guyana

(a) TOTAL APPROVED FUNDING: US$49,500

(b) DISBURSEMENTS TO DATE: US$47,000

(c) PURPOSE: To conduct a study into the commercial drying of chilli peppers using ventilator-type dryers.

(d) EXPECTED OUTPUTS: Information on designing of dryers, methodology of handling peppers from harvesting to drying and packing to satisfy existing standards.

(e) PROGRESS TO DATE: Project completed - final report to be submitted by January 1985.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Unavailability of peppers, imported material for the construction of the dryers and unusually heavy rainfall. Also chemicals for laboratory tests were unavailable.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: CDB Assistance in procurement of imported chemicals and materials. First shipment arrived March 10, 1983.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0013 - Technology Research Fund

(i) EXECUTING AGENCY: Institute of Applied Science and Technology

(j) BENEFICIARY: Guyana and Region

(k) DATE APPROVED BY CDB: July 1980

(l) DATE AGREEMENT SIGNED: August 27, 1980

(m) (i) SCHEDULED COMPLETION DATE: June 1984

(ii) LIKELY COMPLETION DATE: June 30, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Series of country workshops to train people in construction and use of successful dryers.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 7

(ii) FROM DATE AGREEMENT SIGNED: 4

PROJECT: Pilot Ceramic Tile Project

COUNTRY: Jamaica

(a) TOTAL APPROVED FUNDING: US$67,500

(b) DISBURSEMENTS TO DATE: US$67,144

(c) PURPOSE: To test and evaluate local formulations for the production of ceramic wall and floor tiles on a pilot plant scale, test a new low energy production technique and to evaluate the response of the local market to local production of these items.

(d) EXPECTED OUTPUTS: Establishment of an indigenous ceramic tile technology for use in commercial production of tiles and a regional consultancy capacity.

(e) PROGRESS TO DATE: Project completed. Final report outstanding.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Delays were experienced in delivery of nearly all items of equipment and kiln furniture.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS:

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0013 - Technology Research Fund

(i) EXECUTING AGENCY: Scientific Research Council, Jamaica

(j) BENEFICIARY: Jamaica and Region

(k) DATE APPROVED BY CDB: July 1982

(l) DATE AGREEMENT SIGNED: October 22, 1982

(m) (i) SCHEDULED COMPLETION DATE: June 30, 1984

(ii) LIKELY COMPLETION DATE: April 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: On receipt of final report CDB to consider the project for loan financing.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 3

(ii) FROM DATE AGREEMENT SIGNED: 2

PROJECT: Utilisation of Coconut Wood

COUNTRY: Jamaica

(a) TOTAL APPROVED FUNDING: US$49,300

(b) DISBURSEMENTS TO DATE: US$49,300

(c) PURPOSE: To transfer coconut wood harvesting and utilisation techniques to Jamaica.

(d) EXPECTED OUTPUTS: Systematic harvesting and replanting of aged, dying or dead coconut trees; transfer of know-how for cutting and grading coconut wood and promotion of use of coconut wood for house building, fence posts, sporting goods, handles, hand-tool handles, curios and specialty items by establishing demonstrations of various applications.

(e) PROGRESS TO DATE: Project completed, proven to be highly successful. Workshop held to train technicians in harvesting, sawmilling and utilisation techniques for coconut wood.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: None

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: New Zealand Contribution to CDB's Special Fund Resources

(i) EXECUTING AGENCY: Forest Industries Development Co. Ltd. (FIDCO)

(j) BENEFICIARY: Government of Jamaica

(k) DATE APPROVED BY CDB: October 22, 1981

(l) DATE AGREEMENT SIGNED: January 27, 1982

(m) (i) SCHEDULED COMPLETION DATE: December 31, 1982

(ii) LIKELY COMPLETION DATE: Completed.

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Visits made by Senior Technical Assistant during October 1983. Training of interested Jamaicans and persons from other CDB member countries in production of low, medium and high density lumber from coconut wood.

(o) NO. OF SITE VISITS (i). FROM START OF PROJECT: 5

(ii) FROM DATE AGREEMENT SIGNED: 3

PROJECT: (a) Assessing and Regulating National Forest Resources Available for Fuelwood/Charcoal, (b) Establishing a Fuelwood Species Trial and (c) Improving Charcoal Production and Cookstoves.

COUNTRY: Montserrat

(a) TOTAL APPROVED FUNDING: US$204,800

(b) DISBURSEMENTS TO DATE: US$151,764

(c) PURPOSE: Assessing and regulating natural forest resources available for fuelwood/charcoal, establishing a fuelwood species trial, improving charcoal production and coostoves.

(d) EXPECTED OUTPUTS: Identification of most suitable fuelwood species, charcoal kilns and cookstoves and production of a manual and publication material for use in popularising techniques reccmmended by the study.

(e) PROGRESS TO DATE: Final reports on kiln and cookstove design received. Forest evaluation component still in progress.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: None

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytic Support and Field Tests and Applied Research and Development.

