655-0009
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PD-AAG-801
ISN 153

PROJECT PAPER

CAPE VERDE

RENEWABLE ENERGY

Project 655-0009

(AIP 625-0937.03)

Authorized: February 26, 1980

Amount: $500,000

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete)

Amendment Number

Document Code

2. COUNTRY/ENTITY

3. PROJECT NUMBER: 635-0009

4. BUREAU/OFFICE: SER 06

5. PROJECT TITLE (maximum 40 characters): CAPE VERDE RENEWABLE ENERGY

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 08 DD 31 YY 82

7. ESTIMATED DATE OF OBLIGATION (Under "B" below, enter 1, 2, 3, or 4)

A. Initial FY 80 B. Quarter 2

8. COSTS ($000 OR EQUIVALENT $1 =

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LAST FY E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(465)	(35)	(500)	(465)	(35)	(500)
(Loan)	( )	( )	( )	( )	( )	( )
Other 1.						
2.						
Host Country		100			100	100
Other Donor(s)		800 est			800 est	800 est
TOTALS	465	935 est		465	935 est	1400

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION / PRIMARY PROGRAM PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) 741	873		-	-	500	-	500	-
(2)								
(3)								
(4)								
TOTALS					500		500	

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE COD

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code: 000

B. Amount: 455

13. PROJECT PURPOSE (maximum 440 characters)

To provide the GOCV with R&D experience in non-fossil fuel energy systems as input to the formulation of a National Energy Plan which : a) reduces reliance on fuel imports, and
b) makes available local energy inputs for the population

14. SCHEDULED EVALUATIONS: Interim MM YY MM YY; Final MM 08 YY 82

15. SOURCE/ORIGIN OF GOODS AND SERVICES: Code 000; 941; Local; Other (Specify) 935

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

17. APPROVED BY: CDO/Guinea Bissau-Cape Verde

Director Renso

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION

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File 655-00

PROJECT AUTHORIZATION

NAME OF COUNTRY: CAPE VERDE

NAME OF PROJECT: CAPE VERDE - RENEWABLE ENERGY

NUMBER OF PROJECT: 655-0009

1. PURSUANT TO Section 121 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Renewable Energy Project (655-0009) for Cape Verde ("the Cooperating Country") involving a planned obligation of not to exceed $500,000 in A.I.D. grant funds in FY 80, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs of the project.

2. The project consists of a thirty month program of research and development of small-scale technologies for exploiting renewable energy resources in Cape Verde, including the development of an applied research and development plan, the analysis of energy needs and resources, the design and manufacture of prototype devices, and the testing of performance and acceptability of prototypes, including investigation of the economic and financial implications of new devices and systems before they are built and while they are being tested. A.I.D. funding will provide technical assistance in the form of equipment, instruments, supplies, technical advisors, and training to the Cape Verde Ministry of Rural Development, Bureau of Conservation and Natural Resources (MRD), the implementing agency for the project.

3. No Project Agreement shall be signed nor shall funds in any other way be obligated for this project until Congressional Notification requirements have been satisfied.

4. The Project Agreement, which may be negotiated and executed by the officer (s) to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and conditions as AID may deem appropriate.

5. a. Source and Origin of Goods and Services

(1) Except as indicated in paragraph 5 a (2) below, goods and services, except for ocean shipping, financed by A.I.D. under the project shall have their source, origin, and nationality in countries included in AID Geographic Code 941 and the Cooperating Country, except as A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States or the Cooperating Country.

(2) In accordance with the procurement source waiver approved by the Director, REDSO/WA, on February 11, 1980, project commodities of a value not to exceed $13,505 may have their source and origin in countries included in A.I.D. Geographic Code 935.

b. Condition Precedent

Prior to any disbursement, or to the issuance of any commitment documents under the Project Agreement, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D. written evidence of a commitment from the United Nations or another donor to provide to the project the services of one wind/solar technician for a period of not less than two years and a second wind/solar technician for a period of not less than 18 months.

Signature: James O'Malley

Title: Country Development Officer

Date: February 26, 1980

Clearances:

G. Thompson, REDSO/WA (DRAFT)
J. Carroll, REDSO/WA (DRAFT)
G. W. Evans, REDSO/WA

CAPE VERDE RENEWABLE ENERGY

PROJECT PAPER

DECEMBER , 1979

PREFACE

This Project Paper was prepared by J. Clark Spooner, P. O. Box 3, Leland, Michigan, 49654, under Contract No. AID-AFR-C-1612 in November and December, 1979 at Praia, Cape Verde and Abidjan, Ivory Coast. Much valuable assistance was contributed by the staffs at both posts particularly Mr. Hugh Smith and Mr. Joseph Carroll.

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I. Project Background:

The Cape Verde Renewable Energy Project Identification Document (PID) was prepared during the period March-June, 1979. It proposed a project to assist the Government of Cape Verde, Ministry of Rural Development, Bureau of Conservation and Natural [illegible] (MRD), with their already active wind energy p[illegible] the scope of their activities to include other [illegible] resources.

These components will be integrated into a rational, broadened R and D program in wind energy and the other renewable energy sources available in the Cape Verde Islands.

As detailed in the PID, the Republic of Cape Verde is faced with two critical resource scarcities: water and fuel. Fresh water has become a scarce and precious commodity in this island republic. In response to this crisis, the government has embarked upon a program to increase and stabilize water supplies for domestic and agricultural consumption through the development of the country's groundwater resources.

Providing for water, either through pumping groundwater or desalting sea water, requires substantial inputs of energy. In large part, this is now being provided for by imported fossil fuels, which represent an ever increasing imbalance to Cape Verde's already overextended balance of payments current account.

In the rural areas, firewood is the primary source of domestic energy. A large percentage of Cape Verde's population continues to rely on a combination of firewood and, increasingly, on animal dung to prepare their meals. The uncontrolled exploitation of trees and brush for firewood has led to a steady destruction of natural vegetation. Government legislation prohibiting the cutting of wood goes largely unheeded, as most people have no alternatives.

Cape Verde has a wealth of energy in the form of sunshine and wind, which could be used to pump water and meet domestic energy needs. The Government of Cape Verde (GOCV) is interested in developing and promoting technologies which capture this energy and transform it into a useable form.

A more rapid development of wind and solar energy in Cape Verde has been hindered by the lack of a comprehensive R and D program, as well as insufficient operating space, workshop facilities and materials. An R and D staff (which currently consists of 4full-time

professionals, 2 support staff and 13 part-time workers) c[illegible] operates out of a small office in the Ministry of [illegible] (MDR). Some storage and work space is available in an exist[illegible] temporary workshop borrowed from the Public Works Department in downtown Praia.

There are established precedents in Cape Verde for exploiting renewable energy sources. Two manufacturers in Mindelo, Sao Vicente Island have been fabricating windmills, modeled after the North American multi-blade farm windmill, for at least twenty years. Sixty-five of these machines are being used nearby to irrigate small vegetable gardens. Several others are installed on Sal Island and some are reported in use on other islands. On the Island of Sal, simple wooden windmills are being used to pump sea water for salt production.

In 1977, the GOCV initiated a small program to install, test and monitor a variety of water pumping systems using wind and solar energy. This program is managed by the MDR's Director General of Conservation and Exploitation of Natural Resources. A site near Praia (Achada Sao Felipe) has been chosen for installing some of the systems donated by the Church World Service (CWS), the Swiss Government, the Dutch Government, the French Government, UNICEF, USAID and CIMADE*. Once installed, these will pump water to irrigate experimental agricultural plots, provide water for domestic use, and some lighting. See Appendix C.

II. Project Description

This project is a small-scale, two and one-half year activity which, i successful, will become the first phase of a larger program. It is a step in achieving the GOCV's goals of reducing reliance on imported fuels, decreasing the pressure on the country's vegetative resources, and providing more facilities for the rural population.

This project has already provided the incentive for the GOCV to commit themselves to the provision of a suitable workshop, technical advisors, personnel and ongoing budget support for a well rounded program in Renewable Energy (Appendix E). The U.S. inputs will be equipment, instruments, supplies, technical assistance and training so that an applied research and development plan can be made and implemented. The plan will analyze needs, measure resources, design and manufacture prototypes, test performance and acceptability. The final evaluation will select the most promising areas and devices for further development and dissemination.

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*French private voluntary organization

The major inputs which are provided for in this project are:

1. instruments and equipment to measure and analyze wind, solar and other renewable energy resources

2. instruments, equipment and supplies for a suitable design office and workshop thus enabling the MD to make prototypes and to maintain the existing devices which utilize renewable energy

3. imported renewable energy devices for testing and modification to adapt to local conditions

4. short-term technical assistance advisors to assist in the development of a comprehensive plan for applied R & D and in other areas not provided by the Dutch technicians, i.e. wind/electric power at Tarrafal, active and passive solar engineering, hand pumps/stoves and participant training for Cape Verdeans, (Appendix IV of PID)

5. technical literature

Windmills have a historical precedent in Cape Verde and a small wind energy development program is now being implemented. Program activities include assembling, installing and testing wind equipment. Existing personnel are trained only in this field of activity. The primary market at present for wind equipment is the GOCV. Through management of the well drilling program the GOCV is moving to control and carefully monitor the limited ground water supply.

In contrast, there is little experience in Cape Verde in developing technologies which tap other renewable sources of energy. This project will provide initial support for local construction of prototypes of selected small-scale technologies. The ultimate market for these devices would be the individual, the family unit, or the community.

In order to ensure that windmills and renewable energy systems being tested are economically appropriate, the GOCV will investigate the economic and financial implications of new systems both before they are built (as one basis for their selection) and while they are being tested.

It is planned that two Dutch technicians financed by the U.N. or GON will be assigned to work with the wind and renewable (non-wind) programs respectively. The first, Joop Van Meel, who has worked in the wind program for two years, has just renewed his contract and the second, who will work with the non-wind devices, is being requested by the GOCV from the Dutch Government. The services of the latter would be needed for program planning about six months from the start of the project. Several suitable Dutch technicians have been contacted informally. In summary, no recruiting problems are anticipated. These will provide the principal continuing technical assistance to this project.

Short-term training will be provided to key staff persons. This training will entail some visitations to selected wind facilities in the United States; participation in intensive, "hands-on" workshops or training courses; and visitations to the renewable energy centers in Senegal and Niger.

A. Wind Program

This project will provide support for the following activities:

1. Installation and maintenance of wind systems already delivered to Cape Verde.

2. Establishment of a reliable wind energy potential data base through the provision of wind measuring equipment and data analysis capabilities.

3. Acquisition and installation of Mindelo windmills at selected sites on Santiago to increase awareness among Cape Verdeans of the existence of local technology and capabilities, and to stimulate local industry.

4. Installation of more powerful prototype wind pumps capable of pumping water from depth of 100 meters.

5. Acquisition of pedal pumps and installation of hand and pedal pumps. (Although this technology derives its power from human muscle rather than the wind, it will be included in the scope of this project because of its relevance to the water development program.) The project will provide the short term services of a specialist to assist the workshop's staff. It should be noted that the following other donors have contributed to the GOCV wind energy program through these contributions:

a) France - 2.5 million french francs for assorted pumps
b) Church World Service - 10 small windmills
c) UNICEF - 10 large Dempster pumps
d) Dutch religion organizations-2 large Australian wind pumps and construc inputs for local windpumps

6. Feasibility study of an integrated wind/electric/hydro system in Tarrafal, Santiago. This project will provide the services of a power systems designer to make a feasibility study of the potential for using wind and small-scale hydro systems to pump water and generate electricity in conjunction with the ongoing Tarrafal Water Resources Project (655-0006)

B. Renewable (Non-Wind) Energy Program

This program will be to construct and test a carefully chosen selection of energy devices which meet local needs. The United States will provide the services of a solar engineer during the first few months of the workshop's operation to assist in planning and initiating a work program for prototype development including solar cookers, stills, food dryers and biogas digesters. The construction of a small solar air heater for processing gypsum will be considered. Large, hitherto unexploited deposits of gypsum exist in Cape Verde and are a potential substitute for imported cement in many construction applications. Improved wood stoves will also be included in this activity.

Although similar technologies have already been utilized in other parts of the world, each one must be adapted to Cape Verde's physical and cultural environment. Devices will be relatively simple to construct, operate and maintain, and will be labor-intensive. The center will maximize use of local construction materials. This is particularly important in view of the scarcity of wood as a building material.

To ensure that these technologies are consistent with local practices, the workshop staff will include a woman representative from a nearby village. (selected with the assistance of the Ministry of Health and Social Affairs) Through her presence and participation, information on women's desires and needs in the villages and towns would be available during the selection and design process.

C. Alternative Energy Workshop

The GOCV is committed to provide an office and workshop. Its design and size will be the same as the Food Crop Protection Training Center and warehouse previously constructed at the Achada Sao Filipe. The interior arrangements will be revised to suit the needs of this

project. This facility will be the center for R & D activities on wind and other renewable energy technologies. The facility will also serve as a demonstration center. The MRD personnel will construct and install a solar water heater on the premises. A field test will [illegible] that devices being produced can perform satisfactorily and will provide data for new designs.

The GOCV will provide the land for the workshop and pay the salaries of all local staff as well as local operating costs.

The United States contribution will include: the services of a solar engineer; instruments and equipment for the workshop; consumable supplies and materials for the first two years of the program; short term technical assistance where required, participant training for technical personnel, and a carefully chosen selection of relevant publications and journals.

D. Fabrication of Devices:

The project personnel will install imported demonstration units and monitor their operation. They will be maintained and modified as necessary to produce prototypes for future units to be utilized in Cape Verde. Non-wind demonstration devices will also be designed, made, installed and tested.

E. Beneficiaries

The purpose of this project is to strengthen Cape Verde's institutional capacity to undertake applied R & D, and the immediate beneficiary is, therefore, the GOCV.

Project inputs will enable the government to more expeditiously install wind pumping equipment. Once installed, farmers and villagers living in the immediate vicinity of these systems would benefit from the increased water supply. Through the purchase of locally built windmills, the project will stimulate local industry and employment, and promote greater use of and reliance on indigenous skills and resources. On the national level, the country will ultimately benefit economically and environmentally: a decline in fuel imports will represent a foreign exchange savings, and a reduction in firewood consumption will ease the pressure on the country's forest and vegetative resources.

E. Relationship of The Project to AID and GOCV Priorities

A. Relationship to AID Priorities

As related in the PID, project assistance in the energy sector is consistent with AID development in Cape Verde. The Agricultural Sector Assessment, which provides the rationale for AID's medium and long-term development assistance program in Cape Verde, makes special note of the country's abundant wind and solar resources, and recommends their development. Cape Verde's Small Program Strategy Statement includes energy as a component of AID's program there.

A request for assistance in the renewable energy sector was submitted to AID by the Director General of the Club of the Sahel (CILSS), of which the United States is a member. The Club recently issued a report outlining the role of energy in the region's development and strongly encouraging each member government to formulate a national energy policy. It also urges the development of technologies which conserve scarce energy resources, and experimentation with promising applications of "new" sources of energy. The Club report contains copies of the GOCV's requests for outside assistance (Appendix D). The CILSS investigators felt that because of abundant wind resources in Cape Verde, it would be an ideal location for applied research in using wind energy for water pumping, distillation and electrical generation.

