

936-5728

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Add 8C, Ch 8, HB 3 (TM 3:35)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
C = Change
D = Delete

Amendment Number

DOCUMENT CODE

3

2. COUNTRY/ENTITY
Worldwide

3. PROJECT NUMBER

936-5728

4. BUREAU/OFFICE
Science & Technology
Office of Energy

ST/EY

5. PROJECT TITLE (maximum 40 characters)

Energy Policy Development & Conservation

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
07 31 87

7. ESTIMATED DATE OF OBLIGATION

(Under "B" below, enter 1, 2, 3, or 4)

A. Initial FY 82

B. Quarter 4

C. Final FY 86

8. COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY 82			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(1,000)	()	(1,000)	(8,000)	()	(8,000)
(Loan)	()	()	()	()	()	()
Other 1.						
U.S. 2.						
Host Country						
Other Donor(s)						
TOTALS	1,000		1,000	8,000		8,000

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) SD	740					1,000		8,000	
(2)									
(3)									
(4)									
TOTALS									

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

11. SECONDARY PURPOSE CODES

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

A. Code

B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

To provide technical assistance to LDCs so that they may effectively address their national energy problems through analysis, institution building and policy development; to assist LDC governments to develop institutions, personnel and processes for effective policy-making; to help LDCs achieve measurable improvements in the efficiency of energy use.

14. SCHEDULED EVALUATIONS

Interim MM YY | MM YY | Final MM YY
07 84 | | 09 86

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

16. AMENDMENTS NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page FF Amendment)

STATE OFFICIAL FILE

17. APPROVED BY

Signature

Alan E. Jacobs

Title

Alan E. Jacobs
Director, Office of Energy

Date Signed

MM DD YY
07 07 82

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

MM DD YY
07 07 82

PROJECT AUTHORIZATION

ENTITY: Interregional

NAME OF PROJECT: Energy Policy Development and Conservation

PROJECT NUMBER: 936-5728

1. Pursuant to Section 106 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the centrally funded project Energy Policy Development and Conservation involving planned obligations of not to exceed \$8,000,000 in grant funds over a five year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process to help in financing foreign exchange and local currency costs for the project.

2. The Project consists of technical assistance to developing countries addressing their national energy problems through analysis, institution-building and policy development. The project's two principal areas of activity are: a) technical assistance to institutions engaged in energy planning, analysis and policy development and b) assistance to both public and private sector entities aimed at improving the efficiency of energy consumption. A research program addressing key energy policy issues and a mechanism for inter-country coordination and a synthesis of lessons and experiences gained under the project and its predecessor project are designed to ensure a cross-fertilization of ideas and experiences, the generation of new knowledge and understanding, and the wide dissemination of this information.

3. Special conditions of approval: None

4. Source and Origin of Goods and Services:

- a. Each developing country where training or other assistance takes place under this project shall be deemed to be a cooperating country for the purpose of permitting local cost financing.
- b. Goods and services, except for ocean shipping, financed by A.I.D. under the project shall have their source and origin in a cooperating country or in the United States except as A.I.D. may otherwise agree in writing.
- c. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels of the United States.

Signature: _____

Jack Vanderryn

Jack Vanderryn

S&T/PO STAMPED

S&T/EN JUL 7 1982

Clearance:

S&T/EY, A. Jacobs *AKJ*
S&T/PO, B. Chapnick *(11)*
GC, C. Stephenson *CS (phone)*

References:

- 1. Project Paper
- 2. Action Memo

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR OF ENERGY AND NATURAL RESOURCES

FROM: S&T/EY, Alan B. Jacobs

DATE: July 6, 1982

SUBJECT: Authorization of the Energy Policy Development and Conservation Project (936-5728)

Alan B. Jacobs

Problem: Your approval of the attached project paper, "Energy Policy Development and Conservation", is required. The project was reviewed by the Energy and Natural Resources Sector Council on June 24, 1982, with all the Regional Bureaus, PPC, GC and S&T representatives concurring that the project should go forward. Where appropriate, the specific recommendations of the Sector Council have been incorporated into the PP, this memorandum, and/or the cable to the field. Accordingly, the following specific actions are requested:

- 1) Authorization to proceed with project implementation as described in the project paper;
- 2) Approval of AID grant financing of \$8,000,000 over the five-year life of the project, with annual authorizations as follows: FY 1982, \$1.0 million; FY 1983, \$1.0 million; FY 1984, \$2.0 million; FY 1985, \$2.0 million; and FY 1986, \$2.0 million;
- 3) Approval to proceed with the initial procurement activities under the project, including a) procurement of a contract with the Institute for Energy Analysis to plan, manage and document a coordination conference on energy planning and policy development; b) negotiation of Project Agreement amendments with the governments of Sudan and Morocco to continue work begun under the predecessor project, and procurement of contractors to carry out that work; and c) competitive procurement of a contractor to manage conservation services under the project. Other procurement activities under the project will be submitted to you for approval on a case-by-case basis.

Discussion: The Project's basic purpose is to provide technical assistance to developing countries so that they may effectively address their national energy problems through analysis, institution-building and policy development, and so that they can achieve the ultimate goal of economic growth and sustainable development with adequate energy supplies at the lowest possible total economic, financial and social cost consistent with development goals.

The project's two principal areas of activity are: a) technical assistance to institutions engaged in energy planning, analysis and policy development and b) assistance to both public and private sector entities aimed at improving the efficiency with which scarce and expensive energy resources are consumed. A research program addressing key energy policy issues common in developing countries and a mechanism for inter-country coordination and a synthesis of lessons and experiences gained under the project and its predecessor project are designed to ensure a cross-fertilization of ideas and experiences, the generation of new knowledge and understanding, and the wide dissemination of this information.

The project addresses the most fundamental and catalytic area of the AID energy program, that of broad energy policy development and analysis. Out of these activities emerge strategies that can be implemented by AID Missions, host governments, other donors and private investors. Interventions with technology, training, experimentation and demonstration can be identified and evaluated for an initial determination of feasibility under this project. Its focus is therefore comprehensive; that is, its activities encompass consideration of all sources of energy supply -- traditional, conventional and renewable -- as well as all energy-using economic sectors, both traditional and modern. It will look at energy demand with as much thoroughness as energy supply, and at policies aimed at bringing the two into balance over the long term. It will seek an integration of energy planning and policy development into the larger field of economic development planning.

The project is fully responsive to the Agency's emphasis on technical assistance and institution-building. It also recognizes a fundamental lesson of past experience -- that no amount of development assistance can be fully effective in the absence of a sound policy environment to encourage wise use of scarce resources, as well as the generation of income and growth. Energy policies are increasingly recognized as a key factor in the development of LDC economies in the post-1973 world. AID's overall assistance program in the energy sector seeks to encourage the growth of institutions capable of identifying viable long-term solutions to the energy problem and avoiding disruptive short-term crises that derail overall economic growth. This project can play a catalytic role in that process, not only in the countries it will assist directly, but also in other countries where its experiences and the knowledge gained from its activities will be shared and utilized.

Throughout the life of the project, it will be necessary to maintain a careful balance between assistance to individual countries and global attention to generic issues and research questions. S&T/EY's view is that these two levels of activity are complementary and are both essential to the success of the project. Past experience indicates that experience within individual countries can be extremely valuable in producing lessons and information useful to other countries as well as providing leverage for measurable change and improvement within the country directly assisted. The project's mechanisms for cross-fertilization and synthesis of experience are viewed as perhaps the most important elements of the project. These mechanisms include conferences and workshops, outreach and "clearinghouse" functions to be carried out by the project's "synthesis contractor", formal evaluations of the results of country-level activities, and the dissemination of both country-level work products and -- perhaps most important -- the comparative or generic issue-oriented research to be carried out within the project's research program. The first activity to be undertaken to promote this process of coordination and synthesis will be a major conference on energy planning and policy analysis planned for January 1983. The conference will be attended by AID staff (Washington and Mission), contractors who have been working at the country level of energy planning assistance under the predecessor project

be an academic exercise in data manipulation, too isolated from actual events to provide a realistic guide for policies and programs, is also shared by those concerned with both energy and overall development. Shortages of trained analysts with links to decisionmakers, and the tendency to prepare detailed but static plans that are outdated all too quickly by ensuing events, are problems in many LDC ministries. Coordination of energy policies and programs with specialized sectoral policies for transportation, agriculture, industry, housing and education is an important requirement for effective energy strategies that is often overlooked. Technical assistance can help to alleviate all these problems.

Albert Waterston, in his significant book on economic development planning (Development Planning: Lessons of Experience, Johns Hopkins Press, 1964), points out that developing country governments need to address development planning with both "top down" and bottom up" approaches; the same can be said for energy. The "top down" element is the establishment of broad objectives, targets and national policy directions, while the "bottom up" is the identification and feasibility analysis of specific projects, regulations and investments needed to implement policy objectives. While the former is generally the task of central government agencies, the latter is often shared by local and regional governments, parastatal and private enterprises. Relatively few countries have yet found a means of coordinating the two into the ideal "integrated" energy blueprint; here again, technical assistance can help.

Waterston also observes that the process of planning may be more important than the product. His observation on development planning is, again, equally applicable to energy:

"Just as there is more to planning than the preparation of a plan, so planning does not necessarily require a formal development plan...The important question is not what is a plan and what is not... It is rather whether the planning process is firmly established as a matter of government policy. The document, whether a list of policies, a budget, a partial or a comprehensive plan, is far less important than the planning process." (Waterston, p. 106.)

The importance of the process itself, as opposed to the product, can be clearly seen in the energy area because experience with energy has demonstrated the dramatic effect that unforeseen change can have on the best-laid plans. Energy plans developed ten years ago would be largely useless today because they would likely have failed to anticipate the quintupling of real world oil prices or the supply disruptions that resulted from conflicts in the Middle East in 1973 and 1979-80. Yet hindsight tells many countries that they would have made far easier adjustments to these events if they had had planning processes and institutions in place at the time. Now, they are attempting in many cases to establish such means of preventing new crises in the 1980's and 1990's.

In approaching the difficult field of energy policy development, then, it is important for A.I.D. to offer assistance that realistically addresses the problems and constraints being faced by developing country governments. Whatever the specific approach, it must be carried out with a constant eye on the fact that energy is not the only concern that governments must address. As Joseph Filippi has written in a World Bank paper (Organizational Aspects of Energy Policies in Developing Countries, World Bank, 1980):

"While energy pervades most aspects of economic life, the components of an energy strategy cannot be expected to supercede other national goals." (p.1)

In fact, making energy available for productive purposes at reasonable cost should be considered a means of enhancing overall economic growth and social development, rather than an end in itself. Filippi advocates an evaluation of energy policy in this broad context:

"The success of an energy policy is measured by its effect on growth, employment, balance of payments, inflation and income distribution. Qualitative and other factors less readily quantifiable in monetary terms (e.g., environmental and strategic considerations) must also be taken into account." (p. 2)

Perhaps the most critical need is for an approach to energy policy development that allows for flexibility in response to both the specific circumstances of each country and the need within each country for frequent readjustment to changing circumstances. As previously pointed out, no energy blueprint, no matter how detailed and how drawn, will continue to be useful over a five, ten or twenty year period unless it can anticipate and respond effectively to changes in energy supply, price and technology and to unexpected deviations from advance projections of economic growth. And no formula or "recipe" for energy policy design can be applied universally to countries in different regions with different resource endowments, economic and political structures, and social goals.

While energy planning and policy development are primarily a government function, and LDC governments are therefore the principal direct beneficiaries of assistance under this project, it is important to recognize that because of energy's critical role in any national economic, government energy policies and investments have a major impact on the viability and vitality of the private sector. Virtually every productive activity requires energy, and assurance of a steady, reasonably priced supply is necessary for a stable or growing enterprise. Government policies in developing countries significantly affect supply levels, types of fuel or power sources available, and the contribution of energy costs to total costs of production.

Technical assistance to LDC energy policy-making and planning agencies can support private-sector enterprises in both the U.S. and the recipient countries, both directly and indirectly. By helping to

formulate policies with regard to energy prices, taxes and tariffs, technical assistance can help provide incentives to indigenous private companies to use energy efficiently, to invest in energy-efficient capital equipment, and to develop domestic energy resources. Support to the U.S. private sector can come about in two major ways: first, by using technical assistance efforts to encourage government energy policies that, in turn, encourage outside investment in the development of indigenous energy resources, and second, by highlighting U.S. technical capabilities in the energy area and thereby encouraging LDC governments and private companies to purchase goods and services from American sources.

In most countries with which A.I.D. works, the energy sector itself is government-controlled, with state-owned enterprises acting as suppliers of oil, electricity, coal, natural gas and even occasionally wood from government forest preserves. In other instances, energy supplies come from joint ventures between the public and private sectors, including private expatriate investors in oil fields, mines or refineries. There are emerging opportunities for the private sector, however, in traditional and renewable sources of energy.

While the U.S. experience with energy suggests that the private sector may be a more efficient vehicle for supplying fuel and power, the realities of LDC circumstances are such that governments can be expected to continue to dominate energy development in developing countries, at least for conventional fuels and power. Even in the U.S., private oil companies and utilities are subject to extensive government policy intervention in their activities, such as taxation and regulation. Thus it seems clear that government energy policy is a critical factor in any scheme of energy and economic development, and that assistance with energy policy development in any country regardless of the structure of the energy sector itself - is a valuable contributor to the development of energy-consuming private enterprise.

A further point to be considered in this regard is the role that government can play in creating markets for future private sector initiatives in energy. Pricing policies are the most important example: by initiating systems of cost-based, subsidy-free pricing, government can help create demand for substitute fuels (such as renewables) and can encourage conservation. Pricing reform has become a top priority of the International Monetary Fund, the World Bank and commercial lenders to developing countries, as a means of creating economic conditions under which the private sector can flourish. A.I.D. can join this effort by encouraging rational energy pricing through this policy development assistance project.

2. Selected AID Experiences with Developing Countries' Energy Problems and Policies

The important differences among countries and the effect of these differences on appropriate approaches to technical assistance with energy policy development can best be illustrated by some of the

experiences A.I.D. has had to date in providing assistance to countries with widely differing kinds and degrees of energy problems.

2.1 Togo

The tiny West African country of Togo typifies the challenges facing many low-income, agriculturally-based developing countries striving to ensure that adequate energy supplies will be available to fuel their ambitious economic development plans. Unblessed with fossil fuel resources, Togo imports over 90% of its commercial energy supplies -- crude oil from Nigeria and electricity from a hydroelectric dam in neighboring Ghana. This imported energy feeds modern industrial, transport and tourist facilities built in Togo during the mid-1970's when a dramatic but short-lived surge in world phosphate prices convinced Togolese leaders that exports of Togolese phosphate could finance a dramatic leap into a late 20th-century economy centered around such new energy-intensive facilities as four large tourist hotels, an oil refinery, a cement plant, a chemical factory and a steel foundry.

For nine out of ten Togolese, on the other hand, everyday life continues to follow traditional paths. Subsistence agriculture, too primitive even to employ draft animals in most cases, brings forth meager yields. In mud-brick, thatched-roof rural homes, firewood, charcoal and small quantities of kerosene are typical sources of energy for cooking and lighting. As rapid population growth and urbanization create new urban markets for these traditional fuels, prices rise to unaffordable levels and rural dwellers find scavenging for free wood increasingly difficult due to spreading deforestation.