(i) EXECUTING AGENCY: Ministry of Agriculture - Montserrat

(j) BENEFICIARY: Government of Montserrat

(k) DATE APPROVED BY CDB: April 2, 1982

(l) DATE AGREEMENT SIGNED: June 17, 1982

(m) (i) SCHEDULED COMPLETION DATE: July 7, 1984

(ii) LIKELY COMPLETION DATE: June 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Promotion of successful technique throughout the Region under the Regional Energy Action Plan.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 8

(ii) FROM DATE AGREEMENT SIGNED: 6

PROJECT: Banana Stem Defibering Pilot Plant

COUNTRY: St. Lucia

(a) TOTAL APPROVED FUNDING: US$235,063

(b) DISBURSEMENTS TO DATE: US$203,596

(c) PURPOSE: To build and operate a pilot plant to extract fibre from the pseudo-stems of bananas and test the market for the fibre produced in order to test the viability of the industry.

(d) EXPECTED OUTPUTS: Information which will lead to the successful operation of banana defibering plants in the Region.

(e) PROGRESS TO DATE: Plant operated until November 30, 1984. Fibre produced despite some machine defects and changes. Positive spinning tests done in Germany and expected to be done in Jamaica in 1985.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Slowness of St. Lucian contractors. Delay in obtaining procurement waiver. Change in machine supplier because first supplier went out of business.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Regular visits to St. Lucia to speed up production and improvement of fibre quality.

(g) REPORTING DATES: End of calendar year

(h) FUNDING SOURCE: USAID 538-0013 - EIP-1 - Technology Research Fund
USAID CDF-1-Income

(i) EXECUTING AGENCY: CDB

(j) BENEFICIARY: Banana Industry in Commonwealth Caribbean.

(k) DATE APPROVED BY CDB: July 4, 1980

(l) DATE AGREEMENT SIGNED: December 19, 1980

(m) (i) SCHEDULED COMPLETION DATE: November 1984

(ii) LIKELY COMPLETION DATE: January 31, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Plant to be replicated if results show banana fibre industry to be feasible.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 55

(ii) FROM DATE AGREEMENT SIGNED: 55

PROJECT: Wind Powered Chill Room

COUNTRY: St. Lucia

(a) TOTAL APPROVED FUNDING: US$46,948

(b) DISBURSEMENTS TO DATE: US$39,163

(c) PURPOSE: To design and test a wind powered chill room in Dennery, St. Lucia and monitor its performance, assess the villagers' operation and maintenance of the system and improve marketing of fish catch.

(d) EXPECTED OUTPUTS: Technical evaluation of design of chill room in terms of maintenance of design temperatures. Increase in fish catch sold and in villagers' income levels, provision of cold storage in the village.

(e) PROGRESS TO DATE: Windmill erected and undergoing commissioning trials.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: The project has suffered from communication problems in St. Lucia, but these have been resolved by discussion with various parties.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: The Project Supervisor visited St. Lucia twice to resolve design problems.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Technical Programme - Field Tests and Applied Research and Development.

(i) EXECUTING AGENCY: Central Planning Unit, Government of St. Lucia

(j) BENEFICIARY: Region

(k) DATE APPROVED BY CDB: October 1981

(l) DATE AGREEMENT SIGNED: February 15, 1982

(m) (i) SCHEDULED COMPLETION DATE: August 1984

(ii) LIKELY COMPLETION DATE: August 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: If the project is successful, to encourage use of similar systems elsewhere in St. Lucia and the Caribbean.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 7

(ii) FROM DATE AGREEMENT SIGNED: 6

PROJECT: Technical Assistance in Improving Arrowroot Starch Extraction Technology

COUNTRY: St. Vincent and the Grenadines

(a) TOTAL APPROVED FUNDING: US$39,600

(b) DISBURSEMENTS TO DATE: US$33,868

(c) PURPOSE: Assist the Arrowroot Industry Association (AIA) in improving the efficiency of starch extraction by identifying areas of existing operations where improvements can be made by the introduction of alternative techniques or by more effective use of existing techniques.

(d) EXPECTED OUTPUTS: (1) Identification of techniques for improving processing preparations; (2) identification of investment requirements for improving the efficiency of the industry; and (3) proposals for rationalising the industry.

(e) PROGRESS TO DATE: Project completed. Report received and reviewed by TEU staff and AIA. Improvements to industry recommended.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: None

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID - 538-0013 - Technology Research Fund

(i) EXECUTING AGENCY: TEU and local consultants

(j) BENEFICIARY: AIA

(k) DATE APPROVED BY CDB: December 20, 1982

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: June 1983

(ii) LIKELY COMPLETION DATE: June 1985 for AIA's Comments.

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Loan project will be prepared by CDB's Agriculture Division depending on needs and resources of the industry.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 3

(ii) FROM DATE AGREEMENT SIGNED: 2

PROJECT: Pilot Bio-Digester System for the Arrowroot Industry Association's (AIA) Wallilabou Factory

COUNTRY: St. Vincent and the Grenadines

(a) TOTAL APPROVED FUNDING: US$34,100

(b) DISBURSEMENTS TO DATE: US$30,610

(c) PURPOSE: To design, construct, commission and field test a bio-digester system which will reduce pollution in a nearby river by utilising all the arrowroot wastes from the factory in a bio-digester/sludge drying system producing biogas for partial substitution of diesel fuel used to run the factory engines and liquid effluent (sludge) which will be dried and used as a soil conditioner/fertiliser and/or animal feed.

(d) EXPECTED OUTPUTS: Successful demonstration of the bio-digester technology to treat agro-processing wastes, control pollution originally caused by these wastes, produce energy for process use and feed and/or fertiliser for agricultural use, adoption of bio-digester technology by producers of large concentrations of bio-wastes.