B. Relationship to GOCV Priorities

The proposed project is directly related to the GOCV's long-term objective to increase agricultural productivity and will be integrated with an AID financed project in the Tarrafal region of Santiago which is expected to irrigate 600 hectares of land. This region particularly leads itself to wind energy and specific integration will be explored during the design of Tarrafal II (August, 1980).

The project will investigate needs and design, build and test solar stills and solar fish dryers which may substantially increase the availability of potable water and protein. Wide scale use of improved wood burning stoves could reduce fuel wood consumption by as much as fifty percent, thereby decreasing the pressure on the country's rapidly disappearing vegetation.

III. Technical Description

A. Wind Energy

Data on wind speed and direction for several sites in Cape Verde are available for the years 1915 to 1971, and for Prada airport for 1978. However, this data does not provide an accurate indication of the country's actual wind energy potential. The current wind speed data collection network in place on Cape Verde is inadequate to assess accurately wind energy potential.

The AGRHYMET project will include most of the instruments (see Table I following page) and will collect most of the data needed to calculate wind energy potential; however, it will not be the optimum, since that project is designed to serve agriculture. Their anemometers will be placed at a height of 6 meters from the ground. For measuring wind energy, a height of ten meters is the normal minimum, thus their data will be useful but not entirely accurate for the purposes of this project. The best places to monitor wind energy potential are too windy or may be otherwise unsuitable for many agricultural crops and thus will not be chosen for AGRHYMET stations, i.e., Prada airport and vicinity. This project will therefore provide some wind speed frequency distribution and turbulance measurement and recording instruments to be used in siting wind energy equipment. Mobile wind run and duration measuring instruments will also supplement the permanent AGRHYMET stations equipment, on occasion. In all cases, Data available from AGRHYMET will be available to the Ministry of Rural Development for use in this project.

Located in the northeasterly trade wind belt, Cape Verde has very good wind potential. The winds blow practically continuously for nine or ten months a year. Many trees are deformed by strong winds (known as flagging), an indication of strong, undirectional winds. High mean wind speeds (17 m/s) were recently recorded by the French on Sao Vicente.

Adequate instruments enable the wind and the devices on test to be accurately observed, thus the causes of success or failure can be definitely determined and taken into account in any redesign or installation effort. This analysis capability will be supplied by the project. This project will build upon efforts already underway in Cape Verde to further develop technologies which derive their power from the wind.

A. Sahel Water Data Network (AGRHYMET) Project, [illegible]nt for the 15 Stations in Cape Verde

1. Telecommunications
2. Anemometer
3. Cambell-Stokes (sun duration)
4. Raingauge
5. Wind runmeter
6. Thermometer
7. Recording hygrometer
8. Recording thermometer
9. Psychrometer
10. Thermometer (Max. - Min.)
11. Evaporometer, Pich.
12. Evaporometer, Bac. Class A
13. Geo thermometers (soil temperature)
14. Pyrometer (sun insolation) at 5 stations only

The station at Sao Jorge, Santiago will receive (by telecommunications) and process all data.

TABLE I

. Location of AGRHYMET Stations in Cape Verde

LES STATIONS AGRO-HYDRO DE BASE AGRHYMET

Pror nour etre equipees d'appareils de telecommunications

Ilhas de	Est[illegible]s	Latitudes			Longtitudes			Altitudes
Santiago	S. J[illegible]	15	03'	00"	23	37'	15"	370 m
	Ste. Cruz	15	08'	30"	23	35	30"	18
	Tarre al	15	15'	40"	23	45'	30"	15
	Cabeza Carrera	15	05'	30"	23	40'	30"	555
	Trindade	14	57'	20"	23	34	00"	200
	Achada Mosquito	14	58'	30"	23	41'	00"	200
Fogo	Monte Velha	15	00'	00"	24	21'		1500
	Mont[illegible]iros	15	02'	00"	24	20		20
	Monte Genebra	14	51'	00	24	27'		355
S. Antao	Paul	17	09'	40"	25	01'	30"	206
	Alto Mira	17	07'	00"	25	14'	00"	900
	Ribeira Fria	17	03'	00"	25	09'	40"	30
S. Nicolau	Faja de Cima	15	38'	20"	24	20'	30"	400
	Praia Branca	16	38'	20"	24	23'	30"	200
	Talho	16	37'	00"	24	19'	00"	270
Maio	Calheta	15	22'	30"	23	14	00	19
Boa Vista	Rabil	16	07'	40"	22	53'	30"	35
Brava	Nova Sintra	14	52'	00"	24	42'	30"	500
	Campo Baixo	14	51	00"	24	44'		640
S. Vicente	Monte Verde	16	52'	30"	24	56'		600

B. Non-Wind Renewable Energy

Some data on global radiation and duration of sunshine are available for Cape Verde. However, as pointed out in the PID, the data on global radiation is unreliable due to poor siting of equipment, uncalib[illegible] and equipment [illegible]akdown. No data on [illegible] was ever recorded. The instruments p[illegible]ed by the AGHRYMET project will provide for the [illegible]uisition [illegible] installation of direct and diffuse radiation and duration sensors at 5 sites. For training and to correlate data with AGHRYMET, some duplicate instrumentation will be installed at the workshop test field.

There is little experience in Cape Verde in employing technologies which exploit solar and other (non-wind) sources of energy. This project will develop a limited number of promising technologies to determine which are technically, economically, and socially feasible within the Cape Verdean context.

Devices to be developed should meet the following criteria:

- Fulfill identifiable needs;
- Use local materials and skills;
- Be simple to maintain and repair;
- Be inexpensive and affordable by a Cape Verdean family or community.

The hand pump and improved cook stove development will be investigated by this part of the organization.

IV. Social Feasibility

This project will respond to the basic needs of the rural poor who comprise the majority of Cape Verde's population. Little information however, is now available on village energy needs and uses. The anticipated national energy assessment, to be made within the next year, will provide some of this data. This project will produce prototype devices, data and the infrastructure to support an ongoing wind and non-wind energy program.

It is evident that wind powered pumps already have proved their acceptability to a significant number of farmers. With their operational improvement and the availability of service they should be more widely accepted at the conclusion of this project. Wind powered pumps provide the small farmer

with the energy resources he needs to expand his farming activity. Water in most cases is the limiting factor in farm production.

The wants and needs of the users of non-wind [illegible]ble energy devices will be researched at the conception of the R & D program. The village representative employed for this project will be part of the selection committee which will determine prototype development priorities. The small solar devices to be produced will ultimately be owned and operated by villagers, as individuals or groups. If they are properly adapted to the environment and the users are trained in their use, they will offer a direct benefit to the rural poor. Health standards will improve with pure, potable distilled water. Improved quality and quantities of food will result from the use of better food dryers.

The improved woodstoves will reduce the consumption of wood and thus save either time and effort or cost as well as reduce environmental degradation. Hot water heaters at dispensaries will improve cleanliness and health.

The dissemination of information and incentives for manufacture or purchase of devices will be carried out through the appropriate government ministries which will each have a representative on the selection committee.

V. Economic Feasibility

The overall economic goal of this project is to reduce the cost to and Cape Verde's reliance on imported fossil fuel by developing technologies that derive their energy from local, renewable resources. Cape Verde is not yet fully committed to a petroleum-based development path. Introduction of renewable energy technologies as substitutes for fossil fuels for meeting present and future energy needs will have a substantial, favorable impact on the country's foreign exchange reserves and balance of payments.

Detailed information necessary for undertaking a cost benefit analysis of the devices to be developed and tested under this project is non-existent, since the actual prototypes themselves will be developed as part of the outputs of the R & D facility. However, certain economic assumptions can be made at the outset concerning the viability of renewable energy devices and economically based judgments will be made on prototypes as they are developed.

Cooking is an area where the introduction of renewable energy devices holds real promise. The firewood situation is so critical that the introduction of devices which [illegible] or eliminate reliance on fuelwood have a [illegible] acceptance. Because of the acute firewood [illegible] and effort is spent searching for wood. The present cost of firewood in the cities is four escudos per kilogram. Based on Sahelian norms, assuming an average usage of 2,000 kg per year per family, the total annual cost would be 8000 escudos ($220). The average per capita income in Cape Verde is $120, indicating that only the higher income city dwellers can afford to buy firewood in these amounts. Thus there would be a strong incentive to use economically viable and well designed solar cookers or woodstoves.

This project will also assist in improvement of the efficiency of wood stoves. A 30 to 50 percent saving per stove in the use of wood would be a realistic goal. For areas where only brackish or sea water is available, desalination using the sun's energy may already be competitive with diesel operated systems. Other technologies, such as a fish dryer and an air heater for processing gypsum, would stimulate local industry, increase local production, and create employment opportunities. And in the case of gypsum, for which there is a potential export market, large scale production could generate foreign exchange earnings.

As it has already been mentioned, the project purpose will be the creation of an R & D institution capable of selecting, designing, building and testing renewable energy devices. Hence, an overall cost/budget analysis of prototype byproducts can not be made; however, the project institution will utilize an economist as part of the selection committee charged with determining priorities for development of new renewable energy devices. When the GOCV has made their national energy assessment, the economic potential in various areas will become more apparent and may then be quantified.

Devices such as solar stills, cookers and food dryers, in addition to economic benefits, also have improved health and quality of life as end products which are non-economic benefits.

A major emphasis of this project is to design prototypes using local materials and resources wherever available. Again, in addition to lowering the selling price of a device, this would also minimize import requirements and save foreign exchange.

VI. Administrative Feasibility

This project will be managed by the Director General of Conservation and Exploitation of Natural Resources in the Ministry of Rural Development. This is the [illegible] took the lead in the development of the present wind [illegible] program because of its close association with the development and distribution of the national water supply.

Some R & D activities proposed under this project include development in areas under the jurisdiction of other Ministries. To ensure coordination with these other ministries, an informal committee will be established to guide the program and will include representatives of the following agencies:

Ministry of Rural Development

- Bureau of Conservation and Natural Resources;
- Bureau of Agriculture, Forestry and Livestock;

Ministry of Economic Coordination:

- Department of Fisheries;

Ministry of Health and Social Affairs, and

Ministry of Education

The present staff will be increased to handled the new tasks. This will entail recruitment of two additional technically trained personnel. Mr. Joao Fonseca, electrical engineer who returned from training in Portugal earlier this year, will be the new Director and Mr. Jorge Monteiro will be the Mechanical Workshop technician foreman. Both of the above are working in the program. The two other technicians (instrument man and solar technician) will be chosen from among those who will be finishing their training at the AGRHYMET Center in Niamey in mid-1980.

The MDR has approved the increased recurrent operating funds for 1980 to cover the cost of all of the added personnel as outlined in the P.I.D., Appendix VI.

As noted earlier, Mr. Joop Van Meel, Dutch technician, Wind Energy Advisor, has had his contract renewed until November, 1980 . Attached as Appendix E is a copy of the Minister of Rural Development's letter, indicating the GOCV commitment to provide a second technical volunteer for this project to work primarily in the solar field. It is believed that Mr. Van Meel's contract will be extended another two years making him available for the entire duration of the project.

VII. Environmental Impact.

The Country Development Officer has made a negative environmental determination. The IEE is included as Appendix E. The workshop and test yard will be built on the Achada Sao Filipe on vacant Government owned land near the sites of several existing wind energy devices. It is not close to human habitations. All wells in Cape Verde are drilled and monitored as part of the overall Groundwater Resources Development Program. This project will produce or install a small number of demonstration and prototype devices with little environmental impact.

In the long term, reduction in the use of petroleum and wood for fuel will reduce air pollution and the reduction in pressure on vegetation will also reduce erosion and increase soil fertility which are all beneficial to the environment.=

VIII. Evaluation.

This will be carried out during the course of the project, by the REDSO/WA energy advisor who will make periodic visits.

The REDSO Energy Advisor will also have to keep abreast of developments in the Tarrafal Water Resources Project (655-0009) so that the feasibility study for the integrated wind/electric/hydro feasibility study is started at the proper time. (See P.I.D., Appendix I, Section 8C) The study should start shortly after decisions are made on the dams but prior to the ordering of the major pieces of equipment.

At the end of a 30 month period, a two person team will make the final evaluation and make recommendations. If the REDSO Energy Advisor considers it advisable, the final evaluation can be delayed as much as six months. It is expected that the final evaluation will provide the basis for follow-on projects in this field, thus close coordination will be required to provide continuous support to this important effort.

IX. PROJECT COST ESTIMATE

Total cost of this project is approximately $628,000 of which AID will fund approximately $495,000 and the GOCV the balance. The GOCV will provide the land and construct the facility, as well as cover the workshop's operating costs.

A. Summary Budget

	ITEM	AID Contribution (in U.S.$)	GOCV Contribution (in U.S.$)*
I.	Value of Land		$ 4,500
a.	Construction		80,000
II.	Commodities and Equipment	221,810	
III.	Components for Installation	39,590	
IV.	Local salaries and Operating costs		48,070
V.	Participant Training	18,300	
VI.	U.S. Technical Assistance	116,000	
VII.	Evaluation	13,000	
VIII.	Contigency and Inflation (25%)	86, 740	
	TOTAL	495,440	$132,570

*Exchange Rate: $1 = 36 escudos

B. Detailed Budget - U.S. Contribution

	ITEM	Foreign Exchange ($)	Local Currency ($)
I	Commodities and Equipment		
	Wind Analysis Instrumentation	18,330	
	Solar Measuring Instrumentation	13,780	
	Solar/Wind Shop Equipment	99,985	$ 700
	Consumable Materials & Supplies	17,000	$ 3,000
	Electrical Instruments & Supplies	5,415	
	Pipe Tools	2,340	
	Vehicles	54,400	
	Library & Subscriptions	1,000	
	Office Equipment	4,565	1,295
	Subtotal	216,815	4,995
II	Components for Installation	22,840	16,750
III	U.S. Technical Assistance		
	Solar Engineer, 6 months	78,000	
	Wind Expert, Tarrafal Project 2 months	25,000	
	Hand Pump Expert, 1 month	13,000	
	Subtotal	$ 116,000	
IV	Participant Training		
	• Training for Director & Foreman in applied wind and solar technology, and tour of renewable energy centers in West Africa, 6 & 3 months respectively	11,000	
	• Training for Instrumentation Technician, 3 months	3,500	
	• Training for Solar Technician in Niamey, Niger, 8 weeks	2,300	

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B. Detailed Budget – U.S. Contribution

ITEM	Foreign Exchange (U.S.$)	Local Currency (U.S.$)
Training for Economist in techniques of benefit cost analysis, African benefit cost workshop 3 weeks.	1,500	
Subtotal	18,300	
V Evaluation		
2 consultants for 2 weeks each	13,000	
Subtotal I-V	386,955	21,745
VI Contigency & Inflation – 25%	86,740	
Subtotal I-VI	473,695	21,745
TOTAL U.S. CONTRIBUTION	495,440	

X. FINANCIAL PLAN

ESTIMATED COSTS:

	1ST YEAR		2ND YEAR	
	U.S.$	C.V.	U.S.$	C.V.
Land		4,500		
Construct. Shop		80,000		
Commodities	221,810			
Components	31,590		8,000	
Salaries (local)		16,020		32,050
Part. Training	14,800		3,500	
Tech. Assist.	57,900		58,100	
Evaluation			13,000	
Cont. and Infl.	69,400		17,340	
	$395,500	100,520	99,940	32,050
		496,020		132,990

ESTIMATED OTHER DONOR CONTRIBUTION

XI. IMPLEMENTATION PLAN

The Ministry of Rural Development has already accomplished several items which are important to the project even before the project agreement is signed. They have the first Dutch technician, the Director of the Project and the Workshop Mechnical Foreman on the job.

