

**ENERGY ACTIVITIES SUPPORTED BY THE AFRICA BUREAU**

**Submitted to:**

**The Selected Development Problems Division  
Office of Development Resources  
Bureau for Africa  
Agency for International Development**

**March 13, 1981**

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by Patricia S. Larson

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## INTRODUCTION

This report is an update as well as an expansion of the paper entitled "Fuelwood and Other Renewable Energies in Africa" written by Carol Ulinski in November 1979. <sup>1/</sup> It discusses the legislative and policy setting for the Africa Bureau's energy program and projects, and provides a narrative description, budgetary information and status on energy projects currently supported (or planned) by the Africa Bureau of AID.

The report is designed to give other AID bureaus and offices, private voluntary organizations and other aid donors, Congress and other interested people an overview of the Africa Bureau's energy activities. It is purely descriptive because most of the projects are just getting underway and in most instances it is too early to evaluate their results.

The information contained in the report was obtained primarily from AID project and budgetary documentation and files provided by the Selected Development Problems Division and the Country Project Officers of the Office of Development Resources. <sup>2/</sup>

### I. THE LEGISLATIVE SETTING

Since the Foreign Assistance Act of 1975, Congress has urged AID to assist developing countries meet their energy needs. In that Act Congress authorized programs to help developing countries alleviate their energy problems, listed energy as an example of rural infrastructure projects which AID should undertake and supported a program of intermediate technology development. <sup>3/</sup> AID's energy mandate was outlined in greater detail in Section 119 of the Foreign Assistance Act of 1977. This legislation called on AID to give particular attention to the promotion of "small-scale, decentralized, renewable energy sources for rural areas carried out as integral parts of rural development efforts." It went on to say that "these programs shall be directed at the earliest practicable development and use of energy technologies which are environmentally acceptable, require minimum capital investment, are most acceptable and affordable by the people using them, are simple and inexpensive to maintain and are transferable from one region of the world to another." <sup>4/</sup>

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<sup>1/</sup> Some of the information in the introductory section is based on the Ulinski report. The author wishes to acknowledge the contribution of Ms. Ulinski.

<sup>2/</sup> Additional information can be obtained from the Selected Development Problems Division, Bureau for Africa, Room 2480, Agency for International Development, Washington, D.C. 20523.

<sup>3/</sup> Public Law 94-161, H.R. 9005, 89 Statutes at Large 849, et. seq.

<sup>4/</sup> Public Law 95-88, H.R. 6714, 91 Statutes at Large 937, et. seq.

Another energy issue which is of particular interest to Congress is the deforestation problem. The International Development and Cooperation Act of 1979 contained an amendment calling on AID to give emphasis to "community woodlots, agroforestry, reforestation and protection of watershed forests and more effective forest management" in dealing with this problem. This Act also broadened AID's energy assistance mandate by authorizing AID to spend "up to \$7 million for geological and geophysical survey work and to encourage the exploration for potential oil, natural gas and coal reserves in non-OPEC developing countries." 1/

The Africa Bureau has followed these legislative guidelines, particularly Section 119, in developing its energy program and projects.

### The Africa Bureau's Energy Policy and Program

The Africa Bureau's energy strategy continues to be based on the Airgrams on energy in Africa and village firewood production sent to the field Missions in July and August of 1979. 2/ It has the following priorities:

- (1) Programs addressed to fuelwood production -- both large-scale plantations and village woodlots -- and fuelwood conservation -- improved wood and charcoal burning stoves and charcoal kilns.
- (2) Light, small-scale renewable energy applications suitable for rural African communities or families -- water supply, grain grinding, irrigation, handicrafts and other basic life functions -- to increase rural productivity and improve the quality of life.
- (3) Building African capacity to carry out research and development work in Africa on appropriate energy technologies. AID is assisting energy ministries and solar energy labs in several countries and is strengthening the energy work of rural development agencies in several others.

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1/ Public Law 96-53, S.588, 93 Statutes at Large 360, et. seq.

2/ "Energy in Africa--AFR's Program Emphasis," AIDTO CIRC A-204, August 30, 1979 and "Village Firewood Production and Other Cooking Fuels," AIDTO CIRC A-157, July 3, 1979.

- (4) Assisting African countries to analyze the energy priorities of both their modern and traditional sectors through energy field surveys and national energy assessments. 1/

As indicated in the tables in Section III(B) the Bureau's renewable energy program, including fuelwood, has risen from practically zero in FY77 to nearly \$8 million in FY78, and to \$11 million in FY80. Nearly \$13 million is being requested for FY82. As is shown in the Summary Budget Table on page 7, the majority of this funding is being or will be spent on technical assistance, testing and demonstration and dissemination of technologies, roughly \$21 million, \$17 million and \$16 million respectively. Nearly \$13 million will be spent on training and over \$7 million will be spent on analysis and studies. These activities will result in the development and dissemination of over thirty technologies in over twenty countries -- all but those with the smallest aid programs. 2/ In some instances, energy components are being incorporated into existing projects in health, agriculture, education and rural development. In others, new undertakings are being supported.

In addition to project activities, special studies have been commissioned on such key energy problems as the economics of renewable energy systems, community forestry projects, community participation in African fuelwood surveys, and methods of evaluating energy projects. 3/

Special workshops have been held to share knowledge and experience on energy, forestry and fuelwood issues. In June 1978 the Bureau sponsored a "Workshop on Firewood in Africa." An African Solar Energy Workshop sponsored by the Bureau in May 1979 has led to the formation of a new Solar Energy Society for Africa. A workshop convened in Paris in November 1979 brought donor and African experts together to improve coordination of forestry and fuelwood activities. An AID/Peace Corps community fuelwood workshop held in Upper Volta in February 1980 strengthened collaboration between the two agencies and identified project opportunities.

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1/ The Central Energy Office of the Development Support Bureau of AID (DS/EY) has recently initiated projects in conventional energy identification and support, conventional energy training, energy efficiency and conservation, and small decentralized hydropower, in addition to its project in energy policy and planning and other activities. The Africa Bureau plans to rely on the DS/EY program when this type of assistance is requested by an African country.

2/ See Appendix A.

3/ See French, David and Patricia Larson, "Energy for Africa: Selected Readings," Bureau for Africa, AID, Washington, D.C., September 1980.

The Bureau has played a leading role in making the fuelwood/reforestation issue a key concern for the group of donors -- France, Belgium, Germany, Great Britain and Canada -- who have associated themselves as members of "CADA" (Concerted Action for Development in Africa). As the lead country, the U.S. is working with CADA members and African governments in identifying countries in which major fuelwood and community forestry programs might be undertaken. The Bureau has also been active in CILSS/Club du Sahel ecology and forestry activities. 1/

In the fall of 1981 the Bureau is planning to convene workshops on "energy, forestry and the environment" at which AID personnel can exchange views with African and Western experts on key issues and ways in which the Bureau can improve and expand its work in these fields.

In order to develop and carry out these activities more efficiently, the Africa Bureau is increasing the size of its energy field staff. Both REDSOs 2/ in East and West Africa now or will soon have energy advisors on contract.

### III. PROJECT DESCRIPTIONS AND BUDGETARY AND OPERATIONAL STATUS

This section reviews both the regional and bilateral energy projects funded by the Africa Bureau. Environmental projects which include tree-planting and forestry management activities not specifically designated for fuelwood production and centrally funded projects are not included.

A brief explanation of AID's project documentation process, funding mechanisms and the categories and abbreviations used in the budgetary tables will help in understanding this report.

There are two major steps in the AID project development process:

- 1) A Project Identification Document (PID) is submitted by the AID Mission to Washington. This document includes a brief description of the proposed project and sufficient information to provide a basis for judging whether it is feasible and consistent with AID priorities;
- 2) If a PID is approved, a Project Paper (PP) is written. The PP provides a detailed description of the project, an analysis of the project's feasibility from social, technical, economic, environmental, and institutional perspectives, a plan for implementation and a detailed financial plan. The PP is reviewed either in Washington or the field, depending on the amount of the project, and if approved, the project is authorized, a project agreement is signed with the host country government and the funds are obligated.

Several of the energy projects have been funded under two regional, umbrella programs called the Accelerated Impact Program (AIP) and the

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1/ The eight Sahelian countries most severely affected by the 1968-73 drought (Mauritania, Senegal, Mali, Niger, Chad, Upper Volta, the Gambia and Cape Verde) are represented by the CILSS, a regional coordinating organization based in Ouagadougou, Upper Volta.

2/ Regional Economic Development Services Organization.

Improved Rural Technology project (IRT). AIP's are small (\$500,000 or less), two-year pilot projects which can be quickly processed and meet the following conditions:

- It introduces a new technology;
- It provides for participation by local institutes and beneficiaries; and
- It provides for the transfer of productive skills and knowledge to beneficiaries.

The IRT project supports small (under \$100,000) projects which involve technology innovation by local organizations in such areas as agriculture, food processing, village water supplies, energy, construction and health.

The Energy Source and Activity categories used in the budgetary tables of this report are slight modifications of those developed by the AID Bureau for Program and Policy Coordination's energy advisor. Energy sources are defined as follows:

- Fuelwood (FW): trees planted to be used directly as fuel;
- Renewable energy (RN): direct solar, wind, small hydro, and biomass (charcoal, agricultural residues, animal wastes, etc.);
- Fossil fuels (FF): oil, gas, coal, oil shale, tar sands and peat,

The activities are defined as:

- Technical assistance (TA): the provision of skilled experts in a variety of fields to provide advice and training to carry out the project, both short- and long-term;
- Analysis and studies (A&S): activities undertaken to compile or assess available energy sources, actual end uses, energy demand, and other studies, and evaluations (where a short-term consultant is hired specifically to do a study or evaluation, the budget for that person is included in this category);
- Training (TR): activities of a training nature, including in-service or academic training, observational tour training, workshops, public education activities and other promotional activities;
- Testing and demonstration (T&D): activities undertaken to learn how a system works in a laboratory or a controlled field application;
- Dissemination (DS): activities undertaken with the primary purpose of disseminating technologies to expand the available supply of energy through production or increased efficiency.

The last two categories generally include funding for laboratory and other building construction, materials for prototype development, testing equipment, technologies, vehicles, infrastructure, operating costs, etc.

The Funding by Year table is as follows:

- FY78, FY79 and FY80 <sup>1/</sup>: These figures are actual obligations obtained from the Selected Development Problems Division and the Office of Development Planning of the Africa Bureau;
- OYB81: This is the Operating Year Budget (OYB) for the project, which is subject to change during the year depending on the project circumstances and the Bureau's overall budgetary situation. These figures are maintained and updated on a regular basis by the Bureau's Office of Development Planning;
- CP82: This is the proposed funding level for each project which is submitted to Congress at the beginning of the budgetary cycle; it is likely to change drastically as the AID budget moves through the legislative process.

The Appropriation Categories (App. Cat.) are as follows:

- SH - Sahel Development Program
- SD - Technical Assistance, Energy, Research, Reconstruction
- FN - Agriculture, Rural Development and Nutrition, Development Assistance
- PH - Population Planning and Health, Development Assistance
- ES - Economic Support Fund

LOP stands for total funding over the Life-of-Project.

Note: All funding figures represent thousands of dollars.

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<sup>1/</sup> The AID fiscal year (FY) begins October 1 and runs through September 30.

ENERGY PROJECTS  
BUREAU FOR AFRICA  
(In 000s)

SUMMARY BUDGET

	LOP Authorization/Request by Activity						Funding by Year				
	TA	A&S	TR	T&D	DS	Total *	FY78	FY79	FY80	OYB81	CP82
AUTHORIZED/OPERATIONAL FULLWOOD PROJECTS	5,774	1,307	2,766	1,348	5,649	16,841	250	3,431	7,077	3,666	1,551
AUTHORIZED/OPERATIONAL RENEWABLE ENERGY PROJECTS	2,683	995	1,328	6,663	459	12,127	3,941	2,008	1,575	1,320	2,120
AUTHORIZED/OPERATIONAL FOSSIL FUEL PROJECTS	6,010	63	620	-	5,584	12,205	3,635	-	2,200	2,450	1,106
<u>SUBTOTAL</u>	14,415	2,237	4,621	8,207	11,692	41,253	7,829	5,519	10,852	7,436	4,777
PLANNED FULLWOOD PROJECTS **	1,160	-	569	87	2,542	9,050	-	-	-	1,247	1,355
PLANNED RENEWABLE ENERGY PROJECTS **	4,084	232	565	1,709	2,148	17,730	-	-	-	1,582	5,340
PLANNED GENERAL ENERGY PROJECTS **	1,200	5,000	2,300	7,500	-	20,000	-	-	-	3,244	5,500
<u>SUBTOTAL</u>	6,444	5,232	3,434	9,296	4,690	46,796	-	-	-	6,073	12,195
<u>TOTAL</u>	20,911	7,597	12,777	18,614	16,382	88,049	7,829	5,519	10,852	13,507	16,972

\* Numbers may not add up due to rounding.

\*\* Activity figures for planned projects are incomplete and will not add up to the total.

