

AGENCY FOR INTERNATIONAL DEVELOPMENT  
PROJECT DATA SHEET

1. TRANSACTION CODE  
A = Add  
C = Change  
D = Delete  
Amendment Number 1

DOCUMENT CODE 3

2. COUNTRY/ENTITY  
Worldwide

3. PROJECT NUMBER  
936-5728

4. BUREAU/OFFICE  
S&T/Office of Energy

5. PROJECT TITLE (maximum 40 characters)  
Energy Policy Development and Conservation

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)  
MM DD YY  
09 30 92

7. ESTIMATED DATE OF OBLIGATION  
(Under "B" below, enter 1, 2, 3, or 4)  
A. Initial FY 82 B. Quarter 3 C. Final FY 91

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

A. FUNDING SOURCE	FIRST FY 87			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	( 1,800 )	( )	( )	( )	( 18,000 )	( 18,000 )
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S.						
1. Mission Buy-ins					11,938	11,938
Host Country						
Other Donor(s)						
<b>TOTALS</b>					29,938	29,938

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)SDA	740			7,934		6,000		14,000	
(2)ARDN	740					4,000		4,000	
(3)									
(4)									
<b>TOTALS</b>				7,934		10,000		18,000	

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

11. SECONDARY PURPOSE CODE

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

A. Code B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

The purpose of this project is to provide technical assistance to developing countries so that they may effectively address their energy problems through analysis, institution building and policy development.

14. SCHEDULED EVALUATIONS  
Interim MM YY 06 87 MM YY 06 89 Final MM YY 06 92

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 PP Amendment.)

Extend the EPDAC period of obligation by five years and increase the S&T/ funding by \$10 million. Of the total \$11,938 million for Mission buy-ins shown in block 8 above, \$10 million represent those associated with this amendment.

17. APPROVED BY  
Signature: James B. Sullivan  
Title: Acting Director, Office of Energy  
Date Signed: MM DD YY 10 31 97

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

## Project Authorization

Entity: Worldwide

Project Number: 936-5728

Project Title: Energy Policy Development and Conservation  
(EPDAC) Project.

1. On July 1982, the Energy Policy Development and Conservation (EPDAC) Project was authorized to provide \$8.0 million for project operation until July 1987. Pursuant to Sections 103 and 106 of the Foreign Assistance Act of 1981, I hereby authorize the amendment of the "Energy Policy Development and Conservation" project, involving centrally funded planned obligations of not to exceed \$10.0 million over a five year period, subject to availability of funds, in accordance with the A.I.D. OYB allotment process, to help in financing foreign assistance costs for the project. Available funding for the project may also include \$10.0 million from Mission buy-ins and OYB transfers from the Regional Bureaus.

2. The project amendment will provide technical assistance to institutions engaged in energy planning, analysis and policy development, and to both public and private sector entities aimed at improving the efficiency with which scarce energy resources are utilized. This will be accomplished through: 1) assisting lesser developed country (LDC) governments develop institutions, personnel and processes capable of effective energy policy-making; 2) implementing policies, programs and investments needed to relieve chronic and severe energy and power problems, while minimizing vulnerability to future uncertainties in energy prices and availability; and 3) helping LDCs achieve measurable improvements in energy efficiency, reliability and national energy self-sufficiency. The EPDAC project will promote the economic growth and increased productivity of LDCs through policy, institutional and technological approaches to providing energy and power at the lowest possible economic, financial and social cost.

### 3. Source and Origin of Commodities, Nationality of Services

a. Commodities financed by A.I.D. under the project shall have their source and origin in the cooperating country\* or the United States except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the cooperating country or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing.

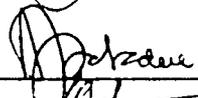
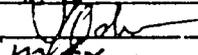
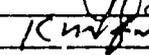
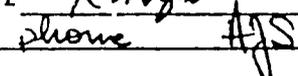
b. The aggregate cost of all goods and services procured under each agreement in a cooperating country may not exceed \$750,000.

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.