SCHEDULE OF SEVENTS

Event	Action by	Date Month: Start	Finish
1. Project Agreement signed	AID/Praia&MRD	1	1
2. Workshop Bldg. Contract & Construction	MRD	1	12
3. Write PIO/CS for Vehicles, Materials & Supplies	AID/Praia & REDSO Specialist	2	3
4. Write PIO/TS	AID/Praia	2	3
5. Request 2nd (Solar) technician	MRD	1	3
6. Planning of shop layout	Proj.Director	2	3
7. Director training in USA		6	9
8. Select Technical personnel & train (Instrument, solar & economist)	Project MGT.	6	8
9. Solar Engineer from USA Planning of R&D program	AID/Praia /AID/W	9	12
10. Support staff selection and hiring	MRD	12	14
11. Workshop Mechanical Supervisor trng in Senegal & Niger	MRD	11	14
12. Move Renewable Energy activities into new Workshop	MRD	13	14
13. Second (Solar) technician	MRD	13	31
14. Vehicles, tools & Equip. arriving	MRD	13	15
15. Tarrafal Wind/Hydro/Power feasibility study	AID/Praia & REDSO	13	16

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EVENT	ACTION BY	DATE/MONTH START	DATE/MONTH FINISH
16. Installation of test components	MRD	14	16
17. Director training in Senegal & Niger	MRD	14	15
18. Construction of solar devices	MRD	15	-
19. Testing of solar devices	MRD	16	-
20. Inventory consumable materials and supplies	MRD	18	18
21. Solar Engineer returns from U.S. for final three months to update R&D planning	AID/Praia	22	25
22. Conduct review of all data collection & processing procedures and make necessary revisions	MRD	22	22
23. Evaluate first group of solar devices	MRD	22	22
24. Project Evaluation conducted	AID/Praia AID/W	30	30
25. Project ends - follow-up evaluation (tentative)	AID/Praia	36	36

XII. PROCUREMENT PLAN

1. Responsibilities:

All procurement of goods and services under this Grant will be the prime responsibility of the Ministry of Rural Development (MRD) of Cape Verde (GOCV). Upon acceptance of this procurement Plan and its inclusion in the Project Paper, the MRD will designate an official responsible for procurement actions and the control of procurement documentation. A counterpart official in the MRD should be designated to assist and/or monitor the necessary project procurement. The GOCV will have title to all goods upon their arrival in Cape Verde. It will effect customs clearance and arrange for transportation to the project site(s).

2. Procurement Services Agent (PSA):

Commodity procurement in the United States (Geographic Code 000) will be undertaken by a professional PSA appointed by the MRD. It is expected that a procurement services contract will be negotiated with the Afro-American Purchasing Center (AAPC), New York, to acquire this expertise. The appointment of a PSA will be finalized within thirty (30) days after the signing of the Grant Agreement.

AAPC is fully qualified to act as a PSA for AID projects; its fee is negotiable and will be determined prior to any procurement being undertaken.

If the host government so requests, AID or any other United States government agency is eligible to and can act as the project procurement services agent.

3. Source and Origin

The authorized source of goods and services for this project is Geographic Code 941. Some locally procured construction material, electrical supplies, and maintenance equipment as well as Code 935 items listed in Annex (1) hereof and shelf-items will be the exceptions to this source restriction.

Local procurement will be carried out in accordance with chapter 11, Handbook 15.

It is expected that the Director, REDSO/WA, will use his

waiver authority as granted in Africa Delegation of Authority No. 140 to waive source/origin requirements for some procurement; specifically those items listed in Appendix I to meet the needs of the project.

4. Method of Procurement

Procurement will be accomplished in accordance with AID Regulations and good commercial practices. As a matter of procedure, the following will be observed:

- CDO/Praia will prepare the PIO/Cs on the basis of the commodities shown on the equipment list. GOCV approval of the PIO/Cs will be indicated, and REDSO/WA will approve the documents and submit them to the PSA.
- PIO/Cs will be controlled and numbered by REDSO/WA.
- The GOCV will conduct local procurement for commodities authorized as local currency or shelf-item procurement.
- CDO/Praia will coordinate the proper receipt and speedy utilization of all project commodities, and monitor the requirements for re-supply and replenishment of store stock items.
- The GOCV will effect Non-U.S. Code 941 and 935 offshore purchases

5. Equipment List

Is shown as Appendix G and technical library list Appendix J. All major items will be procured in the United States, Code 000.

6. Delivery

All important goods will be shipped on the basis of CIF Praia. Suppliers will be required to obtain all risk marine insurance in the amount of 120% of the CIF cost of the goods. AID's shipping requirements will be observed; air shipment authorized in the event that the cost by surface would exceed air shipment or not be greater than 120% of surface shipment costs, as determined by project management. AID marking requirements will be enforced on all project commodities, with exceptions approved by REDSO/WA.

7. Receipt and Utilization

The CDO/Praia will assist the MRD in monitoring the arrival and clearing of inbound project commodities, including the completion of inspection reports and receiving documents. Shortages of damages will be promptly reported to the PSA and proper documentation provided as follow-up. CDO/Praia will insure prompt and proper utilization of project commodities.

8. Technical Assistance

A. Long Term

As indicated in various sections of this project paper, two long-term expatriate technicians will be required to implement this project. One of these technicians is already working with the MRD, implementing energy projects, and will be assigned to the Renewable Energy project upon commencement of project implementation. This expatriate technician is being financed, for the most part, by the Dutch government, with the GOCV providing some financial support. The second technician, a solar energy specialist, will be procured through another donor agency by the GOCV.

B. Short Term

The three short term consultants to be procured for technical assistance (see page 15) will be procured through the issuance of a PIO/T by USAID/Praia, authorizing AID/W to recruit them in a timely manner. The GOCV has indicated that they do not have the capability of recruiting these technicians.

9. Participants

PIO/P's will be issued by USAID/Praia to finance the short-term training of participants to be trained in Africa and the United States.

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US AID OFFICIAL RECORD

ACTION COPY

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AID

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UNCLAS PRAIA 0139

AIDAC

E.O. 12065: N/A
TAGS
SUBJECT: RENEWABLE NERGY PROJECT (655-0009)

REF:(A) ABIDJAN 0583, (B) CARROL/SMITH MEMO DTD 1/10/80

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1. RE FINANCING OF TWO EXPATRIATE TECHNICIANS FOR THE SUBJECT PROJECT, MDR OFFICIAL, SOARES, CONFIRMS THAT:

A. FIRST TECHNICIAN - DUTCH TECHNICIAN, JOOP VAN MEEL'S CONTRACT EXPIRES NOV 1980. BOTH VAN MEEL AND SOARES STATED THAT CONTRACT CAN BE RENEWED WITH DUTCH GOVERNMENT FOR AN ADDITIONAL TWO YEARS WITHOUT FORMALITY. SOARES HAS INDICATED INTEREST IN HAVING VAN MEEL REMAIN FOR DURATION OF PROJECT AND, VAN MEEL APPEARS TO BE INTERESTED TO REMAIN IN CAPE VERDE THROUGHOUT THE IMPLEMENTATION OF PROJECT.

B. SECOND TECHNICIAN - MDR HAS IDENTIFIED DUTCH CANDIDATE AND CURRICULUM VITAE HAS BEEN SUBMITTED TO THE SECRETARY OF STATE FOR COOPERATION AND PLANNING. DUTCH TECHNICIAN ON BOARD STATED THAT DUTCH GOVERNMENT FAVORABLY DISPOSED TO FINANCE THIS TECHNICIAN. AID/PRAIA PROGRAM OFFICER, SMITH, SPOKE WITH DIRECTOR GENERAL OF COOPERATION, WHO INDICATED THAT HE IS REVIEWING CURRICULUM VITAE OF SEVERAL INTERESTED CANDIDATES AND A SELECTION WILL BE MADE SHORTLY. DIRECTOR GENERAL WILL BE LEAVING FOR HOLLAND ON SATURDAY JANUARY 26, AND SAID THAT HE WILL DISCUSS THE CONTRACTING OF THE RENEWABLE ENERGY TECHNICIA WITH THE DUTCH GOVERNMENT. DIRECTOR GENERAL SEES NOT RPT NO PROBLEM IN RECEIVING DUTCH GOVERNMENT FINANCING OF THIS TECHNICIAN.

[illegible] CONTRIBUTION TO FINANCING THE FIRST DUTCH TECHNICIAN [illegible] PER YEAR TABLE 5

JANUARY 26, AND SAID THAT HE WILL DISCUSS THE CONTRACTING OF THE RENEWABLE ENERGY TECHNICIA WITH THE DUTCH GOVERNMENT. DIRECTOR GENERAL SEES NOT RPT NO PROBLEM IN RECEIVING DUTCH GOVERNMENT FINANCING OF THIS TECHNICIAN.

2. GOCV CONTRIBUTION TO FINANCING THE FIRST DUTCH TECHNICIAN (VAN MEEL) AMOUNTS TO APPROXIMATELY $3,500 PER YEAR. TABLE 5 OF PID (PAGE 81) PROVIDES DETAILED BREAKDOWN OF GOCV'S SUPPORT OF LOCAL TECHNICIANS. IN ADDITION SOARES STATED THAT AN ELECTRICAL ENGINEER, WHO RECENTLY COMPLETED HIS STUDIES IN PORTUGAL, HAS BEEN ADDED TO HIS STAFF TO WORK WITH THE RENEWABLE ENERGY PROJECT.

3. THE FOLLOWING DONORS HAVE CONTRIBUTED PUMPS WHICH WILL BE UTILIZED IN THE SUBJECT PROJECT:

A. FRANCE - ESTIMATED COST 2,500,000 FRENCH FRANCS (TF).

B. CHURCH WORLD SERVICES - OFFERED 25 SMALL WINDMILLS, OF WHICH 10 ARE ALREADY INSTALLED

C. UNICEF - DONATED 10 LARGE DEMPSTER PUMPS IN OCTOBER 1979

D. DUTCH RELIGIOUS ORGANIZATION - CONTRIBUTED TWO (2) LARGE AUSTRALIAN WIND PUMPS

IN ADDITION TO THE ABOVE THE DUTCH GOVERNMENT HAS BEEN REQUESTED TO CONTRIBUTE COMMERCIAL WIND PUMPS AND TO ASSIST IN THE LOCAL CONSTRUCTION OF THE PUMPS.

4. UNTIL FURTHER NOTICE, HUGH SMITH WILL BE THE PROJECT MANAGER IN THE FIELD.

MCGOWAN

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APPENDIX 'A'

COMMENTS ON QUESTIONS RAISED IN THE PID APPROVAL CABLE STATE 173109

(A) The Government of Cape Verde requested the continuing services of Mr. Joop Van Meel, the Dutch technician who directed their wind energy program for the past two years. He has just returned to Praia under a contract extension to November 1980. The services of a second technician is being requested by the GOCV as stated by the Minister of Rural Development in his letter No. 1703 dated December 7, 1979 (see Appendix E). The services of this technician will not be necessary until detailed program planning is started in Praia (about six months from start of project). Mr. Van Meel informally contacted four qualified and willing technicians while on his recent trip to Holland. Recruitment and timing should not be a problem. However, firm availability of Van Meel for the remainder of the project and for 18 month a second technician will be a condition precedent to first disbursement. (See Appendix A1).

(B) Correlation between this project and the Sahel Water Data Project (AGHRYMET) is explained in the PP, page 8 and 9.

(C) All groundwater is the property of the Government of Cape Verde. Water can not be extracted (in theory, at least) without the permission of the Ministry of Rural Development Bureau of Conservation and Exploitation of Natural Resources. The Groundwater section of this bureau is advised by Mr. Denis Fernandopulle, a very experienced hydrologist. This on-going position is funded by UNDP.

The subject of ground water, its availability, recharge rate and use are extensively discussed in the Agricultural Sector Assessment, pages 69-73. This report was produced in August 1978 for USAID and is thus current. The USAID funded Cape Verde Irrigation Investigation and Training Project (Tarrafal) 655-0005 is designed to provide more information on this subject also. The provision of the small number of wind driven pumps provided by this project will not significantly alter the ground water resources of Cape Verde.

(D) The overall management of all Renewable Energy activities is and will continue to be under the Director General of Conservation and Exploitation of Natural Resources. He provides coordination between donors and will direct the developing R & D effort envisioned in this project. Appendix C lists the status of all donor projects. The PP describes this in the Project Background and the Administrative Suitability sections.

(E) Other donors are actively assisting the GOCV in the Renewable

Energy field, but mostly with small demonstration/design activities. The GOCV is promoting other assistance but as yet has no positive response to their request for a workshop. No response is anticipated from the request to CILSS within the next year at least. To maintain the present rate of progress and promote a cohesive plan, this project [illegible] for renewable energy activities is sorely [illegible]ed.

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UNCLASSIFIED STATE 173109

SUBJECT: RENEWABLE ENERGY PID REVIEW JUNE 18, 1979 - 655-009 - CAPE VERDE

1. BASED ON THE COMMITTEE RECOMMENDATION THE AA/AFR [illegible] AND THE PID FOR FURTHER DESIGN.

2. THE FOLLOWING QUESTIONS AND CONCERNS SHOULD BE ADDRESSED DURING THE PREPARATION OF PP:

(A) SINCE THE TA ASSISTANCE IS INDISPENSABLE TO THE PROJECT, THE GOCV SHOULD BE ADVISED TO SUBMIT A FORMAL REQUEST DIRECTLY TO THE U.N. VOLUNTEER OFFICE AT GENEVA FOR TWO U.N. TECHNICIANS OR THROUGH U.N. REPRESENTATIVES IN CAPE VERDE. AVAILABILITY OF THE TWO U.N. VOLUNTEERS, OR EQUIVALENT TA MUST BE CONFIRMED WHEN PP SUBMITTED FOR APPROVAL.

(B) THE CORRELATION BETWEEN THIS PROJECT AND THE SAHEL WATER DATA PROJECT SHOULD BE DEFINED IN THE PP.

(C) SAFEGUARDS SHOULD BE DEVELOPED IN THE PP TO ASSURE THAT WATER TABLE LEVELS ARE PROPERLY MONITORED. CONCERN WAS EXPRESSED THAT THE OUTFLOW MIGHT EXCEED THE RECHARGE RATE IF NOT MONITORED.