For the Togolese, one challenge of energy planning is to find new approaches to integrated agriculture and forestry development so that rural energy needs can be met while the government's stated goal of food self-sufficiency is advanced. To meet commercial energy needs in the modern sectors in the absence of any oil or gas prospects, the Togolese are preparing to construct a new large hydropower dam with World Bank assistance, and are looking for ways to make their fixed capital stock of industry, transport and tourism facilities more productive, thereby lessening the strain they bring to the country's external debt burden and balance-of-payments deficit.

In 1981, A.I.D. funded a short-term study of the Togo energy situation at the request of the Togolese government. Under S&T/EY's Energy Policy and Planning Project (936-5703), a team of analysts from Associates for Rural Development, Louis Berger, Inc. and Energy/Development International carried out a one-month in-country effort in collaboration with Togolese officials from the Ministry of Public Works, Energy and Hydraulological Resources. The resulting report, "Overview of the Togo Energy Situation", offered concrete recommendations for a number of activities the Togolese government could undertake to alleviate the country's energy problems on both a short-term and a long-term basis. The Togolese have since requested the services of a long-term resident energy advisor to help them implement the report's recommendations.

2.2 Morocco

Morocco, which shares with Togo an abundance of phosphates, differs by also enjoying at least the prospect of future energy self-sufficiency. Oil shale reserves there rank eighth in the world with an estimated 200 billion tons. Some coal and uranium resources also exist, and a recent promising discovery of natural gas further expands the possibilities for self-reliance.

Yet Morocco today remains dependent on imported petroleum for over 80% of total national commercial energy supply. In 1980, Morocco paid \$1.3 billion for imported oil, an amount equal to 30% of total imports and over half of the country's total export earnings. As a result, commercial borrowing, government spending, the balance-of-payments deficit and inflation are all rising in an economic picture also strained by a severe drought and a guerilla war in the Western Sahara.

The Moroccan challenge will thus be to invest in exploitation of known resources while continuing to search for new sources of energy, particularly conventional oil and gas. Hydropower and renewables are also expected to contribute to future supplies, but substantial economic and institutional barriers continue to slow progress toward the development of these sources. Oil shale development, Morocco's most obvious opportunity for energy self-sufficiency, is at present a highly risky prospect. Since even U.S. shale resources are little developed, Morocco finds itself in the unenviable position of pioneer -- some say guinea pig -- for new technologies. Yet Morocco may not be able to wait very long before taking major steps to develop oil shale if current growth in energy demand continues.

A.I.D.'s involvement in the energy sector in Morocco began in late 1980 with a project agreement for assistance under S&T/EY's Energy Policy and Planning Project (936-5703). Early discussions with officials of Morocco's Ministry of Energy and Mines revealed that the Moroccan energy officials were seeking a new approach to their task of developing comprehensive investment budgets for the energy sector in an environment of great uncertainty about future oil shale technologies, oil import costs and prospects for indigenous oil and gas. They were convinced, as were A.I.D.'s staff and contractors working with them, that a traditional "energy assessment" -- a one-time look at future energy needs and possible strategies for meeting those needs -- would be of marginal utility.

Moroccan energy analysts and their A.I.D.-funded technical assistance contractors began their approach to developing an energy strategy with the assumption that such a strategy should be oriented to groups of projects or investments that make up overall investment budgets -- as opposed to analysis of individual projects in isolation. This meant that the analysis would involve a large number of variables and relatively high level of complexity that could best be handled by employing some form of automated data processing. Recent

improvements in both hardware and software for microcomputers provided an opportunity to use a self-contained portable computer for this application.

The pioneering approach chosen in this case was therefore the development of a dynamic analytical framework programmed on a microcomputer -- that is, a simple model that could help Moroccan planners evaluate various packages (portfolios) of energy projects in terms of their risks, their ability to meet alternative demand projections, their internal rates of return, their impacts on employment and other social goals, their special requirements for skilled manpower, and their requirements and impacts in terms of foreign exchange. As groups of projects are evaluated with the aid of the model using criteria established by the Moroccans to reflect national development priorities, they can be rejected or adopted by policy-makers for inclusion in the national energy strategy depending on the aggregated results of the various economic, social and engineering judgments and analyses. Moroccan officials can use the model to test alternative evaluation criteria; for example, if Morocco wishes to limit a portfolio of projects to those projects which involve only low risk levels, the portfolio may fail to produce enough energy to meet expected demand while satisfying a second criterion -- that oil imports be reduced. Faced with this policy dilemma, Moroccan decision-makers can adjust either the import criterion or the risk criterion to create a more attainable result. In either case, the trade-offs will be explicit. The process involves constant interaction between man and machine, with human judgments always controlling the value-based criteria while the machine provides analytical assistance.

Events since the Moroccan project began have demonstrated the value of a dynamic approach. In December 1981, the Office National d'Activites et Recherches Pétrolières (ONAREP), which is Morocco's recently-created national oil corporation, struck what appears to be a significant find of natural gas in two exploratory wells. At this writing it remains too early to determine the precise extent of the gas field, but it is the belief and certainly the hope of Moroccan planners that a whole new energy supply picture may now be evolving as a result of the find. With a dynamic, computerized planning tool, the Moroccans will be able to build in new exploration data as it is produced, and add new gas-based projects to the investment portfolio.

The bulk of the A.I.D.-funded work done to date in Morocco has been in the development of the computerized analytical framework, the training of Moroccan personnel in its use, and the collection and programming of extensive data on Moroccan energy consumption and production, both actual and projected. Twenty-four proposed energy projects have undergone preliminary analysis within the model, and several supply scenarios, based on alternative project portfolios, are being developed. As will be discussed later in this paper, proposed future work would include ongoing technical assistance to the Moroccans as they gain additional experience with the analytical model to arrive at actual investment decisions and other governmental energy policies.

2.3 Sudan

The Sudanese economic situation is currently one of the world's most critical. The rising cost of imported petroleum has aggravated the crisis; it is estimated that petroleum imports in 1980/81 amounted to more than \$400 million compared with total export earnings of only \$560 million. Agricultural and industrial output has declined in recent years with cotton, traditionally Sudan's most important export, falling from \$300 million in export earnings in the mid-1970s to \$180 million in 1981. Declining production has been the result of a large number of factors including deteriorating infrastructure facilities, unrealistic pricing policies, inadequate and erratic electric power supplies, government mismanagement and shortages of spare parts, fuel and raw material imports. The country's annual balance of payments deficit is over \$700 million and the outstanding external debt is now more than \$3 billion.

In response to this worsening economic situation, Sudan --with the assistance of the International Monetary Fund -- has begun an economic stabilization program designed to reduce the balance of payments deficit and to expand domestic production. The plan includes rehabilitating existing plants and agricultural schemes, a moratorium on new development projects, periodic foreign exchange rate adjustments, elimination of input price subsidies and the provision of production incentives. At the same time, most international donors have agreed to reschedule Sudan's debt repayment and to provide substantial balance of payments assistance. Thus, while the economic situation is unlikely to show much improvement for some time, a program is now being implemented to halt the economic decline and to provide a measure of stability.

A.I.D.'s energy sector assistance program in the Sudan was developed in response to a 1980 request from the Minister of Energy, Sharif El Tunami. A long-term resident project coordinator arrived in Khartoum in early 1981 to begin work with the newly formed National Energy Administration (NEA). The NEA staff at the time consisted of about 30 very recent university graduates and five or six mid-level staff seconded from the General Petroleum Corporation and the Forestry Department.

From the outset the project has been viewed as largely a training and institution-building project. The training aspects have been among the most significant because most of the NEA staff had no previous energy-related training. Training has occurred in formal sessions and on the job. The NEA staff was divided into separate groups, each responsible for collecting data for a major energy-consuming sector -- agriculture, household, transportation or industry.

The A.I.D.-funded contractor has also assisted the NEA in developing an energy library and information system. No central data files had been kept on energy information and in fact there were few efforts to collect any information on energy on a routine basis. Technical assistance has been provided to improve energy data collection efforts, and to process this information.

The NEA staff, the resident energy advisor and the short-term contract consultants have devoted considerable effort to preparing reports and policy recommendations for the Ministry of Energy on issues of immediate economic and political concern. For example, the project staff prepared reports outlining petroleum product supply and distribution problems. A project consultant is now working with senior officials to improve the petroleum allocation system and to expand the role of the private sector in the supply and distribution of petroleum products.

In response to a request from the Minister of Energy for advice on how to improve the reliability of the power sector, the project team prepared two major reports--one making recommendations for short-run improvements and the other outlining longer term options for the development of the power sector. As a result of the recommendations made in this first report, the USAID mission was asked to consider purchasing electric power equipment and spare parts under the recently expanded Commodity Import Program. This request was approved and formal specifications are now being drawn up to procure approximately \$20 million worth of electrical equipment to implement the Blue Nile Reliability Improvement program. This is a tangible example of the way in which technical assistance with energy planning and policy development can provide leverage to attract capital investment in the energy sector.

The project team has devoted somewhat less attention to an examination of domestic fuel resources, but a bioenergy team is currently assessing the country's biomass resources to make recommendations as to how these can be utilized most effectively. Other consultants will examine small hydroelectric resources in Sudan.

No definitive information is now available on Sudan's petroleum resources. However, a number of companies are actively exploring. Proven reserves are now estimated to be capable of supporting production of at least 25,000 barrels per day and a Chevron executive recently suggested that reserves could total as much as 10 billion barrels, making Sudan a more important producer than Indonesia or Algeria.

The overall results of the first phase of the Sudanese energy sector technical assistance effort will be presented in a report that will include projections of future energy supply and demand and an analysis of major energy issues confronting the government of Sudan. The document is viewed as one in a series of steps required to develop a process by which energy issues can be analyzed and recommendations made for government action.

2.4 Tunisia

Although not a member of OPEC, Tunisia is an oil exporter. In 1980, Tunisia produced approximately 5.5 million tons of oil and consumed domestically less than two million tons; oil exports provided over 30% of the country's export earnings that year. Tunisia obviously enjoys a degree of energy security that most A.I.D.-assisted

countries lack, yet the future has been cast into doubt by the fact that energy consumption between 1974 and 1979 grew by an average annual rate of 10.8%, while energy production grew by only 5.5%. If those trends continue, Tunisia can expect to become a net energy importer in the late 1980's.

Aware of the need to plan ahead for this change, the Tunisian government commissioned a national energy study in 1979. That study, carried out by a U.S. consulting firm (without A.I.D. involvement), told the Tunisians more about their lack of good energy data than it did about their future options. The report recommended in particular that the government improve its data base for energy consumption in industry, transportation and agriculture before attempting to develop specific policies for these sectors, which are seen as especially important because industry and transportation together account for half of total Tunisian energy consumption, and 95% of commercial fuel and power consumption, while agriculture uses only six percent of total energy but is the sector in which the Tunisian government seeks to expand output and productivity most rapidly in the coming decade. Agriculture currently provides more than 50% of Tunisian employment and 20% of GNP. Furthermore, Tunisia is a net importer of foodstuffs. Tunisian officials see energy availability as one key to increased food production.

A.I.D. responded to this request for sectoral energy demand analysis by funding, under the Energy Policy and Planning Project (936-5703), first an industry-sector demand study (in FY 1980) and then additional studies of the transportation and agriculture sectors (beginning in FY 1981). Under a contract with Ferguson-Bryan and Associates (a minority-owned small business) and a subcontract with Energy/Development International, the industry study was fielded in February 1981 and will be completed by mid-1982. The transport and agriculture studies were fielded in late 1981 and will be finished in the spring of 1983.

The specific questions being asked by the Tunisian Ministry of National Economy through these studies are:

- 1) Are there opportunities for conservation to improve the efficiency of energy end use in the industry and transport sectors?
- 2) Can better allocation of energy supplies, possibly including increased use of fossil fuels for mechanization, fertilization and irrigation, increase agricultural productivity?
- 3) Where, in each of the three sectors, are there opportunities to substitute more plentiful indigenous resources, especially renewables?
- 4) How should Tunisian pricing policies be designed to encourage maximum energy efficiency, while still serving other social purposes such as making energy affordable for the poor?

5) How will Tunisia's economic development plans and investments in the industrial, transportation and agriculture sectors affect overall national energy demand in the next five years, and the next twenty years?

The policy questions implicit in these investigations must be answered, ultimately, by the Tunisians themselves. The present studies will help by providing factual data to aid the decision-making process.

The methodology employed in the industry study was designed not only to produce information, but also to build the capability of Tunisian plant engineers to develop and carry out a program of continuous data collection and analysis and to implement changes in factory operations that will produce actual efficiency improvements. Thus the program began with two cycles of training for engineers from 20 Tunisian factories, during which they were taught the techniques of energy auditing, procedures for monitoring energy consumption in steam systems, boilers, electric motors and other major end-use processes, and economic analysis of investments in energy efficiency devices. The training course was followed by detailed energy audits of seven industrial facilities representing a cross-section of Tunisian industries, with special emphasis on energy-intensive industries such as cement, bricks, steel, sugar and paper. These audits produced extensive detailed data as well as indications of a general pattern of inefficiency in Tunisian industry. The final element of the industry study, now underway, is a pilot survey of fifty plants in order to broaden the industrial energy data base and test a questionnaire that the Tunisians expect to adopt as part of their annual census of industry. As an ongoing tool for information-gathering, the energy module of this census will provide a permanent factual basis for industrial energy policy-making in Tunisia.

In the transport sector, passenger modes dominate energy consumption with 72% of the sectoral total. Privately-owned autos and trucks account for an estimated 40% of transportation energy use, yet the data base on these private vehicles and on passenger-based energy consumption is extremely weak. Based on information available from other countries, including the U.S., it is believed that considerable potential for conservation exists in the private passenger transport area, if policies are undertaken to encourage changes in driver behavior, vehicle maintenance, technological change and traffic management. To test this premise in Tunisia, the A.I.D.-funded researchers developed a survey of vehicle owners who are identified at government inspection stations and asked to complete a detailed questionnaire about their vehicles, their auto use and maintenance, and certain socioeconomic data such as occupation. Respondents are also given a series of five postcards to fill out and mail in each time they fill their cars with fuel, providing additional data about fuel economy, purpose and extent of driving since the last fill-up, and other items. The full survey is being carried out in several regions of Tunisia over a full year, in order to account for regional and seasonal variations.

The Tunisians' principal need for energy-related information in the agriculture sector stems from the government's plans to achieve food self-sufficiency and increase agricultural export earnings. Therefore, the A.I.D.-funded team worked not only on a sector-wide basis, but also on a detailed analysis of two high-priority subsectors, hard wheat (to promote self-sufficiency) and tomatoes (to enhance export earnings). At the macro level, energy information has been gathered by designing an energy survey module to be attached to the Ministry of Agriculture's annual census of Tunisian farms. The module relates volume of energy inputs -- broken down by commercial fuels (primarily diesel), electricity, fertilizers and chemicals, human and animal labor -- to farming activities including livestock production, soil preparation, seeding, fertilizer application, weeding, irrigation, harvesting and transport of farm commodities. Approximately 14,000 farms will be surveyed by Tunisian census-takers using the energy module.