C. AUTHORIZED/OPERATIONAL FUELWOOD PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OY881	CP82
635-0205	The Gambia Reforestation Project*	SH	FW	50	149	305	-	677	1,181	-	1,181	-	-	-
615-0205	Kenya Renewable Energy Development Project		FW RM FF	2,144	399	369	944	944	4,800	-	-	3,482	1,318	-
625-0937	Mali Village Reforestation (AIP)	SH	FW	50	22	32	101	290	495	-	-	495	-	-
682-0205	Mauritania Renewable Resources Management*	SH	FW	339	325	75	-	431	1,170	250	325	275	320	-
683-0230	Niger Forestry and Land Use Planning Project*	SH	FW	405	225	218	303	-	1,151	-	-	332	173	83
685-0219	Senegal Fuelwood Production Project	SH	FW	700	187	247	-	1,999	3,133	-	1,400	700	730	-
685-0243	Senegal AFRICARE Reforestation (OPG)	SH	FW	64	-	-	-	62	126	-	-	126	-	-
685-0247	Senegal Village Woodlots - AFRICARE (OPG)	SH	FW	63	-	-	-	148	211	-	-	211	-	-
686-0235	Upper Volta Forestry Education and Development*	SH	FW	1,958	-	1,499	-	1,012	4,469	-	525	1,350	1,125	1,468
625-0937.08	Upper Volta Village Forestry (AIP)	SH	FW	-	-	18.5	-	30.5	49	-	-	50	-	-
625-0937	Upper Volta Yatenga Agri-Forestry Proposal (AIP)	SH	FW	-	-	.2	-	55.8	56	-	-	56	-	-
SUBTOTAL				5,774	1,307	2,766	1,348	5,649	16,841	250	3,431	7,077	3,666	1,551

\* These figures represent that portion of total project funding that is estimated will be spent on fuelwood or other energy activities.

D. AUTHORIZED/OPERATIONAL RENEWABLE ENERGY PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
633-0209	Botswana Renewable Energy Technology Project	ESF	FW/RN	1,174	186	654	1,250	40	3,304	-	-	725	1,000	1,500
625-0937.03	Cape Verde Renewable Energy	SH	RN	-	85	22	388	-	495	-	-	500	-	-
632-0206	Lesotho Renewable Energy Technology	SD	RN	783	-	219	403	195	1,600	-	1,600	-	-	-
698-0407.07	Liberia Mini-Hydro Electric Activity (IRT)	FN	RN	4	-	-	-	66	70	50	-	-	20	-
688-0217	Mali Renewable Energy	SH	RN	505	584	211	2,800	-	4,100	2,174	-	-	300	620
688-0202	Mali Operation Mil (Photovoltaic Pump)	SH	RN	-	-	-	220	-	220	220	-	-	-	-
688-0213	Mali Action Ble (PV Pump)	SH	RN	-	-	-	220	-	220	220	-	-	-	-
683-0235	Niger Solar Energy	SH	RN	63	-	72	365	-	500	500	-	-	-	-
698-0410.22	Rwanda Renewable/ Improved Traditional Energy (AIP)	SD	RN	120	9	59	240	60	488	-	-	-	-	-
625-0937	Senegal Renewable Energy (AIP)	SH	RN	10	38	91	113	48	300	-	-	300	-	-
685-0208	Senegal Bakel Crop Production	FN	RN	-	75	-	625	-	700	700	-	-	-	-
698-0407.09	Togo Rural Solar Technology Activity	FN	RN	-	-	-	-	50	50	-	-	50	-	-
698-0410.13	Upper Volta Solar Energy Demonstration (AIP)	SD	RN	24	17.5	-	38.5	-	80	80	-	-	-	-
SUBTOTAL				2,683	995	1,328	6,663	459	12,127	3,944	2,088	1,575	1,320	2,120

E. AUTHORIZED/OPERATIONAL FOSSIL FUEL PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
698-0410.09	Burundi Alternative Energy-Peat (AIP)	SD	FF	169	39	85	-	197	490	490	-	-	-	-
695-0103	Burundi Alternative Energy-Peat II	SD	FF	5,408	-	277	-	2,315	8,000	-	-	2,000	2,000	1,106
655-0005	Cape Verde* Desalination and Power	SH/PH	FF	433	-	90	-	3,072	3,595	3,145	-	-	450	-
650-0039	Sudan Petroleum Training	SD	FF	-	24	176	-	-	200	-	-	200	-	-
SUBTOTALS				6,010	63	628	-	5,584	12,285	3,635	-	2,200	2,450	1,106

F. PLANNED FUELWOOD PROJECTS (in \$000s)\*\*

695-0105	Burundi Bururi Forest *	FN	FW	183	-	51	65	559	858	-	-	-	-	-
698-0410.35	Guinea Community Forestry School Tree Nursery (AIP)	SD	FW	305	-	130	22	43	500	-	-	-	497	-
657-0005	Guinea-Bissau* Forestry Project	FN	FW	-	-	-	-	-	3,200	-	-	-	250	500
682-0220	Mauritania Environmental Restoration*	SH	FW	1,172	-	388	-	1,940	3,500	-	-	-	500	500
696-0117	Rwanda Rural Works*	SD	FW	-	-	-	-	-	1,000	-	-	-	-	355
SUBTOTALS				1,160	-	569	87	2,542	9,058	-	-	-	1,247	1,355

\* These figures represent that portion of total project funding that is estimated will be spent on fuelwood or other energy activities.

\*\* Activity figures for planned projects are incomplete and will not add up to the total.

G. PLANNED RENEWABLE ENERGY PROJECTS (in \$000s) \*

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
641-0106	Ghana Renewable Energy	SD		-	-	-	-	-	3,500	-	-	-		600
682-0223	Mauritania Alternative Energy Development	SH	RN	2,388	-	284	1,478	-	4,150	-	-	-	700	800
685-0246	Senegal Renewable Energy II	SH	RN/FW	-	-	-	-	-	5,000	-	-	-	500	1,940
650-0041	Sudan Village Renewable Energy	SD	RN	1,696	232	281	231	2,148	4,588	-	-	-	382	2,000
698-0410	Tanzania Dodoma Rural Energy Development (AIP)	SD	RN	-	-	-	-	-	500	-	-	-	-	-
SUBTOTALS				4,084	232	565	1,709	2,148	17,738	-	-	-	1,582	5,340

H. PLANNED GENERAL ENERGY PROJECTS (in \$000s)\*

603-0013	Djibouti Energy Initiatives	ESF		-	-	-	-	-	4,000	-	-	-	2,000	2,000
698-0424	Africa Regional Energy Initiatives for Africa	SD	All	1,200	5,000	2,300	7,500	-	16,000	-	-	-	1,244	3,500
SUBTOTALS				1,200	5,000	2,300	7,500	-	20,000	-	-	-	3,244	5,500

\* Activity figures for planned projects are incomplete and will not add up to the total.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
The Gambia 635-0205 Gambia Forestry Project*	SH	Fuelwood	50	149	305	-	677	1,181	-	1,181	-	-	-

Project Purpose:

To increase the efficiency of production and utilization of wood and wood products in the Gambia.

Project Summary:

The project will consist of five components:

1. Training - To broaden and deepen the Forestry Department's pool of manpower skilled in all aspects of wood production management and utilization;
2. Outreach - To carry out an educational campaign aimed particularly at rural inhabitants and concerned with the vital economic and environmental importance of trees and woodlands;
3. Technical assistance - To conduct a study of the technical, economic, and social feasibility of exploiting mangroves and to provide short-term consultancies on wood production and utilization;
4. Production - To establish 1,300 hectares of fast-growing Gmelina arborea and to support a pilot program to integrate tree planting into the economic life of rural areas by establishing ten village woodlots; and
5. Utilization - To improve productivity at the only sawmill in the Gambia.

Host Country and Other Donors:

The GOTG will contribute \$233,329 to the project. A number of other donors are sponsoring activities in the Gambia's forestry sector including the UK, Germany and FAO/Arab Development Bank.

- \* These figures represent 75% of project funds, those estimated to be spent on fuelwood-related activities.

Major Outputs:

1. 1,300 hectares of Gmelina plantations established.
2. Fifty hectares of village woodlots established.
3. Fourteen employees of Forestry Department trained.
4. Media campaign designed.
5. Mangrove feasibility study carried out.

Status:

The project was authorized on May 3, 1979 for six years. Three Gambians are in the U.S. undergoing training. A contractor for the Mangrove Feasibility Study is about to be selected.

Project Documents and Reports:

Project Paper, August 3, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Kenya 615-0205 Renewable Energy Development Project	-	Fuelwood	1,030	133	223	622	622	2,630	-	-	3,482	1,318	-
		Renewable	514	133	73	322	322	1,364					
		Fossil Fuels	600	133	73	-	-	806					
			<u>2,144</u>	<u>399</u>	<u>369</u>	<u>944</u>	<u>944</u>	<u>4,800</u>					

Project Purpose:

To stimulate the development and dissemination of renewable energy technologies; promote and expand afforestation and fuelwood conservation efforts; support the institutional development of the Ministry of Energy; and assist in energy planning and petroleum conservation.

Project Summary:

The project has the following major components:

1. Initial planning and surveys - Provide a computer terminal and other assistance for national energy planning and a data bank and library;
2. Institutional development - Provide four long-term experts -- in afforestation, agroforestry, cookstoves and charcoal production, and renewable energy water pumping systems and short-term consultants in training, sociology, etc. to the Kenyan Ministry of Energy;
3. Applied research and demonstration - Help establish a network of nursery, species, research, and fuelwood/agroforestry demonstration and extension centers in Kenya's major ecological zones. Also, provide consulting assistance and initial capital for the establishment within the MOE of an Energy Development Fund to provide loans and grants to government and non-government organizations for renewable energy projects and programs focused on Kenya's poor. Technologies to be financed include woodlots, agroforestry, improved wood and charcoal cookstoves, improved charcoal production, windmills for water pumping, hydraulic rams, animal and hand pumps, solar crop drying, and other small-scale renewable energy technologies;
4. Training - Provide on-the-job training for MOE counterparts, study tours to third countries for MOE and other Ministries' staff, workshops and other informal training for extension workers and villagers. Assistance will also be provided for curriculum development; and
5. Ongoing monitoring and evaluation of project progress.

Host Country and Other Donors:

The GOK is contributing \$1,700,000 to the project. A number of other donors have initiated or are planning energy projects in Kenya including the World Bank, the UNDP, the EEC, Germany, Japan, China, the UK, and Sweden, and efforts will be made under this project to coordinate with them.

Major Outputs:

1. Fifteen trained energy planning, conservation, and renewable energy staff for MOE.
2. Up to six nursery/extension centers established.
3. Energy Development Fund established.
4. Demonstration, dissemination and evaluation of renewable energy technologies.
5. Analysis and studies in national energy policy and programming completed.

Status:

Proposals for implementation of the project have been submitted to the MOE and selection will be made around April, 1981.

Project Documents and Reports:

Project Paper, August, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity						Funding by Year				
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Mali 625-0937 Village Reforestation (AIP)	SH	Fuelwood	50	22	32	101	290	495	-	-	495	-	-

Project Purpose:

To identify successful and cost effective processes for achieving reforestation and more efficient use of wood resources at the village level in Mali's Fifth Region.

Project Summary:

The project will establish two tree nurseries, several experimental and demonstration plots, seek to strengthen the Forest Service's extension capabilities, and in the latter years, promote pilot activities in woodlots, windbreaks, fruit and shade trees, live fencing and improved wood burning stoves. An information system will be established for project monitoring and evaluation.

AID will provide technical assistance (Peace Corps per diem and subsidies for Malian project personnel), in-country and third country training, commodities, equipment and construction materials.

Host Country and Other Donors:

GRM contributions to the project will total approximately \$97,500 for project personnel (including the project director) and land. The Peace Corps will provide three volunteers.

Major Outputs:

1. Village woodlots, tree nurseries, demonstration plots, improved wood-burning stoves and other rural forestry interventions functioning efficiently.
2. An information system for project monitoring and evaluation established and functioning.
3. A support system for project activities at national, regional and village levels.
4. Improved technical capabilities of villagers and project personnel.

Status:

The project was authorized on September 18, 1980. A U.S. economist visited Mali in November 1980 to develop an economic methodology for the project. AID and the GRM are in the process of selecting pilot villages.

Project Documents and Reports:

- Project Paper, September, 1980.
- "The Economics of Village-Level Forestry: A Methodological Framework," February, 1981.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	OS	Total	FY78	FY79	FY80	OYB81	CP82
Mauritania 682-0205 Renewable Resource Management	SH	Fuelwood	339*	325	75	-	431	1,170	250	325	275	320	-

Project Purpose:

To develop an ecologically and socially sound, integrated plan for the management and conservation of renewable resources in Mauritania.

Project Summary:

The project has three major components:

1. A renewable resources survey to establish baseline data for a national renewable resources plan for project development;
2. A series of experimental pilot interventions, such as sand dune stabilization, range management, reforestation and forest management; and
3. Long-term training in resource management, extension and resource personnel management and short-term training in extension methods and landsat photo interpretation.