(D) THE COMMITTEE NOTED THAT OTHER SMALL RENEWABLE ENERGY EXPERIMENTS FUNDED IN PART BY THE DONOR COMMUNITY ARE UNDERWAY IN CAPE VERDE. THE PP SHOULD DESCRIBE THE RELATIONSHIP BETWEEN THESE ACTIVITES AND THE AID PROJECT AND SPECIFICALLY INDICATE WHETHER OVERALL MANAGEMENT OF THESE ACTIVITIES ARE OR WILL BECOME A MAJOR RESPONSIBILITY OF THE DIRECTOR GENERAL OF CONSERVATION AND NATURAL RESOURCES.

(E) THE PP TEAM SHOULD ATTEMPT TO MAXIMIZE OTHER DONOR INVOLVEMENT INCLUDING THE POSSIBILITIES OF OTHER DONORS PARTICIPATING IN THE CONSTRUCTION AND OPERATION OF THE ALTERNATIVE ENERGY WORKSHOP. IN THIS REGARD THE CONTRIBUTION OF THE GOCV TO THE WORKSHOP REQUIRES CONFIRMATION IN THE PP.

3. OTHER CONSIDERATIONS OR OBSERVATIONS BY THE COMMITTEE.

(A) THE FEASIBILITY STUDY OF INSTALLING AND INTEGRATING WIND/ELECTRIC/HYDRO SYSTEM ON TARRAFAL SHOULD NOT BE INCLUDED AS PART OF THE NATIONAL ENERGY ASSESSMENT BUT SHOULD REMAIN IN PROJECT.

(B) COMMITTEE SUGGESTED THE NATIONAL ENERGY ASSESSMENT SHOULD BE CARRIED OUT CONCURRENTLY WITH THE RENEWABLE ENERGY PROJECT AND IT WILL BE FUNDED AS A SEPARATE ACTIVITY. THE NES WILL BE THE SUBJECT OF A SEPTEL.

.../4

4. IN VIEW PID NOW APPROVED, REQUEST MISSION/REDSO ADVISE SCHEDULE/TIME FRAME FOR PP DEVELOPMENT AUTHORITY. FYI - AFR/DR/SDP HAS DEVELOPED EXTREMELY VALUABLE SERIES OF ANNEXES WHICH, WITH A CERTAIN AMOUNT OF REWRITING CAN CONSTITUTE MAJORITY OF PP.

APPENDIX B

LIST OF OFFICIALS CONTACTED BY PP TEAM

Mr. Horacio Soares, Director General of Conservation and Exploitation of Natural Resources, Ministry of Rural [illegible]t (MRD)

Mr. Aguinaldo Lisboa-Ramos, Secretary General, Ministry of Rural Development

Mr. Antonio Pires, Director of Crop Protection, (MRD)

Mr. Sona Martins, Engineer, Cadastral Survey, (MRD)

Mr. Francisco Alves Vieira, Superintendent Maintenance Shop, MRD

Mr. Joop Van Meel, Advisor, Non-Conventional Energy Project and Implementor, UNDP Project, MRD

Mr. Denis Fernandopulle, Advisor, Groundwater Resources Division, MRD

Mr. Pinto, Engineer in Charge of Technical Construction Ltd., Praia

Mr. Soares, Supervisor for Machinery and Equipment of Technical Construction Ltd., Praia

APPENDIX C

RENEWABLE ENERGY PROJECTS IN CAPE VERDE (INCLUDING INPUTS)

1. Non-conventional energy demonstration project: Donor: [illegible]

- Toyota pick-up truck
- Extensive set of hand tools
- Three electric generator driven water pumping windmills
- Drip irrigation system

Status: One is functioning at Sao Martinho (Bicycle wheel) and two are being installed at Achada Sao Felipe (Darius-Rede and Elektro)

2. Installation of 25 Dempster windmills: Donor: Church World Service

- 25 Dempster windmills, rotor diameter 8': pump 2½" bore x 5½" or 7½" stroke, capacity 1.2 m3/hr at 27.m.height
- tower: 30' height
- Funds for the construction of 2 water reservoirs of 50 m^3 capacity
- Extensive set of spare parts for windmills

Status: Fifteen windmills have been installed of which 4 are temporary - on five islands.

3. Installation of 10 Dempster windmills: Donor: UNICEF

- 10 Dempster windmills, rotor diameter 12': pump bore 3" x 12" stroke;
- Capacity 1.8 m^3/hr at 45 m. height
- Tower: 30' height

Status: The windmills just arrived in Praia. A lot of parts are missing. Shipment spent one year in Lisbon. A list of missing parts and needed spare parts is to be made and sent to UNICEF.

.../2

4. Village water supply by a solar pump: Donor: CIMADE (Private French Agency

-A solar thermal pump, SOMRETES (French make) 0.6 KW

-Funds for constructing water tanks and the village water supply.

Status: The installation of the pump was started by SOMRETES technician. He had an accident and the work stopped in April.

5. Aerowatt wind pumping station: Donor: CIMADE (Private French Agency)

-Aerowatt wind generator, rotor diameter 9.2 m.

-Power 4.1 KW at a rated wind speed of 7 m/s

-Submerd pump: Capacity 10 m^3/hr. at a head of 70 m.

-Control panel and rectifier for interconnecting

Status: All equipment has arrived. Completion of foundations are waiting arrival of bolts and anchors, that are not available in Cape Verde.

6. Construction of prototypes: Donor: SWD (Dutch University Aid)

-Provided some tools and is preparing design of a prototype for an enlarged Sao Vicente type (fan) windmill. Will finance materials for four prototypes.

7. Equipment of borehole with siphon: Donor: U.S. Embassy, Praia

-The U.S. Embassy will finance the piping and construction of a small tank and a public fountain at Picos, Santiago. There is a drilled well in which the static water level is just below ground level (in a very hilly region). The water will be extracted by gravity by means of a siphon. A self-help project.

8. Pilot biogas plant: Donor: U. S. Embassy, Praia

In the cattle center of Sao Jorge Santiago, a small biogas plant will be built. The needed materials have been ordered in Lisbon. The U.S. Embassy is financing the construction as a self-help project.

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9. Small windmills for Maio: Donor: CIDA (Canada)

-The windmills to be purchased have not yet been defined.

10. Aerowatt material: Donor: FAC (fonds pour le Sahel)

-Two Aerowatt pumping stations for Sao Nicolau.

(Similar to No. 5 above).

-Three Aerowatt wind potential evaluation instrument stations

-Two Aerowatt wind generators fro lighthouse power supply.

-Two large (60 KW Aerowatt wind generators for electric power supply to the town of Porto Novo (Santo Antao) and/or Sal Rei (Boa Vista).

Status: Equipment on order. To be financed from the budget of 1978 and 1979.

11. Wind pumps at Santo Antao: Donor: DTH(Dutch Aid)

-Four large Australian windmills will be purchased for installation on Santo Antao. 25" diam. with various pumps for deep or shallow wells.

Status:

Specifications being reviewed by DTH. Expect to order in two months.

12. Wind electric system with battery storage: Donor: USAID

- To be installed at Food Crop Protection Warehouse, Achada Sao Felipe.

-Jacobs type, 3 KW, 14' diameter rotor with battery storage.

Status: Equipment on order.

APPENDIX D

Letters from Ministry of Cooperation to CILSS requesting assistance and published September 1979 in the report "Energy in the Strategy of Development of the Sahel"

1. Proposition No. 12

   Preparation of a plan of assistance to utilize wind energy on a large scale to reduce the dependence of the island on petroleum based energy;

2. Proposition No. 3

   Study the feasibility and make a plan for a regional center for applied research of wind energy;

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Informal translation of letter number 1703, dated December 7, 1979, from the Ministry of Rural Development, Cape Verde:

Mr. James O'D Maher
Country Development Officer
Praia, Cape Verde

Dear Sir:

Following the conversation between Mr. Maher and Horacio Soares, Director General for Conservation and Exploitation of Natural Resources, on December 6, 1979, we would like to inform you that the Government of Cape Verde would assume responsibility for paying construction expenses of a building for the future project concerring renewable energy, these expenses are estimated at $80,000 U.S.

Besides this, it is also the intention of my Government to ask within the next few months through the U.N. System or Bilateral Cooperation system, a volunteer for an operational technician to assist the realization and carrying out of the referred renewable energy project.

I take this opportunity to present you my best compliments.

Signed, Joao Pereira Silva
Minister of Rural Development

CILSS
CLUB DU SAHEL

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MISE EN ŒUVRE D'UNE STRATEGIE DE L'ENERGIE DANS LES PAYS DU SAHEL

Mission d'information et d'identification de projets
22/5/79 au 12/7/79

SEPTEMBRE 1979

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PROPOSITION D'ACTION N° 3

CREATION D'UN CENTRE REGIONAL POUR L'ENERGIE EOLIENNE

1 - FORMULATION

Etude de la faisabilité d'un centre régional de recherches appliquées pour l'énergie éolienne. Le Centre serait implanté dans les Iles du Cap Vert mais travaillerait au profit de l'ensemble des Etats Sahéliens.

2 - JUSTIFICATION

Le projet ci-dessus est issu du rapport "l'Energie dans la stratégie de Développement du Sahel" page 137. Son principe a déjà été approuvé par les Autorités du Cap Vert mais sa réalisation pratique et son approbation définitive suppose au préalable une meilleure description des objectifs de ce Centre, de son organisation, de ses coûts d'investissement et de fonctionnement, etc.... et une évaluation raisonnable des résultats à attendre de ce projet.

Le choix du Cap Vert comme lieu privilégié d'implantation est justifié par le fait que ce pays dispose de conditions exceptionnellement favorables pour le développement et l'utilisation de l'énergie éolienne :

- présence de vents forts et stables
- caractère isolé
- manque d'eau
- forte motivation des habitants
- expérience déjà ancienne de l'utilisation des éoliennes

- présence de compétences techniques sur place ;
- démarrage en cours de plusieurs projets d'utilisation de l'énergie éolienne.

Un caractère régional [illegible] serait souhaitable [illegible] plusieurs [illegible] pays [illegible] susceptibles d'[illegible] l'énergie éolienne (Sénégal, Mauritanie, Mali, etc.) [illegible] acquérir une expérience dans ce domaine malgré leurs moyens limités.

Les applications principales de l'énergie éolienne concerneraient :

- la production de l'énergie électrique sur un réseau en parallèle avec les moyens conventionnels de production ;
- la production autonome d'énergie électrique pour des localités de faible importance ;
- la production d'électricité pour l'alimentation d'équipements isolés phares, balises, relais de télécommunication, etc. ;
- le pompage de l'eau ;
- le dessalement de l'eau par osmose inverse ;
- la mouture des céréales ;
- etc.

Dans chacune de ces applications l'énergie éolienne devra être compétitive par rapport aux alternatives disponibles.

3 - OBJECTIFS

L'étude de faisabilité devra mesurer l'opportunité réelle de ce projet et, dans le cas de conclusions favorables, préciser les objectifs à assigner à ce Centre, définir les moyens nécessaires et les modalités de fonctionnement envisageables et surtout évaluer l'impact de ce projet d'un certain nombre de points de vue.

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Les experts constatent que de nombreux petits projets en énergie éolienne sont envisagés mais qu'ils sont d'une échelle dérisoire par rapport aux besoins énergétiques de ce pays.

Le financement international d'un programme pour l'utilisation à grande échelle de l'énergie éolienne permettrait : entre autres

de réduire fortement la dépendance de ce pays vis-à-vis des dérivés pétroliers

de faciliter la prise en charge de son financement ;

d'assurer la cohérence des actions dans ce domaine.

OBJECTIFS

- vérifier l'intérêt d'un programme d'utilisation intensive d'énergie éolienne,
- établir le contenu de ce programme,
- préparer le lancement d'un tel programme

4 - DESCRIPTION DES TACHES

analyse de l'état actuel de la technologie éolienne,

disponibilité des matériels éoliens : coûts, performances, durée de vie, entretien requis, etc.

évolution prévisible dans un avenir rapproché,

analyse des besoins énergétiques du Cap Vert en énergie électrique et en pompage,

analyse des moyens actuels de production d'électricité et de leurs prix de revient,

inventaire du potentiel éolien dans les différentes îles ;

analyse des problèmes associés au couplage des aérogénérateurs sur un réseau électrique,

identification des applications prioritaires,

BCD ARCHIVE DOCUMENT

DESCRIPTION DES TACHES

L'étude de faisabilité de ce Centre pourrait s'articuler autour des points suivants :

a) Analyse de la situation présente

- inventaire des travaux et projets déjà en cours au Cap Vert et dans les pays sahéliens en matière d'énergie éolienne,
- état des recherches appliquées dans le Monde : principales applications devenant économiques - organismes étrangers susceptibles de coopérer avec le Centre,
- ressources humaines disponibles.

b) Identification des besoins en Recherche et Développement

- identification, après entretien avec les Responsables des pays concernés, des secteurs prioritaires d'application de l'énergie éolienne,
- identification des travaux à entreprendre pour répondre de manière adaptée aux besoins de ces secteurs prioritaires

c) - Opportunité de la création de ce Centre

Compte tenu des besoins exprimés, des projets et travaux déjà engagés, des résultats à attendre, etc.

d) - Définition des vocations possibles pour le Centre.

e) - Objectifs plausibles à atteindre à court, moyen et long terme.

f) - Organisation du Centre

- statuts envisageables
- organigramme
- modalités de coopération entre toutes les parties concernées
- activités de formation
- système de collecte, stockage et diffusion de l'information (publications, séminaires, etc).

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g)- Moyens nécessaires

moyens humains compétences souhaitables, disponibilité locale, formation

moyens matériels — description
- coût d'investissement des différentes phases
- coûts de fonctionnement.

h)- Evaluation de l'impact du projet et recommandations.

En quoi ce projet contribuera-t-il au développement des Iles du Cap Vert et du Sahel en général ? Analyse multicritère. Prise en compte du point de vue des Responsables politiques. Etablissement

5- MOYENS ET DUREE

L'étude devrait être conduite par un ingénieur économiste de haut niveau connaissant bien les problèmes énergétiques des pays en voie de développement assisté, à temps partiel, par des spécialistes du pompage de l eau, de la production d'électricité, du dessalement de l'eau, des techniques éoliennes, etc.

Cet expert devra travailler en collaboration étroite avec les responsables scientifiques et techniciens des différents pays et les Autorités du Cap Vert qui ont déjà réfléc sur ce problème et ont pris des initiatives dans ce domaine (Centre National pour le transfert technologique).

La durée du projet serait de 4 mois et nécessiterait environ 5 hommes-mois.

6 - REMARQUES :

Le Centre devra s'appuyer au maximum sur les ressources humaines du Cap Vert et des Etats de la région et inclura un important "volet formation".

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localisation de ces applications,

choix des techniques de production et dimensionnement unitaire,

définition du programme et de ses différentes phases,

évaluation des coûts et moyens associés à ces diff[illegible]

analyse des conditions de mise en [illegible] du prog[illegible]
impact,

etc.

