

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

THROUGH: DAA/AFR, Alexander R. Love

FROM: AAA/AFR/DR John W. Koehring

ISSUE:

1. Your approval is requested to carry out a special program for the comparative evaluation of selected energy development activities in Africa during the period June-December 1982.
2. Your authorization is requested for (a) the use of \$40,000 of Section 106 (selected Development Activities) PD&S funds, and (b) \$40,000 of Operating Expense funds to finance this special program.

DISCUSSION: On April 29 you approved a Guide for Action for energy and forestry activities which provided for a program to evaluate our experience so far in these areas (See Tab A). An Energy/Forestry Evaluation Working Group has developed the attached evaluation program for selected energy projects. A forestry evaluation plan to look at research, training, and production projects is being developed and will be presented for your approval early in FY 1983. Two teams will be assembled integrating A.I.D. direct hire staff and contractors and will require OE and PD&S funding. The energy evaluation program would be carried out in three phases by a combination of AID/W, AID Mission and contract staff.

Phase I (4 weeks in June-July 1982 in Washington) would consist of developing and pretesting detailed evaluation methodology, and reviewing literature relevant to the projects to be evaluated. During this phase the scope and methodology will be refined, taking into account recommendations made by members of the Energy/Forestry Evaluation Working Group, particularly those of the AFR Evaluation Officer (See Tab C).

Phase II (4 weeks in September-October in Africa) would consist of field visits by evaluation teams to selected energy projects financed by AID and other donors. Countries and projects have been tentatively selected, subject to the concurrence of the appropriate AID Missions, and are shown in the Action Plan (Tab B, page 18).

Phase III (4 weeks in October-November 1982 in Washington) would consist of comparative analysis of the projects evaluated and preparation of a final report for presentation to you in draft by December 1.

The methodology set forth in the attached scope of work (Tab B) will make it possible to do systematic comparisons across projects and technologies and assess their potential for meeting similar end-uses. It should thus be possible to reach concrete conclusions as to the particular problems and technologies on which our technical assistance and training should concentrate and to devise a coherent strategy for action likely to make a maximum impact on African energy problems.

Working through the Cooperation for Development in Africa (CDA) Energy Technical Committee, we plan to ask other CDA donors to cooperate by (1) allowing AID evaluation teams to visit certain of their energy projects, and (2) participating in a CDA evaluation workshop which we would initiate in Africa in early 1983 to examine the lessons which the comparative project evaluation will have yielded. Thus, if properly conducted, it is likely that the proposed evaluation program will have an influence well beyond AID.

We would propose to execute this evaluation program leaning heavily on the participation of direct-hire AID staff from AID/W and field Missions, partly to save money but more importantly to encourage the learning process through direct transfer of experience among AID Missions. However, for continuity, credibility and special skills, we will need to involve a few contract staff through IQCs.

It is estimated that all three phases of the evaluation program will cost \$150,000. We would propose to begin the program using (a) \$40,000 of Sec. 106 (Selected Development Activities) FY 1982 Project Development and Support funds for Phase I contract costs and (b) \$40,000 of Operating Expense funds for travel and per diem costs of AID direct-hire participation in Phase II. To permit Phase II field work to begin in September, a portion of the Operating Expenses would be funded in FY 1982, depending on end-of-year availabilities, and the remainder would be provided in FY 1983.

The Office of Regional Affairs (AFR/RA) has agreed that \$40,000 be provided for this program from the Energy Initiatives for Africa Project (698-0424) under which evaluations and technology assessments of this kind may be undertaken.

6886931

Because this innovative energy evaluation program will be of wide general interest, the S&T Bureau has agreed to contribute up to \$30,000 to finance the services of participating energy experts under a RSSA with the Department of Energy.

RECOMMENDATIONS:

- 1. That you approve the scope of work, action plan and budget (Tab B) for the proposed energy evaluation program.

Approved: ATM

Disapproved: \_\_\_\_\_

Date: June 27, 1982

- 2. That you authorize the use of \$40,000 of Sec. 106 PD&S funds and \$40,000 of Operating Expense funds in FY 1982 and FY 1983 to finance this energy evaluation program.