AID inputs include:

- Technical assistance - Sixteen person-years of long-term technical assistance in revegetation, range management, reforestation and extension, and eighty-six person-months (six people) to carry out the resource survey;
- Training - Long-term training in the U.S. and third countries (eight people) and short-term, in-country training; and
- Equipment, commodities, housing construction and vehicles.

Host Country and Other Donors:

The GIRM will contribute a total of \$788,000 to the project for personnel, land, water rights, etc.

\* These figures represent 25% of project funds, those estimated to be spent on fuelwood-related activities.

Major Outputs:

1. Completed national resource survey.
2. Eight Mauritanians trained in resource management, forty in extension methodology and nine in landsat photo interpretation.
3. Two plant nurseries established.
4. Two dune stabilization areas and two well/vegetation grazing reserves established.
5. Survey of forest reserves and development of reforestation program completed.

Status:

The project was authorized on March 30, 1978 for five years. The U.S. contractor visited Mauritania in March, 1980 and began implementation planning. Six Mauritanians began training at South Dakota State University in July, 1980. The resource survey is underway and expected to be completed by this summer, whereupon the pilot intervention will begin.

Project Documents and Reports:

Project Paper, March, 1978.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Niger 683-0230 Forestry and Land- Use Planning Project	SH	Fuelwood	406*	225	218	303	-	1,151	-	-	332	173	83

#### Project Purpose:

To establish an analytical and planning capability within Niger's Forest and Water Service for natural resources: soils, water, vegetation and wildlife planning and to produce a long-term plan for the rehabilitation, conservation and protection of Niger's natural resources.

#### Project Summary:

Project components include:

1. Establishment of a natural resource management planning unit in the Service des Eaux et Forêts which will be in charge of all project activities;

2. Sixteen model sites - seven sites will be production sites for firewood, forage, forest products, nurseries, etc.; and nine sites will be conservation-oriented and focus on wind-breaks, fire control, revegetation, etc.

3. Management plans for 63 national forest reserves;

4. A natural resource inventory to serve as a basis for planning; and

5. Training and outreach through in-service and some formal training programs, information sharing and cooperation with other government ministries, and a public awareness campaign.

AID inputs include:

- Technical assistance - Four person-years of long-term and four person-years of short-term assistance in forestry planning and demonstrations, resource surveying, and extension and management training;
- Training - Four person-years of long-term U.S. training, four person-years of long-term third country training and short-term informal training in Niger; and
- Commodities, equipment, supplies, and vehicles.

#### Host Country and Other Donors:

The GON will contribute \$1,332,000 for salaries, office buildings, etc. The Peace Corps will contribute six person-years of volunteer service totalling \$131,000.

\* These figures represent 30% of project funds, these estimated to be spent on fuelwood-related activities.

#### Major Outputs:

1. Operational planning and study unit.
2. Countrywide natural resource inventory.
3. Model forestry/conservation demonstration sites.
4. Several Forestry Service central office and field staff trained.
5. Forestry and conservation curriculum developed.
6. Public awareness campaign conducted.

#### Status:

The project was authorized on December 31, 1979 for four years. The project forester arrived in-country in December, 1980. He has organized a government team to work with him and project activities are just beginning.

#### Project Documents and Reports:

Project Paper, March 5, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Senegal 635-0219 Senegal Fuelwood Production Project	SH	Fuelwood	700	187	247	-	1,999	3,133	-	1,400	700	730	-

#### Project Purpose:

To improve the efficiency of fuelwood production for Dakar/Thies and help stabilize seasonal fluctuations in supply and price, to provide employment, improve the environment and revenues for Thies region and to reduce pressure on up-country forest cutting.

#### Project Summary:

The grant will provide in part for the development of 3,000 hectares of rapid-growing trees in controlled areas of the Bandia Classified Forest, and a central nursery producing 700,000 seedlings per year. The wood will be distributed by issuing harvesting contracts to local timber cutters, timber co-ops and village groups. A major component of the project is the development of easily extendable fuelwood production systems. Research and evaluation monitoring will be conducted on such issues as nursery planting, clearing techniques, live fencing and agro-silvicultural systems.

#### AID inputs include:

- Technical assistance - Project leader, forestry consultancies, and some local manpower;
- Training - Five professional foresters to be trained in the U.S. and third countries, and a variety of in-country training;
- Equipment costs; and
- Research (foreign exchange costs).

#### Host Country and Other Donors:

The GOS will contribute \$779,000 and use of the Bandia Forest Land. The Peace Corps will contribute one volunteer at a cost of \$40,000.

#### Major Outputs:

1. The successful production of 3,000 ha. of fast-growing tree species.
2. The development of Senegalese expertise in the management of fuelwood production projects.
3. An extendable fuelwood production system.
4. Some local forestry development at the village level.
5. A nursery.

#### Status:

The project was authorized on April 27, 1979 for five years. The project leader arrived in-country in May 1980. 3,200 hectares have been surveyed and mapped and nearly 2,500 seem suitable for fuelwood species. Over 50 hectares have been cleared. Nursery beds for neem have been completed and those of Eucalyptus are being started. The Peace Corps mechanic has arrived. Equipment that was ordered is beginning to arrive.

#### Project Documents and Reports:

- PID, August 1976
- PRP, Land Conservation and Revegetation, March 1977
- Interim report, Development Program: Senegal Integrated Resource Management, December 1977
- Project Paper, February 1979

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	TOTAL	FY78	FY79	FY80	OYB81	CP82
Senegal 685-0243 AFRICARE Reforestation (OPG)	SH	Fuelwood	64	-	-	-	62	126	-	-	126	-	-

Project Purpose:

To assist the Government of Senegal and inhabitants of rural areas to establish woodlots to produce firewood and replace dwindling forests.

Project Summary:

Individual woodlots of approximately twenty hectares or 13,000 trees and nurseries will be established in five villages. Woodlots will be prepared with and turned over to village quasi-cooperatives. Villagers will be trained by the Forest Service. The Africare representative in Senegal will provide administrative and technical support to the project. Africare will provide funds for nursery production of seedlings, transportation, woodlots establishment during the first year and replacement of trees which don't survive.

Host Country and Other Donors:

One senior technical engineer and one field technical staff person from the Forest Service will be assigned to the project on a part-time basis.

Major Outputs:

1. Five 20 hectare woodlots established.
2. Five nurseries established.
3. Villagers trained in their development and maintenance.

Status:

The project was authorized on May 29, 1980. Site visits were made to participating villages during October, 1980. The first year's tree planting campaign has ended and 80 of 100 hectares of trees were planted.

Project Documents and Reports::

Grant, May 29, 1980

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Senegal 685-0247 Village Woodlot Firewood Production	SH	Fuelwood	63	-	-	-	148	211	-	-	211	-	-

Project Purpose:

To assist the Government of Senegal and the inhabitants of rural areas to establish individual woodlots to produce firewood for cooking and poles for housing.

Project Summary:

Woodlots and agroforestry systems will be established at the rate of nine hectares (or 5,525 trees) per year in forty villages. The woodlots will be prepared with and turned over to village quasi-cooperatives that contribute labor and land on a self-help basis. The members of the cooperatives will be trained by the Senegal Service of Water and Forests (SWF) and Peace Corps Volunteers. A land-use plan will be developed by AFRICARE for each participating village and an agreement on the distribution of benefits will be signed by each village cooperative and the SWF prior to planting any trees.

The project will be implemented by AFRICARE who will provide funds for land preparation, seedling production, woodlot protection, extension assistance and transportation. A mid-term and a final evaluation will be carried out. After five years, USAID will conduct another evaluation.

Host Country and Other Donors:

Eight Peace Corps Volunteers will work for the project as village extension agents.

Major Outputs:

Forty, nine-hectare woodlots established.

Status:

The project was authorized on August 29, 1980; however, as of November, 1980 it was not underway because the Government of Senegal had not yet requested funding. Three PCV's have been assigned to the project and are in villages.

Project Documents and Reports:

Grant, August 29, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
			TA	A&S	TR	T&D	OS	TOTAL	FY78	FY79	FY80	OYB81	CP82
Senegal Food for Development Program*	P.L.480	Fuelwood	81	-	194	-	1,795	2,070			2,070		

Project Purpose:

To employ tree planting as a means of preventing the movement of sand dunes from covering any additional fertile land along Senegal's northwest coast and to protect villages from shifting sands in the area.

Project Summary:

3,700 hectares of trees will be used in the stabilization of dunes along a 73 kilometer stretch, in planting trees at the windward edge of some highly productive vegetable growing basins, and in planting wind-breaks around villages in the region. It is intended that the trees will also provide a source of fuelwood, poles, fruit and nuts to villagers. Another small component of the project is to extend improved vegetable growing practices to market gardeners in the project zone.

The project will finance necessary construction (including nurseries), equipment, vehicles, personnel and operating costs to ensure the successful planting of the 3,700 hectares of trees. It will be implemented by the Senegal Service of Water and Forests.

Host Country and Other Donors:

The host country will be implementing the project.

Major Outputs:

1. The successful production of 3,700 ha. of trees.
2. Sand dunes stabilized.
3. Villagers aware of importance of trees in protecting village environment.
4. Farmers utilizing more modern methods of vegetable production.
5. Women's incomes increased.

Status:

The project agreement was signed in May 1980 and amended in January 1981. The project is now being implemented.

Project Documents and Reports:

Program Proposal for Senegal, Food for Development Program, P.L. 480, Title III, FY80-82, February 1980.

\* These figures represent 30% of project funds, that portion estimated will result in fuelwood production. The amounts have not been included in the budget tables because the project is funded through the Department of Agriculture's P.L. 480 program.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Upper Volta 686-0235 Forestry Education and Development	SH	Fuelwood	1,958*	-	1,499	-	1,012	4,469	-	525	1,350	1,125	1,468

Project Purpose:

To improve the GOUV implementation capability in water, land and resource use. Specifically, to promote a new role for foresters as promoters of multiple-use, sustained-yield forests and the involvement of villagers in forest use and management, with an emphasis on wood for fuel and improved charcoal production techniques.

Project Summary:

The project has two major elements:

1. Expansion and improvement of the Dinderesso Training Center for lower-level forestry agents; and
2. The development and execution of a model management plan for the national forest (6,000 ha.) adjoining the training center.

AID support to the school includes three long-term technicians at three years each and short-term consulting assistance. Support to the forestry component includes seven person-years of forestry management assistance supported by short-term assistance. Training consists of short-term third country training and study tours for forest agents and students.

Buildings, equipment, materials and operating costs will also be provided.

Host Country and Other Donors:

The GOUV sees this project as a high priority and is contributing a total of \$1,929,000. A number of other donors have forestry projects in Upper Volta including German, Dutch and French aid agencies and the World Bank.

- \* These figures represent 75% of project funding, that estimated to be spent on fuelwood activities.

Major Outputs:

1. School infrastructure provided and functioning.
2. School fully staffed with competent teachers and support personnel.
3. Program of practical work/study and field trips underway.
4. Graduates from the school.
5. Forest management plan.

Status:

The project was authorized on March 23, 1979 for five years. The project manager and team leader have been in Upper Volta since January, 1981. They have begun ordering supplies.

Project Documents and Reports:

Project Paper, October 13, 1978.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Upper Volta 625-0937.08 Village Forestry (AIP)	SH	Fuelwood	-	-	18.5	-	30.5	49	-	-	50	-	-

Project Purpose:

To facilitate a regionally-oriented system of reforestation which will provide villages with improved forestry extension services in Kaya, Upper Volta.

Project Summary:

Project activities include:

1. Identifying villages interested in reforestation;
2. Establishing an extension program to promote communication between forest agents and villagers;
3. Establishing a nursery (3,000-6,000 annual seedling capacity) and a plantation of four to six hectares in four villages; and
4. Undertaking a project evaluation.

Host Country and Other Donors:

The GOUV will contribute \$30,000. The Peace Corps will provide five volunteers at a value of \$90,000 and the Dutch will provide materials and equipment.

The Netherlands is working on large nurseries and the Swiss and Germans are promoting large-scale reforestation in the area.

Major Outputs:

1. Four nursery/plantation sites established.
2. Increased supply of firewood (32-96 m<sup>3</sup>).
3. Increased supply of fruit trees.
4. Improved soil, slowing of erosion and desertification.
5. Villagers trained in tree planting.

Status:

The project was authorized on September 4, 1980 and is being implemented.

Project Documents and Reports:

Project Activity Paper, May, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Upper Volta 625-0937 Yatenga Agri- Forestry Proposal (AIP)	SH	Fuelwood	-	-	0,2	-	55.8	56	-	-	56	-	-

Project Purpose:

To demonstrate the practicality of alternative approaches to the problem of seedling survival through the direct association of reforestation and agriculture.

Project Summary:

The project will demonstrate integrated systems of windbreaks and run-off agriculture (including putting over 8,000 m<sup>2</sup> of land back into production), the use of live fencing, and fuel-conserving wood stoves. Small volume, decentralized nurseries managed by village women will be established. Technical training sessions will be conducted by Peace Corps Volunteers for extension agents and villagers. An evaluation will be undertaken.