5 MOYENS NECESSAIRES

Consultants

un chef de projet,

un expert en énergie éolienne ayant déjà l'expérience des problèmes opérationnels liés à l'installation et au fonctionnement de ces équipements,

un expert en production d'électricité,

un expert en problèmes hydrauliques,

un analyste financier issu d'un organisme de financement international.

Durée : 8 mois - 1 an.

Volume de l'intervention : environ 20 hommes-mois.

ENERGIES RENOUVELABLES

PROPOSITION D'ACTION N° 12

UTILISATION LARGE DE L'ENERGIE EOLIENNE DANS LES ILES DU CAP VERT

1 - FORMULATION

Préparation et lancement d'un programme international d'aide pour l'utilisation à grande échelle de l'énergie éolienne dans les Iles du Cap Vert.

2 - JUSTIFICATIONS

Les Iles du Cap Vert sont aujourd'hui presque totalement dépendantes des produits pétroliers raffinés importés pour leur approvisionnement énergétique (énergie électrique, pompage, etc) et ces importations pèsent lourdement sur la balance commerciale de ce pays.

Les Iles du Cap Vert bénéficient en revanche d'une ressource énergétique nationale très abondante, l'énergie éolienne qui est extrêmement peu valorisée aujourd'hui. Or, les experts de la mission sont convaincus que l'énergie éolienne est déjà une énergie compétitive dans le contexte du Cap Vert, que les technologies sont confirmées et que celle-ci pourrait prendre une place très significative dans la production locale d'électricité (soit en alimentant le réseau en parallèle avec des groupes diesel électrogènes, soit en fonctionnement autonome dans les centres isolés pour le pompage de l'eau, le dessalement de l'eau de mer par osmose inverse, la réfrigération, etc).

MINISTÉRIO DO
DESENVOLVIMENTO RURAL

GABINETE DO MINISTRO

APPENDIX E
(Translation attached)

Praia, 7 de Dezembro de 1979.-

Senhor James O'D. Maher

Country Development Officer

Embaixada dos E. U. A.

P R A I A

Excelentíssimo Senhor

No seguimento da conversa havida entre o Senhor e o Eng.º Horacio Soares, Director-Geral da Conservação e Aproveitamento dos Recursos Naturais, no dia 6 de Dezembro de 1979, informo-o que o Governo de Cabo Verde assumirá a responsabilidade pelas despesas de construção de um edifício para o futuro programa de energia renovavel, as quais se estimam em 80.000 dollars americanos.

Além disso, é tambem intenção do meu Governo pedir nos proximos meses, no âmbito do sistema das Nações Unidas ou da cooperação bilateral, um voluntário ou "expert operational" para assistir na realização e montagem do referido projecto de energia renovavel

Aproveito a oportunidade para lhe apresentar, Senhor Maher, os meus melhores cumprimentos.

/João Pereira Silva/
-Ministro do Desenv. Rural-

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APPENDIX F

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Cape Verde Islands

Project Title: Renewable Energy

Funding: FY Total Project Cost is $ 628,010 of which $ 495,440 is to be provided by AID, and $ 132,570 from Government of Cape Verde sources.

Life of Project: Two years starting October, 1979.

IEE Prepared By: J. C. Spooner, General Engineer REDSO/WA April, 1979.

Environmental Action Recommended: The project will have no significant effect on the environment and, therefore, a negative environmental determination is recommended.

Concurrence: Mission Director Decision

Recommended Environmental Action:

Approved: James O'D Maher
James O'D Maher, CDO

Disapproved: _____

Date: December 4, 1979

Initial Environmental Examination

I. Description of Project Area and Its Environment

The purpose of the project is to support the GOCV through the Ministry of Rural Development in its effort to develop renewable energy resources and to conserve vegetative fuel by improving the efficiency of its use. The project will provide instruments and facilities to assess the wind and solar energy potential; shop facilities and materials to build and install various devices; technical assistance and training to upgrade the existing staff; and prototypes for experimental installations.

The project will be implemented primarily on the Island of Santiago, the most populous of the main islands. It is located 600 Km from the west coast of Africa at 15° north latitude in the northeast trade wind belt. The land is hilly, generally rocky and unproductive because of scarce rainfall and little topsoil. There are some reserves of groundwater on this island. There is little firewood and all fuel (petroleum) is imported.

Workshop facilities and a fenced test yard will be installed at the Achada San Filipe about five kilometers from the capital city of Praia. This is a 350 meter high, windswept plateau where a windmill and a solar pump have already been installed and an experimental area is being developed for irrigation. There are no habitations within one kilometer of the proposed workshop site and test area. There is presently little or no vegetation because of lack of water. Groundwater is available at a depth of about 50 meters. Prototype windmills will be initially installed for water pumping on existing boreholes as well as other locations on the islands as the project progresses.

Wind devices will include direct drive water pumps and electric generators. Solar devices could include stills, food dryers, solar cookers, and waterheaters. A prototype of a woodburning stove would also be constructed. Wind and solar energy measuring instruments will be placed at strategic sites on the major islands. Wherever possible this will be in conjunction with the Agrhynet project.

II. Environmental Effects and Analysis of Significance

a. Land

The Agricultural Sector Assessment (April 1978) estimates that 10% of the land is cultivated and another 10% arable if water is available. As an experimental and test project this effort will have little effect on the land although the shop and the test site will be on land which could be productive if water was available. The essential character of this land will not be changed. Small amounts of added water will allow some areas to become agriculturally productive.

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b. Water

All pumping of groundwater will be under the direction of the resident FAO hydrologist. If necessary, test wells will be installed to monitor water table and salt intrusion effects. Amounts of water will be relatively small. Solar stills will be used in villages to upgrade potable water quality where now only brackish water is available.

c. Atmospheric

A diesel driven generator in the shop will make a small change in the air quality. It's engine is equivalent to that of one truck envisioned for this project. Noise will be at a nominal level, remote from habitations. All test devices will have negligible effects on the atmosphere. Wind devices in some areas will reduce the use of diesel engines and thus reduce air pollution.

d. Economic

In the immediate future there will be a slight increase in economic activity because of added jobs and more productive agriculture. Some wind machines will reduce the use of diesel engines with a corresponding saving in imports of fuel. Ultimately, there will be an improvement in the economy of the islands, primarily in the rural areas.

e. Health and Safety

Improved supplies of safe potable water will result from the project. Deep wells and solar stills will reduce the incidence of water borne diseases. Irrigation will be on a minor scale and will be intermittent, with little impoundment of water.

All test and measuring devices will be enclosed or fenced to protect them as well as any animals or persons in the area from accidental contact. Proper engineering design and supervision of experimental devices will prevent accidents. Windmills will be remote from habitations and airports.

III. Conclusions

It is felt that the overall environmental effects of this project will be beneficial. Therefore, a negative determination is recommended.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-Areas	Impact Identification and Evaluation
A. Land Use	
1. Change the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
5. Other factors	
B. Water Quality	
1. Physical state of water	L
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	
a. Quality of potable water will be improved both with water stills and deep wells	NL
C. Atmospheric	
1. Air additives	N
2. Air pollution	N
3. Noise pollution	L
4. Other factors	

N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

D. Natural Resources

1. Diversion, altered use of water _____ L

2. Irreversible, inefficient commitments _____ N

3. Other factors

E. Cultural

1. Altering physical symbols _____ N

2. Dilution of cultural traditions _____ N

3. Other factors

Ethnic _____ N

Educational _____ N

F Socioeconomic

1. Changes in economic/employment patterns _____ L

2. Changes in population _____ N

3. Changes in cultural patterns _____ M

4. Other factors

Agricultural activity _____ N

G Health

1. Changing a natural environment _____ N

2. Eliminating and ecosystem element _____ N

3. Other factors

Accessibility to medical attention _____ N

Control of endemiological diseases _____ L

H. General

1. International impacts _____ N

2. Controversial impacts _____ N

3. Larger program impacts _____ N

4. Other factors

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APPENDIX H

INSTRUMENTATION, EQUIPMENT, AND SUPPLIES: ITEMIZED LISTING

A. Solar Measuring Instruments

B. Wind Measuring Instruments

C. Shop Equipment

D. Electrical Instruments and Supplies

E. Pipe Tools

F. Shop Supplies and Consumable

G. Components for Installation

H. Office Equipment

I. Vehicles

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A. Solar Measuring Instruments

Electrical Characteristics: 220 V - 50 Hz

Calibrations - Metric

Ship all these items via Lisbon to Praia, Cape Verde

Suggested vendor: Weather Measure Corp., Sacramento, Cal.

Cat. #1078

	Page	Description	Model	Qty.	Unit Price	Del. Price
1.	183	Thermometer	38/55TMI-C	10	16	255
2.	183	Thermometer	TM6	2	75	240
3.	176	Min-Max Thermometer	TM45-C	4	16	100
4.	99	Sling Psychometer	HM-1	1	29	50
5.	99	Sling Psychometer, pocket	HM-15	1	28	50
6.	99	Psychometric Slide Rules	HM-12C	2	4	15
7.	192	Hygrothermograph	H311S	2	295	960
8.	192	Charts for above	C311-D-HF	8	9	120
9.	192	Charts for above	C311-W-HF	2	9	30
10.	100	Dial Hygrometer	HM 26	2	48	155
11.	153	Campbell-Stokes Sun Duration Recorder	R431-A	2	545	1740
12.	153	Charts for above	C431-C	2	57	180
13.	158	Silicon cell radiometer	R414	2	380	1,215
13a.	158	Cable for above 20 ft.	R413-2C	2	5	10
14.	159	Recorder, potentiometric 1"/hr.	R12V-1	2	1,400	4,480

	Page	Description	Model	Qty.	Unit Price	Del. Price
15.	158	Charts ST-2.5 699351		24	9	340
16.	159	Shadow band	R449	1	150	240
17.	159	Pyranometer Meter Display	R446	1	100	160
				Sub-Total		10,340

Suggested vendor: Forestry Suppliers, Inc., Jackson, Miss.

18.	413	Pocket Thermometer-10 to 110°	89138	5	4.55	35
18a.	268	Magnetic compass and case	KB-20 and 37011	2	26	325
18b.	208	Builders level and tripod	43751 and 43753	1	203	325
18c.	307	Level rod, metric 15'	93551	1	50	80
18d.	134	First-Aid Kit	25079	2	27	85
				Sub-Total		610

Suggested vendor: Omega Engineering, Stamford, Conn.

19.	I-30	Thermocouple sets (Cu-Constan)	MCT-T	2	49	155
20.	I-30	Mercury battery for above		5	5	40
21.	I-30	Omni Amp. Portable Thermocouple		1	125	200
22.	I-30	Mercury batteries for above		4	5	30
23.	I-32	Digital thermometer, 12 V	2176 A	1	575	925
24.	D-9	Thermocouple wire	GG-T-30	1000 ft.	175	280

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	Page	Description	Model	QTY.	Unit Price	Del. Price
25.		Thermocouple ref. junction	LXCJ-T	1	95	155
26.	F-9	T-C Connectors	NM P-COCO-MF	20	4	125
27.	I-11	Digital Thermometer	2160-T	1	299	480
28.	G-3	FC Thermocouple Assy. Kit	N965	1	275	440
				Omega Sub-Total		2,830
				Forestry Supplies Sub-Total		610
				Weather Measure Sub-Total		10,340
				TOTAL		$13,780

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B. Wind Analysis Instruments

Note: Specify all following for highly corrosive salt water environment

Suggested vendor: Natural Power, Inc. , New Boston, New Hampshire 03070

Item No.	Item	Qty	Unit Price	Del. Total Price
1	Wind spectrum analyzer for measuring and recording wind speed frequency distribution. Should record 16-32 intervals with digitally displayed readout. Two input anemometers and 2 recording output channels. Must record wind speed intervals by meters per second in 1/2 m/sec. intervals. Model name "Compilator".	2	1,200	3,840
2	I.C. Board Parts (5%) for above		60	190
3	Wind run odometers, 2 channels of input and output for 2 separate anemometers. Wind speeds in m/sec. Natural Power, Inc., Model "Accumulator"	4	200	1,280
4	Parts (5%) for above	4	10	70
5	Extra anemometer heads for items 1 and 3	6	25	280

Suggested vendor: Lambrecht GMBH, Hamburg, W. Germany

6	Lambrecht Model No. 1482 (Woelfle type). Mechanically driven integrated strip chart (pressure sensitive) for wind velocity and direction. (Made in West Germany - this is the only mechanically driven device of its kind and is unique. No U.S. manufacturer available). Include 3 years of chart paper.	2	2,000	6,400

Suggested Vendor: Unarco-Rohn Inc., Peoria, Illinois

7	Telescoping towers 50' Rohn model H-50 or equivalent with all hardware	6	250	2,400
8	Weatherproof electric box 12" x 12" x x 10" or equivalent with provisions for locking	6	70	670

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Item No.	Item	Qty	Unit Price	Del Total Price
9	U-clamps for 1 1/2" diameter pipe, 2 1/2" deep	60	1	96
Suggested vendor:	Natural Power, Inc., New Boston New Hampshire 03070*			
10	Wire 4 conducters Belden type weatherproof or equivalent	2.500 ft	.20	800
11	D-cell batteries, heavy duty nickle cadmium	150	2	480
12	Battery charger for above D-cell batteries	1	25	40
13	Hand-held anemometers with anemometer cups, direction, and wind speed read-out in m/sec on a sweep dial.	2	70	225
14	Turbulence measuring set read-out in m/sec, plus all related parts and charts for 3 years. (This should be a wind speed and wind direction measuring system which records 1/10 of a second fluctuations on a fast moving chart recorder).	1	1,000	1,600
		Sub-Total		18,330

* Equipment to be used with items 1 - 5

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C. Shop Equipment

Electrical characteristics: Large machines — 380 V - 3 phase 50 HZ
Line voltage 380 V
Phase voltage 220 V
Small machines — 220 V - 50 HZ

Metric calibrations: Include 2 copies of operating manuals and parts, lists, send by mail to USAID, American Embassy, Praia, Republic of Cape Verde

Suggested vendors (unless otherwise noted individually):
Mc-Master Carr, Chicago, Illinois or
Montgomery Ward Export, Baltimore, Md

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A. Machine Tools and Attachments	Qty.	Unit Price	Total Del. Price
1. Engine Lathe 12" swing x 48" (similar to McMaster hollow spindle w/motor (Carr 3191A2 p. 1387 cat. 85)	1	10,000	16,000
2. Chuck and wrench for above	1	500	800
3. Milling attachment for item 1	1	2,500	4,000
4. Lathe tools, set for item 1	1	1,500	2,400
5. Drill press, sensitive 5/8" cap. spindle w/motor (similar to McMaster Carr 2774H21 Cat. 85 page 1362)	1	2,500	4,000
6. Chuck adapters for above	1	50	80
7. Drill press vice and bolts	1	75	120
8. H.S. drills, number sizes, 1 set	1	35	55
9. H.S. drills, letter sizes, 1 set	1	35	55
10. H.S. drills, 1/8" thru 1/2", sizes by 32 nds.	1	60	105
11. Vertical mill, 2 H.P. motor	1	6,000	9,600
12. Dividing head, fixtures, clamps and bolts (assorted)	1	1,000	1,600
13. Cutters, end mills, saws, etc. for item 11	1	1,000	1,600
14. Bench grinder, double end, pedestal 8" diameter, med. and fine whells, 1" wide, w/motor, guards and water tank	1	400	640