\* Each country where research, training, technical, or other assistance takes place under the project shall be deemed to be a cooperating country for the purpose of permitting local costs financing of goods or services for the activity being conducted in such country.

  
Jack Vanderryn  
Agency Director for Energy and  
Natural Resources

Clearances:

S&T/EY:JBSullivan		Date	3/11/87
S&T/EN:JOsborne		Date	3/23/87
S&T/PO:GFGower		Date	3/20/87
GC/CP:SRTisa		Date	3/12/87

Drafter: AID/S&T/EY:ASabadell:02/24/87:1933P:235-8918



ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR ENERGY AND NATURAL  
RESOURCES, BUREAU OF SCIENCE AND TECHNOLOGY

FROM: S&T/EY, James Sullivan  3/13/87

SUBJECT: Energy Policy Development and Conservation (EPDAC)  
Project Approval.

Problem: Your approval is needed for funding of the Energy Policy Development and Conservation Project, 936-5728.

Discussion: On October 31, 1986, Dr. Brady approved the concept for extending the Energy Policy Development and Conservation (EPDAC) project, and authorized the Office of Energy to proceed with the design of an amendment to the EPDAC project. The budget in the project paper amendment is identical to that contained in the concept paper. S&T/EY obligations are assumed to be \$10 million (SDA \$6 million, ARDN \$4 million), over the five year period from FY 87 to FY 92, with an additional \$10 million mission buy-ins and OYB transfers from the regional bureaus.

The increase in funding will help ensure that increased energy efficiency and economically beneficial supply options are pursued in AID-assisted countries. The project will provide assistance to less developed countries (LDCs) so that they may: 1) develop institutions and personnel capable of effective energy policy making; 2) design and implement policies, programs, projects and investments to relieve current energy and power problems while minimizing vulnerability to future energy crises; 3) improve the efficiency and performance of energy systems and institutions.

The Energy Policy Development and Conservation (EPDAC) project was authorized in 1982. Over the four year period ending July 31, 1987, a total of \$9.872 million has been obligated for this project, consisting of \$7.934 million from S&T/EY and \$1.938 million from Mission buy-ins and OYB transfers.

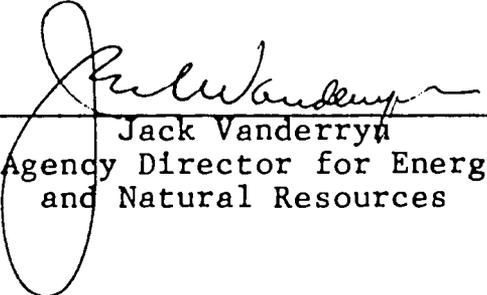
Mission interest in the EPDAC project has grown rapidly. In the energy policy portion of the project, Mission buy-ins soared from \$80,000 in FY 85 to over \$900,000 in FY 86, including funding commitments from Pakistan, India, Bangladesh, Sudan and Ecuador. Further major commitments are under discussion with India, Egypt, Morocco and the Africa Bureau. S&T/EY has also collaborated successfully with the World Bank in Madagascar and Zaire. The Energy Conservation Services Program (ECSP) has also been enthusiastically received by host country governments and U.S. A.I.D. missions. ECSP has initiated 37 major projects to provide

direct assistance to 16 countries: Costa Rica, Djibouti, Dominican Republic, Ecuador, Egypt, Haiti, India, Indonesia, Guatemala, Morocco, Pakistan, Peru, Philippines, Singapore, Sri Lanka and Thailand. Buy-ins totalled over \$1 million just three years into the contract, far exceeding early projections.

Because of these successes with the Missions and host country governments, the results of the FY 1987 project evaluation are not expected to interfere with the forward momentum of the EPDAC project and the new initiatives under discussion with several key Missions and multilateral development banks.