AID-financed inputs include materials and equipment and the services of a fence-making expert.

Host Country and Other Donors:

The GOVU will contribute \$2,400 to the project. The project beneficiaries will contribute \$4,270. The Peace Corps will contribute the cost of two PCVs for two years totalling \$36,000.

Major Outputs:

1. Village nurseries established.
2. Windbreaks planted, micro-catchments constructed, and crops planted.
3. Stoves built and demonstrated.
4. Training sessions held.
5. Live fencing demonstrated.

Status:

The project was authorized in November, 1981.

Project Documents and Reports:

Project Proposal, July, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Botswana 633-0209	ESF	Fuelwood	587	93	327	625	20	1,652	-	-	725	1,000	1,500
Renewable Energy Technology Project		Renewable Total	587	93	327	625	20	1,652					
			1,174	186	654	1,250	40	3,304					

Project Purpose:

a) To introduce village renewable energy technologies (RET's) which are easily reproduced and inexpensive, and b) to research, develop and put into use RET's which can reduce Botswana's dependence on vulnerable supplies of increasingly expensive fossil fuels.

Project Summary:

The project has the following components:

1. Baseline data collection on village and institutional energy use in three pilot districts, particularly on cooking and heating practices;
2. A three-month Village Awareness Campaign on the need to conserve wood, followed by construction of demonstration units -- earthen wood-burning stoves, solar ovens and solar water heaters, thatch insulation and evaporative coolers;
3. The introduction of small wind and hand-operated water pumps in eight villages;
4. Training of project personnel, extension workers, village entrepreneurs and other villagers in the construction and maintenance of the RET's;
5. Construction of a solar-heated and cooled building for the Botswana Technology Center (AID to finance one-third of the costs), four buildings at the Rural Industries Innovation Center, one passive solar house and three village training facilities;
6. Research and development on seven "institutional or commercial" RET's including solar water heaters, photovoltaic water pumps, wind-powered water pumps, pedal-powered sorghum dehullers and grinders, photovoltaic electric systems, woodlots and woodstoves; and
7. Energy assessments of either national or sub-sector issues.

AID will provide funding for two long-term technicians (renewable energy specialist and sociologist) and twenty-five person-months of short-term consultants, training, construction, commodities, and equipment and support costs.

Host Country and Other Donors:

The Government of Botswana will contribute \$1,178,300 to the project and the Peace Corps will provide five volunteers at a cost of \$225,000.

Major Outputs:

1. Information on energy use collected in three districts.
2. Village Awareness Campaign conducted and demonstration units built.
3. One-thousand domestic village technology units installed by villagers and entrepreneurs.
4. Eight small wind and hand pumps systems installed by farmers or village development groups.
5. RET project personnel, GOB extension workers, village entrepreneurs and others trained.
6. Nine project buildings constructed demonstrating RET potential.
7. R&D carried out on seven institutional and commercial RET's and at least two of these in use.
8. Botswana capacity to manage and implement ongoing extension, training, and research after the project.
9. Energy assessments completed.

Status:

The project was authorized on September 19, 1980 for five years. A request for proposals will be issued in the Spring of 1981.

Project Documents and Reports:

Project Paper, April, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	OS	Total	FY78	FY79	FY80	OYB81	CP82
Cape Verde 625-0937.03 Renewable Energy (AIP)	SH	Renewable	-	85	22	388	-	495	-	-	500	-	-

Project Purpose:

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 for the population.

Project Summary:

This pilot project will assist the Alternative Energy Workshop/ Demonstration Center in analyzing energy needs, measuring resources, designing and manufacturing prototypes and testing performance and acceptability. Devices to be tested include wind-powered water pumps, hand and pedal water pumps, solar cookers, stills and dryers, biogas digesters, and wood stoves.

AID inputs include technical assistance, training and equipment, instruments and supplies, including relevant publications and journals. Short-term training will be provided for key staff persons in the U.S., through study tours to other countries and through participation in "hands on" workshops. The project will provide the short-term services of a wind specialist/power systems designer (two months), a solar engineer (six months), and a hand pump expert (one month). Project evaluation will also be provided.

Host Country and Other Donors:

The GOCV will provide land for the workshop, pay the salaries of local staff and operating costs totalling approximately \$133,000. Two Dutch technicians, financed by the UN or the Netherlands will be assigned to work on wind and other renewable programs for the lab. France, Church World Service, UNICEF, and Dutch church groups have all contributed to the wind program.

Major Outputs:

1. Wind and solar R&D facility operational.
2. Facility staff trained.
3. Data on wind/solar resources.
4. Prototypes constructed and tested.

Status:

The project was authorized on February 26, 1980 for two and a half years. It is now being implemented; commodity procurement has begun.

Project Documents and Reports:

- Project Identification Document, June, 1979.
- Project Paper, December, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			IA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Lesotho 632-0206 Renewable Energy Technology	SD	Renewable	783	-	219	403	195	1,600	-	1,600	-	-	-

#### Project Purpose:

To meet expanding energy demand and conserve high cost, non-renewable energy resources, primarily among lower income groups, by developing and disseminating a set of renewable energy technologies (RET's) in selected rural areas and to establish the institutional basis for disseminating nationwide those systems found to be technically, socially and economically feasible through self-help, entrepreneurial and government programs.

#### Project Summary:

This three-year pilot project will promote village-level energy conservation measures such as fuel efficient wood and dung burning mud stoves, pedal powered grain grinding, thatch insulation and passive solar greenhouses, and undertake research and development on such technologies as anaerobic digesters and mini-hydroelectric production which seem technologically feasible, but are beyond the economic and technical capabilities of villagers.

A village-level process will be used to identify energy needs and select technologies to meet those needs. Villagers will be selected for training and will return to the village to set up demonstration units. Evaluation and feedback will be a central aspect of the project. Research and development will take place at a laboratory to be established by the project in Maseru.

AID inputs to the above activities include:

- Technical assistance - A program coordinator (physical scientist), field supervisor (social scientist), laboratory supervisor, administrative assistant, and a stock supply manager will be provided for three years, along with twenty months of short-term consulting.
- Training - Training will be provided for project staff, Peace Corps volunteers, Ministry of Rural Development counterparts, village energy technicians, and village participants. Curriculum and other training materials will be developed during the project.
- Construction - An energy conserving house will be built for the Project Coordinator for demonstration purposes.
- Commodities and other support costs to carry out these activities will also be provided.

#### Other Donors:

The Government of Lesotho will contribute \$77,000 to the project for project staff, office, laboratory and warehouse space. The Peace Corps will provide four volunteers over the life of the project.

#### Major Outputs:

1. Trained renewable energy staff in MORO and in villages with link between them.
2. A village renewable energy technology implementation process established based on village definition of needs.
3. Introduction and evaluation of village RET's.
4. Construction and evaluation of R&D technologies.
5. An operational research and development laboratory.
6. Construction and evaluation of energy efficient house.

#### Status:

A contractor has just been selected to implement the project and will initiate implementation in April.

#### Project Documents and Reports:

Project Paper, August, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82
Liberia 698-0407.07 Liberia Mini-Hydro Electric Activity (IRT)	FN	Renewable	4	-	-	-	66	70	50	-	-	20	-

Project Purpose:

To design, install and evaluate an experimental 25-30 Kw micro-hydro electric power plant to provide two villages with a low cost, low maintenance source of electricity.

Project Summary:

The electricity will be used for water pumping, agricultural processing, lighting, refrigeration and other light industrial activities.

AID will contribute short-term local consulting in sociology and economics, the equipment and materials needed to construct the micro-hydro system and water pumping system. An AID engineer will assist the PCV on technical matters and monitor the project.

Host Country and Other Donors:

The GOL will contribute \$17,000 for equipment and vehicles. The participating community will contribute \$20,000, including labor and end-use equipment. The Peace Corps will contribute one volunteer.

Major Outputs:

1. Electricity and water supply system established.
2. Improved health conditions.
3. Increased lighting.
4. Mechanized agricultural processing.
5. Other light industries established.

Status:

Construction of the dam has begun and the villagers have raised money for a grain mill and other end-use equipment. Because of the difficult conditions in the region and transportation problems, etc., it is estimated that the system will not become operational until 1982.

Project Documents and Reports:

Project Activity Paper, January 16, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Mali 688-0217 Renewable Energy	SH	Renewable	505	584	210.5	2,800.5	-	4,100	2,174	-	-	300	620

#### Project Purpose:

The project is designed to improve the quality of life in Mali, especially in rural areas, by providing energy for tasks which are now done by hand, to contribute to the alleviation of Malian dependence on fossil fuels and firewood, and to gain a better understanding of the social and economic consequences of introducing renewable energy technologies in rural Africa.

#### Project Summary:

The project has four phases:

1. Material, technical and training support for the Malian Solar Energy Laboratory, including R&D on solar water heaters, crop and fish dryers, wood stoves, and a photovoltaic battery charger;
2. Socioeconomic, and meteorological surveys in 25 villages;
3. Several devices and applications tested in several villages, including four photovoltaic-powered water pumps; and
4. Analysis and evaluation of the experiments.

#### AID inputs include:

- Technical assistance - An energy scientist (two years) and a social anthropologist (one year) will be provided along with short-term consulting in renewable energy, sociology and economics.
- Training - Short-term training in the U.S., support to Malian educational institutions, and in-country training.
- Other costs include commodities, vehicles, construction materials, equipment, etc.

#### Host Country and Other Donors:

The Government of Mali will contribute \$1,134,000 to the project and the Peace Corps will contribute \$220,000 for volunteers.

#### Major Outputs:

1. Solar lab functioning with R&D plan completed.
2. Socio-economic and meteorological studies completed.
3. Functioning renewable energy devices located at selected village sites; devices monitored and evaluated.
4. Enhanced Malian capability to carry out renewable energy program and projects.

#### Status:

The project was authorized on August 16, 1978 and in July, 1979 the Solar Energy Research Institute (SERI) in Golden, Colorado was appointed the implementing agency. While the project experienced a number of delays during its first year, implementation is now picking up speed, largely due to the arrival of the long-term project engineer in October of last year.

- Early start pumps - Funds have now been released so the pumps can be installed.
- R&D - R&D activities were begun by a short-term engineering consultant who was in Mali from January to April of 1980. Draft R&D plans have been completed for woodstoves, solar dryers, cookers and ovens, wind, photovoltaic pumps and grinders. R&D on woodstoves is underway. In addition, a tentative schedule has been completed for short-term consulting to assist in carrying out these plans. USAID has not yet requested bids for construction of the new lab and workshop.
- Surveys - Several trips have been made to Mali by the project anthropologist. On the energy-use surveys, a field pre-test has been completed, the survey has been revised, enumerators have been recruited and trained and the survey is underway. It is estimated to be completed in early 1982. Wind surveys are also underway.
- Training - Two Malian engineers are undergoing training at Colorado State University and SERI.

The program has been extended to April, 1982.

#### Project Documents and Reports:

Project Paper, June, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity					Funding by Year					
			TA	A&S	TR	T&D	ns	TOTAL	FY78	FY79	FY80	OYB81	CP82
Mali 688-0213 Action Ble	SH	Renewable	-	-	-	220	-	220	220	-	-	-	-

Project Purpose:

To install two, solar (photovoltaic) pumps.

Major Outputs:

Photovoltaic pumps installed and operating.

Project Summary:

The Action Ble project is attempting to increase grain production through the introduction of small farmer owned and operated irrigation systems in villages along a portion of the Niger River. One of the major project inputs is the installation of 500 small diesel pumps, 100 animal driven flow pumps and five manually operated pumps along river perimeters to benefit groups of small farmers.

Two solar (photovoltaic) pumps will also be installed. The first solar pump, previewed in the Project Paper, is to be located at the research station in Dire for crop irrigation and also to provide power for a small grain grinder and thresher. A second solar pump will be located in the pilot village of Bourem and will be used primarily to supply Bourem with potable water.

Status:

As of September 1980 the solar pumps had not been installed.

Project Documents and Reports:

Action Memorandum, November 13, 1979

Host Country and Other Donors:

None.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
			TA	A&S	TR	T&D	DS	TOTAL	FY78	FY79	FY80	OYB81	CP82
Mali 688-0202 Operation Mills	SH	Renewable	-	-	-	220	-	220	220	-	-	-	-

Project Purpose:

To provide two solar (photovoltaic) pumps for pumping water for village use.

Project Summary:

Operation Mills is an agricultural and rural infrastructure project consisting of improved grain varieties, wells, rural road construction, literacy, etc. begun in late 1976. The project was revised in 1979 to include two photovoltaic pumps for village water in an area where wells were equipped with non-functioning gas engine generators.

Host Country and Other Donors:

None.

Major Outputs:

Pumps installed and working.

Status:

A source/origin waiver was approved on July 3, 1979. One pump has been installed, but as of September 1980 it was not working. The manufacturer had been informed.