7

Machine Tools and Attachments	Qty.	Unit Price	Total Del. Price
15. 2 extra extra wheels for above	4	25	100
16. Wheel dresser, for item 14	4	15	25
17. Power hack saw and motor w/coolant tank and pump, 6" vertical capacity*	1	1,200	1,920
18. H.S. blades, for above	6	80	130
19. Sheet metal brake, manual, mild steel cap., 96" x .098"**	1	1,200	1,920
20. Sheet metal roller manual, capacity 48" x .090"	1	900	1,440
21. Sheet metal shear, manual, capacity 48" x .098"	1	1,000	1,600
22. Hydraulic press, manual 25 T.	1	500	800
B. Hand and Power Tools			
1. Drill bit grinder jig	1	10	16
2. Forge w/blower, hood and water tank	1	100	640
3. Anvil — 150 pounds	1	200	320
4. Blacksmith tools set (chisel, punch, tongs)	1	100	160
5. Mechanics master auto tool set Sears Cat. p. 857, 9R46391R1	2	800	2,560
6. Mechanics starter tool set Sears Cat. p. 854, 9R53022C	4	70	450
7. Auto body tool set, Sears Cat. p. 850, 9R48888C and 9R4171	1	90	150
8. Oxyacetylene medium duty welding and cutting set, with regulators, hoses tips, goggles, spectacs, aprons and gloves. (DIN European thread system)	2	250	400

* similar to McMaster Carr 397483 Cat.85, page 1463

** similar to McMaster Carr 2434T36 Cat 85, page 1279

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Hand and Power Tools	Qty	Unit Price	Total Del. Price
20. Chisel cutters, tungsten carbide	2	5	15
21. Shovels, longhandle	30	12	560*
22. Picks	10	15	240*
23. Electric auger, 8" diameter (post hole digger) x 6'	2	15	58
24. Ladder, step 8', wooden	2	55	180
25. Ladder, extension 20', wooden	2	75	240
26. Three wheel shop crane/hoist/hydraulic manual 1 1/4 ton cap	2	300	600
27. BC type, 10 lb., dry powder type fire extinguishers w/mounting racks	10	25	400
28. Battery charger, 12 v., 6 unit, automatic type suited for 6 v., 12v., 24 v., 48 v.	1	80	125
29. Battery load checker, 12 v. lead acid	1	15	25
30. Hydrometer (battery acid)	2	5	15
31. Oxygen bottles (DIN European thread system	10	200	3,200
Suggested vendor: Air Liquide, Lisbon			
32. Fans 14" oscillating, pedestal AC/DC	5	30	240
33. Trouble lamps, 20' cable w/clamps	5	10	80
34. 3T. capacity chain hoist, manual, 6' lift	1	150	240
35. 1/2" nylon rope	1000 ft	300	480
36. 1/2" nylon pully snatch block	6	120	190
37. Floor jack, 2 ton 16" lift, portable roller type	1	200	320

* local procurement, shelf item

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Hand and Power Tools	Qty	Unit Price	Total Del. Price
Suggested vendor: Air Liquide, Lisbon			
9. Acytelene generator, for use with item 8	2	150	240
Suggested vendor: Air Liquide, Lisbon			
10. Air compressor, elect. driven, 5 CFM, complete w/hose, chucks etc.	1	250	400
11. Arc welder, D.C. 200 A., diesel drive (Kohler), 4 wheel trailer mount, portable, with 50' cables, hoods, glasses, chippers, gloves electrode holders (2), 6" C-clamps (2)	1	4,000	6,400
12. Concrete mixer, 4 cu. ft., cap., non-tilt, diesel drive (kohler), 4 wheel mount, complete with water tank, meter, and skip hoist	1	800	1,280
13. Portable 7" circular saw, electric with 3 extra combination saw, rip saw and abrasive blades	1	125	200
14. Portable orbital sander, electric with 10 packs assorted abrasive refills	1	125	200
15. Portable electric nibbler shear, cap. .80" mild steel	1	150	240
16. Portable electric drill, variable speed, reversible 1/2" capacity, medium duty with extra jacobs chcuk and key	1	100	160
17. Butane, three torch set complete w/ lighter, wrench hoses	1	40	65
Suggested Vendor: Air Liquide, Lisbon			
18. Benches, shop, 30" x 72" metal top, 36" high (bolted, knocked down)	10	200	3,200
19. Shelving, slotted angle 2 1/2" x 2 1/2" x 6' for shelves, 24 sect. 24" x 30" - 4 high incl. nuts, bolts and washers	1	440	710

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Hand and Power Tools	Qty.	Unit Price	Total Del. Price
38. Gin pole for 2000 load.	1	150	240
Suggested Vendor: Unarco-Rohn, Peoria, Illinois			
39. Auto Mechanics creeper	1	25	40
40. Cable clamp crimping and swedging tool, complete with 1000 clamps for 1/4" wire rope	1	100	160
41. RPM counter totalizing type, mechanical rotating input	5	15	120
42. Stroke counter totalizing type, lever actuated	5	10	80
43. Water meters, for 1 1/4" nom. pipe (to measure and totalize flow suitable for use with a reciprocating pump)	60	300	480
44. Water flow meter for 1 1/2" nom. pipe (to measure and totalize flow, suitable for reciprocating pump).	1	150	240
45. Water flow meters for 2" Nom. pipe (to measure and totalize flow, suitable for reciprocating pump)	1	200	320
46. "C" clamps assorted sizes maleable iron	4	10	65
47. Anglecmeter	3	15	75
Suggested Vendor: Brookstone, Rockford, Illinois			
48. Sheet metal hand shear, left/right hand	1	15	30
49. Measuring tape, 30-40m, coated steel, (measuring in both meters and inches)	1	25	40
50. Measuring tape, 4-5 m (measuring in both meters and inches)	1	10	15
51. Metal T-square (machinist type)	1	30	50
52. Machinists metal scribe	1	10	15
53. 10,000 lb. test chain, welded link, galv. 30 feet, hook each end	1	30	50
54. Shackles with clevis pin, 10,000 lb. cap.	6	5	50

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Hand and Power Tools:	Qty	Unit Price	Total Del. Price
55. Cylinder hone, 2-4" diameter	1	25	40
56. Cylinder hone to 3/4 1/4 to 2" diameter	1	20	30
57. Piston ring compressor to approx. 5" diameter	1	15	25
58. Hand drill for wood (gears completely enclosed from elements) 1/4" capacity	1	25	40
59. Micrometer set of 4 (0 to 4") similar to Sears 9E38717 but metric	1	120	190
60. Vernier caliper, 0 to 130 mm Sears cat. H. 9E40257	1	20	30
61. 1 gasoline internal combustion engine (to be modified for biogas digester) 3 HP 4 cycle 1 cyl. horiz. shaft with dual fuel Marvel-Schehler special carburetor	1	1,000	
Suggested Vendors: Engine - the Kohler, Co. Kohler, Wisc. Carburetor - Marvel-Schehler-Tillotsen, Decatur, Ill.			
62. Diesel electric generator (Kohler engine) 50 H 3 220 VAC phase voltage 380 v. line voltage 15 KVA with 10% spare parts	1	7,500	12,000
63. Spare parts - 10%			8,900
64. tap & die set metric, m2 to m 24	1 set	150	240
65. Plastic gas/oil/water portable tank 250 gal. capacity (to fit pickup truck box)	2	250	800
66. Foundry moulders hand tools	1 set	150	240
67. Chemical test set (grey iron)	1	150	240
68. Oil burner, blower and motor (for melting 100 lbs grey iron in retort)	1	300	480
			$100,685

of which $700 is local

D. Electric Instruments and Supplies

	Description		Unit Price	Total Cost Del.
1.	Universal electric meter which measures resistance (volts, amperes, frequency and power factor)	1	200	320
2.	AC kilowatt hour meter, capable of 50 amps, 380 volts with mounting sockets with counter-type readout (not dial)	2	100	320
3.	AC kilowatt hour meter, capable of 50 amps, 220 VAC with counter-type readout (not dial)	2	70	225
4.	DC kilowatt hour meter capable of 40 amps 240 VDC	2	80	255
5.	Megger, capable of locating shorts to ground by applying high voltages to circuit	1	500	800
6.	Universal ohmmeter, solid state, to 40,000 ohms, AC/DC voltages to 600	2	30	95
7.	Wire spools (250'/spool) stranded copper 6, 8, 10, 14, 16 and 18 gauge, 30C/foot	6	180	720
8.	Electricians pliers for cutting and stripping wire and crimping connectors	1	10	15
9.	Assorted electrical connections with splice joints for 6, 8, 10, 14, 16 and 18 gauge wire	1	50	80
10.	Assortment of alligator-type clips of various sizes	1	20	30
11.	Electrical storage cabinet for above connections, clips, nuts and bolts	1	40	65
12.	Assortment of nuts, bolts, washers and lock washers for electrical work (do not duplicate mechanical nuts and bolts)	1	50	80

Description	Qty.	Unit Price	Total Del. Price
13. Soldering gun dual temperature 220V 150-230 watts	1	25	40
14. Assortment of welding rods for item 12, shop equipment list (mild steel)	1	500	800
15. Timing light rpm	1	50	80
15a. Dwell meter for gasoline engine tuning	1	25	40
16. Assortment of transistors, resistors, capacitors, diods and potentiometers for maintenance purposes	1	200	320
17. Ignition pliers			15
18. Electrician pliers with side cutters			25
19. Electrical tape	25 rolls	1	40
20. 60/40 rosin core solder	20 rolls	1	30
21. Flash lights; 3-4 "D" cell type	3	15	70
22. Citizens' band radios for 2 vehicles, 1 for shop	3	125	600
23. Portable clamp on Ammeter			350
	TOTAL		$5,415

Suggested Vendors: McMaster-Carr, Chicago, Illinois;

or Montgomery Ward Export, Baltimore, Maryland

E. Pipe Tools

Number	Description	Qty.	Unit Price	Total Del. Price
1	Die sets for threading ½-3" I.D. pipe; BSP thread, to include die holder, etc. Ridgid or comparable.	2	150	480
2	Manual pipe threader for ½-3" I.D. pipe, BSP thread with all necessary accessories. Ridgid or comparable.	1	200	320
3	Pipe thread cutting oil.	10 gal.		160
4	8", 10", and 14" adjustable pipe wrenches. Ridgid or comparable.	6 @ 20		210
5	Chain-type pipe wrench for pipes to 3" I.D.. Ridgid or comparable.	2 @ 50		160
6	Mobile pipe cutters for up to 3" I.D. pipe w/spare cutter wheels/rollers. Ridgid or comparable.	2 @ 50		160
7	Bench-mounted pipe cutter for up to 3" I.D. pipe. Ridgid or comparable.	2 @ 75		240
8	Pipe reamers for 3/8"-3" pipe. Ridgid or comparable.	3 @ 20		90
9	Hand-operated hydraulic pipe bender. Ridgid or comparable.	2 @ 100		360
10	Pipe (chain-type) vises for up to 3" pipe.	2 @ 50		160
		TOTAL		$2,340

F. Solar-Wind Shop Supplies and Consumables

		QTY.
1.	Plywood 1/2", exterior, finish oneside, 4' x 8'	50
2.	Construction lumber	
3.	Black iron pipe (Sched. 40) 1/2"	300 ft.
4.	Black iron pipe (Sched. 40) 3/4"	150 ft.
5.	Black iron pipe (Sched. 40) 1"	75 ft.
6.	Galvanized cast iron pipe fittings, miscellaneous tees, nipples, unions, couplings, els	300
7.	Black C. I. pipe fittings, miscellaneous tees, nipples, unions, couplings, els	300
8.	Valves, brass, globe, 1/2" Class 150	10
9.	Valves, brass, blobe, 3/4", screwed ends	10
10.	Valves, brass, globe, 1", screwed ends	5
11.	Valves, brass, gate, 1/2", screwed ends	15
12.	Valves, brass, gate, 3/4", screwed ends	15
13.	Valves, brass, gate, 1", screwed ends	5
14.	Valves, brass, check (one way) 1/2"	6
15.	Valves, brass, check (one way) 3/4"	6
16.	Valves, brass, check (one way) 1"	4
17.	Teflon tape, 10 yd. rolls, 1/2" wide	10
18.	Pipe dope, 1/2 pint cans	12
19.	Copper tubing (half-hard) 1/2"	300
20.	Copper tubing (half-hard) 3/4"	10
21.	Copper els, 90° 1/2"	20
22.	Copper els, 45° 1/2"	20

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	Qty.
23. Copper Tees ½"	10
24. Copper couplings ½"	10
25. Copper crosses ½"	5
26. Copper els., 90°, 3/4"	15
27. Copper els., 45°, 3/4"	15
28. Copper tees, 3/4"	5
29. Copper couplings, 3/4"	8
30. Copper crosses, 3/4"	5
31. Solder- 50% lead, 50% tin, 1 lb. bars	20
32. Acid flux, 3 or 4 oz. tins	20
33. Valves, brass, gate ½", sweat ends	6
34. Valves, brass, gate 3/4", sweat ends	4
35. Valves, brass, globe, ½", sweat ends	6
36. Valves, brass, globe, 3/4", sweat ends	4
37. Copper tube pipe adapters, ½"	10
38. Copper tube pipe adapters, 3/4"	10
39. Hose clamps, stainless strap, screw 2"	12
40. Hose clamps, stainless strap, screw 4"	12
41. Galvanized iron sheet, 4' x 8', 28 gage	30
42. Galvanized iron sheet, 4' x 8', 22 gage	30
43. Copper sheet, 4' x 8', 28 gage soft	10
44. Aluminum sheet, 4' x 8', 22 gage	10
45. Glass wool insulation batts, 4" thick x 22" x 36"	125
46. Acetic acid pint containers	
47. Window glass, std. strength, 1 meter wide	600' lineal
48. U-V resistant polyethylene sheet, 6 mil.	10,000 ft^2