(e) PROGRESS TO DATE: Construction of digester completed. Diesel engines to be converted to run on biogas. System operational from December 1984 to April 1985, arrowroot harvesting season.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Lack of site supervision during construction.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Biogas Team to visit at least every week during initial and critical stages of construction.

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID 538-0032 - Field Tests, Applied Research and Development

(i) EXECUTING AGENCY: AIA

(j) BENEFICIARY: AIA

(k) DATE APPROVED BY CDB: November 29, 1983

(l) DATE AGREEMENT SIGNED: December 1983

(m) (i) SCHEDULED COMPLETION DATE: August 31, 1985

(ii) LIKELY COMPLETION DATE: August 31, 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Workshop to familiarise masons with the construction techniques and farmers, health officers, loan officers of agricultural banks, agricultural extension officers with the technology, its applications and the assessment of investment opportunities.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 5

(ii) FROM DATE AGREEMENT SIGNED: 1

PROJECT: Banana Transportation by Aerial Cableway

COUNTRY: Windward Islands (Dominica, Grenada, St. Lucia and St. Vincent)

(a) TOTAL APPROVED FUNDING: US$96,000

(b) DISBURSEMENTS TO DATE: US$75,568

(c) PURPOSE: Development and demonstration of an appropriate and replicable design of cableway for in-field transportation of bananas on hilly terrain. Evaluation of economic, financial and social feasibility of small farmers using cableways.

(d) EXPECTED OUTPUTS: A workable design of cableway capable of being built in the smaller Caribbean Islands, an evaluation of the benefits in labour cost reduction and reduction in damage to fruit and data on costs of building and operating cableways.

(e) PROGRESS TO DATE: CARDI submitted final report which concludes that cableways uneconomic for use in handling bananas in hilly regions.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: The original NIAE design was poorly modified to use local materials which led to procurement problems and equipment failure.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Project terminated.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID/New Zealand Technical Assistance Fund

(i) EXECUTING AGENCY: Caribbean Agricultural Research and Development Institute/Windward Islands Banana Growers' Association

(j) BENEFICIARY: Region

(k) DATE APPROVED BY CDB: June 1978

(l) DATE AGREEMENT SIGNED: August 4, 1978

(m) (i) SCHEDULED COMPLETION DATE: September 30, 1982

(ii) LIKELY COMPLETION DATE: June 1985 likely if project restarts soon.

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Report to be submitted to Ministries of Agriculture in those countries participating in project.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 8

(ii) FROM DATE AGREEMENT SIGNED: 8

PROJECT: A Biomass Resource Analysis and Assessment for the Windward and Leeward Islands and Barbados

COUNTRY: Regional

(a) TOTAL APPROVED FUNDING: US$113,530

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To provide an assessment of the quality, distribution and scale of biogas resources and supply in eight Caribbean countries. To identify viable techniques of biomass conversion and specif· pilot projects leading to their commercialisation.

(d) EXPECTED OUTPUTS: Assessment reports on the biomass p›tential to each country and suggested pilot projects.

(e) PROGRESS TO DATE: Project not yet implemented.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: USAID has not agreed :o finance the project.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Alternative sources of funding are being sought.

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID 538-0032 - Resource Assessment and Analytical Support

(i) EXECUTING AGENCY: University ›f Puerto Rico/CEER. Evaluation by CARDI

(j) BENEFICIARY: Region - LDCs and Barbados

(k) DATE APPROVED BY CDB: July 24, 1981

(l) DATE AGREEMENT SIGNED: Not sig..ed

(m) (i) SCHEDULED COMPLETION DATE: Project to last 9 months.

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Alternative sources of funding to be identified.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 1

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Caribbean Technological Consultancy Services Network (CTCS)

COUNTRY: Regional

(a) TOTAL APPROVED FUNDING: US$131,670 up to December 1984
US$777,400 (new approvals for period 1985-87)

(b) DISBURSEMENTS TO DATE: US$127,000

(c) PURPOSE: To establish a network of indigenous experts to solve industrial problems in the region.

(d) EXPECTED OUTPUTS: Formation of a network of institutions; improvement in technology transfer leading to greater operational efficiency in industry.

(e) PROGRESS TO DATE: Project progressing well. Financing obtained from IDRC, UNDP and CDB to continue the project for 3 years.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: None

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Bi-monthly to IDRC.

(h) FUNDING SOURCE: USAID 538-0013 - EIP-1 - Technical Information Unit
USAID 538-0032 - Communications Programme - Travel and Per Diem.
USAID CDF-1 - Income
IDRC; UNDP; CDB.

(i) EXECUTING AGENCY: Technology and Energy Unit

(j) BENEFICIARY: CDB's Commonwealth Caribbean member countries.

(k) DATE APPROVED BY CDB: January 18, 1982 (Pilot Project)
December 1984 (Extension to Project)

(l) DATE AGREEMENT SIGNED: December 1984 (IDRC)
January 1985 (UNDP)

(m) (i) SCHEDULED COMPLETION DATE: (i) June 1983 (pilot phase - Actual Completion Date December 1984)

(ii) December 31, 1987 (new approvals)

(ii) LIKELY COMPLETION DATE: December 31, 1987

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Further development of network and programme to make it self-financing.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 44 field visits.

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Eastern Caribbean Wind and Solar Energy Resource Assessment

COUNTRY: Antigua & Barbuda, Barbados, Montserrat, St. Kitts & Nevis and St. Lucia

(a) TOTAL APPROVED FUNDING: US$546,194.