The findings of Section 621(a) have confirmed the decision to use Oak Ridge National Laboratory (ORNL) as the contractor for the Energy Planning and Policy Development (EPPD) portion of the project. ORNL was selected on the basis of the unique and particular expertise of its key staff members in the area of energy planning and policy development in developing countries. No other institution offers the same combination of diverse energy expertise, multidisciplinary talent, developing country field experience, and demonstrated effectiveness in assembling multi-institutional teams to meet EPDAC project needs.

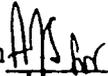
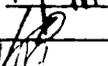
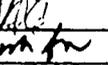
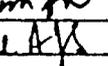
Recommendation: That you approve a five year extension and an increase of \$10 million for funding the Energy Policy Development and Conservation Project by signing the attached Project Authorization, and the use of Oak Ridge National Laboratory by signing below.

  
\_\_\_\_\_  
Jack Vanderryn  
Agency Director for Energy  
and Natural Resources

Attachments:

1. Approved Concept Paper
2. Project Paper
3. Project Authorization Form

Clearances:

S&T/EY, JBSullivan		Date	3/13/87
S&T/EN, JOsborne		Date	3/23/87
S&T/PO, CColeman		Date	3/16/87
S&T/PO, GFGower		Date	3/26/87
GC/CP, SRTisa		Date	3/12/87

PROJECT AMENDMENT  
ENERGY POLICY DEVELOPMENT  
AND  
CONSERVATION PROJECT  
(EPDAC)

Project Number 936-5728

Prepared by  
Office of Energy  
Bureau for Science and Technology  
USAID

February, 1987

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## I. PURPOSE OF PROJECT AMENDMENT

The purpose of this proposed amendment is to extend the Energy Policy Development and Conservation (EPDAC) project, 936-5728, from July 31, 1987 to July 31, 1992, and to increase the life-of-project cost by \$20 million. The S&T funded portion of the project will be \$10 million, and OYB transfers and Mission buy-ins will constitute the remaining \$10 million.

## II. PROJECT BACKGROUND

The Office of Energy (S&T/EY) is financing the EPDAC project which has been operating since 1983 and will end on July 31, 1987. The goal of this project is to promote the economic growth and increased productivity of developing countries by providing energy and power at the lowest possible economic, financial and social cost. The purpose of this project is to provide technical assistance in energy policy development and conservation to developing countries so that they may effectively address energy problems. This will be accomplished through analysis, institution building and policy development. Specifically, the project seeks to: 1) assist lesser developed country (LDC) governments to develop institutions, personnel and processes capable of effective energy policy-making; 2) provide assistance in designing and implementing policies, programs, projects and investments needed to relieve chronic and severe energy and power problems, and minimize vulnerability to future uncertainties in energy prices and availability; and 3) help LDCs achieve measurable improvements in energy efficiency, reliability and national energy self-sufficiency.

Over the past several years, the EPDAC project has defined and implemented new energy strategies relevant to Agency roles and developing country realities of the 1980s. This project has provided technical assistance to target LDCs in such priority areas as power sector efficiency improvement; allocation of research and technology development investments; energy pricing strategies; energy systems for productive enterprises in rural areas and expanded private sector roles.

The EPDAC project was initiated in FY 1982. Annex B summarizes the major accomplishments of the project. Over the four year implementation period, energy priorities in developing countries, and expressions of interest from Missions have changed, but conventional energy and power infrastructure continue to absorb the lion's share of annual domestic investment. The World Bank, for example, estimates that developing countries will need to invest \$60 billion in electric power each year in order to keep up with expected demand growth. About half of this total will be a direct

foreign exchange cost. Failing to meet the demand of electricity will jeopardize the development process, because availability of electric power is indispensable to Third World economic growth. In an era of scarce capital availability, sound energy planning, efficient energy utilization, and innovative technical and managerial approaches will lower the investment cost of basic needs and infrastructure.

Most of the recent wide variations in world oil prices have been caused by short-term political actions and economic conditions rather than long term economic forces. Whether this decline is sustained, energy problems in developing countries will not disappear. Power system expansion to meet development needs and energy price reform are urgent requirements. Efficient private sector solutions are needed for institutional problems that are beyond the capabilities of indigenous public sector institutions. Abundant, affordable, and available energy is needed for economic development in rural areas.