Project Documents and Reports:

-Action Memorandum, June 28, 1979

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	OS		FY78	FY79	FY80	OYB81	CP82
Niger 683-0235 Solar Energy*	SH	Renewable	63	-	72	365	-	500	500	-	-	-	-

Project Purpose:

To assist Niger's Office of Solar Energy (ONERSOL) to participate in an expanded program to develop, test and apply solar energy technologies, especially for the benefit of Niger's rural poor.

Project Summary:

Project elements include: architectural design and construction supervision services for the new ONERSOL facility; provision of laboratory instruments and equipment; laboratory and field testing of solar water pumping systems, and to a lesser extent solar refrigerators, solar crop dryers and improved wood stoves; consultations and training courses by American experts and training in the United States for two ONERSOL employees.

Host Country and Other Donors:

The Government of Niger will contribute \$1,500,000 in addition to in-kind contributions.

Advances in technologies will be disseminated through a UNESCO-financed training program at ONERSOL.

\* Formerly Project # 683-0039.

Major Outputs:

1. ONERSOL facility constructed.
2. Operational applied research in renewable technologies.
3. Advanced degrees.

Status:

The project was authorized on September 15, 1978 and is underway. The lab has been constructed and moved into. Technologies are being developed and tested; however, not all of the equipment has arrived. The Deputy of ONERSOL is studying at the University of New Mexico and is expected to complete the program in the Fall of 1981.

Project Documents and Reports:

Project Paper, September 28, 1978.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	NS		FY78	FY79	FY80	OYB81	CP82
Rwanda 698-0410.22 Renewable/Improved Traditional Energy (AIP)	SD	Renewable	120	9	59	240	60	488	-	488	-	-	-

Project Purpose:

To assist the Government of Rwanda in support of institutional mechanisms and activities to improve its understanding of the country's rural energy needs and to conduct research, development, field testing and analysis of renewable and improved traditional energy technologies to meet those needs.

Project Summary:

Project activities include:

1. Dialogue with and surveys of three communities to determine their energy needs;
2. Training of Rural Energy Technicians selected from these communities;
3. R&D and testing, in the lab (CEAER) and in the field, of renewable water supply and irrigation, biogas refrigerators, mini-hydroelectric turbines, solar crop dryers, improved stoves and charcoal or brick kilns;
4. Establishment of a Rural Energy Fund;
5. Establishment of a project documentation and an international information exchange mechanism; and
6. Project evaluation.

AID inputs include:

- Technical assistance - A long-term project advisor and short-term consulting in renewable energy and sociology;
- Training - In-country and third country training for CEAER staff, and in-country training for university students and Rural Energy Technicians;
- Funding to establish the information exchange and library; and
- Other equipment and materials.

Host Country and Other Donors:

The Government of Rwanda will contribute \$177,000 to the project for CEAER staff.

Major Outputs:

1. Community energy surveys completed.
2. Technologies tested and installed in rural communities.
3. Rural Energy Technicians and CEAER staff trained.
4. Rural Energy Fund established and operating.
5. Project evaluation.

Status:

The project was authorized on August 31, 1979 for two years. Short-term consultancies by an energy technologist and by a survey expert have been completed. Equipment is beginning to arrive. AID is in the process of selecting a long-term project advisor.

Project Documents and Reports:

Project Paper, August 13, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Senegal 625-0937* Renewable Energy (AIP)	SH	Renewable	10	38	91	113	48	300	-	-	300	-	-

Project Purpose:

To relieve the pressure on Senegal's fuelwood supply by promoting improved charcoal production methods, more efficient woodburning and charcoal cookstoves and simple solar fish dryers and storage tents.

Project Summary:

Project activities include:

1. Training heads of charcoal-making teams in improved charcoal production - the "Casamance Kiln" method;
2. Designing, developing, testing and disseminating more efficient cookstoves, with the cooperation of local women;
3. Training extension workers to build and demonstrate the stoves;
4. Developing and field testing several models of a "solar tent" fish drying and storage system to determine the most acceptable design for more widespread dissemination; and
5. Ongoing monitoring and evaluation.

AID inputs include short-term technical assistance and training in charcoal production, and stove and solar dryer construction and testing, and equipment and materials for prototype development and field testing.

Host Country and Other Donors:

The GOS will contribute \$80,000 to the project for personnel, travel and office space. Two volunteers will be provided by the Peace Corps.

\* Formerly project #685-0233.

Major Outputs:

1. Charcoal-makers trained.
2. Affordable, culturally acceptable wood-burning stoves disseminated.
3. Extension workers trained in stove building.
4. Solar tent drying and storage system developed, field-tested and evaluated.
5. Village artisans trained in solar dryer construction.

Status:

The project was authorized on October 15, 1979 for two years. More than 200 stoves have been built.

The solar tent dryer and charcoal kiln activities are now getting underway.

Project Documents and Reports:

- PID (Overseas Development Council), March, 1978.
- Project Paper, October, 1979.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	IS	Total	FY78	FY79	FY80	OYB81	CP82
Senegal 695-0208 Bakel Crop Production	FN	Renewable	-	75	-	625	-	700	700	-	-	-	-

**Project Purpose:**

To provide an experimental solar energy pump for pumping water for an irrigated agriculture scheme.

**Project Summary:**

The 30 KW pump, which will be capable of irrigating a 200-hectare area, will be installed near diesel irrigated perimeters in the Bakel area.

Provision has been made for careful monitoring and evaluation of the pump in technical, social, institutional and economic terms.

AID will provide funding for technical assistance, hardware and studies and evaluation.

**Host Country and Other Donors:**

The Government of France is contributing \$625,000 to the project for the pump, part of the turbine system, site construction, system assembly and technical assistance. The Thermo-Electron Company is contributing \$170,000 for the solar collectors.

**Major Outputs:**

1. Solar thermal pump operational.
2. Evaluations completed.

**Status:**

The project was authorized on March 28, 1978, and implementation planning began in July 1978. Construction in Senegal began in late 1980.

The collector mounting structures are nearing completion and installation of the collectors should begin soon. Designs for all of the other components have been completed. The system is expected to be operational in late 1981.

A U.S. contractor will be in Senegal in late March 1981 to set up a monitoring and evaluation plan for the project.

**Project Documents and Reports:**

Project Paper Amendment, February 23, 1978.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Togo 698-0407 Togo Rural Solar Technology Activity (IRT)	FN	Renewable	-	-	-	-	50	50	-	-	50	-	-

Project Purpose:

To stimulate the introduction of appropriate technologies in rural areas while taking the maximum number of precautions to avoid the frequent causes for failure of such initiatives.

Project Summary:

Solar dryers, hot water heaters and other small technologies, such as solar distillers and cookers, will be developed and constructed at the University of Benin Solar Energy Laboratory. This will be done under the supervision of the Laboratory Director who will also be the Project Director. Four solar dryers will then be installed in rural market centers and four solar hot water heaters will be installed in rural maternity centers. The other technologies will be demonstrated at appropriate rural gathering points. The rural population will be asked to assist in technology construction and will be responsible for its maintenance.

AID will provide funding for the materials and equipment needed to construct and test the technologies.

Host Country and Other Donors:

The GOT will contribute the equivalent of \$5,000 to the project and local residents will contribute \$1,000 for materials and labor. The Togo Ministry of Mines, Energy and Hydrology will provide the services of a consulting engineer.

Major Outputs:

Four solar hot water heaters, four solar food dryers, and solar cookers and distillers installed in rural areas.

Status:

The project was authorized on March 25, 1980. Work on prototype development at the lab is progressing satisfactorily; however, there have been some delays in procurement. A study tour was made to Niger's solar lab -- OMERSOL -- by Benin Solar Energy Lab staff. They are in the process of selecting sites for field testing.

Project Documents and Reports:

Activity Paper, January 11, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity						Funding by Year				
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Upper Volta 698-0410.13 Solar Energy Demon- stration (AIP)	SD	Renewable	24	17.5	-	38.5	-	80	80	-	-	-	-

Project Purpose:

To demonstrate, study and evaluate the potential of solar energy as a power source for such common village tasks as grain milling and water pumping, and to study the social and economic impact of this innovation.

Project Summary:

This AIP provides supplementary activities and funding for the Development Support Bureau regional project "Studies of Energy Needs in Food Systems." The Upper Volta sub-activity of this project -- a study of energy constraints to increased food production -- began in June, 1976. It was amended in September, 1978 to include a PASA with NASA Lewis Research Center to demonstrate a photovoltaic powered grain mill and water pumping system in the village of Tangaye, and a sociological study to gather baseline data. This AIP is a further amendment to the project for additional data collection, additional solar cells, a more powerful motor for the mill, materials for the milling building, a 5,000 liter water reservoir, supplemental technical monitoring and mid-term and final social impact evaluations. AID will provide technical assistance and training (through NASA), funding for the purchase and installation of the system and project evaluation.

Host Country and Other Donors:

The Government of Upper Volta will contribute \$15,000 to the project for extension assistance, site preparation, etc. The Tangaye villagers will contribute labor for mill building construction, site preparation and solar system installation.

Major Outputs:

1. Solar powered grain grinding and water pumping systems installed and operating.
2. Villagers oriented in management and upkeep of the system.
3. System for monitoring and repair.
4. Data collection system.
5. Study of the impact of labor-saving devices.
6. Study of the adaptability of a photovoltaic system in a rural Voltaic village.

Status:

The AIP was authorized on September 21, 1978. The solar system was installed, with the participation of the villagers in Tangaye in February, 1979 and became operational in March, 1979. An Upper Voltaic was hired to operate and maintain the system, and a Peace Corps Volunteer from the region was seconded to the project on a part-time basis. Several technical problems were experienced during the first six months of operation; however, since then it has operated fairly well. This good performance was due in part to significant amounts of outside technical assistance from AID/Ouagadougou and NASA/Lewis. The GOUV and the Tangaye villagers are very supportive of the project. Mid-term and final social impact evaluations have been completed.

In October, 1980 it was decided that NASA would continue to provide technical assistance and spare parts to the project for two more years with funding from DS/EY. During this time Upper Voltaics will be trained in the operation and maintenance of the system so they can take charge of it.

Project Documents and Reports:

- Project Paper, September, 1978.
- Baseline Data Report, 1978.
- Mid-Term Evaluation, October 29, 1979.
- Final Social Impact Evaluation, September 24, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Burundi 698-0410.09 Burundi Alternative Energy -Peat (AIP)	SD	Fossil Fuel	169	39	85	-	197	490	490	-	-	-	-

Project Purpose:

To assist Burundi to develop its peat reserves for non-industrial thermal energy use and to develop and design alternative approaches to encourage rural peasant consumption of peat as a thermal energy source.

Project Summary:

Planned project activities included assistance to the national peat office (ONATOUR) in:

1. Personnel recruitment and management;
2. The introduction of financial controls and an accounting system;
3. Experimentation in appropriate technology in peat production production; and
4. Various research and study activities on promoting peat use.

AID inputs included technical assistance, commodities, and other costs. A long-term project manager (two years), Irish technical experts (six years) and short-term economics and sociology assistance (fifteen months) was provided for. "Other costs" included short-term consultant services for research and development studies, local staff support, operating costs, etc.

Catholic Relief Services (CRS) was the implementing agent.

Host Country and Other Donors:

The GRB contribution of \$675,000 was to cover salaries, vehicles and administrative support. CRS was to provide \$90,000.

Major Outputs:

1. A core ONATOUR staff of at least twenty Burundians trained in management techniques.
2. Six peat extraction sites producing approximately 30,000 metric tons of processed peat per year.
3. Improved peat production tools.
4. Three to five peat-related research studies completed.

Status:

The project was authorized on March 8, 1978, for two years; however, it did not become operational until March, 1979. During its operation a project manager was installed and two of the three Irish bog foremen were recruited. Progress was made in strengthening ONATOUR, but not to the extent planned. While peat production increased significantly, technical problems in peat extraction were not resolved. The urban and rural poor were found not to be a ready market for peat and most of the peat produced was sold to large institutions. Studies on peat marketing and the operation of ONATOUR were completed. Development of a peat-burning stove was started. The project was evaluated in late 1979 and it was decided to terminate it and move on to Phase II (Peat II-#695-0103).

Project Documents and Reports:

- Project Paper, March, 1978.
- Project Evaluation, January 1980.
- Reports on ONATOUR Operations and Peat Marketing, June, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82
Burundi 695-0103 Alternative Energy- Peat II	SD	Fossil Fuels	5,408	-	277	-	2,315	8,000	-	-	2,000	2,000	1,106

#### Project Purpose:

First, to conserve the country's forest reserves, upon which the overwhelming majority of the population relies for cooking and heating, by increasing the availability and acceptability of peat as an alternative energy source; second, to strengthen the Burundian agency that will be responsible for carrying out the project (ONATOUR).

#### Project Summary:

This project is the follow-on to Peat I, a pilot AID-funded activity that is now completed. It will give priority attention to consumers of charcoal, who are mostly urban households. However, artisanal, commercial, institutional and industrial markets will also be cultivated. The project anticipates the expansion of peat production largely through the introduction of appropriate machinery. The implementing agency, ONATOUR, is expected to become financially self-sufficient. In addition, a marketing strategy will be developed and implemented.