(b) DISBURSEMENTS TO DATE: US$540,434

(c) PURPOSE: To provide wind and solar data for each island included in the project, to the tourism, agricultural and engineering sectors throughout the Caribbean.

(d) EXPECTED OUTPUTS: Detailed statistical analysis of existing wind and solar data for each island and wind flow and solar radiation maps for each island.

(e) PROGRESS TO DATE: Project completed. Final report submitted.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Personnel shortages within CMI delayed completion.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0013 - Technology Research Fund.
USAID 538-0032 - Technical Programme - Resource Assessment and Analytic Support.

(i) EXECUTING AGENCY: Caribbean Meteorological Institute

(j) BENEFICIARY: Region

(k) DATE APPROVED BY CDB: October 1980

(l) DATE AGREEMENT SIGNED: January 31, 1981

(m) (i) SCHEDULED COMPLETION DATE: August 1983

(ii) LIKELY COMPLETION DATE: Completed December 1984

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Dissemination of final report on project. Assessment of market for wind, electric power generation and water pumping in islands covered. Investment in wind farms by utilities in countries covered.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 7

(ii) FROM DATE AGREEMENT SIGNED: 7

PROJECT: Mineral Resource Assessment

COUNTRY: St. Lucia and St. Vincent and the Grenadines

(a) TOTAL APPROVED FUNDING: US$119,500

(b) DISBURSEMENTS TO DATE: US$107,836

(c) PURPOSE: To conduct a Mineral Resource Survey in St. Lucia and St. Vincent and the Grenadines.

(d) EXPECTED OUTPUTS: Information which will assist in assessing the mineral potential of St. Lucia and St. Vincent and the Grenadines through the geo-chemical assessment of stream and beach sediment samples. A geo-chemical atlas of each country covering 44 elements suitable for use by geologists, agriculturalists and public health officials and persons concerned with development of drinking water supplies.

(e) PROGRESS TO DATE: Surveys have been completed and final report submitted for study.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Delays in funding agreement with implementing agency.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Several follow-up letters and telexes sent.

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID 538-0013 - Technology Research Fund

(i) EXECUTING AGENCY: Los Alamos National Laboratories

(j) BENEFICIARY: St. Lucia and St. Vincent and the Grenadines

(k) DATE APPROVED BY CDB: July 25, 1983

(l) DATE AGREEMENT SIGNED: January 31, 1984

(m) (i) SCHEDULED COMPLETION DATE: January 1984 - Final Report received July 1984.

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Report submitted to Governments of St. Lucia and St. Vincent and the Grenadines.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: N/A

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Renewable Energy Development (RED) Station - Feasibility Study and Financing

COUNTRY: Regional

(a) TOTAL APPROVED FUNDING: US$24,050

(b) DISBURSEMENTS TO DATE: Nil

(c) PURPOSE: To determine the technical and financial feasibility of establishing, operating and maintaining a regional RED station and a complement of local outpost units, located in participating Caribbean countries.

(d) EXPECTED OUTPUTS: Establishment of a regionally located, financially viable regional renewable energy development station; creation of a system of local outpost units of the RED station; pooling of manpower and financial resources and focusing of technical efforts through the development of the RED station.

(e) PROGRESS TO DATE: Study completed.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: None

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID 538-0032 - Technical Programme - Resource Assessments and Analytic Support

(i) EXECUTING AGENCY: Enerplan Ltd.

(j) BENEFICIARY: CDB/CARICOM Region

(k) DATE APPROVED BY CDB: September 30, 1982

(l) DATE AGREEMENT SIGNED: No agreement signed. Funding provided through CARICOM

(m) (i) SCHEDULED COMPLETION DATE: October 31, 1983

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: CARICOM will seek donor financing for components of the RED Station and outpost units, if study shows project is feasible.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: N/A

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Wind Energy Conversion System (WECS)

COUNTRY: Barbados

(a) TOTAL APPROVED FUNDING: US$107,960

(b) DISBURSEMENTS TO DATE: US$83,233

(c) PURPOSE: To demonstrate the operation of small WECS privately owned and operated and inter-tied to the electricity grid as a means of utilising the wind energy potential in the Caribbean Region.

(d) EXPECTED OUTPUTS: Measures of system efficiency; evaluation of the operation and maintenance requirements of small WECS; demonstration of the operation of a small WECS inter-tied to the utility grid; preparation of an information brochure on the operation, maintenance and environment parameters of the WECS.

(e) PROGRESS TO DATE: Company on whose premises turbine was to be located has gone into voluntary liquidation. Site in another member country being investigated.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Difficulties in obtaining a suitable 50 Hz turbine.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: After issuing three invitations for proposals, a suitable turbine was identified.

(g) REPORTING DATES: Quarterly

(h) FUNDING SOURCE: USAID 538-0032 - Technical Programme - Field Tests and Applied Research and Development

(i) EXECUTING AGENCY: TEU

(j) BENEFICIARY: Region

(k) DATE APPROVED BY CDB: January 1982

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: August 1985

(ii) LIKELY COMPLETION DATE: October 1985

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: Proposal to find alternative site for turbine in another CDB member country.

(o) NO. OF SITE VISITS (i) FROM START OF PROJECT: 3

(ii) FROM DATE AGREEMENT SIGNED: 3

PROJECT: Hotel Energy Conservation Seminar

COUNTRY: Antigua

(a) TOTAL APPROVED FUNDING: US$6,514

(b) DISBURSEMENTS TO DATE: Nil (Cancellation of budget requested).