AID has come to play the leading role among development assistance agencies in encouraging the emergence of a strong private sector and in providing technical assistance for wise investment choices and pricing policies in the energy and power sector. These roles are indispensable and need to be continued. We propose, therefore, to extend the EPDAC project by five years, and broaden its scope to incorporate the strategic approaches that have evolved through the project. The \$20 million budget level assumes \$10 million from S&T/EY funds, and \$10 million from OYB transfers and the Missions. An in-kind contribution of approximately \$2 million from host countries is also assumed.

### III. PROJECT DESCRIPTION

The goal of this project is to promote the economic growth and increased productivity of developing countries by providing energy and power at the lowest possible economic, financial and social cost. The purpose of this project is to provide technical assistance in energy policy development and conservation to developing countries so that they may effectively address energy problems.

The EPDAC program seeks less expensive means to provide needed energy and to increase energy productivity. Its focus is on removing energy constraints to agricultural and rural development, which are of special interest to AID. Special concerns include energy pricing issues and policies to encourage private sector investment, both from the U.S. and from local investors. Proper

pricing and a receptive environment for mobilizing private investment will significantly reduce the energy capital shortfall and make possible the attainment of AID's income growth goal. The two major components of technical assistance to be provided under the project are assistance in:

(1) Energy Policy and Planning Development (EPPD)

This component is directed at analyzing the overall policy environment for energy investments and providing recommendations for improved decision making and policy reform.

(2) Energy Conservation Services Program (ECSP)

This component is designed to provide assistance in conservation, particularly through engineering analysis, energy audits, pre-investment feasibility studies, and investment promotion. This section will address only those policy issues relevant to energy efficiency improvements.

The linkage of these two assistance categories is based on the fact that policy development for energy conservation is an integral part of overall national energy planning and policy-making, and is generally the responsibility of the same government agency.

A. Country Selection Criteria

The target countries will be those where the benefits of AID-financed energy projects may be expanded and augmented. Other countries will be included as needs change. This project supports S&T, Mission and regional bureau plans and activities, as well as the policy reform, private sector, institution building and technology transfer pillars of AID's development strategy.

Country activities will be tailored to individual country needs while bearing in mind the larger mandate to focus on energy solutions that can be widely adapted or replicated. Therefore, central project country activities will complement the bilateral activities of A.I.D. Missions.

In view of limited project resources, careful country selection will be necessary. 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 the selection process:

1. A demonstration of interest in technical assistance for energy policy development and conservation on the part of the host government and/or the country A.I.D. Mission,

including an indication that the country and/or 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, and development prospects.
3. The existence of, or active plans to create, an entity responsible for energy planning, policy development and conservation;
4. The potential replicability or applicability of project activities and results in other A.I.D.-assisted countries;
5. The potential to provide leverage for 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;

#### B. Energy Policy and Planning Development (EPPD)

The priority activities, designed to reflect AID's objectives, include the following:

- (1) Policy and institutional reform, with special attention to energy pricing;
- (2) Strong private sector involvement in capital mobilization, resource development and management, technology innovation and commercialization;
- (3) Improved energy investment decision-making, with special attention to least-cost power investment planning.

The EPPD will emphasize the policy and institutional environment, as well as the investment climate, affecting energy supply and demand options. The EPPD will explore and examine options for energy resource development, energy conversion technology and efficient energy utilization to the extent that they are relevant to improved investment decision-making, strategies for commercializing the results of research and development, and pricing reform.

#### 1. Pricing Policy and Institutional Reform

Energy is directly affected by macroeconomic fiscal and monetary policies, including policies to influence exchange rates, inflation and employment. Energy comprises a major share of government

expenditure, particularly where large parastatal power companies and state trading organizations for oil operate inefficiently under subsidies. Other policies, such as investment and tax codes, seriously impede the substitution of more efficient private and market-based alternatives.