Approved: ATM

Disapproved: \_\_\_\_\_

Date: Jun 27, 1982

v

Clearances:

AFR/PMR, B. Spangenberg (draft, for PD&S funds only) \_\_\_\_\_

AFR/DR, Lane Holdcroft HLH \_\_\_\_\_

AFR/PMR, D. Ford Brown (draft) \_\_\_\_\_

AFR/BA, Edward Butler EB \_\_\_\_\_

William Eilers (draft) \_\_\_\_\_

Henry Miles (draft, subject to Tab C recommendations) \_\_\_\_\_

, Stephen Klein (draft) \_\_\_\_\_

PPC/E, Molly Hageboeck (draft) \_\_\_\_\_

AFR/DR, Norman Cohen NC \_\_\_\_\_

Drafted: AFR/DR/SDP: Mark Ward MW alz: 6/17/82

17

RENEWABLE ENERGY IN AFRICA: EVALUATION SCOPE OF WORKA. OBJECTIVE

The Africa Bureau is undertaking a reassessment of its energy initiatives for the African continent. Pursuant to that reassessment, the Bureau is planning an evaluation which will:

- Secure pertinent information on the effectiveness and efficiency of renewable energy technologies that are incorporated in current projects;
- Assess, in a preliminary way, the adequacy and appropriateness of these projects given the energy needs of the countries in which the projects have been mounted, and
- Determine whether the monitoring and evaluation mechanisms in existing projects are adequate to ensure that further information will be generated as project progress and that the projects are able to identify changes which may be needed, including changes in the experimental technologies they apply.

B. BACKGROUND

The requirements of the African continent for energy to support the development process, and optimum ways for addressing those needs, are only partially understood today. Much of the domestic consumption of energy in Africa is currently based on the use of wood as an energy source. Wood is supplemented, in different degrees in various sectors, by the use of non-renewable energy sources, such as petroleum. The long term availability and price of both wood and non-renewable fossil fuels used in Africa is a source of concern and a matter of speculation. Detailed projections concerning energy uses and sources are available for only a handful of African countries.

4

Over the past several years, the Africa Bureau has initiated a number of renewable energy projects designed to identify the utility and appropriateness of specific technologies for meeting some of the most common energy needs in the African countries. In addition to projects that deal with renewable energy technologies, the Africa Bureau is also undertaking projects which focus on the supply of wood as an energy source for the continent. In some Missions, studies have been carried out to define the overall energy situation in a particular country, thus providing a basis for understanding how specific technologies and energy sources match the energy needs of a nation. The Africa Bureau projects, together with a number of centrally funded projects through which AID is focusing on the energy planning capacity of the developing countries and on systems for measuring, in a precise way, the efficiency and relative effectiveness of various technologies, are all expected to yield information that can be used, over the long term, to improve Africa's energy position.

In the near term, the Africa Bureau needs to define the next steps it will take in addressing energy needs on the African continent. Information from on-going efforts is needed to support this reassessment. While the Africa Bureau recognizes that the information which can be secured today may only partially address major issues in this area, it is the Bureau's judgement that such information as can be secured, through a Bureau-wide evaluation effort, will contribute substantially to the Bureau's forward planning process. Thus, a multi-site evaluation is proposed which will include an examination of several AID-funded renewable energy projects on the continent, some renewable energy efforts funded by other sources, and an analysis of existing information on the overall energy needs and resources of specific countries. (In parallel to this evaluation effort in the renewable energy area, the Bureau will carry out an evaluation of its forestry projects. The findings of both will contribute to the Bureau's forward looking plan for using AID's scarce resources to their best advantage to assist the African countries in developing and implementing coherent and affordable approaches to meeting their energy needs over the coming years.)

### C. EVALUATION ISSUES AND QUESTIONS

This scope-of-work focuses on the evaluation of AID's renewable energy projects in Africa. AID's proposed evaluation of its renewable energy projects will complement and supplement other studies being undertaken by the Bureau, e.g., a series of evaluations that focus on forestry projects AID has initiated on the continent.