(c) PURPOSE: To assist hoteliers in Antigua, Montserrat and St. Kitts & Nevis to use energy more efficiently.

(d) EXPECTED OUTPUTS: Use of the Hotel Managers' Energy Conservation Manual was promoted and hoteliers were provided with information on technical and financial assistance available from CDB's and DFCs to implement energy conservation projects.

(e) PROGRESS TO DATE: Seminar held in Antigua on November 2, 1984 Seminar only attended by hoteliers from Antigua.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: N/A

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID - Alternative Energy Systems Project No. 538-0032

(i) EXECUTING AGENCY: CDB in cooperation with Antigua Hotels and Tourist Association

(j) BENEFICIARY: Hoteliers in Antigua

(k) DATE APPROVED: October 19, 1984

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: Seminar held in November 1984.

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED OR UNDERTAKEN: None

(o) NO. OF SITE VISITS: (i) FROM START OF PROJECT: 1

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Workshop on Energy Information Systems

COUNTRY: Trinidad and Tobago

(a) TOTAL APPROVED FUNDING: US$15,763

(b) DISBURSEMENTS TO DATE: US$7,085

(c) PURPOSE: To explore and discuss the feasibility of establishing an Energy Information Network for the Caribbean.

(d) EXPECTED OUTPUTS: Plans to establish a Caribbean Energy Information Network using existing national and regional institutional resources.

(e) PROGRESS TO DATE: Project completed.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: N/A

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: N/A

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID - Alternative Energy Systems Project No. 538-0032

(i) EXECUTING AGENCY: Commonwealth Science Council (CSC) in cooperation with CDB and CARIRI

(j) BENEFICIARY: Regional librarians, energy planners and officers

(k) DATE APPROVED: March 26, 1984

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: Workshop held from May 14-18, 1984

(ii) LIKELY COMPLETION DATE:

(n) FOLLOW-UP ACTIONS UNDERTAKEN: The Seminar report and recommendations submitted to CDCC, CCST and to CARICOM Ministers of Energy.

(o) NO. OF SITE VISITS: (i) FROM START OF PROJECT: 2

(ii) FROM DATE AGREEMENT SIGNED: N/A

PROJECT: Seminar on electricity Generation from New and Renewable Sources of Energy (NRSE)

COUNTRY: Antigua

(a) TOTAL APPROVED FUNDING: US$13,041

(b) DISBURSEMENTS TO DATE: US$4,344

(c) PURPOSE: To encourage the development and use of renewable energy sources by major energy consumers in the Caribbean.

(d) EXPECTED OUTPUTS: Potential borrowers sensitised to the issues involved in identifying and preparing projects for generating power from wind energy, bagasse, and sawmilling wastes, which are considered to be commercially viable and which can contribute to the Bank's loan portfolio.

(e) PROGRESS TO DATE: Seminar held in Antigua from November 26-28, 1984.

(f) (i) PROBLEMS LEADING TO IMPLEMENTATION DELAYS: Availability of resource persons.

(ii) ACTION TAKEN TO RESOLVE PROBLEMS: Seminar dates postponed

(g) REPORTING DATES: N/A

(h) FUNDING SOURCE: USAID - Alternative Energy Systems Project No. 538-0032

(i) EXECUTING AGENCY: CDB in cooperation with APUA and OECS

(j) BENEFICIARY: Regional electric utilities and other large industrial energy users.

(k) DATE APPROVED: October 24, 1984

(l) DATE AGREEMENT SIGNED: N/A

(m) (i) SCHEDULED COMPLETION DATE: Seminar held in November 1984

(ii) LIKELY COMPLETION DATE: N/A

(n) FOLLOW-UP ACTIONS PLANNED: Visits to be made to those potential borrowers who have indicated interest in developing such projects.

(o) NO. OF SITE VISITS: (i) FROM START OF PROJECT: 2

(ii) FROM DATE AGREEMENT SIGNED: N/A

APPENDIX III

COMMUNICATIONS ACTIVITIES - 1984

ACTIVITY	FUNDING ($'000)
A. Meetings and Workshops	
1. Workshop on Energy Information Systems - May	16
2. Seminar on Hotel Energy Conservation - November	6
3. Seminar on Electricity Generation from New and Renewable Sources of Energy -November	13
4. National Biogas Workshop - November	1
B. Publications, Posters, Pamphlets	
Publications	
TEU Newsletter (4)	4
Energy Conservation in the Caribbean	3
Waste as a Resource	4
Small Solar Dryers for Rural Communities	1
Report on Meeting of Lab-Based Institutions	-
Wind Energy in the Caribbean	2
General Energy Conservation Bibliography	-
Lorenergy - Using our local Renewable Energy from the Forests	-
Posters	
Wind Energy)	
Biogas Production)	
Charcoal Production)	8
Cookstoves)	
Energy Conservation for Hotels)	
Stickers to promote Energy Conservation)	

COMMITMENTS AND DISBURSEMENTS OF FINANCIAL RESOURCES AVAILABLE UNDER USAID PROJECT NOS.538-0032, 538-0013, IDRC AND UNDP GRANTS, AND CDB'S COUNTERPART CONTRIBUTION
(US$'000)