In many AID-assisted countries, prices for electricity, and petroleum products, are well below the actual cost of supply. Reducing this economic burden is a high priority, which calls for realistic but effective price reform programs. The challenge is to implement approaches which reduce subsidies without advancing negative economic impact for the society at large. This will require innovative combinations of gradual price increases, efficiency improvements in supply institutions (which reduce the actual cost of supply), and efficiency improvements in energy use (which reduce the impacts of price increases).

AID Missions have been encouraged to initiate policy dialogues with host countries on energy pricing because many AID-assisted countries keep energy prices artificially low. AID's belief that such policies are generally economically detrimental is echoed by the World Bank and other donors. The purpose of this activity is to develop and provide information for target countries in support of energy pricing reform. Such information includes basic principles, facts and figures, and possible strategies for reducing price distortions without undesirable political instability. A general guide to host countries will be issued in FY 87 and updated periodically.

## 2. Private Sector Role

Countries that effectively mobilize private savings and provide the private sector with access to credit are significantly better in stimulating economic growth and efficient allocation of scarce resources than countries in which the government restricts or monopolizes access to available credit. However, many developing countries continue to follow policies that restrain the private sector.

A major goal for AID is, therefore, the promotion of policies to encourage the formation of energy-related private enterprises, as one effective means of mobilizing capital and allocating resources efficiently. Pre-investment and marketing activities will be supported to improve the functioning of energy markets, develop managerial skills in the private energy sector, and stimulate a flow of financial resources and technology both within the country and from external sources. In particular, the EPPD will continue activities already initiated to promote U.S. and LDC private sector

capital investment and technology transfer in small power systems, and the production and marketing of fuelwood substitutes. The EPPD will support policy options and incentives leading to private power generation for industrial, rural and utility markets.

The EPPD will pay special attention to the potential of smaller, decentralized power systems (both on-and off-grid) that are economically attractive, and that can be put on-stream to meet specific power needs for rural development, irrigation, and agricultural processing. Indigenous resources such as low-head hydropower, biomass from agricultural residues, wind, photovoltaics, and fossil fuels, can, under certain circumstances, offer cost-effective ways to bring power to remote areas, particularly if integrated with agricultural water projects and rural enterprise development. Biomass is economically attractive as part of a system that manages natural resources and gets maximum income from multiple sources. The relatively small size of individual investments makes this area particularly suitable for local private investors.

Examples of private-sector activities carried out by EPDAC include:

- \* Examining opportunities and policy incentives for private power generation in Thailand, Pakistan and India.
- \* Studies in Pakistan and Haiti to examine the potential of coal briquettes as a household substitute for fuelwood and charcoal, with private-sector production and marketing.
- \* Collaboration with the World Bank in Madagascar, Zaire and Somalia to design an investment strategy for household energy, stressing the role of private entrepreneurs in production, marketing and distribution.

### 3. Energy Investment Decision - Making

The EPPD, in collaboration with multilateral lending institutions, will help selected countries prepare sound investment plans. Recent activities have been focused on assistance to USAID/Islamabad in investment planning for the proposed Lakhra power plant project, and assistance to AID/Madagascar in designing projects in household fuels and hydropower to be financed by a World Bank energy loan; (Annex C).

The most promising approaches to solving the capital supply crisis for electric power expansion involve least-cost planning with optimum utilization of capital investment. Least-cost planning identifies technical investment options which provide cheaper electricity delivered to the consumer. Activities will include workshops and conferences in the U.S. and in the field on R&D needs, and on implementing innovative management and technical approaches to power delivery. The activities will serve as vehicles to involve U.S. private utilities, R&D organizations and the power industry in

the program. A book, "Electricity for Development, Implementing New Approaches," is planned.

Many developing countries, especially those in Sub-Saharan Africa, depend on fuelwood and wood-derived charcoal for up to 95 percent of their domestic energy. In most developing countries, institutional constraints hamper the rapid development of a rural forestry program to augment woodfuels supplies. The effects of urbanization and increased population growth have raised the demand and prices for woodfuels, especially charcoal.