#### AID inputs include:

- Technical assistance - A long-term headquarters team (three people) and a field production and maintenance staff will be provided (six people). Short-term technical assistance (36 months) will be provided in engineering, marketing, sociology, etc.
- Training - On-the-job training for counterpart staff and 24 months of third country training will be provided.
- Demonstration and publicity - Activities include cooking demonstrations, volunteer stove testing, radio and poster advertising.
- Equipment, vehicles and construction - Equipment and vehicles will be provided for the peat production operation and new offices will be constructed for ONATOUR.

#### Host Country and Other Donors:

The GRB will contribute \$1,089,000 to the project for land, operating costs, bog sites, etc. The Government of Ireland will contribute \$1,460,000 for training, survey work and technical assistance. As part of a larger project, the World Bank will be spending \$35,000 to test peat stoves in Burundi. Several other donors (EEC/FED, the Finnish and DANIDA) are assisting Burundi in the development of its peat deposits.

#### Major Outputs:

1. Twenty-two ONATOUR staff members trained.
2. Improved ONATOUR management capability.
3. Resolution of technical questions on production and utilization of peat.
4. Development of commercial bogs.
5. Increased use of peat in urban domestic market.

#### Status:

The project was authorized on August 28, 1980, and is now underway. A contract is being negotiated with the Irish Peat Board to implement the project.

#### Project Documents and Reports:

Project Paper, July 23, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity						Funding by Year				
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Cape Verde 655-0005 Desalination and Power	SH/PII	Fossil Fuel	433*	-	90	-	3,072	3,595	3,145	-	-	450	-

Project Purpose:

To provide a basis for continued economic growth and substantially improve the standard of living for the people of Sal Island by providing minimally adequate supplies of water and electric power throughout the island.

Project Summary:

The major features of the project include a centralized water and power production facility, transmission lines, distribution networks and a waste water removal system.

The technology is comprised of diesel engines driving electric generators, together with electrically-powered vapor compression desalination units.

AID will provide funding for construction of the power and desalination plant, and delivery systems along with technical assistance and training for Cape Verde staff.

Host Country and Other Donors:

The GOCV contribution includes all local costs for labor and materials, land for plant and irrigation sites and existing capital assets to be incorporated into the power distribution network totalling \$2,498,000.

\* These figures represent 50% of the project's funds, those estimated will be spent on power generation.

Major Outputs:

1. A combined desalination/power facility capable of producing up to 750m<sup>3</sup>/day of potable water and 41,000 KWH per day of electricity.
2. A complete water delivery network to carry the plant output from plant site to header tanks in each of three communities.
3. A water distribution system within each of the three communities to deliver water to up to 1,300 households.
4. A sewage removal system for the three communities and sewage treatment for the two largest.
5. A power delivery network to provide energy to the transformers in the three communities.
6. A power distribution system for each of the communities to provide electricity to up to 1,000 households.

Status:

The project was authorized on March 24, 1978 and a contract was issued for design of the plant. Phase I of the design, completed by the contractor on November 30, 1979, projected that project costs would be nearly \$9 million greater than the amount authorized. Negotiations between USAID, the GOCV and the contractor resulted in a scale-down of the project and AID's agreement to authorize an additional \$900,000 and extend the project completion date to March, 1981. This additional funding was authorized on December 30, 1980.

The final plant design has been completed and bids will soon be requested. It is anticipated that construction will begin during the summer of 1981.

Project Documents and Reports:

Project Paper, Spring, 1977.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Sudan 650-0039 Sudan Petroleum Training	SD	Petroleum	-	24	176	-	-	200	-	-	200	-	-

Project Purpose:

To improve the managerial and planning capability of the Sudanese Petroleum General Administration by providing a training program for senior officials.

Project Summary:

Subjects to be covered in the course include management development and organization structure, operations management, financial management, human resources development, personnel management, and energy planning. The program will consist of part-time training in six segments over the course of a year.

The project will be implemented under a PASA between AID and the U.S. Department of Energy. DOE will conduct an end-of-project evaluation. AID will finance separately an independent evaluation.

Host Country and Other Donors:

The Sudan will contribute \$65,000 to the project for the first training segment and local costs of the project.

Major Outputs:

1. Thirty to forty-five members of PGA professional staff trained.
2. Training program evaluated.

Status:

The project was authorized on December 21, 1979 and the training program is underway. Baseline data was gathered in May, 1980. In August, 1980 the Sudanese Government, DOE and AID agreed that the original training program should be expanded in scope and extended in length to December, 1981. An AID-sponsored mid-term evaluation has also been added.

Project Documents and Reports:

- Summary Project Paper, December, 1979.
- Baseline Evaluation, May 14, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			IA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Burundi 695-0105 Bururi Forest	FN	Fuelwood	183	-	51	65	559	858	-	-	-	-	-

Project Purpose:

To preserve one of the last two remaining natural, high altitude forests in Burundi (Bururi Forest) and to develop new sources of firewood and construction timber for the inhabitants of the Bururi area.

Project Summary:

The project will establish a 1,400 hectare tree plantation surrounding the Burundi Forest for the production of firewood and construction wood, replenish 700 hectares of native species within the forest, conduct research, establish a nursery to provide seedlings for the plantation and for local residents, provide an extension and instruction program for forest agents and local people on seedling care, conservation, improved cooking stoves, etc., and encourage the establishment of private and communal woodlots.

AID-financed inputs include short-term technical assistance in forest management and research, and stove development and testing, observational tour training for two Burundians, construction of a project office and warehouse, and the provision of vehicles, materials and supplies.

Host Country and Other Donors:

The GOB will contribute \$220,000 to the project.

Other donor-assisted forestry projects include:

- 1) Afforestation - Supported by the World Bank (7,000 ha), The European Development Fund (3,200 ha), and Belgium/Saudi Arabia (12,000 ha);
- 2) A French forestry research program; and
- 3) A UNDP/FAO training program.

Major Outputs:

1. Protection of the Bururi Forest.
2. Increased supply of fuel and construction wood.
3. Watershed protection for the Malembwe River.
4. Strengthened institutional capacity of the Department of Water and Forests.
5. Dissemination of fuel efficient cooking stoves.
6. Research on fast-growing tree species.
7. Increased awareness of conservation issues among the local people.

Status:

The project paper has been submitted to AID/Washington.

Project Documents and Reports:

Project Paper, December 16, 1980.

- Figures in the table represent 75% of total project funding, the amount estimated will be allocated to fuelwood activities.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Guinea 698-0410.35 Community Forestry School Tree Nursery (AIP)*	SD	Fuelwood	305	-	130	22	43	500	-	-	-	497	-

Project Purpose:

To assist the Government of Guinea to build a foundation on which an expanded community forestry program can be based. The two primary elements of this foundation will be a data base on the adaptability of specific improved planting materials to local conditions and a design process for community forestry based on felt and projected needs of specific communities.

Project Summary:

This pilot project is designed to establish a core of trained personnel, and a series of school tree nurseries, testing and demonstration plots and plant reproduction centers. A short training course for project personnel, school teachers and agricultural school graduates will be designed and implemented. In addition, a community forestry plan will be developed for sixteen villages. The CER's (schools) will serve as the focal point and plant reproduction units for the program.

AID inputs include technical assistance (a long-term horticulturalist and short-term sociological assistance) and equipment and supplies.

Host Country and Other Donors:

The GOG will contribute money for salaries, travel, materials, supplies, etc., the total amount of which has not been specified. The UN/FAO has scheduled a watershed restoration project in the same region and would like to cooperate. The GOG bee husbandry project and two USAID-supported women-in-development projects will also benefit from the project.

\* This project description is based on the Project Identification Document (PID).

Major Outputs:

1. Fifty-two middle-level technicians, villagers and students trained in improved horticultural skills.
2. Thirty-two school tree nurseries, test-demonstration plots and plant reproduction centers established.
3. Basic design and layout of sixteen village or hamlet community forestry plans developed.
4. Reforestation accomplished and plant materials reproduced.

Status:

The Project Identification Document was approved on September 4, 1980. The Project Paper has been prepared in the field but has not been submitted to AID/Washington yet.

Project Documents and Reports:

PID, April, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82
Guinea-Bissau 657-0005 Guinea-Bissau Forestry Project	FN	Fuelwood	-	-	-	-	-	3,200*	-	-	-	250	500

Project Purpose:

To improve the capability of the GOGB, the Forest Service and the country's farmers and villagers to manage and develop their forest resource base for rational, equitable and sustained use.

Project Summary:

The major project activities include the establishment of a forestry development center in Agricultural Zone 1 which will undertake research, training, extension and pilot projects oriented mainly toward village-level forestry management and production.

AID inputs will include:

- Technical assistance - One senior forester and other short-term consulting;
- Training - University-level forestry training in the U.S., forestry technician and community forester training in Senegal and Guinea-Bissau, and short, informal courses; and
- Equipment and construction - Vehicles and materials for center construction, nursery, housing and pilot activities.

Host Country and Other Donors:

The GOGB will contribute \$1,867,000 to the project for land and local personnel costs. The French will contribute \$1,117,000 to the project. The Canadian government will contribute \$68,000 for three forestry volunteers.

\* This is the figure proposed by AID/Bissau on January 26, 1981. A breakdown was not provided.

Major Outputs:

1. Forestry Development Center.
2. Senior foresters, forestry technicians, community forestry workers and others trained.
3. Pilot forestry and conservation activities completed and evaluated.
4. Nursery.
5. Research program underway at Forestry Center.
6. Servicos Florestais strengthened.

Status:

A PID was submitted to AID/W in October, 1980. It was reviewed in November, 1980 and AID/W recommended the project be revised (scaled down). AID/Bissau and REDSO/WA submitted revisions in January and February of 1981. AID/W is still seeking further revisions.

Project Documents and Reports:

PID, October 6, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	OS	Total	FY78	FY79	FY80	OYB81	CP82
Mauritania 682-0220 Environmental Restoration*	SH	Fuelwood	1,172	-	388	-	1,940	3,500	-	-	-	500	500

Project Purpose:

To protect agricultural production, increase tree production, expand improved forestry management techniques and extension services, mobilize communities to support forestry activities, and increase GIRM training capability in forestry.

Project Summary:

This project is the result of an environmental workshop held in September, 1979 by the Government of Mauritania, AID and the National Academy of Sciences. It has four major components:

1. Protection of a zone of agricultural production between Guiml and Sangrafa through sand dune stabilization. Two forestry centers including nurseries, will be established.
2. Creation of two forestry centers for local community development in the "Barrage Region" of Brakna and Gorgol Regions for firewood production, sand dune stabilization, etc.
3. Improvement of forest reserves in three areas by fencing in 500 hectares and applying sustained yield management techniques. Nurseries and outreach to local residents will also be included.
4. Support to the National School of Agriculture Training and Extension Services at Kaedi to reinforce the school nursery and plantation research activities, provide training, etc.

AID-financed inputs include:

- Technical assistance - Long- and short-term assistance in sand dune stabilization, short-term assistance in forestry management and a long-term administrative assistant.
- Training - Long-term training in the U.S. (four people), study tours to third countries and a variety of in-country training; and
- Vehicles, commodities and operating costs.

Host Country and Other Donors:

It is estimated that the GIRM will contribute \$785,000 to the project. The Peace Corps will contribute twenty-two volunteers totalling \$948,000.

\* Figures in table represent 50% of total project costs, those estimated to be spent on fuelwood activities. Project information based on PID. The previously proposed Firewood AIP (625-0937) has been incorporated into this project.

Major Outputs:

1. Seven nurseries and forestry centers.
2. Training for GIRM personnel.
3. Sand dunes mechanically stabilized.
4. Activities of National School of Agricultural Training and Extension Services strengthened.
5. Improved management techniques applied to three forest reserves.

Status:

The PID has been approved and a team is now in Mauritania designing the Project Paper. It is estimated that the project will be authorized by April, 1981.

Project Documents and Reports:

PID, July 4, 1980.

Country Project # Title	App. Cat.	Energy Source	IOP Authorization/Request-By Activity					Total	Funding by Year					
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82	
Rwanda 696-0117 Rural Works*	SD	Fuelwood	-	-	-	-	-	1,000	-	-	-	-	-	355

Project Purpose:

To encourage the communes of Rwanda to identify, plan and implement small, labor-intensive and economically productive rural works, and to establish a decentralized rural development support system.

Project Summary:

The rural works to be financed will be limited to the following areas:

- Improvement and maintenance of farm-to-market roads;
- Improved rural water supply;
- Reforestation/erosion control; and
- Drainage of marshlands.

The project will provide resources and experience to strengthen the administrative and implementation capacity of the communes, provide needed rural works, create off-farm employment for the poorest people, and provide a vehicle for the introduction and extension of new and appropriate rural technologies.

Host Country and Other Donors:

The GOR will contribute personnel, administrative and operational support. The communes will be asked to contribute community labor.

Major Outputs:

Unspecified.

Status:

The Project Identification Document is being designed.

Project Documents and Reports:

None.