PROJECT SUB-HEADS	TOTAL ALLOCATION	CUMULATIVE APPROVALS AS AT 31/12/84	06/85	12/85	CUMULATIVE DISBURSEMENTS AS AT 31/12/84	06/85	12/85
A. GRANT 538-0013 - TECHNOLOGY COMPONENT							
1. Technology Information Unit - Technical Assistance, Operations and Equipment	223	215	-	-	210	-	-
2. Technology Research Fund	1,000	977	-	-	873	-	-
TOTAL	1,223	1,192	-	-	1,083	-	-
B. GRANT 528-0032 - TECHNICAL PROGRAMME, COMMUNICATIONS PROGRAMME AND INSTITUTIONAL DEVELOPMENT							
1. Technical Programme:							
(a) Field Tests, Applied Research and Development)	2,000	1,742	1,995	2,000	1,015	1,899	1,995
(b) Resource Assessment and Analytic Support)							
2. Communications Programme:							
(a) Labour	156	112	136	156	86	145	150
(b) Travel and Per Diem	262	261	262	262	164	250	260
(c) Reproduction, Supplies and Materials	120	88	100	120	55	95	119
3. Institutional Development:							
(a) Energy Unit - Communications, Travel and Per Diem	205	166	185	205	166	180	195
(b) Labour	1,260	1,203	1,260	1,260	1,129	1,234	1,260
TOTAL	4,003	3,572	3,938	4,003	2,615	3,803	3,979
C. IDRC GRANT TO CTCS	441	-	123	201	-	62	123
D. UNDP GRANT TO CTCS	15	-	15	-	-	15	-
E. CDB COUNTERPART CONTRIBUTION TO CTCS	321	-	53	107	-	-	-

APPENDIX V

ANALYSIS OF CTCS INFORMATION AND TECHNICAL ASSISTANCE REQUESTS

PERIOD JANUARY 01, 1984 TO DECEMBER 31, 1984

COUNTRY	DOCU-MENTS	REPACK-AGING	TECHNICAL EXPERTISE IN THE FIELD	REPACKAGING & DOCUMENTS	TECHNICAL ASSISTANCE
Anguilla	-	1	-	-	-
Antigua and Barbuda	-	2	-	-	1
Barbados	-	2	9	1	5
British Virgin Islands	-	1	-	-	-
Bahamas	-	-	-	-	-
Belize	3	2	-	-	-
Dominica	2	-	2	-	-
Grenada	1	3	-	2	3
Guyana	-	-	-	-	-
Jamaica	5	1	-	1	2
Montserrat	1	5	1	2	2
St. Kitts and Nevis	-	2	2	-	2
St. Lucia	1	4	-	-	-
St. Vincent and the Grenadines	4	3	1	1	1
Trinidad and Tobago	1	2	-	2	-
Regional	1	4	1	-	-
Extra-Regional	10	6	-	-	-
TOTAL	29	38	16	9	16

APPENDIX VI

WORK PROGRAMME FOR 1985

Key to Abbreviations Used

COUNTRIES

AG	-	Anguilla
AN	-	Antigua and Barbuda
BA	-	Bahamas
BD	-	Barbados
BVI	-	British Virgin Islands
BZ	-	Belize
CI	-	Cayman Islands
DO	-	Dominica
GA	-	Grenada
GU	-	Guyana
JA	-	Jamaica
MO	-	Montserrat
OECS	-	Organisation of Eastern Caribbean States
RE	-	Regional
SKN	-	St. Kitts and Nevis
SL	-	St. Lucia
SV	-	St. Vincent and the Grenadines
TT	-	Trinidad and Tobago

OTHER ABBREVIATIONS

A	-	Project Approval
C	-	Completion of Activity
D	-	Dissemination of Output
I	-	Initiation of Work/activity
P	-	Project Preparation Completed

WORK PROGRAMME FOR 1985

ACT.	ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COUNTRY
100	COMMUNICATIONS PROGRAMME													
101	Publication of Regular Newsletters	X				X			X			X		
102	Publication of Special Bulletins:													
	(a) Biogas in the Caribbean			X										RE
	(b) Solar Energy in the Caribbean							X						
	(c) Profiles of Small-scale Industries Vol. 1												X	RE
103	Reports on Workshops and Completed Studies													
	(a) Seminar on Electricity Generation from New and Renewable sources of Energy		X											RE
	(b) Selected Papers on the Caribbean Power Sector			X										RE
	(c) Proceedings of Workshop on Power Loss Reduction and Electricity Tariff Studies											X		RE
	(d) Workshop on Bio-digestion of Wastes												X	RE
104	Displays, Posters and Brochures													
	(a) CTCS Network Poster dissemination	D												
	(b) Regional displays on TEU's Work and Publications		X			X		X		X				JA/ OECS
	(c) Poster for Biogas Extension Programme	D												RE
	(d) Posters on Energy Conservation in Tourism Manufacturing and Commerce	D												RE
	(e) Brochure on TEU Publications	D												RE
	(f) Stickers to Promote Energy Conservation	D												RE