Among the most attractive options for increasing supplies is to increase traditional charcoaling efficiency through improved kilns, and substituting traditional charcoals by coal or biomass (agricultural residues) briquettes.

Below is an illustrative list of major activities:

- \* Provide technical assistance for the production of smokeless coal briquettes to be used in field market testing of consumer acceptance.
- \* Perform assessments of the potential impacts of commercial cooking fuel pricing policy reforms on traditional fuel supplies and demand.
- \* . Contribute to joint AID-World Bank assessments in fuelwood/charcoal economics, marketing and substitution to support improved fuelwood management and options for fuelwood substitution. Potential countries include: Niger, Senegal, The Sudan, Somalia, Mali, Mauritania, Zimbabwe.
- \* Explore the market, manufacturing, and business viability of briquettes made from biomass residues and hybrid (coal/biomass) briquettes. Potential country: Dominican Republic.
- \* Implement an Asian regional workshop on household fuel substitution. Potential host country: India.

#### C. Energy Conservation Services Program (ECSP)

The encouragement of energy efficiency in both the physical and economic senses of the word is the focus of the ECSP component of this project. The ECSP 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.

The ECSP activities will include training, data collection and analysis, information dissemination and technical and managerial consulting services to promote efficient fuel consumption. S&T/EY will contract with a private-sector entity with experience in energy conservation in developing countries. The selected organization will manage the conservation component of the project and will serve as a resource to which LDC governments 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 on energy efficiency improvements. 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 purchase and facility output. This will also include studies on transportation systems such as busses and taxi fleets.
2. Energy efficiency studies of household fuels for urban and rural demands;
3. Transfer of energy auditing capability to LDC plant, building and transportation engineers and managers, through demonstration, hands-on training and provision of instruments;
4. Cooperative design of ongoing programs to monitor and manage energy consumption through efficient operation and maintenance practices;
5. Development of recommendations for no-cost and low-cost improvements in energy efficiency;
6. Pre-investment analysis, including estimation of payback periods and potential energy savings, for target energy-using facilities, and including the transfer of analytical capability in this area to counterparts;

7. Manuals, audio-visual materials, and other literature to help managers and engineers improve the efficiency of systems and processes; and

8. Assistance to support proposals for major retrofits or new facilities to improve energy efficiency.

Because LDCs emphasize electric power load and demand management as well as rural needs, project activities will supplement energy audits and feasibility studies in large industrial plants with efficiency improvements in power systems and end-use devices (such as irrigation pumps and electric motors), household fuels, and transportation systems.

#### 1. Industrial Sector

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. There are also 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.

There is also 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.

The ECSP will carry out activities to improve the energy management capabilities of industrial facilities and promote private sector energy conservation activities.

This component will be user oriented and will include the following activities:

- \* Technical/financial feasibility studies (including co-generation of electricity and process heat) which can later be used as the basis for securing financing (i.e. "bankable"). These bankable proposals will serve as prototypes for applications elsewhere in the country and in other LDCs. An example is described in Annex C. The contractor will be responsible for assisting AID in identifying potential sources of financing for conservation investments. Activities are being considered in Dominican Republic, India and Morocco.
- \* In-country training courses on industrial energy demand management, energy auditing, energy conservation project evaluation and implementation. Among the possible country applications are: India, Dominican Republic, Costa Rica and Indonesia.
- \* Development of a database on energy use standards for typical industrial processes and products.

## 2. Power Sector

Co-Generation: To encourage private sector investment in the power sector, this initiative will assess the potential for co-generation, and will develop strategies to capture this potential. Although co-generation alone cannot solve power shortage problems in LDCs, it can quickly increase electricity generation in many countries by more than 10 percent, while at the same time conserving fuel and reducing electricity peak demand. The objective of this initiative is to identify specific opportunities for co-generation in order to promote private sector activities and investments.

The ECSP will design country-specific strategies to implement co-generation. In FY 86, three such studies were initiated with the Asia/Near East Bureau in Pakistan, Thailand and India. The results of these studies will be disseminated in FY 87, and future country applications include, among others, India (ongoing effort), the Dominican Republic and Morocco.