Over the last several years, AID has initiated a series of experimental projects that involve the use of renewable energy technologies. The common objective of these projects, which employ different technologies and are located in a number of African countries, has been to determine the feasibility (in social and institutional as well as technical terms) and cost-effectiveness of alternative energy sources/systems for meeting specific energy needs. While each project has many unique features, the projects as a set tend to address energy needs/uses that are found throughout the continent and employ energy technologies which, if viable in one site, may be widely useful.

Ideally, an evaluation of these projects would assess not only their immediate effectiveness and impact but also the degree to which the technologies employed offer a practical means for addressing some defined portion of a country's overall energy needs over some projected future. Realistically, AID hopes that its evaluation of several of its renewable energy projects will yield:

- Reliable data concerning the performance of specific energy technologies at different sites, through a comparison between projects;
- Reliable data concerning the performance of different energy technologies that address the same need, or end-use, through comparisons undertaken within as well as between projects;
- Management-useful information on the degree to which AID's renewable energy projects:
  - are securing information on such factors as the institutional and social implications of using specific alternative energy systems;

- are securing information on the technological and economic performance of the systems that are being tested and demonstrated within a project, and, equally important,
- have in place mechanisms for gathering such information as may be required to adjust project implementation plans to increase the likelihood of project success or identify when and what new technologies (that have greater potential utility than the ones selected at the time the project was designed) should be added to or substituted for technologies currently being tested/demonstrated within a project.

Broadly conceived, each of the renewable energy projects AID has initiated in Africa is a working laboratory in which AID and the African nations can examine existing alternative (and renewable) energy technologies. Such working laboratories, when they live up to their potential, will not only define the overall "goodness" of specific systems, they will also be the key source of ideas about improvements and additional options. Together, the set of project initiated on the African continent, should provide the kind of multi-situation answers (about technological and economic performance as well as social and institutional considerations) that AID and the African nations need to select specific technologies as candidates for broad based diffusion, either through local enterprises and markets or other arrangements that will ensure that the best of these technologies are widely available.

While AID is relatively confident that a systematic evaluation of its renewable energy projects in Africa will yield useful information from comparisons of specific technologies in different settings and comparisons of alternative technologies for meeting a given need, it is expected

that the proposed evaluation would secure management useful answers on these issues. (The evaluation would not attempt to secure "fine grain" measures of, for example, the degree to which a particular device was efficient in terms of its energy use as compared to a device that was only marginally different.\* We would, however, expect to learn which devices work and which don't appear to be affordable or acceptable, and what a basic rank ordering of energy technology, based on cost and utility/acceptability, appears to be for specific end-uses of importance to Africa. In addition, the project level evaluative activities would seek to determine whether the monitoring and evaluation components of on-going Bureau projects are adequate, given a "learning laboratory" perspective on these efforts.

In addition to technology comparisons based on project level information from renewable energy projects funded by AID and other donors, the evaluation will seek to use existing data, supplemented by field information, to determine whether the types of renewable energy technologies AID is funding offer the African nations real options for meeting significant portions of their energy needs. While we intend to address the question of the relationship between specific project technologies and national

---

\*The type of detailed measurement processes needed to secure "fine grain" data on such technologies are expected to be developed under a PPC initiative to be mounted in the next several months. While the Africa Bureau would look to this effort for some technical guidance, the Bureau's evaluation would not wait for, nor tend to rely on these very precise measures. The Bureau evaluation, which is designed to meet pressing management needs, would aim for accurate, albeit more "gross grain" findings and conclusions than PPC's initiative will eventually allow AID to develop.

9

energy needs through this evaluation exercise, it must be recognized that the data base for this analysis is limited and that the answers in this area simply will not be definitive. Nevertheless, the fact that the question concerning the "fit" between AID projects and Africa's energy needs is a central one from a planning and program management perspective, the evaluation must attempt to produce usable information on this crucial topic. Various means of using study data and existing information will be applied to secure this information, including efforts to review data in-country on national energy needs wherever the evaluation team travels to secure project level data, efforts to use existing data on some countries to generate hypotheses about the needs of countries for which there is very little data, etc.