At the micro level, 48 wheat and tomato farms have been selected for detailed analysis throughout the 1982 growing cycle. Surveyors from the Ministry of Agriculture will visit these farms approximately once a month to measure energy use in each aspect of their operations. Analysis of these data, and of the broader survey data, will be carried out using the processing and programming capabilities of the government-run computer center, Centre National d'Informatique.

Although the A.I.D.-funded sectoral energy analysis in Tunisia is limited in scope to demand data gathering in three sectors, it is expected to make an important contribution to Tunisian government decision-making on energy and to serve as a useful example of truly collaborative work, with U.S. technical assistance provided by contractor and Bureau of the Census personnel and actual field surveys carried out entirely by Tunisian personnel.

2.5 Guyana

Guyana shares with all the foregoing countries (other than Tunisia) the problem of heavy dependence on imported oil. Petroleum imports provide 68% of primary energy supplies in Guyana, costing in 1979 G\$206, or 26% of total export earnings. Despite an increase in the value of Guyanese bauxite exports, the country has experienced slow or negative economic growth and balance-of-payments deficits in the late 1970's and early 1980's.

Guyana established a new National Energy Authority in early 1981 after a long period of planning and legislative deliberation, during which a temporary body, the National Energy Unit, laid the groundwork for the NEA's work program. A reconnaissance visit by two S&T/EY staff members and a consultant in early 1980 led to the provision of a resident energy advisor whose assignment was to help the Guyanese government to:

- 1) Establish a data gathering system on energy production and consumption;

- 2) Develop a national energy balance;
- 3) Design and install an energy planning process;
- 4) Identify the NEA's staffing, training and consulting requirements;
- 5) Gather information on energy programs in other countries, emphasizing conservation and alternative energy programs;
- 6) Coordinate Guyana's involvement in regional energy programs, such as those developed by CARICOM and the Caribbean Development Bank; and
- 7) Develop operations and management systems for the NEA to enable it to carry out its planned responsibilities.

In addition, the consultant was asked to participate extensively in the completion of a national energy assessment for Guyana which was separately funded by A.I.D. through CARICOM.

The Guyana activity offered the clearest-cut example to date of the process of building a new energy policy institution from scratch. The A.I.D.-funded advisor was in the country for nine months, long enough to see the NEA launched and partially staffed and the assessment substantially completed, but not long enough to fully implement the seven elements of the original institutional development plan. This activity confirms the necessity of providing long-term energy technical assistance if substantial results are to be achieved.

While the experience of these five countries -- Togo, Morocco, Sudan, Tunisia and Guyana -- does not represent all of A.I.D.'s experience with energy policy development, it does provide a good sample of different national needs and approaches. A common thread, not heavily emphasized in the foregoing section but present in all the illustrative countries, is a national commitment to improve energy efficiency as one means of reducing dependence on foreign oil. Conservation is the second major element of the Energy Policy Development and Conservation Project.

B. Energy Conservation

In the statement of project goals, it was pointed out that A.I.D.-assisted countries are seeking to ensure the availability of energy at the lowest possible total economic, financial and social cost consistent with national development goals. A strategy to achieve this end can employ a variety of tactics including the development of new indigenous energy supplies, the establishment of policies to promote investment in such supplies, and -- on the demand side of the energy balance -- the deployment of efficient energy-consuming technologies and practices, with policies to encourage them. It is the last area with which we are concerned in this section of the project paper.

The encouragement of energy efficiency in both the physical and economic senses of the word is the focus of a major component of this project. The project seeks to help each unit of energy input produce more in terms of the output of useful work, thereby freeing incremental energy supplies for purposes related to economic expansion and development. It is expected that developing countries will continue to experience more rapid energy growth than industrialized countries in the years to come, but that available energy supplies can be stretched through conservation to stimulate as much productive economic activity as possible. It may be, for example, that liquid fuels conserved in energy-intensive industries could be employed to increase agricultural productivity through use in farm machinery or fertilizer production. Further, conservation can help offset the economic burdens that result from high levels of dependence on imported oil by reducing the cost of producing economic output, including exports.

It is important to distinguish between conservation as it is meant here and curtailment, which implies a reduction of energy services. The aim of this project, and of conservation strategies being developed in a number of countries, is not to "do without", but to "do more with less". Probably because of a failure to make clear this important distinction in early discussions of the role of energy conservation in developing economies, it was not uncommon to hear the argument that LDCs use so little energy, in comparison with industrialized nations, that conservation was impossible, inappropriate, or both.

A 1980 article in a British journal typifies this point of view:

"Energy conservation, in general, is not an appropriate energy policy strategy for LDCs. Only where large wasteful use of energy already occurs does there exist a serious conservation potential. The moral obligation and practical potential for energy conservation exists in the North." (McKillup, Energy Policy, December 1980.)

This viewpoint overlooks a number of important factors, such as the following:

1. Many less developed countries have industrial sectors dominated by a few energy-intensive facilities such as cement plants, chemical fertilizer factories, oil refineries, paper and pulp manufacturers, or primary metal processors which do indeed have conservation potential;
2. LDC industrial plants are frequently based on old and inefficient technologies, designed when energy was cheap and conservation of fuel and power was not a factor in industrial development planning;
3. In countries with relatively small current industrial, and transportation bases, future development plans in these sectors offer major opportunities for building state-of-the-art, highly efficient technologies into the national infrastructure; and

4. In comparing energy conservation with various "supply side" options for meeting LDC energy demand, conservation strategies enjoy the advantages of much shorter lead times and often much lower cost and faster payback than virtually every option for increasing energy supply.

It is also sometimes argued that only the more advanced developing countries, such as Korea, Brazil, Mexico and Venezuela, can profit from efforts targeted at energy conservation in the modern sectors, especially industry. Recent analyses suggest, on the contrary, that even the least developed countries could achieve substantial economic benefit from conservation assistance. S&T/EY-sponsored case studies of conservation potential in Haiti and Sri Lanka, and a more recent World Bank analysis of the latter, bear out this point of view.

In Haiti, a country with a per capita GNP of only \$260 in 1978 and a per capita annual energy consumption of only 78 kilograms of coal equivalent (as compared with 11,374 kgce in the United States), the industrial sector accounts for 35% of total commercial energy consumption and 41% of imported oil. In certain key industries, energy costs comprise a substantial portion of total production costs; in cement, for example, the cost of fuel accounts for 31.3% of the value of production. (Institute of Energy Analysis, 1981, p. 129.) Furthermore, the combined consumption of Haiti's cement plant, its electric power stations and its bauxite industry accounts for nearly 80% of national fuel oil demand, all of which comes from imports (IEA, p. 131.) Energy savings in the cement industry alone and in the entire industrial sector could thus contribute significantly to Haitian energy independence and economic well-being.

Sri Lanka's per capita GNP is even lower than Haiti's, at \$230 in 1979, but per capita energy consumption is higher at an estimated 140 kg of coal equivalent. The Sri Lankan economy is more industrialized than Haiti's, so it is not surprising that both the A.I.D.-funded case study and the World Bank country assessment concluded strongly that considerable conservation potential exists there in industry, transport and large commercial buildings. The World Bank assessment notes that serious current electricity shortages during the dry season, when the country's hydropower dams operate well below capacity, have already slowed down the ambitious investment-promotion programs instituted by the present government after its election in 1977. Only conservation, the assessment argues, can alleviate these shortages in less than five years, after which new supply projects are expected to be on line. Total potential savings from an industrial/commercial conservation program, the Bank estimates, could be worth \$24 million (in 1980 US\$) by 1985 and \$36 million by 1990. The investment of \$4.9 million in conservation improvements in just five industry subsectors -- cement, steel, tires, ceramics and paper -- would achieve savings of \$3.2 million per year beginning immediately after their installation, according to the Bank's conservation expert.

In most of the oil importing developing countries there are significant opportunities like these to increase the efficiency of fuel consumption with effective programs of demand management and

conservation. World Bank analyses suggest that such savings could amount to between 15% and 25% of projected demand in 1990. The technical opportunities for more efficient energy use can be found in all the major economic sectors of developing countries.

1. Industry

In industry, World Bank data suggest that LDC energy-intensive industries such as cement, paper, chemicals, oil refining, metals, food processing and mining may be as much as 20% more energy-intensive than comparable industries in the U.S. and other developed countries. The reasons seem to lie in such problems as technological lag, inadequate maintenance, diseconomies of scale and shortages of capital to substitute for energy.

Industrial conservation in LDCs (as elsewhere) begins with "housekeeping" measures involving little or no capital cost: better equipment maintenance and operation procedures, plugging of heat and steam leaks, etc. Next come moderate-scale adjustments such as installation of heat recovery devices, increased use of recycled materials, more efficient lighting, heating and insulation of work spaces, etc. In addition, there are major changes in technologies and/or processes that require significant capital investment and relatively long lead times, and can best be implemented in most cases by incorporating state-of-the-art technologies in new plants, rather than by retrofitting existing ones. Finally there is the question of proper energy/economic planning - that is, taking full account of the long-term energy costs associated with alternative industrial development strategies. This could discourage energy-intensive industries where a country lacks indigenous energy resources and cannot afford to import the quantities required. Such planning could also minimize energy-intensive activities that are uneconomic because of size and scale factors and encourage proper planning for industrial employment areas so that they minimize energy requirements.

2. Electricity Generation

Oil is the fuel for half of all electricity generation in LDCs, and a number of studies suggest that power generation is 20-25% more fuel-intensive in LDCs than in industrialized countries. Efficiency improvements in the electricity sector will result initially from pricing reforms, better operation and maintenance of existing facilities, and load management techniques. Longer-term opportunities include better system design and optimal sizing of power plants, achievement of better load factors through careful siting, creation of rational grids and interconnections, encouragement of inter-country connections, promotion of cogeneration, and shifts from oil to other fuels.

3. Transportation

In transportation, the World Bank reports that LDCs are as much as 40% more energy-intensive than the OECD nations. Efficiency

improvements in transportation are more difficult to effect, and more dependent on individual country circumstances, than in industry. The best opportunities seem to lie in long-term transportation planning and urban planning. Urban passenger transport can be made more efficient through development of policies to encourage traditional personal transport modes such as bicycles, pedicabs, mopeds, even walking, and to isolate these modes from vehicular traffic. Bus service would also be significantly improved through these and other means of traffic management, since many LDC cities are now hopelessly clogged (and polluted) by idling cars and buses in near "gridlock" conditions. Inter-city freight and passenger transport efficiency is also a long-term proposition, involving mode shifts (such as railroad expansion) and gradual replacement of inefficient vehicles (especially trucks) with newer and better models.

4. Buildings

In buildings, the focus of activities to conserve commercial fuels will be in urban areas - in large office buildings, hotels, multifamily housing, etc. Many LDC cities are dotted with western-style buildings that fail either to compensate for or take advantage of local climatic conditions. Policies to improve the efficiency of space conditioning, lighting, water heating and other energy services in LDC buildings would include development and enforcement of more appropriate building codes (including provisions for passive solar design), fuel substitution (including solar water heating) and improved appliance efficiency.

II. Project Description

The Energy Policy Development and Conservation Project will carry out a program of activities at both the country and worldwide levels, some focused only on policy development and planning, some on efficiency and conservation, and some on both. Proposed activities at both levels and in both activity categories will be described below.

A. Country-Level Activities

1. Country Selection Criteria

Country-level technical assistance will be tailored to individual country needs while bearing in mind the larger mandate of the Office of Energy to focus on energy solutions that can be adapted or replicated in other countries. Country-level activities under this project will not, of course, be designed to carry the funding burden that should more properly be borne by the bilateral funds of A.I.D. Missions; rather, the central project will provide the cornerstones for Missions' related or follow-up projects. At the same time, S&T/EY recognizes that the process of building sound national energy policies and institutions is a long one, and that even the basic task of starting that process may require an involvement of two or even three years. Hence the judgments

of how much to do, how long to stay, and how much money to commit under the central project in any given country will always need to be carefully taken in a collaborative decision-making process involving all the appropriate A.I.D. bureaus and offices. Considering that the available project resources are limited, great care will need to be taken in selecting countries where assistance is to be provided; this is especially important as requests for assistance are expected to exceed the project's capacity for funding. The following criteria have been developed to assist S&T/EY, Regional Bureaus and Missions in their collaborative country selection process:

1. A significant demonstration of interest in technical assistance for energy policy development and conservation on the part of the host government and the country A.I.D. Mission, including an indication that the country A.I.D. Mission will fund related or follow-up activities;
2. The critical nature of the national energy problem as it relates to overall economic performance, development prospects and to the national security and political stability of the country;
3. The current existence of, or active plans to create, a government entity responsible for energy planning, policy development and conservation, and with which project personnel can work productively;
4. A potentially productive, non-duplicative, complementary relationship between the proposed activity and other A.I.D. projects (both bilateral and centrally-funded) within the country, as well as projects of other donors;
5. The identification of appropriate and useful project activities which are likely to promote the development of country policies that will in turn aid in resolution of the country's energy problems;
6. The potential replicability or applicability of project activities and results in other A.I.D.-assisted countries;
7. The potential for the proposed policy development or conservation activity to provide leverage for significant and productive energy sector investments, especially in the indigenous private sector and from U.S. private sources, but also from other official lenders such as the multilateral development banks;
8. The overall strategic or political importance of the country to U.S. foreign policy, and strong friendly ties between the U.S. and the country.

These criteria are designed to ensure that country-level activities under the project respond to balanced interests and needs ranging from national security to project cost-effectiveness. There is no intention to impose rigid quantitative scoring requirements on the selection process; rather, the criteria taken together are meant to serve as guidelines to aid Missions and S&T/EY in responding to requests for assistance from host governments. It can be expected that some countries will present strong showings in terms of most or all the criteria, while others will have more uneven circumstances, with one or two criteria -- such as severity of the national energy problem (criterion #2) or importance of the country to U.S. foreign policy (criterion #8) -- providing compelling justification by themselves for activities under this project.

2. Summary of Country-Level Activities

For most country-level activities under this project, as under the predecessor project, a long-term energy advisor supplemented with short-term expert consultation services will be the principal vehicle for assistance with energy planning and policy development. The technical assistance to be provided will include the following general categories of activities:

- 1) Organizational and manpower development in energy policy-making and planning entities;
- 2) Establishment and maintenance of programs for energy data collection and analysis;
- 3) Analysis of energy resources;
- 4) Economic evaluation of energy supply projects, government policies, demand management needs, and private-sector opportunities in the energy sector;
- 5) Preparation of flexible and dynamic energy plans that reflect the cooperating countries' needs, constraints and priorities;
- 6) Assistance with drafting of investment codes, laws, regulations, pricing schedules and other implements of energy policy;
- 7) Development of funding proposals, requests for proposals and other financing and project vehicles to permit energy development and leverage activities far beyond the project; and
- 8) Creation of energy demand management and conservation programs.

In keeping with the project's emphasis on institution-building, long-term assistance will characterize most country-level activities. In certain cases, however, a reconnaissance study, or overview assessment, may be undertaken as a preliminary step to analyze

long-range assistance needs that might be fulfilled under either this project or under a Mission-funded project. The Togo study funded under the predecessor project is a model for this type of quick assessment. It has become increasingly apparent during the last year, however, that the need for such quick studies has been diminished by the country energy assessment program of the World Bank; S&T/EY is accordingly anxious to focus primarily on activities with a more lasting impact and a more collaborative approach between host country and expatriate analysts and planners.