ACT.	ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COUNTRY
105	Radio and Television													
	(a) Radio Tapes on Successful Renewable Energy and Conservation Projects				I		C		D					
	(b) Video/slide tape on successful small-scale energy systems (charcoal, biogas, solar dryers, etc.)				I							C		
106	Workshops/Seminars/ Conferences													
	(a) Nat'l Workshop on Bio-Digestion of Wastes					X								BA
	(b) Regional Workshop on Bio-digestion of Wastes										X			BD
	(c) Nat'l Hotel Energy Conservation Seminar								X					BA
	(d) Farm Tech '85 - Seminar and Exhibition		X											JA
	(e) Seminar on Energy Planning (UNECLAC/CDB)				X									
	(f) Workshop on Power Loss Reduction and Electricity Tariff Studies									X				RE
	(g) Regional Workshop on Food Processing Quality Control						X							RE
	(h) Regional Workshop on Preventative Maintenance											X		RE
	(i) National Seminar on Production Cost Control										X			SL
107	Select Information Packages													RE
	(a) Small-scale Cashew Processing						I		C					RE
	(b) Cold Storage of Perishables								I		C			RE
	(c) Shellers/threshers for peas, corn and peanuts										I		C	RE
	(d) Directory of Resource Persons Available through CTCS													RE
	(e) Publication of Regular CTCS Newsletters		X		X		X		X		X		X	RE

ACT.	ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COUNTRY
108	Special CTCS Network Meetings													
	(a) Special Meeting of CTCS Network Steering Committee		X								X			RE
	(b) Meeting of Reps. of Lab-based Insts.							X						RE
109	CTCS Network Extension Visits													
	(a) Antigua/St. Kitts/ Montserrat		X				X			X		X		RE
	(b) Anguilla						X					X		AG
	(c) Bahamas			X					X					BA
	(d) Belize			X				X						BZ
	(e) BVI			X					X					BVI
	(f) Cayman Islands						X							CI
	(g) Dominica			X					X		X		X	DO
	(h) Grenada		X				X			X		X		GA
	(i) St. Lucia	X			X		X		X				X	SL
	(j) St. Vincent				Y.		X			X		X		SV
110	CTCS Network Referral Centre Visits													
	(a) Guyana				X									GU
	(b) Jamaica						X							JA
	(c) Trinidad and Tobago				X									TT
111	CTCS Network Technical Assistance													
	(a) Responses to enquiries													
112	Audits of On-Going CDB Projects													
200	ENERGY CONSERVATION STUDIES													
	Loss Reduction Study - AN							I		A			C	AN
	" " " - BZ		I		A					C				BZ
	" " " - GA	I		A				C						GA
	Elec. Tariff Study - DO					I	A		C					DO
	" " " - SK							I		A	C			SK

ACT.	ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COUN-TRY
300	TECHNOLOGY DEVELOPMENT PROGRAMME - PROJECT PREPARATION													
	(a) Bio-digester, Antigua	P	A											AN
	(b) Bio-digester, Belize			P	A									BZ
	(c) Bio-digester, Guyana		P	A										GU
	(d) Bio-digester, Montserrat						P	A						MO
	(e) Bio-digester, SKN				P	A								SKN
302	Wind Farm Demonstration Project				I			P		A				MO
303	Small Decentralised Hydro-Power Demonstration Project		I			P		A						BZ
304	Study of Fuelwood and Charcoal Economy in OECS			I						C				OECS
400	INVESTMENT PROMOTION													
401	Identification and Preparation of Loan Project for Captive Energy Saving Wind Turbine							I			P			BD
402	Energy Conservation in Tourism thru' Establishment and Promotion of Revolving Loan Fund	I	P	A										BD, OECS, BA
403	Use of Sawmilling Wastes Among DFC's Clients													RE
404	Use of Vegetable Wastes on Plantations Among DFC's Clients													RE
405	Use of Bio-digesters Among DFC's Clients													RE
406	Identification and Preparation of Project for Electricity from Bagasse and Wood Waste	I							C					JA
407	Electric Power Loss Reduction - St. Lucia													SL
408	Electric Power Loss Reduction - St. Kitts and Nevis													SKN
409	Electric Power Loss Reduction - Dominica													DO

ACT.	ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	COUN-TRY
410	Feasibility Study for Increased Production of Electricity from Surplus Bagasse in Barbados Sugar Industry		I								C			BD
411	Identification and Preparation of Projects for Electricity Production from Bagasse	I									C			BZ
412	Pricing Electricity from Intermittent Sources			I				C						RE
413	Guidelines for Appraising Energy Projects			I				C						RE
500	SUPERVISION OF ON-GOING PROJECTS AND STUDIES													
	Banana Defibering Pilot Plant													SL
	Testing and Demonstration of Solar Pumping System													AN
	Wind Turbine Demonstration - Antigua													AN
	Wind Powered Chill Room - St. Lucia													SL
	Wind Turbine Demonstration - CDB													RE
	Red Mud Plastic Bag Bio-Digester													BD
	Hydropower Resource Assessment - Dominica													DO
	Hydropower Resource Assessment - Belize													BZ
	Hydropower Resource Assessment - Grenada													GA
	Fuelwood/Charcoal and Cookstove Project													MO
	Biogas Pilot Plant - Wallilabou													SV
	Electric Tariff Study - St. Lucia													SL
	Electric Tariff Study - St. Vincent													SV
600	TEU COMMITTEE MEETINGS													
	(a) TEU Advisory Committee	X												RE
	(b) TEU Technical Advisory Sub-Committee	X				X				X				RE
	(c) CAES Project Advisory Committee			X										

APPENDIX VII

APPROVED FIELD TESTS, RESOURCE ASSESSMENTS AND ANALYTIC STUDIES
(ALL FUNDING SOURCES INCLUDED)