\* This project information was taken from the Rwanda FY82 ADS. The figures in the table represent 30% of project funds; those estimated will be devoted to fuelwood activities.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year					
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82	
Ghana 641-0106 Renewable Energy*	SD	Renewable	-	-	-	-	-	3,500	-	-	-	-	-	500

Project Purpose:

To assist the Government of Ghana (GOG) to develop economically and ecologically viable energy conservation programs and renewable energy sources through the provision of technical assistance and appropriate renewable energy devices.

Project Summary:

Project activities will be spelled out after the results of the World Bank's national energy assessment have been examined.

Host Country and Other Donors:

The Ghana Government has several agencies concerned with energy including an interministerial National Energy Committee. In addition to the IBRD's involvement, the European Economic Commission may consider funding activities in biomass renewable energy.

Major Outputs:

Not yet specified.

Status:

The project will be designed during FY81.

Project Documents and Reports:

None.

- This information is based on the FYR2 Congressional Presentation (p. 287).

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Mauritania 682-0223 Alternative Energy Development*	SH	Renewable	2,388	-	284	1,478	-	4,150	-	-	-	700	800

Project Purpose:

To create an Applied Energy Center to provide a framework for renewable energy activities 1) where developments in alternative energy can be adapted to the Mauritanian environment, particularly those affordable by the poor, 2) where Mauritanians can be trained in alternative energy development, and 3) to assist in promoting widespread acceptance of renewable energy innovations.

Project Summary:

The Applied Energy Center will have a technical section, an implementation/extension section and a training and documentation section. Energy applications to be immediately examined are cooking, wind, water quality improvement, methane production, and animal traction. Technologies for secondary consideration include photovoltaics, solar refrigeration, passive solar cooling, small-scale industrial applications and solar food drying. Other GIRM agencies will be asked to assist the Center in field work. Local leaders, village artisans and residents will be involved in problem identification, testing and implementation.

AID will provide funding for a long-term technical advisor, other medium- and short-term technical assistance, training for Center staff in the U.S. or third countries and in-country training, and materials for construction of the Center, equipment and vehicles.

Host Country and Other Donors:

The GIRM with the help of the UNDP will contribute \$1,207,000 to the project. The Peace Corps will contribute \$258,000 for three volunteers.

While several energy projects have been initiated in Mauritania (the largest being the Sofretes solar thermal pumps financed by the FE FED), there has been no official, coordinated approach to energy problems in Mauritania until now.

\* This project description and budget is taken from the Project Identification Document.

Major Outputs:

1. Applied Energy Center established and operating.
2. Center staffed and staff trained.
3. Technologies adapted to Mauritanian environment, field tested and evaluated.

Status:

The Project Paper is now being written.

Project Documents and Reports:

Project Identification Document,  
July 21, 1980.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Total	Funding by Year				
			TA	A&S	TR	T&D	DS		FY78	FY79	FY80	OYB81	CP82
Senegal 685-0246 Renewable Energy II*	SH	Renewable Fuelwood	-	-	-	-	-	5,000	-	-	-	500	1,940

Project Purpose:

To increase fuelwood supply by improved charcoal production, increased wood production in village woodlots, and expanded use of woodburning stoves. Also, to improve fish drying by using simple solar dryers.

Project Summary:

This project will expand work started under the Accelerated Impact Program (#625-0937) which involves developing and disseminating wood stoves, promotion of improved charcoal production techniques and the introduction of simple solar fish dryers. The proposed project will also reinforce the work of the AFRICARE and Peace Corps village woodlot programs which are now underway, by allowing them to expand into 150 additional villages.

Host Country and Other Donors:

Senegal will provide approximately \$750,000 to pay for personnel and other costs of the project. No other donor is directly involved in this project, although the charcoal production techniques are based on the experience gained from an FAO and UNDP project.

\* This information is based on the FY81 Congressional Presentation (p. 135) from August, 1979.

Major Outputs:

1. Village woodlots established.
2. Charcoal producers trained.
3. Charcoal yields increased.
4. Woodburning stoves constructed and disseminated.
5. Solar fish dryers introduced.

Status:

The project will be designed during FY81.

Project Documents and Reports:

None.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	TOTAL	FY78	FY79	FY80	OYBB1	CP82
Sudan 650-0041 Sudan Village Renewable Energy	SD	Renewable	1,696	232	281	231	2,148	4,588	-	-	-	382	2,000

Project Purpose:

To assist the Government of the Sudan in developing applied research capability in rural renewable energy technology with verification through application of research results in village pilot projects.

Project Summary:

The project has two major activities:

1. Strengthening the institutional capabilities of the Institute of Energy Research (IER); particularly its Village Renewable Energy Unit (VREU); and
2. Funding renewable energy demonstration and dissemination activities coordinated by the Institute, but generally funded as sub-grants to PVO's.

Research projects include cold chains and heat for hot water for rural health care centers, village water systems, and local power systems using biomass conversion of agricultural wastes. Development and dissemination efforts will start with improved wood and charcoal stoves for cooking.

AID inputs include long-term technical assistance in management and village renewable energy and short-term assistance in various technical areas, long-term participant training in chemistry and communications, short-term training, observational tour training, commodities for minimally equipping the IER and the VREU and for research and demonstration projects, funding for an information center, surveys and environmental studies, operating support and other costs.

Host Country and Other Donors:

The GOS will contribute \$2,620,000 to the project and West Germany will contribute \$2,030,000. The Dutch are also interested in supporting renewable energy development in the Sudan.

Major Outputs:

1. Institute of Energy Research strengthened; staff trained.
2. Research conducted on several technologies.
3. Improved cookstoves and other technologies developed and demonstrated.

Status:

A PID was reviewed by AID/Washington on July 1, 1980 and was not approved. A revised PID was submitted and approved on March 11, 1981.

Project Documents and Reports:

- Sudan Village Renewable Energy, February, 1980.
- Project Identification Document (Revised), February 24, 1981.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity					Funding by Year					
			TA	A&S	TR	T&D	DS	TOTAL	FY78	FY79	FY80	OYBB1	CP82
Tanzania 698-0410 Dodoma Rural Energy Development (AIP)	SD	Renewable	-	-	-	-	-	500	-	-	-	-	-

Project Purpose:

To undertake research, with substantial local participation, into providing energy to rural communities in the Dodoma region.

Major Outputs:

1. Information on energy problems in rural communities.
2. Trained artisans and extension agents.
3. Technologies developed, adapted, demonstrated and evaluated.

Project Summary:

Project activities include:

- an examination of the energy problems affecting selected villages, the energy consumption patterns and the efficiencies of the techniques presently employed;
- an examination and evaluation of alternative technologies based on environmentally sound renewable energy sources;
- adaptation and modification of the system designs to satisfy local economic conditions and employ local materials;
- fabrication of systems based on such designs;
- evaluation of the economic, social and cultural acceptability of these systems in the selected villages, along with adaptation; and
- transmittal of the knowledge obtained, particularly to appropriate extension agencies;

A rural energy research center will be established to carry out the research, development, demonstration and training components of the project. The Tanzanian National Science Council (UTAFITI) will be the implementing organization.

The three most likely technologies are windpower for water pumping, methane generation for individual family use and charcoal making and utilization.

Host Country and Other Donors:

The United Nations University, the International Development Research Center of Canada, and the Swedish government are interested in the project.

Status:

The Tanzania Mission plans to submit a complete Project Identification document around the end of March 1981.

Project Documents and Reports:

- Project Proposal, Tanzanian National Science Research Council, January 1980

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity					Funding by Year					
			IA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Djibouti 603-0013 Djibouti Energy Initiatives*	ESF	-	-	-	-	-	-	4,000	-	-	-	2,000	2,000

Project Purpose:

To assist the Republic of Djibouti in meeting its energy needs.

Project Summary:

The project will have four components:

1. A national energy sector analysis (NESA);
2. A fund to finance energy projects which will meet priority energy needs identified in the NESA, especially the energy needs of poor people;
3. Assistance as required to the Institut Supérieur des Etudes et Recherches Scientifique et Technique (ISERST); and
4. Other immediately identifiable interventions which could be utilized to contribute to the project goal and purpose.

Host Country and Other Donors:

Unspecified.

- Information based on Project Paper team Statement of Work. Energy sources and funding for individual project components have not been determined.

Major Outputs:

1. National Energy Sector Analysis.
2. Energy Development Fund.

Status:

A Project Paper design team is in Djibouti. PP authorization is to take place in the spring of FY81.

Project Documents and Reports:

None.

Country Project # Title	App. Cat.	Energy Source	LOP Authorization/Request-By Activity						Funding by Year				
			TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
Africa Regional 698-0424 Energy Initiatives for Africa	SD	All	1,200	5,000	2,300	7,500	-	16,000	-	-	-	1,244	3,500

Project Purpose:

To develop and provide technically feasible, cost effective and socially acceptable options to Africa's present dependence on fossil fuels, improve availability of renewable energy sources, particularly fuelwood, and strengthen institutional capacity in Africa to meet the growing energy needs of rural and urban populations.

Project Summary:

The project will have five major components:

1. Planning, policy and evaluation - including surveys of energy resources and requirements, national energy planning, energy program and project development, and ongoing evaluation and comparative analysis of the effectiveness of projects;
2. Experimental pilot sub-projects - to develop and test the feasibility of technologies. This component is intended to supplement the regionally-funded Improved Rural Technology and Accelerated Impact Program mechanisms;
3. Training and institution building - including short and long-term training for staff members of host country institutions and regional organizations in national energy planning, and project development and implementation.
4. Conferences, workshops and studies - to promote and exchange information on energy issues, develop a network of renewable energy and fuelwood activities and their applications in Africa.
5. Pre-investment study - to conduct studies of the feasibility of establishing (or expanding) regional renewable energy research and training activities in Africa.

Host Country and Other Donors:

An African contribution of \$3,000,000 will be solicited.

Major Outputs:

1. Planning, policy and evaluation.
2. Experimental pilot sub-projects.
3. Training and institutional strengthening.
4. Conferences, workshops and studies.
5. Pre-investment study.

Status:

A Project Paper design team is expected to begin work in April or May 1981.

Project Documents and Reports:

Project Identification Document,  
November 14, 1980.

ENERGY PROJECTS  
BUREAU FOR AFRICA  
(In 000s)

SUMMARY BUDGET

	LOP Authorization/Request by Activity					Total *	Funding by Year				
	TA	A&S	TR	T&D	DS		FY78	FY79	FY80	Gr881	CP82
AUTHORIZED/OPERATIONAL FULLWOOD PROJECTS	5,774	1,307	2,766	1,348	5,649	16,841	250	3,431	7,077	3,666	1,551
AUTHORIZED/OPERATIONAL RENEWABLE ENERGY PROJECTS	2,683	995	1,328	6,663	459	12,127	3,941	2,088	1,575	1,320	2,120
AUTHORIZED/OPERATIONAL FOSSIL FUEL PROJECTS	6,010	63	628	-	5,584	12,285	3,635	-	2,200	2,450	1,106
<u>SUBTOTAL</u>	14,415	2,237	4,621	8,207	11,692	41,253	7,829	5,519	10,852	7,436	4,777
PLANNED FULLWOOD PROJECTS **	1,160	-	569	87	2,542	9,058	-	-	-	1,247	1,355
PLANNED RENEWABLE ENERGY PROJECTS **	4,084	232	565	1,709	2,148	17,738	-	-	-	1,502	5,340
PLANNED GENERAL ENERGY PROJECTS **	1,200	5,000	2,300	7,500	-	20,000	-	-	-	3,244	5,500
<u>SUBTOTAL</u>	6,444	5,232	3,434	9,296	4,690	46,796	-	-	-	6,073	12,195
<u>TOTAL</u>	20,911	7,597	12,777	18,614	16,382	88,049	7,829	5,519	10,852	13,507	16,972

\* Numbers may not add up due to rounding.

\*\* Activity figures for planned projects are incomplete and will not add up to the total

C. AUTHORIZED/OPERATIONAL FUELWOOD PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
635-0205	The Gambia Reforestation Project*	SH	FW	50	149	305	-	677	1,181	-	1,181	-	-	-
615-0205	Kenya Renewable Energy Development Project		FW RN FF	2,144	399	369	944	944	4,800	-	-	3,482	1,318	-
625-0937	Mali Village Reforestation (AIP)	SH	FW	50	22	32	101	290	495	-	-	495	-	-
682-0205	Mauritania Renewable Resources Management*	SH	FW	339	325	75	-	431	1,170	250	325	275	320	-
683-0230	Niger Forestry and Land Use Planning Project*	SH	FW	405	225	218	303	-	1,151	-	-	332	173	83
685-0219	Senegal Fuelwood Production Project	SH	FW	700	187	247	-	1,999	3,133	-	1,400	700	730	-
685-0243	Senegal AFRICARE Reforestation (OPG)	SH	FW	64	-	-	-	62	126	-	-	126	-	-
685-0247	Senegal Village Woodlots - AFRICARE (OPG)	SH	FW	63	-	-	-	148	211	-	-	211	-	-
686-0235	Upper Volta Forestry Education and Development*	SH	FW	1,958	-	1,499	-	1,012	4,469	-	525	1,350	1,125	1,468
625-0937.08	Upper Volta Village Forestry (AIP)	SH	FW	-	-	18.5	-	30.5	49	-	-	50	-	-
625-0937	Upper Volta Yatenga Agri-Forestry Proposal (AIP)	SH	FW	-	-	.2	-	55.8	56	-	-	56	-	-
SUBTOTAL				5,774	1,307	2,766	1,348	5,649	16,841	250	3,431	7,077	3,666	1,551

\* These figures represent that portion of total project funding that is estimated will be spent on fuelwood or other energy activities.