Based on the preceding discussion of evaluation objectives, AID has identified a series of questions that are to be answered through evaluations of specific projects and through comparisons made between projects. The questions and comparisons fall into four areas:

- The effectiveness of technologies at different sites;
- The relative effectiveness of different technologies for the same end-use;
- The degree to which projects incorporate mechanisms for learning;
- The degree to which project technologies meet, or can meet, national energy needs.

Each of these areas is discussed separately below.

### 1. The Effectiveness of Technologies at Different Sites

If a renewable energy technology is to be recommended as a candidate for broad diffusion on the African continent, it must not only work well and fit into the conditions that prevail at one site, it must have general applicability and the range of conditions in which it can be used, as well as its technical and economic performance under those conditions, must be understood. To determine the general utility and potential of a specific renewable energy technology, be it a type of stove or an approach for lifting water, information concerning the way

it works and the way it fits into cultural, institutional and skill settings must be understood. Answers to these questions can only be developed through comparisons of the performance and "fit" of the technology in a variety of sites. Within AID's renewable energy portfolio in Africa a number of situations occur that permit such comparisons. Thus, for example, projects in Cape Verde and Senegal are both testing solar fish dryers while projects in Botswana and Niger are both testing photovoltaic devices for pumping water. At the same time, the specific nature of the energy devices may differ from site to site, necessitating the use of measures in the evaluation which will allow comparison between them.

The types of comparisons required to determine the effectiveness of a specific technology (source/system) in different sites will include, for example:

- (a) the amount of energy used to produce a common output, e.g., 100 liters of water pumped -- given differences in the specific characteristics of a photovoltaic device for pumping water;\*
- (b) the cost of producing that common output at different sites;
- (c) the acceptability and social "fit" of the device in different settings;
- (d) the realism of the device for different settings given local institutions (to the degree that these are involved or need to be involved in the management of the use of an energy system/device) and available skills.
- (e) the affordability and economic realism of the specific technology, from the perspective of the investor/consumer as well as from a societal perspective (using economic analysis approaches suggested for renewable energy technologies in the Bureau's Energy for Africa publication and modifying them to fit the level of effort anticipated for this evaluation).

In order to make such comparisons, the evaluators will need to define common metrics that will allow them to normalize differences between sites, e.g., differences in the size of the device used, its exact configuration, etc. They will also need to develop measures of social "fit", institutional capacity, skills and other key elements of the comparisons that can be used across several sites, rather than only in one project area.

---

\* Gross output will be only one of the pertinent dimensions of the technological performance measures for the evaluations. Others will need to be included that consider, for example, number of hours per day the system can be used; days per year; time of day; maintenance requirements and other down-time; scale of the system versus demand for the output, etc.

## 2. The Effectiveness of Different Technologies in Terms of the Same End-Use

The central theme of all of the renewable energy projects AID has initiated in Africa is that substitution is a real possibility -- whether it be a substitution of a solar oven for a wood-using one or the replacement of diesel pumps with wind powered ones. In order to determine which of the energy technologies AID is now testing/demonstrating offers the greatest potential for Africans, AID needs to be able to define the relative strengths and weaknesses of specific technologies. Comparisons between traditional and non-renewable energy devices as well as among renewable energy technologies. Properly made, such comparisons will focus on the end-use, or need, addressed by these alternatives. Table 1 presents a partial display of the alternative energy technologies incorporated in Africa Bureau renewable energy projects and the end-uses they address.

As Table 1 suggests, the primary end-uses addressed by alternative technologies are cooking and water pumping -- two of the major end-uses in villages on the African continent. Within the evaluation, the Africa Bureau intends that comparisons between these technologies will be made that can help the Bureau to identify the most promising candidates for broad diffusion efforts. Comparisons between technologies are in several ways similar to, and require the same skills and measurement approaches, as comparisons between sites for one technology. The major difference is that these comparisons focus on end-use, rather than technology per se. Within that framework, it will be necessary to establish common metrics that allow the evaluators to look across technologies. Several such common metrics exist, e.g., btus, calories, etc. In the evaluation any of these units is acceptable as a comparative basis as long as the same measure is used for all of the comparisons made by the evaluation. With a common unit for comparing energy systems selected, the evaluation will assess:

- Technological performance of different energy technologies for meeting the same need/end-use, e.g., energy required to yield, for example, 100 liters of water, by different devices (where both are measured in calories or btus).