ACTIVITY AREA/SUB-PROJECT	FUNDING ($'000)	DATE APPROVED	SOURCE FUNDING	PHYSICAL STATUS
A. More Efficient Use of Oil				
1. Hotel Energy Audits - Grenada	23	July 1981	538-0032	Completed
2. Hotel Energy Conservation Manual	6	July 1981	538-0032	Completed
3. Energy Efficient Pilot Ceramic Tile Project	68	July 1982	538-0013	Completed
B. Fuel Substitution				
1. Bagasse for Electricity Generation (with ODA, CIDA and CSC)	20			Completed
2. TEU Passive Solar Building	30	Feb. 1980	538-0032	Completed
3. Non-Conventional Water Heating in Tourism Sector	9	Feb. 1980	538-0032	Completed
4. Solar Drying of Chilli Peppers	50	July 1980	538-0013	Completed
5. Testing of Solar Collectors	16	Feb. 1981	538-0032	Completed
6. Wind Turbine Demonstration - Antigua	272	May 1981	538-0032	Turbine erected
7. Integrated Energy Programme - Orange Hill, St. Vincent and the Grenadines	33	June 1981	538-0032	Completed
8. Biogas from Arrowroot Bittie	47	June 1981	538-0013	Completed
9. Monitoring and Evaluation of TEU Passive Solar Building	26	June 1981	538-0032	Funds transferred to new project
10. Biogas at River Plantation	7	Aug. 1981	538-0032	Cancelled
11. Wind-Powered Chill Room - St. Lucia	45	Sept 1981	428-0032	Progressing
12. Electric Power Production from Sawmilling Wastes	16	Nov. 1981	538-0032	Completed
13. Grid-Connected Mini-Hydro Demonstration - Dominica	101	Dec. 1981	538-0032	Scope changed
14. Red Mud Plastic Bag Digester (200 m^3)	31	Dec. 1981	538-0032	Completed. Monitoring in progress.
15. Wind Turbine Project - CDB	108	Jan. 1982	538-0032	Awaiting equipment delivery and new location
16. Study on Biodigestion Characteristics for Chicken Litter	5	Feb. 1984	538-0013	Completed
17. UWI Solar Still Demonstration Project	7	Sept 1983	538-0032	Not taken up
18. Pilot Bio-Digester at Wallilabou Factory - St. Vincent and the Grenadines	34	Dec. 1983	538-0032	In progress
19. Study of Bio-digestion Characteristics for chicken litter, bagasse and chicken litter/ pig manure and solar drying of sludge	5	Feb. 1984	538-0013	Completed
20. Hoad Dairy Farm Bio-Digester System	36	Apr. 1984	538-0032	In progress
21. Extension of Stream-Gauging and Hydrological Assessment - Western District, Dominica	100	Oct. 1984	538-0032	Agreement not yet signed
22. Stream-Gauging and Hydrological Assessment - Belize	116	Dec. 1984	538-0032	Agreement not yet signed
23. Stream-Gauging and Hydrological Assessment - Grenada	100	Dec. 1984	538-0032	Agreement not yet signed
C. Rural Development and Reducing Recruitment of New Fossil Fuel Consumers				
1. Banana Transportation by Aerial Cableway	170	June 1978	SDF NZ 538-0007	Work terminated
2. Hydropower Resources Assessment - Dominica	87	Dec. 1981	538-0032	Progressing well
3. Promotion of Simple Domestic Solar Dryers	10	Mar. 1981	538-0013	Completed
4. Assessing and Regulating National Forest Resources; Establishing a Fuelwood Species Trial; Improving Charcoal Production and Cookstoves	205	Mar. 1982	538-0032	Well advanced

ACTIVITY AREA/SUB-PROJECT	FUNDING ($'000)	DATE APPROVED	SOURCE FUNDING	PHYSICAL STATUS
D. Preparation to Meet Future Needs				
1. Peat Resource Assessment	6	Apr. 1980	538-0032	Completed
2. Wind and Solar Energy Resource Assessment	250) 262) 37)	Aug. 1980 Aug. 1980 June 1983	538-0013 538-0032 538-0032	Field work completed Report submitted
3. Testing and Demonstration of Photovoltaic Solar Pumping System	47	Mar. 1981	538-0013	Installation completed
4. Biomass Resource Assessment	114	July 1981	-	Funding being sought
5. Regional Renewable Energy Development Station - Feasibility Study	24	Oct. 1982	538-0032	Progressing
6. Mineral Resource Assessment	119	Sept 1983	538-0013	Completed
E. Employment Generation/Utilisation of Indigenous Resources				
1. Coir Fibre Pilot Plant	101	Dec. 1977	USAID/SFR	Completed
2. Chemical Lime - Antigua	18	Dec. 1979	538-0013	Completed
3. Control of Crop Damage by Monkeys	42	Dec. 1979	538-0013	Completed
4. Caribbean Appropriate Technology Centre - Feasibility Study	10	Apr. 1980	538-0013	Completed
5. Banana Stem Defibering Pilot Plant	200	July 1980	538-0013	Operations suspended
6. Feed and Fertiliser from Protein Wastes	48	July 1981	538-0013	Completed
7. Utilisation of Coconut Wood	49	Oct. 1981	NZ TAF	Completed
8. Mechanical Harvesting of Arrowroot	5	Jan. 1982	538-0013	Completed
9. Assessment of Arrowroot Processing Technology	40	Dec. 1982	538-0013	Study completed