D. AUTHORIZED/OPERATIONAL RENEWABLE ENERGY PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYBB1	CP82
633-0209	Botswana Renewable Energy Technology Project	ESF	FW/RN	1,174	186	654	1,250	40	3,304	-	-	725	1,000	1,500
625-0937.03	Cape Verde Renewable Energy	SH	RN	-	85	22	388	-	495	-	-	500	-	-
632-0206	Lesotho Renewable Energy Technology	SD	RN	783	-	219	403	195	1,600	-	1,600	-	-	-
698-0407.07	Liberia Mini-Hydro Electric Activity (IRT)	FN	RN	4	-	-	-	66	70	50	-	-	20	-
688-0217	Mali Renewable Energy	SH	RN	505	584	211	2,800	-	4,100	2,174	-	-	300	620
688-0202	Mali Operation Mil (Photovoltaic Pump)	SH	RN	-	-	-	220	-	220	220	-	-	-	-
688-0213	Mali Action Ble (PV Pump)	SH	RN	-	-	-	220	-	220	220	-	-	-	-
683-0235	Niger Solar Energy	SH	RN	63	-	72	365	-	500	500	-	-	-	-
698-0410.22	Rwanda Renewable/ Improved Traditional Energy (AIP)	SD	RN	120	9	59	240	60	488	-	-	-	-	-
625-0937	Senegal Renewable Energy (AIP)	SH	RN	10	38	91	113	48	300	-	-	300	-	-
685-0208	Senegal Babel Crop Production	FN	RN	-	75	-	625	-	700	700	-	-	-	-
698-0407.09	Togo Rural Solar Technology Activity	FN	RN	-	-	-	-	50	50	-	-	50	-	-
698-0410.13	Upper Volta Solar Energy Demonstration (AIP)	SD	RN	24	17.5	-	38.5	-	80	80	-	-	-	-
SUBTOTAL				2,683	995	1,328	6,663	459	12,127	3,944	2,088	1,575	1,320	2,120

E. AUTHORIZED/OPERATIONAL FOSSIL FUEL PROJECTS (in \$000s)

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
698-0410.09	Burundi Alternative Energy-Peat (AIP)	SD	FF	169	39	85	-	197	490	490	-	-	-	-
695-0103	Burundi Alternative Energy-Peat II	SD	FF	5,408	-	277	-	2,315	8,000	-	-	2,000	2,000	1,106
655-0005	Cape Verde* Desalination and Power	SH/PH	FF	433	-	90	-	3,072	3,595	3,145	-	-	450	-
650-0039	Sudan Petroleum Training	SD	FF	-	24	176	-	-	200	-	-	200	-	-
SUBTOTALS				6,010	63	628	-	5,584	12,285	3,635	-	2,200	2,450	1,106

F. PLANNED FUELWOOD PROJECTS (in \$000s)\*\*

695-0105	Burundi Bururi Forest *	FN	FW	183	-	51	65	559	858	-	-	-	-	-
698-0410.35	Guinea Community Forestry School Tree Nursery (AIP)	SD	FW	305	-	130	22	43	500	-	-	-	497	-
657-0005	Guinea-Bissau* Forestry Project	FN	FW	-	-	-	-	-	3,200	-	-	-	250	500
682-0220	Mauritania Environmental Restoration*	SH	FW	1,172	-	388	-	1,940	3,500	-	-	-	500	500
696-0117	Rwanda Rural Works*	SD	FW	-	-	-	-	-	1,000	-	-	-	-	355
SUBTOTALS				1,160	-	569	87	2,542	9,058	-	-	-	1,247	1,355

\* These figures represent that portion of total project funding that is estimated will be spent on fuelwood or other energy activities.

\*\* Activity figures for planned projects are incomplete and will not add up to the total.

G. PLANNED RENEWABLE ENERGY PROJECTS (In \$000s) \*

Project No.	Country/Title	App. Cat.	Energy Source	LOP Authorization/Request by Activity						Funding by Year				
				TA	A&S	TR	T&D	DS	Total	FY78	FY79	FY80	OYB81	CP82
641-0106	Ghana Renewable Energy	SD		-	-	-	-	-	3,500	-	-	-		600
682-0223	Mauritania Alternative Energy Development	SH	RN	2,388	-	284	1,478	-	4,150	-	-	-	700	800
685-0246	Senegal Renewable Energy II	SH	RN/FW	-	-	-	-	-	5,000	-	-	-	500	1,940
650-0041	Sudan Village Renewable Energy	SD	RR	1,696	232	281	231	2,148	4,588	-	-	-	382	2,000
698-0410	Tanzania Dodoma Rural Energy Development (AIP)	SD	RR	-	-	-	-	-	500	-	-	-	-	-
SUBTOTALS				4,084	232	565	1,709	2,148	17,738	-	-	-	1,582	5,340

H. PLANNED GENERAL ENERGY PROJECTS (In \$000s)\*

603-0013	Djibouti Energy Initiatives	ESF		-	-	-	-	-	4,000	-	-	-	2,000	2,000
698-0424	Africa Regional Energy Initiatives for Africa	SD	All	1,200	5,000	2,300	7,500	-	16,000	-	-	-	1,244	3,500
SUBTOTALS				1,200	5,000	2,300	7,500	-	20,000	-	-	-	3,244	5,500

\* Activity figures for planned projects are incomplete and will not add up to the total.

TECHNOLOGYPROJECT

1. Solar water heaters for village dispensaries	688-0217	Mali Renewable Energy
	698-0407.09	Togo Rural Solar Energy (IRT)
	633-0209	Botswana Renewable Energy Technology
2. Solar thermal pump for irrigation	685-0208	Senegal Bakel Irrigated Perimeter
3. Photovoltaic pumps for irrigation and/or drinking water	683-0039	Niger Solar Energy
	688-0202	Mali Operation Mil
	688-0217	Mali Renewable Energy
	698-0410.13	Upper Volta Solar Energy Demonstration(AIP)
	698-0410.22	Rwanda Renewable Energy and Improved Trad. Tech.(AIP)
	633-0209	Botswana Renewable Energy Technology
4. Windmills to pump water and/or generate electricity	688-0213	Mali Action Ble
	625-0937.03	Cape Verde Renewable Energy (AIP)
	698-0410.22	Rwanda Renewable Energy and Improved Trad. Tech.(AIP)
	615-0205	Kenya Renewable Energy Development
	633-0209	Botswana Renewable Energy Technology
682-0223	Mauritania Alternative Energy <sup>1</sup>	
5. Pyrolytic conversion of vegetable wastes	698-0135	Ghana Pyrolytic Conversion Demonstration <sup>2</sup>
6. Pedal powered grain grinding and/or dehulling	632-0206	Lesotho Renewable Energy
	633-0209	Botswana Renewable Energy Technology
7. Photovoltaic battery charger	688-0217	Mali Renewable Energy

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<sup>1</sup> PP, obligation and initial implementation scheduled for FY'81.

<sup>2</sup> Funded from Program Development and Support Funds.

TECHNOLOGY

## 8. Solar grain dryer

PROJECT

688-0217 Mali Renewable Energy  
698-0410.22 Rwanda Renewable Energy (AIP)  
683-0039 Niger Solar Energy  
698-0407.09 Togo Rural Solar Energy (IRT)  
615-0205 Kenya Renewable Energy Development  
625-0937.03 Cape Verde Renewable Energy (AIP)

## 9. Solar Stills

625-0937.03 Cape Verde Renewable Energy (AIP)  
698-0407.09 Togo Rural Solar Energy (IRT)

## 10. Peat production

698-0410.09 Burundi Alternative Energy-Peat (AIP)  
695-0103 Burundi Alternative Energy-Peat II

## 11. Peat stoves

695-0103 Burundi Alternative Energy-Peat II

## 12. Solar fish dryers

688-0217 Mali Renewable Energy  
625-0937.03 Cape Verde Renewable Energy (AIP)  
625-0937 Senegal Renewable Energy (AIP)  
685-0246 Senegal Renewable Energy II<sup>1</sup>

## 13. Improved charcoal production

625-0937 Senegal Renewable Energy (AIP)  
685-0246 Senegal Renewable Energy II<sup>1</sup>  
615-0205 Kenya Renewable Energy Development

## 14. Solar cookers

625-0937.03 Cape Verde Renewable Energy (AIP)  
698-0407.09 Togo Rural Solar Energy (IRT)

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<sup>1</sup> Scheduled for design and obligation in FY'81.

<u>TECHNOLOGY</u>	<u>PROJECT</u>	
15. Solar greenhouse	632-0206	Lesotho Renewable Energy Technology
16. Solar thermal refrigerators for village dispensaries	683-0039 682-0223	Niger Solar Energy Mauritania Alternative Energy <sup>1</sup>
17. Biogas refrigerators for village dispensaries	698-0410.22	Rwanda Renewable Energy (AIP)
18. Biogas digester	632-0206 625-0937.03 682-0223	Lesotho Renewable Energy Technology Cape Verde Renewable Energy (AIP) Mauritania Alternative Energy <sup>1</sup>
19. Mini hydro	632-0206 698-0410.22 698-0407.07	Lesotho Renewable Energy Rwanda Renewable Energy (AIP) Liberia Mini Hydro Electric Activity (IRT)
20. Pedal pumps for water	625-0937.03 615-0205	Cape Verde Renewable Energy (AIP) Kenya Renewable Energy Development
21. Hand pumps for water	625-0937.03 615-0205 633-0209	Cape Verde Renewable Energy (AIP) Kenya Renewable Energy Development Botswana Renewable Energy Technology
22. Solar oven	633-0209	Botswana Renewable Energy Technology
23. Evaporative cooler	633-0209	Botswana Renewable Energy Technology

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<sup>1</sup> PP, obligation and initial implementation scheduled for FY'81

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24. Thatch insulation	633-0209	Botswana Renewable Energy Technology
	632-0206	Lesotho Renewable Energy Technology
25. Passive solar heating and cooling	633-0209	Botswana Renewable Energy Technology
	682-0223	Mauritania Alternative Energy <sup>1</sup>
26. Photovoltaic grain grinding	698-0410.13	Upper Volta Solar Energy Demonstration (AIP)
	688-0213	Mali Action Ble
27. Photovoltaic electricity production	633-0209	Botswana Renewable Energy Technology
	682-0223	Mauritania Alternative Energy <sup>1</sup>
28. Hydraulic ram water pump	615-0205	Kenya Renewable Energy Development
29. Wood and dung burning stoves	625-0937.03	Cape Verde Renewable Energy (AIP)
	625-0937	Senegal Renewable Energy (AIP)
	683-0039	Niger Solar Energy
	698-0410.22	Rwanda Renewable Energy
	632-0206	Lesotho Renewable Energy Technology
	615-0205	Kenya Renewable Energy Development
	625-0937	Mali Village Reforestation (AIP)
	625-0937	Upper Volta Yatenga Agri-forestry (AIP)
	633-0209	Botswana Renewable Energy Technology
	688-0217	Mali Renewable Energy
682-0223	Mauritania Alternative Energy <sup>1</sup>	
685-0246	Senegal Renewable Energy II <sup>1</sup>	

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<sup>1</sup> PP, obligation and initial implementation scheduled for FY'81.

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30. Village woodlots

615-0205	Kenya Renewable Energy Development
685-0243	Senegal AFRICARE-Reforestation (OPG <sub>1</sub> )
625-0937	Upper Volta Village Forestry
685-0247	Senegal Village Woodlots-AFRICARE (OPG)
625-0937	Mali Village Reforestation
633-0209	Botswana Renewable Energy Technology
635-0205	Gambia Reforestation

31. Agroforestry

615-0205	Kenya Renewable Energy Development
685-0219	Senegal Fuelwood Production Project
625-0937	Upper Volta Yatenga Agri-forestry

32. Fuelwood

685-0219	Senegal Fuelwood Production Project
632-0205	Gambia Reforestation
682-0205	Mauritania Renewable Resource Management <sup>1</sup>
683-0230	Niger Forestry and Land-Use Planning <sup>1</sup>
686-0235	Upper Volta Forestry Education <sup>1</sup>
615-0205	Kenya Renewable Energy Development Project
625-0937	Mali Village Reforestation (AIP)
695-0105	Burundi Bururi Forest Project <sup>2</sup>
657-0005	Guinea-Bissau Forestry Management Project <sup>1</sup>
682-0205	Mauritania Environmental Restoration <sup>1</sup>
696-0117	Rwanda Rural Works <sup>1</sup>

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<sup>1</sup> Has fuelwood component

<sup>2</sup> Scheduled for design and obligation in FY'81