(continued on page B-11)

Table 1  
Renewable Energy Technologies Being Tested in Africa Bureau Projects Grouped by End Use

Notes:

1. End uses are listed in a rough order of priority based on AFR strategy objectives of increasing agricultural production and reducing fuelwood consumption.
2. Some technologies have multiple end uses; For example, water heating and refrigeration can be used for domestic purposes, health (in dispensaries), or in small industry (food processing). Electricity generated can be used for a variety of productive (and non-productive) purposes. For each technology only one end use is shown.
3. A number of important energy-related activities are omitted : energy planning, institution-building, training, conventional energy production and conservation in transport and industry peat production.
4. Column 1 shows projects to be evaluated during September-October 1982. Column 2, projects to be evaluated during CY 1983 or 1984.

1. AGRICULTURAL PRODUCTION

Irrigation Pumping	<u>1</u>	<u>2</u>
PV solar	Botswana Rwanda Mali Niger	Upper Volta
Solar Thermal		Mauritania Senegal (Bakel)
Wind	Botswana Mali	Kenya Cape Verde Mauritania
Pedal Pumps		Cape Verde
Hand Pumps	Botswana	Kenya Cape Verde
Hydraulic Rams		Kenya

2. DOMESTIC USES

Cooking and heating Improved wood/charcoal stoves	Botswana Rwanda Mali Niger Senegal	Cape Verde Burundi Lesotho Kenya Mauritania Sudan
---	--	--



- Cost of producing the common output using different systems/sources of energy;
- Differences in the social "fit" of alternative devices for meeting the same need/end-use;
- Differences in the institutional, management and skill implications/requirements for meeting the same need/end-use with different devices (based on real project level experience, not hypotheses).
- Differences in the economic realism and affordability of alternative devices, from the consumer and from society's perspective;

While Table 1 above provides a basis for understanding the types of alternative devices and end-uses that are the focus of the Africa Bureau's projects, the evaluation will not attempt to make all of the comparisons which this table suggests are possible. Rather the evaluation will concentrate on comparisons that will be useful in making decisions about the efficacy of specific devices in terms of high priority needs, e.g., agriculture related energy needs, and those technologies which most clearly offer possibilities for substitution, e.g., sun for wood or wind for petroleum. The proposed comparisons to be made within the evaluation are discussed in greater detail in (D) below. In addition, the more detailed discussion of comparisons identifies the situations in which the evaluation may examine projects funded by other donors as well as those funded by AID.

### 3. The Degree To Which AID Projects are Learning Laboratories

By and large, AID's renewable energy projects in Africa are currently in the middle of their implementation phase. Since the projects are on-going, the evaluation effort should not, and cannot properly be, conceived of as an impact evaluation effort. For many of these projects, the final impact of the effort will not be discernable for several more years. Nevertheless, it will be possible to make the types of specific technology comparisons discussed in (1) and (2) above during this evaluation and the Bureau expects that it will also be possible to secure management-useful information about the way in which these projects are organized to learn from experience and to identify opportunities for experimenting with energy devices which, will not discussed in the original project documents, may be more appropriate than those initially identified for project testing/demonstration. Specifically, it is expected that the multi-project evaluation of AID's renewable energy projects in Africa will determine:

-- whether these projects have monitoring and evaluation mechanisms that can be trusted to provide the project team with information on:

- the technological and economic performance of the energy systems/sources it employs;
- the social "fit" and the institutional capacity/skill implications and feasibility of the devices;
- user interest in/satisfaction with specific devices;
- the market potential of specific technologies beyond the immediate project area (but within the same general context) or other means by which the technologies might be more broadly disseminated;
- the competition faced by specific technologies if they enter the markets in which they are being tested/demonstrated.