It is also useful to emphasize that the Project's country-level activities will generally embody a comprehensive approach, with all energy sources considered in an integrated fashion and with supply, demand and policies aimed at balancing the two incorporated into each country's effort. It has often been said that developing countries typically have two economies -- traditional and modern -- and two energy crises -- oil-import dependency and fuelwood depletion. The project will operate fully in both economies and both energy spheres.

3. Activities Continued from the Predecessor Project

In the first year of project activity, the major country-level activities will be second-phase efforts in two countries (Sudan and Morocco) where assistance with energy policy development began under the predecessor project, Energy Policy and Planning (936-5703). Experience to date in those two countries, described earlier in this paper, has shown that this kind of technical assistance requires a period of at least three or four years to achieve optimal results. Building on the first-phase activities, new efforts will address some of the specific and critical energy problems that have been highlighted. In both cases, strengthening the government institutions charged with energy planning and policy development will be an ongoing priority.

3.1 Morocco

In Morocco, A.I.D. will continue to provide a resident energy advisor to the Ministry of Energy and Mines and to supplement the expertise he brings with short-term assistance in special areas. The principal task of the long and short-term advisors over the next year will be a detailed analysis of energy costs and prices as they affect output, exports and earnings in key sectors of the Moroccan economy. The study will examine the contribution of energy costs (attributable both to direct consumption and to energy that is embodied in the equipment used to produce products or perform services) to the cost of producing phosphates, certain agricultural products and other sectoral outputs to be identified in cooperation with the Moroccans. The Ministry of Energy and Mines has requested assistance in this area to improve their economic forecasting capability, as well as their ability to assess the feasibility of capital investment projects, by using more realistic energy cost and price data. The Moroccans also expect to use the results of the analysis to respond to recommendations on energy pricing and broad economic reforms made by the World Bank and the International Monetary Fund.

Other activities that will be undertaken during the phase 2 Moroccan effort will include: 1) training in the use of the investment analysis model for the staffs of the major energy-related parastatal corporations such as ONAREP (the national oil company), ONE (the electric utility), and SOCHARBON (the coal mining enterprise) so that they, along with the Ministry of Energy and Mines, can use it in evaluating the feasibility of major energy supply projects; 2) a refinement of the investment analysis model so that the costs of selected project portfolios can be allocated to annual capital and operating budgets for each parastatal company involved, thereby also helping MEM with its budgetary review and approval function; 3) ongoing training of MEM staff in the techniques of energy project planning, analysis and management; 4) ongoing support for MEM's new program to promote energy conservation; 5) general management consulting to MEM, with special emphasis on the use of microcomputers to improve Ministry management; 6) initial support to USAID/Rabat in the design of a follow-on energy sector project planned to begin in FY 84; and 7) other activities to be identified.

These activities are expected to require the commitment of approximately 24 person-months of effort in each of the next two years, with the entire S&T/EY-funded effort terminating on September 30, 1984 when the new Mission project begins. The activities would be implemented by the present Morocco contractors, Energy and Environmental Engineering, Inc. and Development Sciences, Inc., under an incrementally-funded amendment to their contract. New personnel would be added to the contractor team, including a senior economist who would serve as resident advisor.

3.2 Sudan

The second phase of the Sudan activity will also involve a gradual transfer of funding responsibility from S&T/EY to the A.I.D. Mission in Sudan. S&T/EY will contribute \$400,000 to phase 2 activities in FY 82, while the Mission will pick up full responsibility in FY 83 with about \$1 million.

Activities to be undertaken in the Sudan during the next year include: 1) continued data collection activities and development of routine reporting forms so that the Sudanese energy data base can be permanently improved and can serve as a basis for ongoing decision-making; 2) a shift in emphasis from short-term to long-term energy problems for detailed analysis; 3) the provision of documents and equipment (including microcomputer hardware and software) to improve Sudanese analytical capability and expand the energy library established during phase 1; 4) continued training and long-term advisory services directed at the National Energy Administration and the planning units of the General Petroleum Corporation and the Public Electricity and Water Corporation; and 5) special studies on key issues such as the optimal use of recently discovered Sudanese oil and gas resources (for the export market or for domestic consumption), and the fuel basis for future electric power expansion (thermal or hydro).

3.3 Togo

Possible continuation of technical assistance with energy policy development to the government of Togo is also under discussion. Whether or not a resident energy advisor will be provided to help implement the recommendations of the short-term overview study funded under the Energy Policy and Planning Project will depend on whether the activity can be effectively coordinated with planning for the World Bank's capital project for the Mono River Hydroelectric Dam and its other energy activities in Togo, and whether the technical assistance can be provided without overburdening the very small A.I.D. program and staff in Lome. If the Togo activity is undertaken, it is expected to be funded early in FY 83 and to begin in the late fall of CY 82.

4. New Country-Level Activities

The first country-level activity to be newly initiated under this project is expected to be in Sri Lanka and to focus initially on industrial energy conservation, possibly broadening later to encompass comprehensive energy policy development and institutional support to the newly-formed Authority for Energy, Natural Resources and Science. The initial conservation activity, which would be funded early in FY 83, would include audits of key industrial facilities, preparation of case studies based on these audits, seminars to provide practical conservation-related information to policy-makers, plant managers and engineers, and detailed recommendations for industrial energy management programs that can be implemented at no cost or low cost. The Sri Lanka activity may later involve the provision of a resident energy advisor who can assist the government of Sri Lanka develop a comprehensive national energy policy and deal specifically with critical issues relating to fuel-switching and conservation. Sri Lanka currently faces significant interruptions in electric power during the dry season when its hydroelectric facilities operate well below capacity. Major new hydro projects are expected to be on line in the late 1980's, but the rapidly-growing Sri Lankan economy -- bolstered by the vigorous free enterprise and investment promotion policies of the government elected in 1977 -- is expected to require continued planning for rapidly growing energy needs.

In the Latin American/Caribbean region, country-level project activities are being considered for Haiti, Honduras, Panama and Ecuador. Discussions with Missions and governments in this region are at a very early stage, and no definite plans have been set. Similarly, exploratory discussions have taken place with regard to possible activities in other African countries (possibly Tanzania and/or Senegal) and Asia (possibly in the Philippines and Thailand). Plans for country-level activities will become firmer once Missions are informed by cable of project approval and invited to express their countries' needs for and interests in assistance with energy planning, policy development and conservation. A draft cable will be attached to this PP as an Annex.

B. Global Activities

1. Energy Policy and Planning Conference

There was relatively little opportunity, during the predecessor project, to share experiences with energy planning, policy development and analysis across country and regional borders, other than through a 1980 workshop on energy survey methodologies coordinated by the National Academy of Sciences. This lack of inter-country activities is essentially due to the long time required for data collection, analysis, organizational development and strategy design before any "output" products can be articulated in a public forum. The country-level activities under the Energy Policy and Planning Project (936-5703) all began operations in 1981. Host country governments and U.S. technical assistance contractors have therefore been relatively unable to share project results until recently.

Now, however, it is appropriate for S&T/EY to promote actively the cross-fertilization of ideas and experiences. Consequently, the first global activity under the new project will be a major conference to bring together the principal actors in the energy planning and policy development activities that have been supported under the predecessor S&T/EY project and a number of other projects funded by Missions and Regional Bureaus. Invitees will include host government officials, A.I.D. personnel and technical assistance contractors in Morocco, Sudan, Tunisia, Guyana, Togo, Malawi, Dominican Republic, Jamaica, Indonesia and Bangladesh. Other Missions will also be informed of the conference and encouraged to attend, at their own expense, along with their appropriate host government counterparts, if they are undertaking or considering activities in energy policy development assistance. Representatives of other institutions and donors, and persons with special expertise in the topics under discussion, will also be invited to participate in the conference and present papers or speak.

The conference will include panels whose members will present papers based on their experiences on generic issues such as:

- 1) effective organizational arrangements for LDCs for energy planning and policy development;
- 2) training and manpower needs of energy policy agencies;
- 3) methods of energy supply and demand forecasting;
- 4) problems of data collection on village and household energy consumption, especially of traditional fuels;
- 5) approaches to feasibility analysis for energy supply projects;
- 6) experience with management of effective energy conservation programs;

- 7) the use and potential of microcomputers for energy policy analysis;
- 8) R & D needs.

These topics are meant only to be illustrative of potential subjects for conference discussion; actual panel and paper subjects will be defined during conference planning.

A contractor will be selected to plan, implement and document the conference. The contractor will not be an organization that has been involved in an A.I.D.-funded country-level activity in energy planning and policy development; consideration will be given to engaging a U.S. university or a non-profit research institution such as the National Academy of Sciences, the Overseas Development Council, the International Institute for Environment and Development, Resources for the Future or the Institute for Energy Analysis. The report that will be prepared after the conference will not be a verbatim proceedings or a compilation of papers; rather, it will be a discussion paper organized around key issues and presented in a format that will facilitate its use as a practical guide for other LDC energy personnel, technical assistance experts and A.I.D. staff.

2. Ongoing Inter-Country Coordination and Synthesis

The conference will mark the beginning of an ongoing program of coordination and sharing of ideas and experiences among the participants in country-level energy planning, policy development and conservation activities. This program will also include the preparation of publications which will draw on past experiences and synthesize the knowledge gained for global use in energy planning, policy development and conservation activities. If the conference contractor's role as a facilitator of shared learning is demonstrated, S&T/EY may wish to extend the contract to provide for the contractor's continued part in convening country-level contractors, comparing and distilling different experiences, identifying and analyzing common issues, etc. If that is not deemed appropriate, a separate "synthesis contractor" will be procured.

The ongoing process of coordination will involve periodic workshops on specific topics of interest to energy planners and policy-makers; outreach through occasional newsletters, discussion papers, and state-of-the-art publications; and a clearinghouse function to keep sponsors of and participants in energy planning, policy development and conservation activities in countries throughout the developing world aware of each other's work and in touch with one another. In addition, A.I.D. Missions considering projects in this area will be able to use the services of the "synthesis contractor," through S&T/EY, to learn of the activities, methodologies, problems and solutions involved in similar projects elsewhere. The contractor will be asked to keep abreast of the activities of other donors, as well as those within A.I.D. The contractor may also participate in the evaluation of

individual country-level activities. The selected organization will, in short, be a repository of state-of-the-art information in this field and will be a valuable resource to be tapped by practitioners. This "synthesis" activity is a key component of the overall project to ensure that the knowledge and insights gained which have broad application will be made available for global use.

3. Conservation Services

The energy conservation side of the project will be addressed on the global (as well as the national) level. S&T/EY's longstanding plans to develop a major training activity in industrial energy conservation have been redirected from implementation within a specific conservation project (or this combined policy development and conservation project) to a component of S&T/EY's Conventional Energy Training Project (936-9997). That project is offering, in FY 82, a two-month technical course in industrial energy efficiency technologies, procedures and analyses (including hands-on audit techniques) for approximately 25 participants from LDC utilities, oil refiners and energy-intensive industrial consumers. The course is being conducted jointly by the University of Tennessee at Knoxville, the Tennessee Valley Authority, and Oak Ridge National Laboratory.

The effort to be undertaken under this project will complement the CETP training by focusing on research, data collection and analysis, information dissemination and technical and managerial consulting services to promote efficient consumption of scarce and expensive (especially petroleum-based) fuels. S&T/EY will contract with a private-sector entity with extensive practical experience in energy conservation combined, by joint venture if necessary, with experience in developing countries. The selected organization will manage the conservation component of the project and will serve as a resource to which LDC governments and A.I.D. Missions can turn for help in analyzing conservation opportunities in selected industries, buildings and transport systems and in organizing country conservation programs. The contractor will also initiate studies and prepare manuals, reports and instructional materials that will be useful throughout the developing world.

Among the specific activities that will be undertaken by the conservation services contractor are the following:

- 1) Energy audits of industrial plants and buildings, including both physical measurements of energy use and flows, and documentation of energy purchases and facility output through examination of written records;
- 2) Transfer of energy auditing capability to LDC plant, building and transportation engineers and managers, through demonstration, hands-on training and provision of instruments;

3) Cooperative design of ongoing programs to monitor and manage energy consumption through efficient operation and maintenance practices;

4) Development of recommendations for no-cost and low-cost improvements in energy efficiency;

5) Life-cycle cost analysis, including estimation of payback periods and potential energy savings, for major energy-using facilities, and including the transfer of analytical capability in this area to counterparts;

6) Implementation of comparative studies of selected energy-intensive industries, such as cement, paper, sugar, oil-refining or others that are widespread in developing countries, to help countries evaluate the energy intensity of their own facilities in comparison with similar facilities in other countries;

7) Publication of manuals, audio-visual materials, and other published literature to help managers and engineers improve the efficiency of systems and processes; and

8) Assistance, as requested, in the preparation of analyses to support funding or investment proposals for major retrofits or new facilities to improve energy efficiency.

4. Research Program

The project's other major category of global activity will be the establishment and management of a research program to investigate selected economic and other social science areas related to energy policy development. Studies will be implemented by using IQC contractors, responding to unsolicited proposals, or procuring specific tasks from other USG agencies, national laboratories or private-sector firms depending on the expertise required for each task. The research program will be managed directly by S&T/EY, in consultation with the Regional Bureaus and Missions, and kept reasonably flexible so that important topics can be addressed as they are identified and found appropriate for funding.

In FY 82, a study will be undertaken to analyze the potential applications of microcomputers for energy planning, policy development and conservation in developing countries. The study will be closely coordinated with a study already underway in the U.S. Bureau of the Census; that study looks at microcomputer applications in development activities generally, but does not focus specifically on energy. Funds from this project will be used to focus specifically on microcomputer applications in energy.

S&T/EY is also considering a study of LDC laws and regulations pertaining to energy policy development and conservation. Such a study would explore non-price mechanisms such as investment and building codes, tariffs on imported automobiles or on industrial

equipment, emergency allocation laws for fuel and electric power, enabling legislation for energy policy-making entities, and so forth. The study would include case studies of selected countries.

Another possible area of research is the interaction of traditional conventional fuels in the energy consumption patterns of countries at various stages of development with differing economic structures and development patterns. Past studies indicate that rising incomes, rapid urbanization and shifting employment patterns all interact in a complex web with changing prices and levels of availability for fuelwood, charcoal and kerosene to alter the patterns of energy consumption in households and small, informal commercial enterprises. The possible introduction of renewable energy sources to meet domestic needs further complicates analysts' efforts to estimate future needs and to set in motion new policies aimed at providing domestic energy at the least cost and lowest risk. Understanding these relationships better will aid policy-makers to forecast demand levels and capital requirements for meeting domestic energy demand in the future. The project's research program will include an early effort to review past work in this area and formulate useful new approaches to analysis of the complex questions involved.

C. Project Beneficiaries

Direct beneficiaries of project activities include the staffs of LDC energy planning and policy-making entities, para-statal corporations that produce and distribute energy supplies, and private energy users, such as industry, passenger or freight transporters, commercial property owners, etc., who will receive technical assistance. Indirect beneficiaries include all energy consumers and potential consumers who will realize the benefits of long-term energy policies designed to ensure adequate supplies and reasonable cost and to reduce risk of traumatic supply interruptions or price changes.