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	Qty.
49 . Polyvinyl sheet (clear), 6 mil.	5,000 ft^2
50 . Aluminized Mylar, 4 mil, roll 100 m^2	1
51 . Fiber reinforced plastic (tarpaulin), roll 100 m^2	2
52 . Assorted nuts, bolts, washer-number sizes	5 lbs.
53 . Assorted nuts, bolts, 3/16-1/4--5/16-3/8 hexhead	20 lbs.
54 . Lockwashers for above item	1 lb.
55 . Wood screws, assorted sizes	15 lbs.
56 . Nails, assorted sizes (common)	25 lbs.
57 . Nails, assorted sizes (galvanized)	10 lbs.
58 . Paint, acrylic, oil base, outside, black matte (gallon cans)	20 gallons
59. Paint, acrylic, oil base, outside, white	10 gallons
60 . Thinner, for above	4 gallons
61 . Brush cleaner, for above	4 gallons
62 . Brushes, for above, 2" nylon	12
63 . Brushes, for above, 3" nylon	8
64 . Brushes, for above, 4" nylon	4
65 . Silicone sealant (12 tubes/box)	2 boxes
66 . Caulking guns for above	2
67 . Plastic hose, thick wall, dark color, for 200° F water) ¼" I.D.	150 ft.
68 . Plastic tubing PVC clear, ¼" I.D.	300 ft.
69 . Heating duct pressure-sensitive tape, 2" wide, 25 yrd. roll	10
70 . Fiber-reinforced pressure-sensitive tape, 3/4" wide, 25 yd. roll	5
71 . Calcium carbide, can, 20 lbs.	5
72 . Parts cleaner (gunk), 1 qt.	30
73 . Cleaning brush for above	2

		Qty.
74.	Turnbuckles for 1/4 " wire rope, 1,000 kg working strength, galvanized	10 each
75.	Wire rope, 1/4" O.D., 7 x 10 galvanized	500 ft.
76.	Miscellaneous steel (1 lot)	10 tons
77.	Local materials (cement, lapilli, pouzzulane)	$3,000*
78.	Firebrick, mullite	200
79.	Plastic fireclay	100 pounds
80.	Ceramic retorts (for 100 lbs. of grey iron)	6
81.	Fiberglass mat	100 ft.^{2}
82.	Polyester plastic qt. cans	20
83.	Aluminum paint, qt. cans	10
	TOTAL	$20,000
	of which $3,000 is local	

* Local shelf item

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G. COMPONENTS FOR INSTALLATION

WIND HARDWARE	QTY.	Total Cost Deliv. USA	Total Cost Local
1. Wind water pumping machines w/2 meter diameter rotor, tower, pump, and all hardware required for installation. Manufactured by Matos of Mindelo, S. Vicente, C. V. ($1,500 each)	5		$7,500
2. Wind water pumping machines w/2 meter diameter rotor, tower, pump, and all hardware required for installation. Manufactured by ONAVE shipyard of Mindelo, S. Vicente, C.V.	5		$8,750
3. Jacobs-type wind electric system: This is a small village electric power system to be set up initially at the shop. The following assumptions are made:			
—4 Kw draw for 5 hours per evening or 20 KW-hrs use per day for lights and radios. Two days storage in batteries (Kw-hrs);			
14' diameter rotor, 240 VDC, 3 kw @ 27 mph, 240 volt control box.			
One battery set, 240 VDC, 40 kw-hr of storage. Gould.			
One tower concrete-type used manufactured locally.			500
One battery charger.			
Assorted junction boxes, DC switches, fuse boxes and fuses			
	Total	$19,840	

Suggested Vendor: Dakota Sun & Wind Ltd., Aberdeen, South Dakota

4. Foot operated deep well, model Kangaroo	3	3,000	
	Total	$22,840	$16,750

Suggested vendor:
Pipers International Water Supply Engr.
Njverheidsstraat 21
P. O. Box 138
Nijkerk, Netherlands

App - H

H. Office Equipment

Suggested vendor: Montgomery Ward Export, Baltimore, MD.

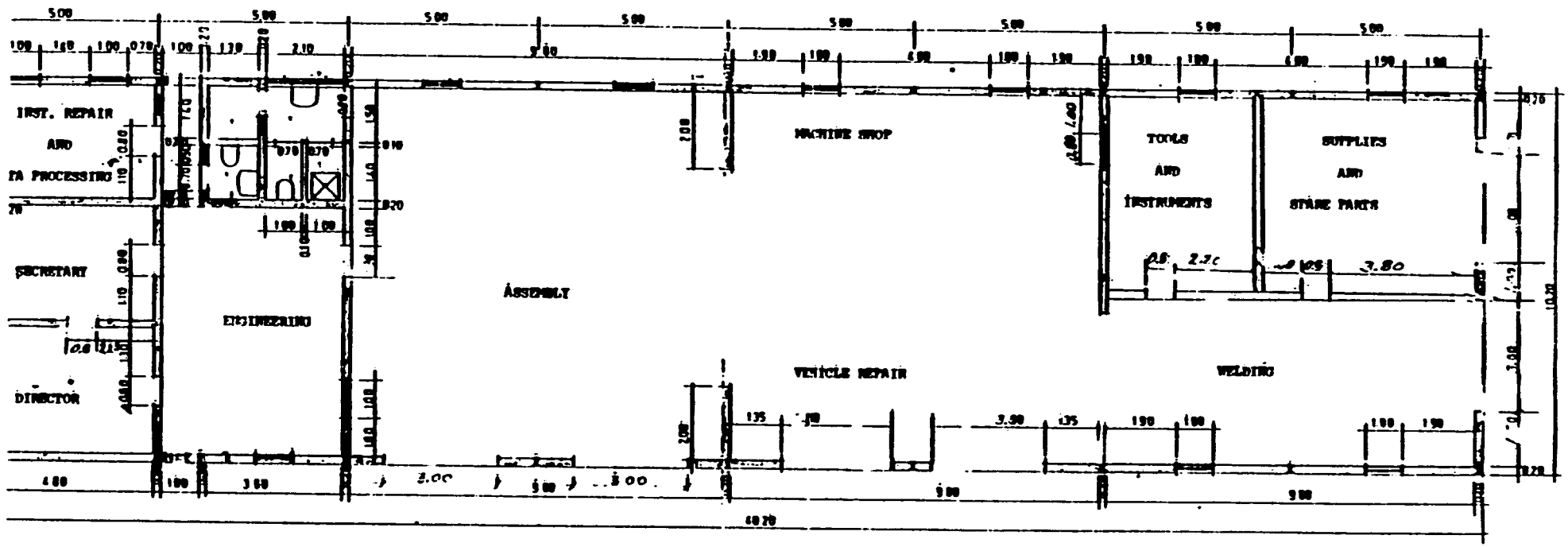
Note: Catalogue numbers from Catalogue H, Sears Roebuck

Electrical characteristics: 220 v 50 HZ

Ship items 9 through 13 airfreight, via Lisbon, to Praia, Cape Verde

	Qty.	Unit Price	Del. Price
1. Legal filing cabinet, 2-drawer, suspension type, ht. 29 x 8-1/4" x 28-1/2	8	120	1,540
2. Visible Index 5" X 8" card file (5-drawer) (office equipment catalogue)	2	60	190
3. Card holders and cards fro item 2 (office equipment catalogue)	1,000	—	160
4. Desk, chari exec. swivel (p.1100) 3H7720N	3	100	480*
5. Desk, chair, secretarial swivel (p. 1100) 3H7726N	1	85	140*
6. Side Chair (p.1100) 3H7722N	6	70	675*
7. Desk lamp (p.1084) 3H5028	4	25	160
8. Drafting table, 42" x 60" Adjustable tilt top, professional type	1	300	480
9. Drafting machine with 18" arms, metric	1	250	400
10. Drafting instruments, triangles and curves (set)	1	50	80
11. Typewriter, manual, office type, pica, 15 " carriage	2	250	800
12. Ribbon, black and red, for above	24	3	115
13. Hewlett-Packard or Texas Instrument programmable calculator with desk-type printer models	1	400	640
	TOTAL		$5,860
	*of which		1,295 is local

APPENDIX N-2 WORKSHOP



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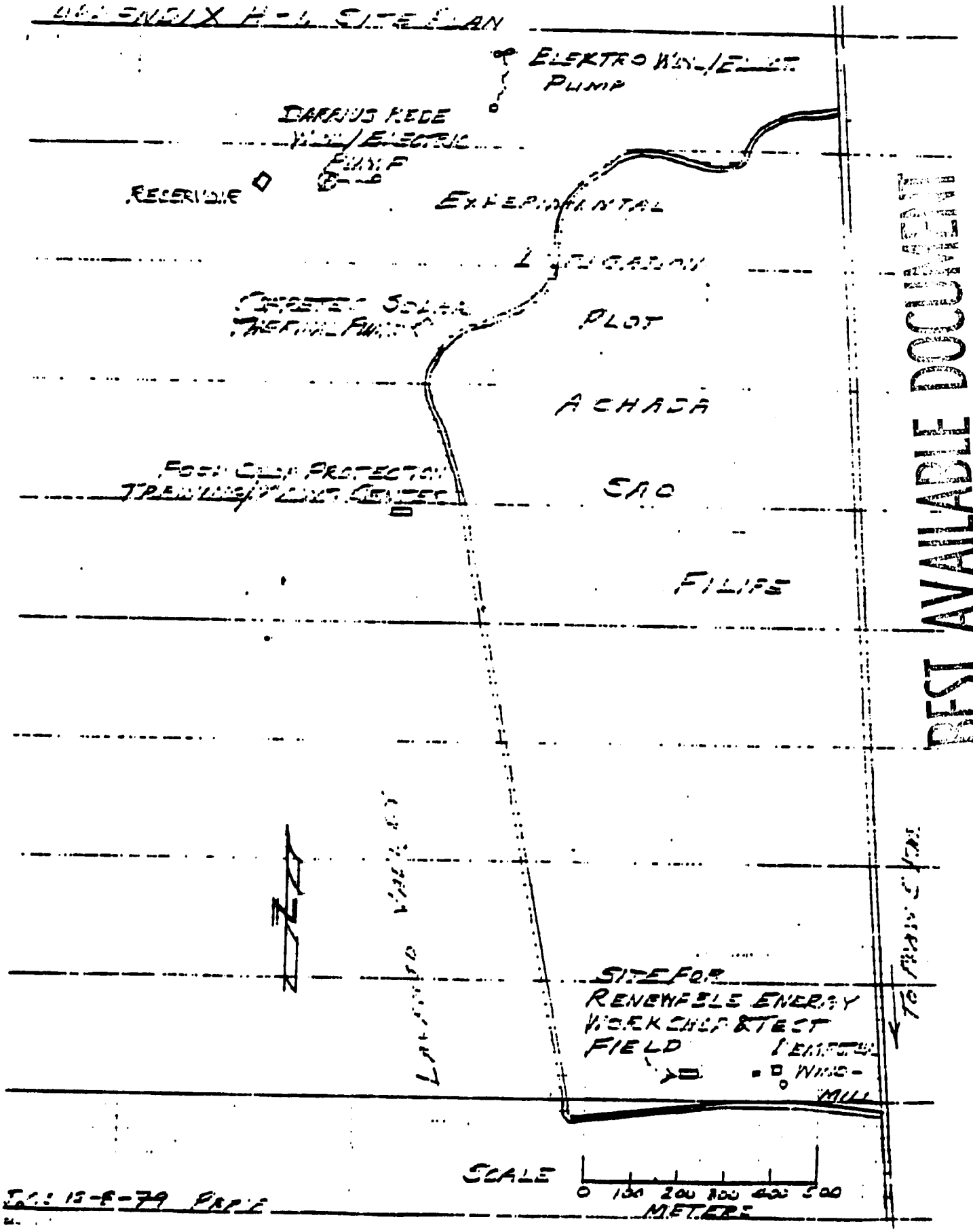
ESCA



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I. VEHICLES

DESCRIPTION	QTY	UNIT PRICE	TOTAL DEL. COST
Ford, Model LN-7000, 32,000 GVW Caterpillar Diesel, manual transmission; single speed rear axle two-wheel drive, tires 10.00 x 20, 12 PR, dual rear; with spare wheel and tire; Dump body and hydraulic P.T.O. hoist. 6 cu. yard capacity tropic cooling; spare parts 10% fast moving	1	25,000	40,000
Ford, Pick-up truck, Model F-250, 8,000 GVW gas engine, 6 cylinder, 4 speed manual transmission; tires 7.5 x 16 10 PR; two wheel drive, fleet side, 8 foot box, front-mounted electric winch, 4,000 # pull, rear bumper; spare parts, 10%, fast moving	1	8,000	14,400
TOTAL:			$54,400

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APPENDIX I 'A'

UNITED STATES GOVERNMENT

memorandum

DATE: January 15, 1980

REPLY TO ATTN OF: Graham Thompson, Chief, PDO

SUBJECT: Cape Verde - Renewable Energy Project (655-)

TO: Gordon W. Evans, Director, REDSO/WA

Problem:

Your authorization is required for a source/origin waiver for the subject project.

Discussion:

Of the approximately $220,000 in commodities which the Project committee considers necessary inputs to this project, $13,505 have been determined not to be available from the authorized geographic code (Code 941) origin. They include $13,305 for wind analysis instruments, shop hand tools and foot pumps and $200 for foreign books and publications. A complete break-down of these commodities is included in the project paper as Appendix I (attached). In accordance with Delegation of Authority 140, you are requested to authorize a source/origin waiver from Code 941 to Code 935 based on the above justification.

Recommendations:

That you approve a source/origin waiver for these project commodities in the amount of $13,505 and that you certify, by signing below, that exclusion of procurement from free world countries other than the co-operating country and countries included in Code 941 would seriously impede attainment of U.S. policy objectives and objectives of the foreign assistance program.

Approved _____

Disapproved _____

Date _____

Attachment:

Cape Verde Renewable Energy Project Paper (655-0009)

Drafted by: JCarroll: ss

Clearance: PScott _____
GThompson _____
HGarmany _____

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

OPTIONAL FORM NO. 10 REV 7-76 GSA FPMR (41 CFR) 101-11.6 5010-112

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APPENDIX I
Items for which a
SOURCE/ORIGIN WAIVER

Required and suggested Source

INSTRUMENTS, EQUIPMENT AND SUPPLIES	QTY.	Total Delivery COST
Section B. Wind Analysis Instruments		
Item B 6 Integrated strip chart recorder wind velocity and direction, pressure sensitive, mechanical drive	2	6,400
Reason: No similar equipment is available from 941 origin		
Source: Lambrecht GMBH Hamburg, West Germany		
C. Shop Equipment - Hand Tools		
Item B 9. Oxyacytelene welding and cutting set	2	400
B 10. Acytelene generator	2	240
B 18. Butane torch, set of 3, complete with hose and fittings	1	65
B 32. Oxygen Bottles	10	3200
Reason: These items must be compatible with other equipment utilizer in project using European thread system, no similar equipment available from 941 origin.		
Source: Air Liquide, Lisbon, Portugal		
G. Components for Installation		
Foot operated deep well pedal pump, Model Kangaroo	3	3000
Reason: No similar equipment available from 941 origin.		
Source: Pijpers International Water Nijverheidsstraat 21 P.O. Box 138 Nijkerk, Netherlands		

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Items for which a

SOURCE/ORIGIN WAIVER

Required and suggested Sources

Foreign Books and Reports - Quantity 1 each

Estimated delivere
Cost $200.00

"Hand Pumps for Use in Drinking Water Supplies in Developing Countries," July, 1977. International Reference Centre for Community Water Supply, P. O. Box 140, 2260 AC Leidschendam, the Netherlands

Kruseman, G. P., and N. A. de Ridder, "Interpretation et Discussion des Pompages D'Essai", International Institute for Land Reclamation and Improvement, Wageringen, Netherlands, 1976.