15

- whether the project management arrangements are such that monitoring and evaluative evidence will receive attention and be acted upon;
- whether the project has the type of supplementary learning mechanisms that would facilitate the identification of newer/better technologies that are not being tested at the project site but could/should be, and whether this supplementary information is available to/used by project management.

The examination of the learning capacity of AID's renewable energy projects is expected to be part of every field site visit -- whether that visit is made in connection with a comparison of a specific technology across several sites or a comparison between technologies that address the same end-use. The questions about learning capacity incorporated into the evaluation will be appropriate for projects at various stages of development -- in the older projects AID would expect to secure evidence about the results yielded by a project's learning mechanisms, i.e., evidence about how well the mechanisms work. In the younger projects, the examination of these questions might only yield information concerning the presence/absence of such mechanisms -- but even that level of information would help AID to understand the degree to which its renewable energy projects are likely to be able to provide "lessons" about renewable energy devices as well as renewable energy project design and management in the future.

#### 4. The Degree to Which Project Technologies Can Meet National Needs

For a limited number of countries, AID anticipates that it will have the data on national energy needs required to perform a "desk evaluation" of the probability that energy devices in use in AID-funded projects could address national needs. It is anticipated that such an analysis will be performed largely in Washington, after field work for this evaluation has been completed. To the

degree possible, field studies will be expected to confirm the perceived validity of existing national energy situation assessments as well as collect data on the potential for diffusing the energy technologies now being tested/demonstrated in projects. By putting together ~~partial~~ partial sets of information, the Africa Bureau hopes to be able to make some preliminary statements about the "match" between project technologies and African needs and to define more fully the range of questions and actions required to validate and expand upon the initial findings of this "desk evaluation". Broadly viewed, the "desk evaluation" should identify which current field efforts appear to have strong potential for addressing major national or continent wide needs, which have little and what areas/technologies that are not now being tested/demonstrated in the field deserve attention in the near future. The findings of this "desk evaluation" will, together with the findings of the field studies, be examined in connection with the findings from the Bureau's examination of its forestry projects to draw out a broad picture of the relationship of current AID programs to African needs and suggest where future foreign assistance efforts might best be directed.

#### D. EVALUATION SCOPE AND THE SELECTION OF FIELD SITES

The Africa Bureau's evaluation of its renewable energy program through a multi-project comparative evaluation will yield adequate data only if all elements of the Bureau's evaluation work in this area are connected through a common framework and methodology. Not every aspect of this overall effort can be undertaken as part of a Bureau-initiated evaluation process; some of the information must come from evaluations undertaken by the missions during the period when the Bureau is examining this topic. For this reason, the scope of work and subsequent methodological details of the Bureau-initiated evaluation will be broadly shared in with the missions and around the Agency. The Bureau-initiated evaluation will, for example, compare two or three types of energy devices for cooking in the course of its field work. To this limited set of information, the Bureau hopes to add data that its missions secure on other energy technologies that address the same end-use (in the course of evaluations run by those missions). The Bureau also anticipates that it may be able to merge the data that the Bureau-initiated and mission-initiated evaluations secure with data from other sources, e.g., analyses carried out on different continents by AID, analyses carried out in Africa by other organizations.

The evaluation contractor AID proposes to engage will work with the Bureau on three key tasks:

- The establishment of a common methodology that can be applied by missions as well as by the team that is undertaking the Bureau-initiated portions of the overall evaluation effort;\*
- Data collection at field sites selected as part of the Bureau-initiated multi-project evaluations;
- Analysis of the data, including data secured by the teams participating in the Bureau-initiated evaluation, the data forwarded to the Bureau by Missions that conduct their own evaluations using the common methodology; data secured from evaluations and assessments carried out by other AID bureaus and by other organizations.