III. Implementation Plan

A number of implementation mechanisms will be employed in this project. At the country level, Project Grant Agreements will be employed to define scopes of work, to specify the financial contributions of S&T/EY, the host government and (where applicable) the Mission or Regional Bureau, and to obligate funds. Contracting will follow. In the cases of Morocco and the Sudan, the Project Agreements and AID/W contracts are already in place and will simply need amendment. The Pro Ag amendments will be signed not later than August 31, 1982, and contract amendments should be completed by October.

Future country-level activities will also be defined and funded through the Project Agreement mechanism. Contracting arrangements are, however, expected to vary according to the most appropriate vehicle for each activity; in appropriate instances, AID/W contracting will be used in order to ensure availability of adequate monitoring staff and

coordination of the various country activities in progress at any given time. In other instances, however, Mission or host-country contracting may better serve the project needs by providing for day-to-day management in the field. Mission contracting will be undertaken after the Mission Director and the Director of S&T/EY determine that the Mission has on hand adequate staff to manage this centrally-funded activity. Host country contracting is likely to be used primarily for selected second-phase activities when both Mission and host government staff capabilities are unusually strong.

It is appropriate to state here that regardless of the contracting mechanism chosen for each country activity, the basic managerial structure will always entail regular collaboration, communication and joint oversight by S&T/EY, the appropriate Regional Bureau, the Mission, and the host government.

At the global level, too, a number of different contracting mechanisms will be employed, beginning with a contractor to plan, manage and document the conference on LDC national energy planning. S&T/EY is convinced that it is important for this contractor not to have participated in any of the individual A.I.D.-funded country planning activities that will be discussed at the conference. Although there are relatively few private-sector firms with clear capability and experience in LDC national energy planning, there is a keen competitive climate among the qualified firms (Energy/Development International, Development Sciences, Inc., Meta-Systems, Resource Management Associates, Associates in Rural Development, etc.) and it will be important for all these firms to participate in the conference on an equal footing. Consequently, S&T/EY proposes to engage the services of the Institute for Energy Analysis, an organization with appropriate qualifications in energy policy analysis, LDC experience and conference management. The contract will be executed by September 30, 1982 and the conference will be held in January 1983. A statement of work for IEA is attached to this Project Paper as Annex B.

The project will also require a contractor to manage the technical aspects of energy conservation assistance on a worldwide basis. This contractor should be an engineering firm, university energy extension service or other entity with strong experience in conducting energy audits, analyzing the costs and benefits of investments in energy efficiency improvements, providing consultation on energy management in energy-intensive industries (including the energy-producing sector - power plants, oil refineries and mines), and in the transport and building sectors. The contractor's experience should include familiarity with industrial processes, electric power production, building technologies and transport systems in developing countries. It will be especially important for the conservation contractor to coordinate its country-specific activities with the energy planning contractors in countries where energy policy development is also being assisted under the project. The conservation contractor will be chosen by open competitive procurement early in FY 1983.

The research component of the project will, as discussed earlier, be kept flexible and managed directly by S&T/EY in consultation with the Agency Director for Energy and Natural Resources, the Regional Bureaus, Missions, PPC, and the Agency's Research Advisory Committee. The RAC, now being reorganized, is expected to include at least one member with special expertise in energy. S&T/EY proposes to establish a small (five-member) project research advisory committee (mini-RAC) to be chaired by the energy expert on the Agency-wide RAC. The committee would meet intermittently as needed, and would be available for informal consultation in determining with S&T/EY and other A.I.D. offices the appropriate topics for research, implementation approaches for specific studies, and the merits of any unsolicited proposals which may be received.

Contracting mechanisms to be employed for the project's research component include IQC contractors (for studies of not more than four-months' duration); non-competitive procurement based on unsolicited proposals; RSSAs and PASAs with other government agencies and their affiliated research institutions; and - in the case of major, long-term studies - open competitive procurement.

While in-house management and ad hoc contracting of the research program are recognized as potentially challenging in terms of S&T/EY staff work load, this approach was chosen because S&T/EY believes it will provide for maximum responsiveness to Agency needs, accountability for results, and cost-effectiveness. This conclusion is based in part on S&T/EY's experience with the ARDEN research program managed by Resources for the Future under the Energy Policy and Planning Project (936-5703). In that instance, RFF staff salaries and overhead consumed a significant portion of the project's resources and S&T/EY found it difficult to ensure the maximum quality and relevance of individual study topics and researchers, since S&T/EY's oversight of individual studies under the AID/RFF Cooperative Agreement was reactive (i.e., the right to approve topics and researchers already developed and negotiated by RFF) rather than initiative (as will be the case under the new project).

An implementation schedule for FY 82 and 83 follows. Obligations are indicated by capital letters.

Implementation Schedule (FY 82 & 83)

- | | | |
|----|---|-----------------|
| 1. | PP reviewed by Sector Council | June 1982 |
| 2. | Project authorized | June 30, 1982 |
| 3. | Proposals solicited from short list for conference contractor | July 1982 |
| 4. | Conference proposals submitted | August 1982 |
| 5. | MOROCCO AND SUDAN PROJECT AGREEMENTS AMENDED | August 30, 1982 |

Implementation Schedule (FY 82 & 83) con't

- | | | |
|-----|---|------------------|
| 6. | CONFERENCE CONTRACT SIGNED | September 1982 |
| 7. | RESEARCH CONTRACTS SIGNED (IQCs, RSSAs, etc.) | September 1982 |
| 8. | Morocco and Sudan contracts amended | September 1982 |
| 9. | EVALUATION TEAM CONTRACTED BY IQC TO EVALUATE COUNTRY ACTIVITIES UNDER 936-5703 | September 1982 |
| 10. | RFP in Commerce Business Daily for conservation services contractor | September 1982 |
| 11. | Conservation proposals submitted | October 15, 1982 |
| 12. | CONSERVATION CONTRACT SIGNED | December 1, 1982 |
| 13. | Energy planning conference held | January 1983 |
| 14. | Evaluation of 936-5703 country activities completed | January 1983 |
| 15. | Conservation services begin | January 1983 |
| 16. | DESIGN TEAMS CONTRACTED (IQCs) TO SCOPE FY 83 COUNTRY ACTIVITIES (SRI LANKA AND ONE OTHER IN AFRICA OR LATIN AMERICA) | February 1983 |
| 17. | Country design teams complete work | April 1983 |
| 18. | Project Agreements prepared and negotiated by S&T/EY staff | May 1983 |
| 19. | PROJECT AGREEMENTS SIGNED | June 1983 |
| 20. | RESEARCH CONTRACTS SIGNED (IQCs, RSSAs, PASAs, etc.) | June-Sept. 1983 |
| 21. | Final conference report due | July 1983 |
| 22. | CONFERENCE CONTRACT AMENDED (OR NEW CONTRACT SIGNED) TO PROVIDE COORDINATION AMONG COUNTRY CONTRACTORS | August 1983 |
| 23. | EVALUATION CONTRACT(S) SIGNED FOR MOROCCO AND SUDAN (IQCs) | September 1983 |

	<u>FY 82</u>	<u>FY 83</u>	<u>FY 84</u>	<u>FY 85</u>	<u>FY 86</u>	<u>TOTAL</u>
I. Country-Level Activities						
A. Morocco	250	250				500
B. Sudan	250					250
C. Other	150(1)*	200(1)*	700(2+)	700(2+)	700(2+)	2,450
D. Evaluations	50**	50	50	50	100	300
SUBTOTAL	<u>700</u>	<u>500</u>	<u>750</u>	<u>750</u>	<u>800</u>	<u>3,500</u>
II. Global Activities						
A. Coordination and Synthesis		175	225	275	175	850
B. Conferences	200		150		200	550
C. Conservation Services		200	475	550	425	1,650
D. Research Program	100	125	350	425	300	1,300
E. Evaluation			50		100	150
SUBTOTAL	<u>300</u>	<u>500</u>	<u>1,250</u>	<u>1,250</u>	<u>1,200</u>	<u>4,500</u>
TOTAL	1,000	1,000	2,000	2,000	2,000	8,000

Notes:

* # in parenthesis indicates new starts; + indicates additional funding for ongoing activity

** Evaluation in FY 82 will be of country activities undertaken in predecessor project (936-5703)

IV. Financial Plan

Eight million dollars will be expended by S&T/EY over the life of the project, which will run from FY 82 through FY 86. Annual expenditures are planned as follows: FY 82, \$1.0 million; FY 83, \$1.0 million, FY 84, \$2.0 million; FY 85, \$2.0 million; and FY 86, \$2.0 million. Wherever possible, these outlays will be augmented with funding from Missions or Regional Bureaus through co-funding arrangements. Co-funding with other bilateral or multilateral donors may also be possible in some cases. Host governments will normally add financial or in-kind contributions equal to 25% of the A.I.D. contribution.

Annual project budget estimates, broken down by level and category of activity, are shown in Table I.

A.I.D.-financed inputs to the project as a whole, organized by expenditure category, are shown in Table II.

TABLE II

	<u>(thousands)</u>
Salaries and fringe benefits	\$2,250
Overhead, G&A, fees	2,250
Travel and transportation	1,500
Other direct costs	
Commodities*	500
Documents & publications	100
Conference facilities & logistics	200
Overseas living expenses **	1,000
Consultants	<u>200</u>
	\$8,000

* Computers, energy audit instruments, etc.

** For resident personnel

V. Evaluation Plan

S&T/EY will evaluate project activities at multiple points in the project and on both country and global levels. Each country-level activity will be evaluated as it is completed, beginning in FY 82 with evaluations of country activities completed under the predecessor project, Energy Policy and Planning (936-5703). In FY 83, Morocco and Sudan efforts will be evaluated. Each country-level evaluation will be conducted by a team comprised of A.I.D. staff, consultants and IQC contractors. Each year over the life of the project will include country-level evaluations as appropriate, with the largest effort going into final evaluations scheduled for FY 86.

At the global level, major evaluations of the inter-country coordination activities, conferences, conservation technical services and the research program will take place in FY 84 and at the end of the

project (FY 86). Like the country-level evaluations, these will be carried out by teams consisting of A.I.D. staff, consultants and IQC contractors.

Each evaluation will include interviews with participants, counterparts, users of work products, and (if appropriate) other donors; detailed review of all work products; examination of financial and administrative records; and consultation with appropriate A.I.D. officials in Washington and in the field. Evaluation plans will be prepared in advance by S&T/EY staff. It is possible at the project's outset, however, to identify key questions that will need to be addressed within the evaluations; these are listed below, according to level of activity (country or global). While the questions as stated are quite general, evaluators will be given specific guidance on how to fill in detailed answers, including examples.

A. Country-Level Evaluation Questions

- 1) Has the country program achieved notable results in terms of:
 - a) Improving the national energy data base?
 - b) Strengthening national energy planning, policy-making and/or conservation-related institutions?
 - c) Increasing the skills of LDC energy professionals in the counterpart institutions (public, para-statal and private)?
 - d) Helping to bring about policy innovations that contribute to achievement of the projects overall goals and purposes?
 - e) Facilitating the analysis, planning and implementation of specific projects, programs and investments to increase energy supply and/or maximize efficiency of consumption?
 - f) Providing leverage for larger investments in the country's energy sector, especially investments by private enterprise?
 - g) Integrating national energy planning and policy development into the larger process of long-term economic development planning?
- 2) Does host government officials view the program and its results in a positive light? How do they plan to sustain the program's achievements?
- 3) Does the country's A.I.D. Mission have a current or firmly committed future follow-on project? How will it build on the S&T/EY-funded activities? How important is it in the Mission's overall program?

4) How is the contractor's performance rated in terms of cost-effectiveness, efficiency of management, responsiveness of A.I.D.'s and host country's needs, and overall quality of work?

5) Did the program raise important issues, provide important lessons or produce significant new information that can be applied in the other A.I.D.-assisted countries? If so, what are they? How can they best be transferred to other settings?

B. Global-Level Evaluation Questions

1) Did the conferences and other activities undertaken to ensure inter-country coordination, shared experiences and learning provide meaningful opportunities for ideas generated in one country to be tested and applied elsewhere? Was the effort successful, in the participants' view?

2) Was the conservation technical services component of the project successful in terms of:

- a) Stimulating changed operation/maintenance practices, retrofits, or ongoing energy audit/measurement/management programs in industry or other recipients of technical assistance?
- b) Publicizing the need and the opportunities for improved energy efficiency?
- c) Producing data on energy intensity of various processes, or conservation potential of various technologies, that can be used by energy consumers?
- d) Training LDC technicians and professionals in the techniques of energy management?
- e) Relating the technical services of the conservation contractor to the policy concerns (e.g. pricing as a stimulant to conservation) of the planning assistance teams and activities?

3) Were the activities undertaken within the project's research program useful in terms of:

- a) Guiding A.I.D.'s overall energy assistance program?
- b) Shedding light on key issues faced by energy policy-makers in A.I.D.-assisted countries?

4) Was the in-house management mechanism, combined with ad hoc study contracting and use of a "mini-RAC," found to be efficient, cost-effective and successful in ensuring useful study topics, high-quality researchers and significant research results?

VI. Project Analyses

A. Economic Analysis

1. Project Benefits

While it is not possible to quantify all the benefits of the Energy Policy Development and Conservation Project, it is possible to identify many of the expected benefits and to describe some of the policy changes that have occurred in response to work undertaken in previous country level energy planning projects. First, it is important to stress that the project has three objectives. It is intended to assist LDC governments in developing effective energy planning and policy-making institutions, to assist in the design of specific projects and policies to alleviate current energy problems, and to help LDCs achieve measurable improvements in the efficiency of energy use. A list of the benefits from the policy development component of the project would include: development of policies and projects which will assure that current and future energy needs are met at the least possible cost; conserving resources by eliminating unnecessary consumption; saving scarce foreign exchange now being used to import high-cost crude oil and petroleum products; helping to leverage funds from other donors and sources of financing to develop and expand domestic energy resources; rationalizing pricing and tax policies to discourage inefficient uses of energy; promoting investments in energy-efficient capital equipment; and encouraging the development of domestic energy resources.

In most developing countries, energy planning, policy-making and production are governmental functions. While in some countries the private sector also plays a major role, the central government still has an important role in setting prices and providing other incentives to individuals and private corporations. It is clear that inefficient government organizations exact heavy costs in terms not only of human resources but in terms of scarce financial resources as well. This project aims to develop institutions and to train individuals working in these institutions to develop a coherent set of national energy policies and mechanisms for analyzing alternative policy and project alternatives so as to enhance overall economic growth and social development.

It is also clear that government energy policies have a profound effect on the business climate. Assuring adequate energy supplies at reasonable cost, preventing disruptive interruptions of electric power, encouraging the use of efficient energy-using processes and conserving foreign exchange to permit new business investments (rather than using it for current oil consumption) -- all these policies can contribute significantly to the growth and development of the indigenous private sector.

Previous A.I.D. experience illustrates that even modest investments in energy planning can result in significant economic benefits. Planning in the Sudan has led to the elimination of subsidies

in petroleum, policy changes to improve access of foreign exchange earners such as agriculturalists and agro-industries to needed fuel, and initiating a short-term electric power reliability improvement program to reduce power outages (which in the past have severely curtailed industrial production) and to reduce the need for inefficient self-generation facilities in residences and commercial establishments.