Wagner, E. G. and J. N. Lanoix, Water Supply for Rural Areas and Small Communities. World Health Organization, Geneva, 1969.

Pessoa, Joao, Boletim Bianual do Laboratorio da Energia Solar, Universidade Federal da Paraiba, 58.000 Paraiba, Brasil.

Gieck, Kurt, Manual de Formulas Tecnicas. Hemus-Livaria Editora, Ltda., Sao Paulo, Brasil.

Silva, Rogerio de Castro E., and Av. O. Jorge, Electricidade Practica (Editorial de Marinha) (20-2° E), Damaia, Brasil, 1977.

The following are published by: Edisud, La-Calade, Aix-En-Provence, France, Collection "Technologies Douces":

Cabirol, Thierry, Albert Pelissou and Daniel Roux, "Le Chauffe Eau Solaire", ISBN 2-85744-013-8, 1978. "Technologies Douces".

Lagrange, Bernard, Biomethane: Tome 1 Biomethane, Une Alternative Credible. Tome 2 - Biomethane, Principes, Techniques, Utilization. "Technologies Douces"

Desautel, Jacques, Les Capteurs Helicthermiques . "Technologies Douces"

Fontanel, Charles, Les Pompes a Chaleur . "Technologies Douces"

Curty, Guy, Eoliennes et Aerogenerateurs . "Technologies Douces"

Energy in the Development Strategy of the Sahel, French Translation, October, 1978. OECD 2, rue Andre Pascal, 75775, Paris, France.

Revue Internationale d'Heliotechnique, Cooperation Mediterraneene Pour l' Energie Solaire. COMPLEX, Siege Social, Palais de la Bourse, 13001, Marseille, France.

"CORRECTIONS MADE ON THIS COPY MUST BE MADE ON ALL COPIES"

TELEGRAM

INDICATE
☐ COLLECT
☒ CHARGE TO PAID

FROM: AMEMBASSY ABIDJAN
CLASSIFICATION: UNCLASSIFIED

E.O. 11652:
TAGS:
SUBJECT:

ACTION:

ACTION: SECSTATE WASHDC
INFO: AMEMBASSY PRAIA
AMEMBASSY BISSAU

UNCLASSIFIED ABIDJAN

AIDAC

FOR AFR/DR/SFWAP AND SER/COM/ALI

E.O. 12065 N/A

SUBJ: CAPE VERDE RENEWABLE ENERGY PROJECT 6554-0009
PROCUREMENT

1. REDSO/WA IS PREPARING TO AUTHORIZE THIS PROJECT IN THE TOTAL AMOUNT OF $455,000.

2. COMMODITY PROCUREMENT INCLUDES ONLY TWO TRUCKS. PROPRIETARY PROCUREMENT IS REQUESTED FOR ONE FORD, MODEL LN 7000; DUMP TRUCK 32,000 GVW WITH 1100 SERIES CATERPILLAR DIESEL 175 HP; ESTIMATED COST $40,000 (DELIVERED) AND ONE FORD MODEL F 250 PICK UP 8,000 GVW 6 CYL. GAS ENGINE ESTIMATED COST $14,400 (DELIVERED).

REDSO
DCM
ECON
CHRN

3. THESE VEHICLES WILL BE OPERATED BY AND MAINTAINED BY THE GOCV MINISTRY OF RURAL DEVELOPMENT WHICH OPERATES

DRAFTED BY	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY
JRGonsalves	12/19/79		PEDSO/WA: GHEvans, Director

CLEARANCES
CCChristian
JCarroll
HGarmany (in draft)

UNCLASSIFIED
CLASSIFICATION

OPTIONAL FORM

ITS OWN GARAGE. THERE ARE TWO IDENTICAL FORD MODEL F [illegible] PICK UP TRUCKS NOW RUNNING IN THEIR FLEET. INTERCHANGEABILITY OF PARTS ON-HAND AND SPECIAL MECHANIC TRAINING INDICATE THE DESIRABILITY OF ADDING ANOTHER UNIT OF THE SAME MAKE AND MODEL. THE MINISTRY ALSO HAS SIX FORD MANUFACTURED DUMP TRUCKS (ALL OPERATIONAL) WHICH ARE OF A LARGER SIZE THAN THE SINGLE UNIT PERMITTED BY THIS PROJECT BUT CATERPILLAR 1100 SERIES ENGINES ARE USED IN ALL OF THEM. OTHER COMPONENTS WOULD ALSO BE SIMILAR OR IDENTICAL. A STOCK OF SPARE PARTS FOR THESE UNITS IS MAINTAINED IN COUNTRY. MAINTENANCE PROCEDURES AND MECHANIC TRAINING FOR THE NEW UNIT WOULD BE SIMILAR. TO REDUCE OPERATIONAL AND MAINTENANCE PROBLEMS ANOTHER UNIT OF THE SAME MAKE IS REQUIRED.

4. PORTUGAL IS BEING AUTHORIZED AS AN ELIGIBLE SOURCE FOR LOCAL PROCUREMENT OF MISCELLANEOUS LOW VALUE CONSTRUCTION MATERIALS. TOTAL VALUE ESTIMATED AT $4,000. SINCE THERE IS NO U.S. FLAG VESSEL SERVICE FROM PORTUGAL TO CAPE VERDE, A WAIVER TO AUTHORIZE TRANSPORT ON CODE 935 VESSELS IS REQUESTED.

FREEDMAN

APPENDIX H

Statutory Checklist

5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights?	Prototype devices developed and tested in this program are for the ultimate benefit of the needy for food production.
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the United States unlawfully?	No
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the International Communist movement?	Yes
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?	N/A
5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?	No

2

A.

6. FAA Sec. 620(a); FY 79 App. Act, Sec. [illegible]. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Angola, Mozambique, or Angola? — No

7. FAA Sec. 620(i). Is recipient country in any way involved in a subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? — No

8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? — No

9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility, or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? — No

10. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters: — No

a. Has any deduction required by the Fishermen's Protective Act been made?

b. Has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620; FY 79 App. Act Sec. 503. (a) Is the government of the recipient country in default for more than 6 months on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds? — No

12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the — N/A

3

A.12.

amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s)." This report is prepared at time of approval by the Administrator of the Operational Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? — No

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? — No

15. FAA Sec. 620A, FY 79 App. Act, Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? — No

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? — No

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty? — No

B. FUNDING CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy? — Most of the funds made available for development project are used to generate employm for the majority of the people.

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B.1.

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor? — N A

2. Economic Support Fund Country Criteria

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? — N/A

b. FAA Sec. 633(b). Will assistance under the Southern Africa program be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President determined and reported to the Congress that such assistance will further U.S. foreign policy interests? — N/A

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? — N/A

d. FY 79 App. Act Sec. 113. Will assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? — N/A

e. FAA Sec. 620B. Will security supporting assistance be furnished to Argentina after September 30, 1978? — N/A

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5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds [illegible] criteria applicable to individual fund sources: Development Assistance (with a [illegible] or criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act (unnumbered); FAA Sec. 653 (b); Sec. 634A. (a) Describe how committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?	A congressional notificatic will be prepared on this project.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	Yes
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No legislative action required
4. FAA Sec. 611(b); FY 79 App. Act Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?	N/A
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	N/A
6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	This project will be implemented along with assistance of other bilateral donors an international agencies.

A.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

The ultimate objective of this project is to improve the technical efficiency of agriculture and small industry.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Commodities will be procured in the U.S. with the exception of a few items which must fit locally available supplies.

9. FAA Sec. 611(a), Sec. 611(b). Describe steps taken to assure that, to the maximum extent feasible, the country is contributing local resources to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The country is contributing local services to the extent possible.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

No

11. FAA Sec. 604(a). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes

12. Foreign Agr. Sec. 108. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?

N/A

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained

a) Project is designed to provide small amounts of water and energy in usable form to the rural poor. Designs will be made with inputs from women and ultimate users of the products.

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B.1.a.

basis, using the appropriate U.S. institutions, (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b) N/A, c) project promotes strengthening of GOCV institutions for self-help in creat input as National Energy Pla d) project goal of renewable energy alternatives will decrease average woman's b rde in firewood collection [illegible] handling water, e) [illegible] lity of project [illegible] other Sahelian countries.

b. FAA Sec. 102, 103A, 104, 105, 106, 107. Is assistance being made available: (Include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers; ---

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research. ---

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; ---

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: ---

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations; ---

(ii) to help alleviate energy problems; ---

(iii) research into, and evaluation of, economic development processes and techniques; Yes. Rural poor will be the direct beneficiaries when devices are tested and perfected.

(iv) reconstruction after natural or manmade disaster; ---

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3.1.b.(4).

(v) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance; ---

(vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to make urban poor participate in economic and social development. ---

c. [107] Is appropriate effort placed on use of appropriate technology? Yes

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)? N/A

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? N/A

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental and political processes essential to self-government. Production of water and energy will increase food supply, improve health and nutrition and utilize local resources.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? Yes

2. Development Assistance Project Criteria (Loans Only) N/A

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? N/A

NOT AVAILABLE

B.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? N/A

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities? N/A

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6C 3 - STANDARD ITEM CHECKLIST

Listed below are standard items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

Procurement will take place by means of normal commercial channels

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?

2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him? — Yes

3. FAA Sec. 604(b). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed? — N/A

4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? — N/A

5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? — Yes

6. FAA Sec. 603. (a) Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. — Yes

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the — Yes

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A.7.

facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? — Yes

8. International Air Transport, Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available? — Yes

9. FY 79 App. Act Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States? — Yes

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? — N/A

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? — N/a

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States not exceed $100 million? — N/A

C. Other Restrictions

1. FAA Sec. 122 (e). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? — N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? — N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-bloc countries, contrary to the best interests of the United States? — Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or guaranty of such transaction? — Yes

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C.

5. Will arrangements preclude use of financing:

a. FAA Sec. 104(f). To pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to undergo sterilization? — Yes

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? — Yes

c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs? — Yes

d. FAA Sec. 662. For CIA activities? — Yes

e. FY 79 App. Act Sec. 104. To pay pensions, etc., for military personnel? — Yes

f. FY 79 App. Act Sec. 106. To pay U.N. assessments? — Yes

g. FY 79 App. Act Sec. 107. To carry out provisions of FAA sections 209(d) and 251(h)? (Transfer of FAA funds to multilateral organizations for lending.) — Yes

h. FY 79 App. Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nations in nuclear fields? — Yes

i. FY 79 App. Act Sec. 601. To be used for publicity or propaganda purposes within United States not authorized by the Congress? — Yes

AID DISCLOSURE

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APPENDIX L

AID 1020-20 (5-70)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Cape Verde Renewable Energy (655-0009)

Life of Project:
From FY 80 to FY 83
Total U.S. Funding $[illegible],000
Date Prepared: [illegible]/77

NARRATIVE SUMMARY Project Inputs: (D-1)	OBJECTIVELY VERIFIABLE INDICATORS Implementation Target (Type and Quantity) (D-2)	MEANS OF VERIFICATION (D-3)	IMPORTANT ASSUMPTIONS Assumptions for providing inputs: (D-4)
A) Commodities	A) 1. Instrumentation for measuring wind and solar energy ($32,000)	Visual and inspection of records	A) 1. AID Funding available on timely basis.
	2. Shop equipment and supplies ($175,000)	Visual and inspection of records.	2. AID Funding available on timely basis.
	3. Vehicles ($[illegible],400)	Visual and inspection of records.	3. AID Funding available on timely basis.
	4. Land & building ($88,500)	Visual and inspection of records.	4. AID Funding available on timely basis.
B) Personnel	B) 1. 6 person-months of US technical assistance	Payroll records	B) 1. TA can be secured on timely basis.
	2. 84 person-months of GOCV management staff, 950 person-months of GOCV technician/labor staff.	Payroll records	2. GOCV will provide staff and budget on timely basis.
	3. 42 person-months of UN volunteer technician	Physical verification	3. Other donor funding
C) Participant Training	C) 15 person-months of overseas training	Travel and School records	C) GOCV will release appropriate staff for training.

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APPENDIX L

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Date of Project: From FY 80 to FY 82
Total U.S. Funding 3,015,000
Date Prepared: 1/17/79

Project Title & Number: Cape Verde Renewable Energy (6-5m(00))

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs: (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for achieving outputs: (C-4)
Wind and Solar R and D Facility operational by end of 24 months of project implementation	Plans for locally manufactured solar and wind energy devices have been drawn up	Inspection of Plans	Climatic conditions will remain suitable to permit valid data to be collected.

AID 1010-20 (11-70)
SUPPL. GUIDANCE 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 80 to FY 82
Total U.S. Funding: $[illegible],000
Date Prepared: 1/7/79

Project Title & Number: Cape Verde Renewable Energy (655-0001)

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1) To provide the GOCV with R and D experience in non-fossil fuel energy systems as input to the formulation of an National Energy Plan which: a) reduces reliance on fuel imports b) makes available local energy inputs for the population.	Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2) Publication of GOCV National Energy Plan.	(B-3) Visual	Assumptions for achieving purpose: (B-4) Various GOCV and other donor inputs/outputs will aid in achieving project purpose.

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APPENDIX L

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Cape Verde: Renewable Energy (655-0000)

Life of Project: From FY 80 to FY 82
Total U.S. Funding $655,000
Date Prepared 12/17/79

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: (A-1)	Measures of Goal Achievement: (A-2)	(A-3)	Assumptions for achieving goal targets: (A-4)
A) Cape Verde reliance on fossil fuels imports reduced.	A) Any measurable import reduction over time	A. Import records	A. Decline in imports not offset by increased use of imported fuels for new sectorial uses.
B) Use of local firewood declines.	B) Measurable reduction in deforestation	B. Forestry records	B. Consumer adaptation to renewable energy technology
C) Increased available income for rural population	C) Purchase of renewable energy devices.	C. GOCV economic indicators.	C. Conversion to wind and solar energy use will reduce per capita cost of energy.
D) Agricultural production increases.	D) Measurable increase in agricultural production.	D. GOCV economic indicators	D. Expanded use of wind power pumps is suitable for increased irrigation.
E) Health of Population improves.	E) Measurable decline in kidney ailments.	E. GOCV Ministry of Health statistics.	E. Solar stills will prove viable means to purify local ground water now too brackish for good health.

APPENDIX M

UNITED STATES GOVERNMENT

memorandum

DATE: December 14, 1979

REPLY TO ATTN OF: W. Dale Davies, Sanitary Engineer, REDSO/WA

SUBJECT: Renewable Energy Project, Cape Verde, 611A Requirements

TO: Gordon W. Evans, Director, REDSO/WA

I have examined the detailed project description, technical analysis cost estimates and financial analysis for the Renewable Energy Project. The existing structures and facilities as well as the prospective building site at Achada Sao Filipe have been examined by a competent engineer and approved as suitable. I conclude that the plans and specifications meet the requirements of section 611A of the Foreign Assistance Act of 1961.

Drafted: JCSpooner:kd
12/14/79

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(REV. 7-76)
GSA FPMR (41 CFR) 101-11.6
5010-112