Field work, in connection with the Bureau-initiated multi-project evaluation, must be organized to secure the maximum number of comparisons (a) of the same technology at different sites and (b) of different technologies that address the same end use. As currently envisioned, the bureau-initiated portion of the evaluation will be carried out by two field teams, which will work as one team in preparing for field visits and during the analysis stage of the effort. In the field, the two teams would both collect primary data at some sites and review existing data (developed by missions) at other sites; e.g.:

---

\* In the course of developing the evaluation methodology, the Africa Bureau will consult with PPC's Energy Office and may seek the advice of that Office's consultants, e.g., John Ashworth of SERI, Norman Brown, VITA, etc., concerning measures pertaining to specific technologies.

- Step 1: Teams A and B work together to prepare field approach;  
(final stage of preparation to be carried out in Africa\*)
- Step 2: Team A proceeds to Botswana and collects evaluation data,  
then goes to Rwanda to review with the mission the mission's  
data on Rwanda together with the Botswana data.
- Team B proceeds to Niger to collect evaluation data; then  
makes stops in Mali and Senegal to review mission collected  
data and share Niger findings.
- Step 3: Teams A and B reassemble in Washington for data analysis  
and report preparation.

(As a complement to the main study described above, a third team (Team C) would carry out one or more brief assessments of particular technologies, e.g., woodstoves. These studies would use the same basic approaches the main teams use, but would tend to carry out investigations in countries where Team A and B would not be collecting or reviewing data. One of the primary purposes of the supplementary studies would be to secure data on other donor projects; a second would be to expand the data base over which comparisons of single technologies in varied settings were made during the analysis phase.)

---

\* Abidjan is the probable site since it is convenient for REDSO to join in the preparation and is a logical place for Mission team members to meet up with the team members from Washington before A and B teams split up.

19

With respect to the development of a common methodology, it is expected that the contractor will work with AID staff and will draw upon existing paradigms such as those provided in the Bureau's book on Energy for Africa and studies such as SERI's work on matching technologies to end-uses rather than "start-from-scratch". It will be important that the methodology finally agreed-upon is one that AID missions can implement themselves without team assistance. With respect to field visits, it is currently anticipated that the field teams will be made up of a mix of contractor, AID/W and AID mission staff; Mission staff would normally be from a different country, but would be involved in renewable energy project work in the country of their assignment. AID/W staff will be drawn from the African Bureau primarily, but may include staff from the Office of Energy in the S&T Bureau and the Office of Evaluation in PPC. With respect to the data analysis task, AID expects that the contractor would play a major role in securing data outside the Bureau as well as organizing and analyzing data secured from the field visits and forwarded by missions that conduct their own evaluations.

Once the field work is done on this evaluation, AID will expect that the analysis of field data will contribute to a better understanding of the way in which specific technologies offer real possibilities for substitution in Africa. To that end, it is expected that the analysis of the study data will include (via data from different projects) an examination of:

- The relative effectiveness of wood-using devices (in terms of a given end-use);
- The comparative effectiveness of renewable/non-wood using technologies and wood-using technologies (in terms of a given end-use), and
- The relative effectiveness of different non-wood using devices.

The term effectiveness as used here is intended to incorporate the several measures of technological, economic, social and institutional performance discussed above. The purpose of the separation is to gain a better view of the degree to which projects are introducing real/viable options to continued heavy reliance on wood as well as the degree to which wood using devices are offering better efficiencies than current African modes of wood consumption for a given end-use.

Action PlanPhase I:

Preparation in the U.S. during the period June-July 1982 .

Establishment of a common methodology.

Review of available documentation on projects and country energy situations.

Consultation with selected energy resource people.

Pretest of methodology on local energy project.

Participation

	<u>Person-weeks (PW)</u>		
	<u>DH</u>	<u>RSSA</u>	<u>Contract</u>
1. <u>Team A (Botswana, Rwanda)</u>			
Energy generalist	2		
Economist			1
Engineer	1		
2. <u>Team B (Niger, Mali, Senegal)</u>			
Energy Generalist	2		
Economist	1		
Engineer			1
3. <u>Evaluation Design</u>			
Evaluation systems expert (PPC/E)	1		
Evaluation design expert (IQC)			2
Renewable Energy technical specialist		3	
Research Assistant (IQC)			4
	<hr/>	<hr/>	<hr/>
	7	3	8