Acting in part on recommendations from an A.I.D. financed planning and policy development team in the Dominican Republic, the government is embarking on a major program to switch from petroleum to coal as fuel for the generation of electric power and as a boiler fuel in many industries. Such a program will require investment for new facilities and transport equipment, and other capital equipment. However, given the current relative costs of coal and oil and assumptions as to the long range prospects for coal and oil prices, the government expects to realize significant foreign exchange savings by encouraging utilities and industries to switch from oil to coal.

Experience in Morocco has clearly demonstrated the need for a capability to carefully and systematically weigh the costs and benefits of alternative investment projects considering changing world market prices for energy products and the changing technologies available. When the planning project first began in Morocco, the government was relying almost exclusively on plans to develop its considerable oil shale resources to satisfy future needs. Now that world market petroleum prices have declined somewhat and the returns on such an investment are less clear, the government is reexamining its program and looking more closely at ways of diversifying its supply and demand management options, including developing newly discovered natural gas resources.

Experience with an energy conservation program in Tunisia showed that significant savings could be made from conservation. The study included plant audits of several of the major energy consuming industries and found that potential fuel savings of between 10 and 30 percent could be made, most without major capital investment. If such savings were realized across all Tunisian industry these savings are estimated to be worth more than \$40 million per year. While such savings can only be realized if industries are given the proper incentives through government pricing policies, access to needed investment capital and technical assistance, it is very clear that modest investment in energy audit programs can lead to substantial fuel savings with modest capital investments.

Estimates made by a recent World Bank mission to Sri Lanka also suggest that the potential savings from conservation are substantial. The Bank estimates that a short-term investment of approximately \$4.9 million could lead to annual fuel savings of \$3.2 million in five of the largest energy consuming industries -- cement, steel, tires, ceramics and paper.

2. Cost-Effectiveness

Previous A.I.D. experience with energy planning assistance indicates that such activities are most effective when they include the full-time assistance of a resident energy advisor, supplemented by short-term consultation from experts on particular aspects of a country's energy problems. Providing assistance along these lines requires payment of the living expenses of the resident advisor and (in most cases) his or her family. Depending on the resources made available by the host country, it may also entail expenditures for office space, local support staff, and some equipment. Hardware procurement needs are limited, being confined to office equipment such as micro-computers, typewriters, copiers, etc.

The provision of a resident advisor has been found highly cost-effective, especially when compared with the alternative of providing only short-term personnel who travel back and forth frequently and live overseas at per diem rates rather than resident rates. S&T/EY's experience in the Sudan indicates that a resident advisor costs approximately \$5,000 per month in direct costs and that contractors' overhead costs are lower for overseas personnel than for travelling US personnel. These costs are, of course, still substantial when compared with the cost of providing only a short-term team to analyze quickly the overall dimensions of a country's energy situation, as was done in Togo under the Energy Policy and Planning Project. But there is little doubt that, while useful, quick assessments have limited potential for effecting real policy changes in the country. Resident advisors, on the other hand, can provide continuity, respond quickly to special needs and requests for assistance with problems as they arise, and contribute to the day-to-day growth of analytical and policy-making capability of the government energy agency.

Like other centrally-funded projects, the Energy Policy Development and Conservation project could give rise to concern that it might overtax A.I.D. Mission's staff time and other resources. The resident energy advisor has been found to eliminate such concerns by taking on the logistical burden of arranging the schedule of work, setting times for the arrival and departure of short-term personnel, and carrying most of the burden of telecommunications between the in-country and home personnel as well as the day-to-day communications with the host government. At the same time, the resident advisor keeps the Mission fully informed and works with Mission personnel on preparation of follow-up projects and activities.

On the conservation side, S&T/EY believes that the procurement of a single contractor to provide services worldwide is the most cost-effective and efficient means of implementation. While that project component will begin with a very modest level of expenditure in FY 83, it will grow in FY 84 to a level at which a small full-time staff can be provided by the contractor. This staff (and additional consultants) can be available on call to respond to requests for

assistance at the country level and can also prepare practical information packages that will benefit all A.I.D.-assisted countries, not just those being assisted directly.

As indicated earlier in this paper, S&T/EY has concluded that the research component of the project will be most cost-effective if the studies are procured on an individual basis rather than through a single contract. This conclusion is admittedly contrary to that reached in connection with the conservation component; the reason for the difference is that it is not possible, at the outset, to identify all the research topics that will be undertaken or the specific expertise that the research will require. It would be inappropriate and unduly costly, therefore, to fund a full-time research staff in any single organization.

3. Conclusion

While not definitively quantified, the benefits of the project are seen to exceed costs to a considerable degree, and certainly sufficiently to justify the project. While alternative implementation mechanisms have been examined, the strategies chosen are believed to provide for a highly cost-effective undertaking.

B. Technical Feasibility Analysis

The question to be addressed in this section is whether the technologies and methodologies to be employed in the project will be effective in achieving the project purposes. Those purposes, reviewed in brief, are: 1) to strengthen LDC institutions and processes for energy policy development; 2) to encourage LDCs to institute policies and programs that will relieve their energy problems and prevent future crises; and 3) to improve the levels of energy, efficiency and self-sufficiency in the the countries assisted.

A variety of technical approaches will be used in this multi-faceted, multi-level project. While each project activity will include innovations, the project as a whole is not intended primarily to break new technical ground. Hardware needs will be minimal -- limited primarily to small computers and, for the conservation activities, instruments to measure energy flows, temperatures, etc. These are, of course, well established technologies.

Like most technical assistance projects, the Energy Policy Development and Conservation Project will function primarily as a transfer of know-how. The energy planning and policy development component of the project will use such techniques as supply/demand forecasting; analysis of energy demand elasticities with price and income variables; econometric modelling and other modelling approaches to examine the role of energy in overall economic development; energy project or investment evaluation according to risk, rate of return, and cost-benefit analysis; and primary data collection through survey methods. These are reasonably well-established techniques, but each has limitations and liabilities of which practitioners are acutely aware. It

is important for the project's contractors, managers and counterparts to bear in mind that these techniques are only as useful as the information and judgment that are supplied by those doing and using the work. Exaggerated claims of problem-solving capability must be avoided and attention must be paid to the rigor with which the methods are used. If exaggerated claims are avoided, the methodologies should make useful and effective contributions to problem solving.

On the conservation side, the project will employ energy audit techniques which will, in turn, lead to recommendations for technical changes to improve the energy efficiency of factories, buildings, transportation systems and agricultural enterprises. Primary emphasis will be given to industry and transportation, the major users of petroleum and electricity in developing countries.

Energy audits involve the measurement of energy consumption and related factors through the collection of documentary and physical data. In a factory, for example, records of fuel purchases and electricity consumption are examined and reconciled, where necessary, with the records of utilities and fuel suppliers. Actual physical measurements are taken at multiple points along the production path to determine the fuel and power requirements of each process and to determine where efficiency can be improved. The technologies employed for energy audits are relatively simple and straightforward; they include steam pressure gauges, thermometers, fuel flow meters, electric meters, and so forth. Energy audits have been carried out in hundreds of thousands of industrial establishments in the U.S. and elsewhere in recent years. In developing countries, however, they are relatively uncommon and the typical condition of records and equipment makes the auditing process far more difficult, as S&T/EY and its contractor learned through the Tunisian activity under the Energy Policy and Planning Project. There, non-existent or inadequate record-keeping, lack of consciousness of energy flows on the part of plant engineers, inoperative gauges and meters and other problems made the energy audits difficult and time-consuming to perform. On the other hand, the Tunisian experience dramatically illustrates the need for such audits and the potential savings that can be realized at little or no cost by improving data collection and maintaining all equipment (including energy measurement devices) in good working order.

Beyond the energy audit, the technologies employed in achieving energy savings in industry are also well-known and established. Cumulative experience in the U.S., other industrialized countries and (increasingly) in the developing countries shows that major savings -- between 10% and 50% -- can be achieved by implementing only a few changes. These include improving combustion control through improved boiler operation (including the replacement of inefficient burners); recovering and using waste heat in steam and hot water; increasing insulation in kilns and furnaces in the cement, steel and ceramics industries; recycling waste materials such as scrap metal; eliminating leaks in cooling systems; installing cogeneration systems; and switching to more efficient or abundant or less expensive fuels. While the project

will not involve the actual financing or installation of such energy-conserving improvements, it will provide the background analysis and economic feasibility determination that should lead to investments in these measures by both private and state-owned industries, either on the basis of a rapid return on investment as an adequate incentive by itself, or by leveraging favorable financing by other donors or lenders.

C. Administrative Analysis

As a centrally-funded umbrella project, with multiple activities, functional categories and levels, the Energy Policy Development and Conservation project will require a variety of administrative and contractual arrangements. These are described in detail in Section III, Implementation Plan. In summary, the project will employ:

- 1) The part-time project management services of two S&T/EY professional staff members;
- 2) Part-time assistance from an S&T/EY program operations assistant;
- 3) A contractor for each country level activity;
- 4) A conference/coordination contractor;
- 5) A conservation services contractor;
- 6) A variety of IQC contractors and/or RSSA/PASA personnel to carry out design activities, evaluations, and studies under the project's research component.

While this administrative arrangement may appear complex and may require more in-house management responsibility than many A.I.D. projects, S&T/EY has concluded that it offers the combination of flexibility and accountability that is clearly necessary for the success of this project.

The project aims to provide effective assistance within individual countries with widely varied energy problems, institutions, and approaches to energy policy development, not to mention fundamental cultural, linguistic, economic and political differences. S&T/EY's prior experience with country-level energy policy and planning demonstrates the importance of selecting contractors who are sensitive to these differences and whose corporate or personal history includes prior exposure to an environment similar to that involved in the present effort. The Office of Energy is unaware of any single potential contractor who could provide such experience and sensitivity on a worldwide basis, and so prefers to contract separately for each country-level activity. At the same time, S&T/EY recognizes the need for communication among the countries and their contractors; thus the conference/coordination contractor will be used to convene country-level participants and to document their shared experiences.

Technical services to promote energy efficiency can, on the other hand, be provided on a worldwide basis by a single qualified contractor (or at least a joint venture). Competitive procurement will provide the necessary stimulus for procurement of firms with capability in energy audits of industrial plants, buildings and transport systems; cost and payback analysis of energy-saving improvements; design of efficient new or replacement facilities; instruction in the techniques of energy management; preparation of written and audio-visual materials to be used to promote conservation; and experience with the special conditions of working in developing countries. It is expected that the successful bidder may well be a joint venture or a prime- and sub-contractor arrangement between a firm with the required technical and engineering expertise and a firm with a social science orientation and LDC experience.

The project will follow usual A.I.D. practices with respect to short-term assignments under the project, such as the design of country activities, the evaluation of completed work, and the implementation of special studies. These will be procured through IQCs, inter-agency agreements, or perhaps -- in the case of certain research topics -- non-competitive contracting on the basis of unsolicited proposals, predominant capability or minority/disadvantaged small businesses under the Small Business Administration's Section 8(A) program.

The reasons for managing the project's research program in-house using ad hoc contracting and a research advisory committee, are spelled out in Section III of this paper, Implementation Plan. To reiterate briefly, S&T/EY has concluded that this approach offers the least cost, maximum responsiveness to A.I.D.'s and cooperating countries' needs, greatest accountability for work quality, and best advice from technical experts (through the advisory committee).

D. Environmental Analysis

The Energy Policy Development and Conservation Project is exempt, by the nature of its purposes, activities and impacts, from the requirements for an Initial Environmental Examination, an Environmental Assessment, and an Environmental Impact Statement. In seeking to develop institutional energy planning capabilities, and helping developing countries to maximize the efficiency of energy use, the project will not constitute a federal activity significantly affecting the quality of the human environment and is, therefore, not subject to the requirements of Section 102(2)(C) of the National Environmental Policy Act.

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7/7/82 EXT. 235-8918

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ENERGY POLICY DEVELOPMENT AND CONSERVATION

PROJECT {936-5728}

REF: 1981 STATE 179548

1. ST/EY ANNOUNCES THE APPROVAL OF A NEW WORLDWIDE PROJECT IN ENERGY POLICY DEVELOPMENT AND CONSERVATION {936-5728}. THE PROJECT IS A SUCCESSOR TO THE ENERGY POLICY AND PLANNING PROJECT {936-5703} OF FY 1979 THROUGH 1981, AND ALSO INCORPORATES THE PURPOSES AND ACTIVITIES OF A SEPARATE ENERGY CONSERVATION PROJECT THAT WAS PROPOSED AT THE PID STAGE LAST YEAR {REFTEL} BUT HAS SINCE BEEN CANCELLED. THE NEW PROJECT IN ENERGY POLICY DEVELOPMENT AND CONSERVATION {EPDAC} WILL HAVE A LIFE-OF-PROJECT COST OF \$8 MILLION, STARTING WITH \$1 MILLION IN FY 82 AND CONTINUING WITH OBLIGATION LEVELS OF \$1 MILLION IN FY 83, AND \$2 MILLION IN EACH OF THE NEXT THREE FISCAL YEARS {FY 84 THROUGH 86}.

2. THE PURPOSE OF THE EPDAC PROJECT IS TO PROVIDE TECHNICAL ASSISTANCE TO DEVELOPING COUNTRIES SO THAT THEY MAY EFFECTIVELY ADDRESS THEIR NATIONAL ENERGY PROBLEMS THROUGH ANALYSIS, INSTITUTION BUILDING AND POLICY DEVELOPMENT. THE PROJECT WILL EMPLOY A COMPREHENSIVE,

INTEGRATED APPROACH THAT ENCOMPASSES ALL ENERGY SOURCES {TRADITIONAL, CONVENTIONAL AND RENEWABLE} AS WELL AS ALL ENERGY-USING ECONOMIC SECTORS, BOTH TRADITIONAL AND MODERN. IT WILL LOOK AT ENERGY DEMAND WITH AS MUCH THOROUGHNESS AS ENERGY SUPPLY, AND AT POLICIES AIMED AT BRINGING THE TWO INTO BALANCE OVER THE LONG TERM. IT WILL SEEK TO INTEGRATE ENERGY PLANNING AND POLICY DEVELOPMENT INTO THE LARGER FIELD OF ECONOMIC DEVELOPMENT PLANNING. SPECIFICALLY, THE PROJECT SEEKS TO:

A. ASSIST LDC GOVERNMENTS TO DEVELOP INSTITUTIONS, PERSONNEL AND PROCESSES CAPABLE OF EFFECTIVE ENERGY POLICY-MAKING;

B. PROVIDE TECHNICAL ASSISTANCE AIMED AT THE DESIGN OF POLICIES, ACTION PROGRAMS, PROJECTS AND INVESTMENTS NEEDED TO RELIEVE CRITICAL CURRENT ENERGY PROBLEMS AND MINIMIZE EXPOSURE TO FUTURE CRISES BROUGHT ABOUT BY UNFORESEEN CHANGES IN ENERGY PRICES AND AVAILABILITY;

C. HELP LDCS ACHIEVE MEASURABLE IMPROVEMENTS IN THE EFFICIENCY OF ENERGY USE AND THE LEVEL OF NATIONAL ENERGY SELF-SUFFICIENCY.