21

Phase I Costs

AID direct hire:	7 PW	No direct costs
RSSA (DOE):	3 PW	\$10,000
<u>Contract:</u>	8 PW	\$30,000
(Assumes an IQC average cost/person-month of \$15,000 including travel, per diem and other support)		
	<u>TOTAL</u>	<u>\$40,000</u>

Phase II: Field data collection and evaluation during the period September-October, 1982

Participation

	<u>DH</u>	<u>Person-weeks</u>	
		<u>RSSA</u>	<u>Contract</u>
1. <u>Team A (Botswana, Rwanda)</u>			
Energy generalist	3		
Economist			3
Engineer		3	
USAID Energy Officer (West Africa)	<u>3</u>	<u>        </u>	<u>        </u>
Team A Total person-weeks	6	3	3
2. <u>Team B (Niger, Mali, Senegal)</u>			
Energy generalist	4		
Economist	4		
Engineer			3
USAID Energy Officer (East Africa)	<u>4</u>	<u>        </u>	<u>        </u>
Team B Total person-weeks	12	-	3

v2

Phase III:

Analysis of data and evaluation report completed in U.S. during the period October-November 1982.

<u>Participation</u>	<u>Person-weeks</u>		
	<u>DH</u>	<u>RSSA</u>	<u>Contract</u>
<u>Team A</u>			
Energy Generalist	2		
Economist			
Engineer	1		
<u>Team B</u>			
Energy generalist	2		
Economist	1		
Engineer			
<u>Evaluation Analysis</u>			
Evaluation systems expert (PPC/E)	1		
Evaluation design expert (IQC)			3
Renewable Energy Technical Specialist		3	
Research assistant (IQC)			2.5
Phase III Total person-weeks	<u>7</u>	<u>3</u>	<u>5.5</u>

Phase III Costs

<u>AID direct hire:</u>	7 PW	No direct costs
<u>RSSA (DOE):</u>	3 PW	\$10,000
<u>Contract:</u>	5.5 PW	<u>20,000</u>
	Total	\$30,000

(Assumes an IQC average cost/person-month of \$15,000 including travel, per diem and other costs)

<u>Participation</u>	<u>Person-weeks</u>		<u>Contract</u>
	<u>DH</u>	<u>RSSA</u>	
3. <u>Team C</u>			
(Complementary evaluation of other donor projects in Burundi, Ivory Coast, Mauretania, Sierra Leone, Togo, Upper Volta)			
Energy Policy Advisor, AID/W	3		
Energy Advisor, REDSO/EA	3		
Energy Advisor, REDSO/WA	3		
Evaluation design expert (IQC)			2
Team C Total person-weeks	9		2
4. Evaluation systems expert (PPC/E) (To lead 3-day methodology orientation workshop in Abidjan at beginning of Phase II)	0.5		
Phase II Total Person-Weeks	27.5	3	8

Phase II Costs

1. AID Direct Hire: 27.5 PW = \$40,000	
a. Travel:	
9 DH x \$1800 =	(16,000)
b. Per diem:	
27.5 PW x 7 da x \$99/day =	(19,000)
c. Miscellaneous team support costs (car rental, secretarial services, translators, and other costs)	(5,000)
2. RSSA (DOE): 3PW =	10,000
3. Contract: 8PW =	30,000
8PW = 2PM x \$15,000/PM	
Phase II Total Costs	\$80,000

24

Evaluation Budget Summary

	AID <sup>1</sup>		RSSA <sup>2</sup>		Contract <sup>3</sup>		Total	
	PW	\$000	PW	\$000	PW	\$000	PW	\$000
Phase I ( June-July)	7	-	3	10	8	30	18	40
Phase II (September-October)	27.5	40	3	10	8	30	38.5	80
Phase III (October-November)	7	-	3	10	5.5	20	15.5	30
TOTAL	41.5	40	9	30	21.5	80	72	150

PW = Person-weeks

1 Funded from Operating Expenses

2 Funded from DOE RSSA

3 Funded equally from PD&S and Energy Initiatives for Africa

25