3. THE LARGER GOAL TO WHICH THE PROJECT WILL CONTRIBUTE

IS TO PROMOTE THE SUSTAINABLE ECONOMIC GROWTH AND SOCIAL PROGRESS OF DEVELOPING COUNTRIES BY ENSURING THE AVAILABILITY OF ENERGY AT THE LOWEST POSSIBLE TOTAL ECONOMIC, FINANCIAL AND SOCIAL COST CONSISTENT WITH NATIONAL DEVELOPMENT GOALS.

4. THE TWO MAJOR CATEGORIES OF TECHNICAL ASSISTANCE TO BE PROVIDED UNDER THE PROJECT ARE, AS THE TITLE SUGGESTS, ASSISTANCE IN ENERGY PLANNING AND POLICY DEVELOPMENT AND IN THE DEVELOPMENT OF PROGRAMS TO PROMOTE EFFICIENT ENERGY CONSUMPTION AND CONSERVATION. ACTIVITIES WILL BE TARGETED AT THE COUNTRY AND WORLDWIDE LEVELS.

5. COUNTRY-LEVEL ACTIVITIES IN ENERGY PLANNING AND POLICY DEVELOPMENT: FOR MOST COUNTRY-LEVEL ACTIVITIES UNDER THIS PROJECT, AS UNDER THE PREDECESSOR PROJECT, A LONG-TERM ENERGY ADVISOR SUPPLEMENTED WITH SHORT-TERM EXPERT CONSULTATION SERVICES WILL BE THE PRINCIPAL VEHICLE FOR ASSISTANCE WITH ENERGY PLANNING AND POLICY DEVELOPMENT AT THE COUNTRY LEVEL. IN SOME CASES, HOWEVER, THE PROJECT MAY BE ABLE TO PROVIDE MISSIONS AND COOPERATING GOVERNMENTS WITH RELATIVELY QUICK STUDIES OF THE OVERALL NATIONAL ENERGY SITUATION OR WITH SHORT-TERM SERVICES INTENDED TO AID IN THE DEVELOPMENT AND INITIAL IMPLEMENTATION OF BILATERAL ENERGY PROJECTS. ST/EY WILL

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NOT SEEK TO CARRY THE FUNDING BURDENS THAT ARE MORE PROPERLY BE BORNE BY THE BILATERAL FUNDS OF MISSIONS; RATHER, THE CENTRAL PROJECT WILL PROVIDE THE CORNERSTONES FOR MISSIONS' RELATED OR FOLLOW-UP PROJECTS. AT THE SAME TIME, ST/EY RECOGNIZES THAT THE PROCESS OF BUILDING SOUND NATIONAL ENERGY POLICIES AND INSTITUTIONS IS A LONG ONE, AND THAT EVEN THE BASIC TASK OF STARTING THAT PROCESS MAY REQUIRE AN INVOLVEMENT OF TWO OR EVEN THREE YEARS. HENCE THE JUDGMENTS OF HOW MUCH TO DO, HOW LONG TO STAY, AND HOW MUCH MONEY TO COMMIT UNDER THE EPDAC PROJECT IN ANY GIVEN COUNTRY WILL ALWAYS NEED TO BE CAREFULLY TAKEN IN A COLLABORATIVE DECISION-MAKING PROCESS INVOLVING ST/EY, THE REGIONAL BUREAUS AND MISSIONS.

6. THE PROJECT IS BASED ON THE VIEW THAT THE PROCESSES INVOLVED IN ENERGY PLANNING AND POLICY DEVELOPMENT ARE AS IMPORTANT AS THE PRODUCTS AND THAT INSTITUTIONAL DEVELOPMENT THROUGH CLOSE COLLABORATION BETWEEN U.S. ENERGY ADVISORS AND COUNTERPART OFFICIALS AND STAFF ARE PREFERABLE TO THE PREPARATION OF STATIC REPORTS AND STUDIES THAT TEND TO BE QUICKLY OUTDATED. THUS THE MAJOR EMPHASIS WILL BE ON A DYNAMIC, FLEXIBLE APPROACH THAT PERMITS QUICK RESPONSE TO CHANGING CIRCUMSTANCES IN THE COUNTRIES ASSISTED UNDER THE PROJECT. THE USE OF NEW PLANNING TOOLS SUCH AS MICROCOMPUTERS WILL BE INCLUDED.

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TECHNICAL ASSISTANCE AT THE COUNTRY LEVEL WILL INCLUDE THE FOLLOWING ACTIVITY CATEGORIES:

A. ORGANIZATIONAL AND MANPOWER DEVELOPMENT (INCLUDING IN-COUNTRY ON-THE-JOB TRAINING) IN ENERGY POLICY-MAKING AND PLANNING ENTITIES;

B. ESTABLISHMENT AND MAINTENANCE OF PROGRAMS FOR ENERGY DATA COLLECTION AND ANALYSIS;

C. ANALYSIS OF ENERGY RESOURCES;

D. ECONOMIC EVALUATION OF ENERGY SUPPLY PROJECTS, GOVERNMENT POLICIES, DEMAND MANAGEMENT NEEDS AND PRIVATE-SECTOR OPPORTUNITIES IN THE ENERGY SECTOR;

E. PREPARATION OF ENERGY PLANS THAT REFLECT THE COOPERATING COUNTRIES' NEEDS, CONSTRAINTS AND PRIORITIES;

F. ASSISTANCE WITH DRAFTING OF INVESTMENT CODES, LAWS, REGULATIONS, PRICING SCHEDULES AND OTHER IMPLEMENTS OF ENERGY POLICY;

G. DEVELOPMENT OF FUNDING PROPOSALS, REQUESTS FOR PROPOSALS AND OTHER FINANCING AND PROJECT VEHICLES TO

PERMIT ENERGY DEVELOPMENT AND LEVERAGE ACTIVITIES FAR BEYOND THE PROJECT; AND

H. CREATION AND IMPLEMENTATION OF ENERGY DEMAND MANAGEMENT AND CONSERVATION PROGRAMS.

7. SELECTION CRITERIA FOR COUNTRY-LEVEL ACTIVITIES: ST/EY HAS DEVELOPED CRITERIA FOR USE IN SELECTING COUNTRIES FOR PROJECT ACTIVITY. THE CRITERIA ARE NOT INTENDED TO BE RIGID OR TO BE SCORED ON A STRICT QUANTITATIVE BASIS, SINCE SOME COUNTRIES MAY OFFER STRONG REASONS FOR INVOLVEMENT BASED ONLY ON ONE OR TWO ESPECIALLY IMPORTANT CRITERIA. THE SELECTION PROCESS WILL BE A COLLABORATIVE ONE, WITH ST/EY, MISSIONS, REGIONAL BUREAUS AND OTHER ENTITIES WITHIN AID PARTICIPATING AS APPROPRIATE. THE CRITERIA ARE:

A. DEMONSTRATION OF INTEREST ON THE PART OF THE MISSION AND HOST GOVERNMENT, INCLUDING AN INDICATION THAT THE MISSION PROGRAM WILL INCLUDE RELATED AND/OR FOLLOW-UP ACTIVITIES;

B. CRITICAL NATURE OF THE NATIONAL ENERGY PROBLEM AS RELATED TO ECONOMIC PERFORMANCE, DEVELOPMENT PROSPECTS, NATIONAL SECURITY AND POLITICAL STABILITY;

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C. EXISTENCE OF OR PLANS FOR A GOVERNMENT ENTITY RESPONSIBLE FOR ENERGY PLANNING, POLICY DEVELOPMENT AND CONSERVATION;

D. POTENTIALLY PRODUCTIVE, NON-DUPLICATIVE RELATIONSHIP BETWEEN PROPOSED ACTIVITY AND OTHER AID PROJECTS, AS WELL AS PROJECTS OF OTHER DONORS;

E. IDENTIFICATION OF CANDIDATE ACTIVITIES UNDER THE PROJECT THAT COULD PROMOTE COUNTRY POLICIES TO AID IN RESOLUTION OF NATIONAL ENERGY PROBLEMS;

F. POTENTIAL REPLICABILITY OR APPLICABILITY OF PROJECT ACTIVITIES AND RESULTS IN OTHER COUNTRIES;

G. POTENTIAL FOR LEVERAGE FOR LARGER ENERGY-SECTOR INVESTMENTS, ESPECIALLY IN THE INDIGENOUS PRIVATE SECTOR AND FROM U.S. PRIVATE SOURCES, BUT ALSO FROM DEVELOPMENT BANKS;

H. OVERALL IMPORTANCE OF THE COUNTRY TO U.S. FOREIGN POLICY, AND STRENGTH OF FRIENDSHIP BETWEEN U.S. AND THE COUNTRY.

B. IT IS EXPECTED THAT FY 82 COUNTRY-LEVEL ACTIVITIES

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WILL INCLUDE SECOND-PHASE FUNDING FOR ENERGY PLANNING/POLICY DEVELOPMENT ACTIVITIES IN MOROCCO AND SUDAN. SECOND-PHASE ACTIVITY IN TOGO IS UNDER CONSIDERATION FOR FY 82 OR FY 83. NEW COUNTRY-LEVEL ACTIVITIES WILL BEGIN IN FY 83. MISSIONS ARE INVITED TO EVALUATE THEIR NATIONAL SITUATIONS WITH REFERENCE TO THE CRITERIA LISTED IN PARA. 6 ABOVE AND INFORM ST/EY OF THEIR INTEREST IN PROJECT ACTIVITIES AS APPROPRIATE. ST/EY IS ANXIOUS TO INITIATE ACTIVITIES IN ALL FOUR GEOGRAPHIC REGIONS.

9. INTER-COUNTRY COORDINATION: ST/EY IS ANXIOUS TO PROMOTE CROSS-FERTILIZATION OF EXPERIENCES WITH AND KNOWLEDGE ABOUT LDC ENERGY PLANNING AND POLICY DEVELOPMENT. CONSEQUENTLY AN EARLY PROJECT ACTIVITY WITH BE A CONFERENCE TO BRING TOGETHER PRINCIPAL ACTORS (INCLUDING COUNTERPARTS) IN ALL THE NATIONAL ENERGY PLANNING PROJECTS SUPPORTED BY AID TO DATE (BOTH MISSION PROJECTS AND THOSE UNDER 936-5703). CONFERENCE IS TENTATIVELY SCHEDULED FOR JANUARY 1983 AND WILL RESULT IN A PUBLICATION. FOLLOWING THE CONFERENCE, A CONTRACTOR (WHO MAY BE THE SAME ENTITY AS THE CONFERENCE MANAGEMENT AND PLANNING CONTRACTOR) WILL BE CHARGED WITH ONGOING ACTIVITIES TO ENSURE A DISTILLATION, SHARING AND SYNTHESIS OF EXPERIENCES AND METHODOLOGIES EMPLOYED IN

ENERGY POLICY DEVELOPMENT AND CONSERVATION ACTIVITIES IN COUNTRIES THROUGHOUT THE WORLD. SUCH ACTIVITIES ARE EXPECTED TO INCLUDE PERIODIC WORKSHOPS, OUTREACH THROUGH NEWSLETTERS AND DISCUSSION PAPERS, A CLEARINGHOUSE FUNCTION TO KEEP ENERGY PLANNERS AWARE OF EACH OTHER'S WORK, AND EVALUATION OF COUNTRY-LEVEL ACTIVITIES. THE CHOSEN ORGANIZATION WILL, IN SHORT, BE A REPOSITORY OF STATE-OF-THE-ART INFORMATION AND A VALUABLE RESOURCE TO BE TAPPED BY PRACTITIONERS.

10. CONSERVATION SERVICES: THE PROJECT WILL HAVE A CONTRACTOR FOR CONSERVATION SERVICES WHO WILL WORK AT NATIONAL, REGIONAL AND GLOBAL LEVELS TO PROMOTE ENERGY EFFICIENCY IN INDUSTRY (INCLUDING ENERGY-PRODUCING INDUSTRIES), TRANSPORTATION AND BUILDINGS WITH THE AIM OF REDUCING WASTEFUL USE OF OIL AND ELECTRICITY. THE CONTRACTOR WILL CARRY OUT RESEARCH AND PROVIDE TECHNICAL ASSISTANCE WITH DATA COLLECTION AND ANALYSIS, ENERGY AUDITS, DESIGN OF CONSERVATION PROGRAMS, AND ECONOMIC ANALYSIS OF RETROFIT PROJECTS. CONTRACTOR IS EXPECTED TO BE EXPERIENCED ENERGY AUDITING/MANAGEMENT/ENGINEERING FIRM WITH LDC EXPERIENCE. CONTRACT WILL BE AWARDED COMPETITIVELY EARLY IN FY 83.

11. ST/EY HAS ON FILE CABLES RECEIVED FROM MISSIONS IN

1981 IN RESPONSE TO REFTEL, MANY OF WHICH EXPRESSED INTEREST IN PROVIDING ENERGY CONSERVATION SERVICES IN RESPONSE TO HOST GOVERNMENT REQUESTS. ST/EY WOULD APPRECIATE UPDATES OF THESE EXPRESSIONS OF INTEREST WHERE APPROPRIATE.

12. RESEARCH PROGRAM: FINAL ELEMENT OF PROJECT IS A MODEST FUND TO SUPPORT RESEARCH ON TOPICS RELATED TO LDC ENERGY POLICY DEVELOPMENT, PLANNING AND CONSERVATION. STUDIES WILL BE IMPLEMENTED BY USING VARIED CONTRACTING MECHANISMS INCLUDING IQCS, RSSA/PASAS WITH OTHER USG AGENCIES AND NATIONAL LABORATORIES, AND CONVENTIONAL CONTRACTS (COMPETITIVE, B-A, NON-COMPETITIVE BASED ON UNSOLICITED PROPOSALS, ETC.) WITH PRIVATE-SECTOR ENTITIES. A SMALL RESEARCH ADVISORY COMMITTEE WILL BE FORMED TO ADVISE ST/EY ON THE MERITS OF VARIOUS RESEARCH TOPICS AND PROPOSALS. IN FY 82, DOLLARS 100 THOUSAND ARE AVAILABLE FOR THE RESEARCH COMPONENT OF THE PROJECT, AND TOPICS BEING CONSIDERED FOR SUPPORT ARE THE POTENTIAL USES OF MICROCOMPUTERS IN ENERGY PLANNING AND AN ANALYSIS OF THE LAWS AND REGULATIONS OF SEVERAL LDCS PERTAINING TO ENERGY POLICY DEVELOPMENT AND CONSERVATION. IT IS EXPECTED THAT PRICING ISSUES WILL ALSO BE A MAJOR TOPIC OF RESEARCH. MISSION'S SUGGESTIONS ON RESEARCH TOPICS ARE WELCOME.

13. ST/EY LOOKS FORWARD TO MISSION REACTIONS AND
EXPRESSIONS OF INTEREST IN THE OVERALL PROJECT. COPIES
OF THE PP WILL BE POUCHED TO MISSIONS REQUESTING IT. YY

STATEMENT OF WORK
ENERGY POLICY AND PLANNING CONFERENCE

Summary:

The Agency for International Development requests that the Institute for Energy Analysis organize a conference on energy policy and planning in developing countries to be held in early 1983. It is expected that this conference will provide an opportunity for A.I.D. staff and contractors, as well as other donors, officials from LDC energy policy institutions, and experts from U.S. academic, research and policy institutions, to exchange information and ideas about their experiences in assisting or setting up energy planning organizations and developing national energy policies. The conference will emphasize experiences resulting from A.I.D.-funded projects in this area. The contractor's major responsibilities will be to organize, administer and host the conference and to prepare a detailed substantive report on LDC energy policy planning based on the papers and discussions offered at the conference.

Conference Objectives:

The energy policy and planning conference is expected to provide a forum for AID staff, other donors, technical assistance contractors, officials of LDC energy institutions to share project experiences. The major focus of the agenda will be a series of generic issues faced by energy planners, while drawing on individual country experiences. Some possible topics for conference panels and/or papers are:

- organizational arrangements for LDCs for energy planning and policy development;
- training and manpower needs of energy policy agencies;
- methods of energy supply and demand forecasting;
- problems of data collection on village and household energy consumption, especially of traditional fuels;
- approaches to feasibility analysis for energy supply projects;
- experience with management of effective energy conservation programs;
- the use and potential of microcomputers for energy policy analysis;
- the relationship between energy planning and overall economic development planning

- R&D needs
- competing policy issues and priorities affecting the energy sector (especially pricing)
- role of government planning organizations vis a vis the private sector
- data needs for energy planning
- role of international donor community in encouraging the development of domestic energy supplies

The final conference agenda will be developed jointly by the contractor and the S&T/EY staff.

The conference will last five days and will be held in the Washington area or in another easily accessible location. It will include approximately 75 participants. The contractor will fund travel and per diem for all non-AID and non-other-donor participants, and honoraria for selected consultants.

Specific Tasks:

1. With advice from S&T/EY, the contractor will be responsible for developing the conference agenda. He will assign papers to be prepared prior to the conference and organize their presentation in a series of panels, workshops and discussion groups.
2. The contractor will make all logistic arrangements for the conference -- select an appropriate conference facility, make all travel, lodging and meal reservations, arrange payment for non-AID participants, and provide secretarial, translation and recording services to the extent required.
3. Prepare invitations for all participants, including those nominated by S&T/EY and other experts as needed.
4. Coordinate all activities at the actual conference, and generally ensuring that the conference provides an effective forum for exchanging information.
5. Prepare and publish a final conference report for distribution to AID staff, host country governments and others interested in energy planning and policy analysis. 250 copies should be provided. The report should not be a verbatim report of the conference proceedings or a compilation of papers, but rather a synthesis of the conference discussions and papers organized around key issues and presented in a format that will facilitate its use as a guide for energy planners and policy analysts. The conference report outline will be subject to review by S&T/EY and the draft report must be approved by AID before formal publication. Publication should take place within six months of the conference.

Qualifications of the Institute for Energy Analysis:

The Institute for Energy Analysis has experience in developing countries, familiarity with energy data collection problems, access to experts familiar with energy planning methodologies skills in economic and financial analyses, knowledge of energy conversion processes, energy resource assessments, knowledge of the costs and sources of financing for energy activities, and a reputation for objective policy research on LDC energy issues. In addition, IEA has an established track record in conference planning and management, access to suitable conference facilities, and experience in preparing publications. IEA's location in Washington, D.C. will also facilitate conference planning.

Background Useful to IEA in Responding to AID Request:

In 1979, the Office of Energy initiated an Energy Policy and Planning project designed to provide technical support to country-level energy planning institutions and to develop methodologies for conducting energy assessments and formulating comprehensive national energy policies. Most of A.I.D.'s country-level planning assistance activities under this project were started in early 1981. To date there has been little opportunity for the people involved in the country level activities to meet one another and to discuss common problems and experiences. This conference is designed to provide such an opportunity, and is expected to provide a valuable exchange of ideas for managers and participants in similar activities under A.I.D.'s second-generation centrally-funded project in Energy Policy Development and Conservation, as well as various Mission and Regional Bureau projects in this field.

Under the Energy Policy and Planning Project three major multi-year country activities were funded in Sudan, Morocco, and Tunisia. In addition, smaller-scale activities were funded in Guyana, Malawi, Togo and Liberia. A.I.D. Missions and Regional Bureaus funded other major planning efforts in Indonesia, the Dominican Republic, Jamaica and Bangladesh. In these projects, technical assistance was provided in one or (more typically) several areas.

- (1) Organizational and manpower development in energy policy-making and planning entities;
- (2) Establishment and maintenance of programs for energy data collection and analysis;
- (3) Analysis of energy resources;
- (4) Economic evaluation of energy supply projects, government policies, demand management needs, and private-sector opportunities in the energy sector;
- (5) Preparation of energy plans that reflect the cooperating countries' needs, constraints and priorities;

- (6) Assistance with drafting of investment codes, laws, regulations, pricing schedules and other implements of energy policy;
- (7) Development of funding proposals, requests for proposals and other financing and project vehicles to permit energy development and leverage activities far beyond the project; and
- (8) Creation of energy demand management and conservation programs.

Examples of some of the specific country-level activities undertaken under the Policy Planning Project follow:

Sudan: AID's energy sector assistance program in the Sudan was developed in response to a 1980 request from the Minister of Energy, Sharif El Tuhami. A long-term resident project coordinator arrived in Khartoum in early 1981 to begin work with the newly formed National Energy Administration (NEA). The NEA staff at the time consisted of about 30 very recent university graduates and five or six mid-level staff seconded from the General Petroleum Corporation and the Forestry Department.

From the outset the project has been viewed as largely a training and institution-building project. The training aspects have been among the most significant because most of the NEA staff had no previous energy-related training. Training has occurred in formal sessions and on the job.

The AID-funded contract has also assisted the NEA in developing an energy library and information system. No central data files had been kept on energy information and in fact there were few efforts to collect any information on energy on a routine basis. Technical assistance has been provided to improve energy data collection efforts, and to process this information.

The NEA staff, the resident energy advisor and the short-term contract consultants have devoted considerable effort to preparing reports and policy recommendations for the Ministry of Energy on issues of immediate economic and political concern. For example, the project staff prepared reports outlining petroleum product supply and distribution problems. A project consultant is now working with senior officials to improve the petroleum allocation system and to expand the role of the private sector in the supply and distribution of petroleum products.

Morocco: AID's involvement in the energy sector in Morocco began in late 1980 with a project agreement for assistance under S&T/EY's Energy Policy and Planning Project (936-5703). Early discussions with officials of Morocco's Ministry of Energy and Mines revealed that the Moroccan energy officials were seeking a new approach to their task of developing comprehensive investment budgets for the energy sector in an environment of great uncertainty about future oil shale technologies, oil import costs and prospects for indigenous oil and gas. They were convinced, as were AID's staff and contractors working with them, that a traditional "energy assessment" -- a one-time look at future energy needs and possible strategies for meeting those needs -- would be of marginal utility.

Moroccan energy analysts and their AID-funded technical assistance contractors began their approach to developing an energy strategy with the assumption that such a strategy should be oriented to groups of projects or investments that make up overall investment budgets - as opposed to analysis of individual projects in isolation.

The pioneering approach chosen in this case was therefore the development of a dynamic analytical framework programmed on a microcomputer -- that is, a simple model that could help Moroccan planners evaluate various packages (portfolios) of energy projects in terms of their risks, their ability to meet alternative demand projections, their internal rates of return, their impacts on employment and other social goals, their special requirements for skilled manpower, and their requirements and impacts in terms of foreign exchange. As groups of projects are evaluated with the aid of the model using criteria established by the Moroccan to reflect national development priorities, they can be rejected or adopted by policy-makers for inclusion in the national energy strategy depending on the aggregated results of the various economic, social and engineering judgements and analyses.

Events since the Moroccan project began have demonstrated the value of a dynamic approach. In December 1981, the Office National d'Activites et Recherches Pétrolières (ONAREP), which is Morocco's recently-created national oil corporation, struck what appears to be a significant find of natural gas in two exploratory wells. At this writing it remains too early to determine the precise extent of the gas field, but it is the belief and certainly the hope of Moroccan planners that a whole new energy supply picture may now be evolving as a result of the find. With a dynamic, computerized planning tool, the Moroccans will be able to build in new exploration data as it is produced, and add new gas-based projects to the investment portfolio.

The bulk of the A.I.D. - funded work done to date in Morocco has been in the development of the computerized analytical framework, the training of Moroccan personnel in its use, and the collection and programming of extensive data on Moroccan energy consumption and production, both actual and projected. Twenty-four proposed energy projects have undergone preliminary analysis within the model, and several supply scenarios, based on alternative project portfolios, are being developed.

Togo: In 1981, A.I.D. funded a short-term study of the Togo energy situation at the request of the Togolese government. Under S&T/EY's Energy Policy and Planning Project (936-5703), a team of analysts from Associates for Rural Development, Louis Berger, Inc. and Energy/Development International carried out a one-month in-country effort in collaboration with Togolese officials from the Ministry of Public Works, Energy and Hydrological Resources. The resulting report, "Overview of the Togo Energy Situation", offered concrete recommendations for a number of activities the Togolese government could undertake to alleviate the country's energy problems on both a short-term and a long-term basis. The Togolese have since requested the services of a long-term resident energy advisor to help them implement the report's recommendations.

In addition to the country-level activities funded under the project, A.I.D. asked the National Academy of Sciences to organize a workshop on energy survey methodologies drawing on the experiences of a large number of experts from the U.S. and abroad. The workshop was held in Jekyll Island, Georgia in January 1980. A copy of the workshop proceedings is attached to this Work Statement.

INFORMATION FOR BUDGET PREPARATION

Estimated Level of Effort

Conference Coordinator/Report Writer - 120 days
IEA senior management - 20 days
Support staff - 120 days
Editor - 20 days

Other Direct Costs

Conference facilities
Report preparation
Communication, reproduction, translation
Consultants (Honoraria) - estimated \$10,000

Travel and Per Diem

Host Country Officials

Africa - 8
3 Sudan, 2 Liberia, 1 Togo, 1 Somalia, 1 Malawi

Asia - 7
3 Indonesia, 2 Bangladesh, 2 Pakistan

Latin America - 6
2 Dominican Republic, 2 Jamaica, 2 Guyana

Near East - 7
3 Morocco, 3 Tunisia, 1 Egypt

Airfare for U.S. contractors
20 @ \$500

Per Diem - 48 participants

ADB 1000-10 12-79
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 82 to FY 86
Total U.S. Funding \$1 million
Date Prepared 12/2/85

INSTRUCTIONS: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN ADD-ON OR EXCLUDED FROM THE PROJECT REPORT. IT NEED NOT BE RETURNED OR REPRODUCED.

Project Title & Number: Energy Policy Development and Conservation (936-5720)

PAGE 1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To promote the economic growth and social progress of developing countries by ensuring the availability of energy at the lowest possible total economic, financial and social cost consistent with national development goals.</p>	<p>Measure of Goal Achievement:</p> <p>Standard economic and social indicators such as GNP growth rates, per capita GNP, structure of GNP, balance of payments, external debt ratio, oil imports as percentage of export earnings, PQEI index, energy supply/demand balances, sectoral performance and energy consumption/intensity statistics.</p>	<p>Reports and statistics of the World Bank, OECD, UN, IIA, Overseas Development Council, and other international organizations, as well as information and statistics generated within the project itself.</p>	<p>Assumptions for achieving goal targets:</p> <p>That more efficient energy use and expanded availability of indigenous supply can make a measurable contribution to economic development.</p>

ANNEX E - LOGICAL FRAMEWORK

Best Available Decisions

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AND 1000-00 (7-77)
SUPPLEMENT 1

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: _____
From FY 82 to FY 86
Total U.S. Funding \$8 million
Date Prepared: 5/20/81

Project Title & Number: Energy Policy Development and Conservation (936-5728)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS PAGE 2
<p>Project Purpose:</p> <p>To provide technical assistance to developing countries so that they may effectively address their national energy problems through analysis, institution building and policy development; to assist LDCs to develop institutions, personnel and processes capable of effective energy policy-making; to provide assistance in the design of policies, action programs and investments needed to relieve critical current energy problems and minimize exposure to future energy crises; and to help LDCs achieve measurable improvements in the efficiency of energy use and the level of national energy self-sufficiency.</p>	<p>Conditions that will indicate purpose has been achieved:</p> <p>End of project status:</p> <p>Existence of effective, well-staffed country energy policy-making entities; country policies, laws, incentives, fundable proposals, etc. aimed at achievement of project goals; commitments from private and public capital sources to fund appropriate projects to increase energy efficiency and indigenous supplies; existence of a body of literature, plans, analyses and methodological works that will advance the state of the art in energy policy development, planning and conservation.</p>	<p>Evaluations at end of FY 84 and FY 86. LDC National energy and economic development plans; government organization charts, budgets and program documents; published World Bank loan information; financial commitments from other international lenders and private capital sources.</p>	<p>Assumptions for achieving purpose:</p> <p>That governments have been motivated by increased oil prices, firewood depletion and other energy problems to give appropriate attention to energy issues in development planning, government organization and budgets, and efforts to attract external financing.</p>

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AND 1020-10 (2-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 82 to FY 86
Total U.S. Funding \$8 million
Date Prepared: 5/28/82

Project Title & Number: Energy Policy Development and Conservation (936-5728)

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Output:</p> <ol style="list-style-type: none"> Country-level energy programs, plans, and studies; Consulting services, manuals, information materials and instruction on energy conservation, especially for industry, transportation and buildings; Studies and research reports on major energy policy issues affecting LDCs; Conferences for country energy policy-makers and technical assistance experts. 	<p>Magnitude of Outputs:</p> <p>An estimated 10 country programs, 12 major studies, 15 conservation assistance packages, and 5 workshop/conferences for energy policy-makers.</p>	<p>Project implementation documents, including PID/Ts, contractor reports, project manager's annual reports, etc.</p>	<p>Assumptions for achieving outputs:</p> <p>That sufficient host government personnel and funds will be made available to work with U.S. teams toward accomplishment of project purposes.</p>

Best Available Document

AND 1020-02 (7-73)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: _____
From FY 82 to FY 86
Total U.S. Funding \$8 million
Date Prepared: 5/19/82

Project Title & Number: Energy Policy Development and Conservation (936-5728)

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <ol style="list-style-type: none"> 1. Data on energy resources, uses, needs and prices, to be gathered from both primary and secondary sources; 2. Analytical tools and methods, such as forecasting techniques, cost/benefit and life-cycle cost analyses, risk assessments, and analyses of social and environmental impacts; 3. Technical expertise and training, provided by U.S. specialists in fields such as economics, planning, policy analysis, physical sciences, engineering, social sciences, and in sectoral operations in industry, transportation, agriculture and housing. 	<p>Implementation Target (Type and Quantity)</p> <p>FY 82: Two country programs continued from predecessor project; conference prepared for energy planners; evaluations of prior country programs; two policy studies undertaken.</p> <p>FY 83: Conservation services begun, two new country programs begun; conference held; additional evaluations and research projects.</p> <p>FY 84-86: Additional country programs, conservation services, research projects, conservation services, evaluations, and conferences.</p>	<p>Contractor reports; monitoring by A.I.D. project office; evaluation.</p>	<p>Assumptions for providing inputs:</p> <p>That project budgets will be sufficient in each year of funding to procure the necessary expert services; that direct-hire staff will be sufficient to provide effective management; that a sufficient supply of the required expertise can be found and procured from private-sector, university, non-profit or national laboratory sources.</p>

Books Available Description