This program of activities will also include the following accomplishments:

- \* Design and development of a co-generation project which can be owned, financed and operated by the private sector. Possible country applications include Pakistan, Thailand, India, and the Dominican Republic.

- \* Organization of energy conservation and co-generation workshops.
- \* Publication of articles on co-generation together with the results of the country assessments.

Power Systems Performance Improvement: LDCs must squeeze as many watts out of their existing power systems as possible, while at the same time ensuring that electricity is used efficiently. This will require substantial improvements in electricity demand management and in power supply availability and reliability. This initiative is aimed at:

1. Increasing the efficiency of power generation, transmission and distribution
2. Better managing the power load.

In FY 87, the ECSP will complete the preparation of a methodology for power system performance improvements. This plan will address options to: increase the availability of existing generation units; extend the life of existing power plants; develop effective load management techniques to optimize the use of electricity and decrease demand, particularly peak demand. The applications for this plan will be worldwide.

The ECSP will also initiate prototype load management projects with developing country utilities. The purpose of these projects will be, for example, to develop procedures to stagger the hours of consumption between various users in order to minimize the costs of load shedding and to identify major technical load management schemes for industries with highest peak load demand. Possible country applications include Costa Rica and Thailand.

The ECSP will assess the impact of efficiency improvements in electric appliances on electricity load characteristics in a given country. Possible country applications are India, Morocco, and Costa Rica.

### 3. Rural Enterprises

Rural enterprises, particularly those related to agricultural production and processing, are key to development. It is estimated that 1 percent increase in agricultural production will require an additional 2 percent increase in "modern" energy supply. The objective of this initiative is to improve energy efficiency in agriculture, particularly in post-harvest processes and irrigation pumping, and in those rural enterprises that usually consume the bulk of the commercial energy in rural areas (e.g., bricks, tiles, textile finishing, metalworking).

In FY 87, ECSP will develop a specific country setting for achieving this objective and which can serve as a model for other LDCs to follow. Particular attention will be given to developing a better understanding of energy use in agriculture; assessing the impact on electric load and diesel fuel of pumped irrigation; and designing simple and low-cost measures to retrofit and/or modernize small-scale rural industrial operations to improve energy and overall productivity. This activity will follow on up the results of FY 86 ECSP technical assistance teams to Haiti and Sri Lanka.

#### D. Project Beneficiaries

Direct beneficiaries of project activities include the staff of LDC energy planning and policy-making entities, corporations that produce and distribute energy supplies, and private energy users, such as industry, and commercial property owners, who will receive technical assistance. Indirect beneficiaries include all energy consumers and potential consumers who will realize the benefits of adequate energy supplies at reasonable cost and the reduced risk of traumatic supply interruptions or price changes.

#### IV. IMPLEMENTATION PLAN

At the country level, host country and Mission agreement will be sought to define scopes of work, and to specify the financial contributions of S&T/EY, the host government and (where applicable) the Mission or Regional Bureau.

For the EPPD component of EPDAC, S&T/EY proposes to continue to utilize the services of Oak Ridge National Laboratory (ORNL) under a PASA arrangement. In July 1984, S&T/EY determined that it needed a unique kind of contractor support for the planning and policy development portion of the EPDAC project. Because of the wide range of energy issues, the contractor needed to possess both unusual breadth of experience and multidisciplinary skills. It had to be prepared to serve as a vehicle for engaging the best available talent for the job to be done, even if that talent resided within other institutions.

After a careful review of the capabilities of various institutions, labs, and agencies, S&T/EY selected the Oak Ridge National Laboratory (ORNL) for this responsibility. ORNL is unique among the multiprogram laboratories of the Department of Energy in its disciplinary breadth in fields of interest to S&T/EY (including the economic and social sciences) and its expertise in program management. It has more than 20 staff members with field experience in developing countries and has drawn upon a resource pool of hundreds of laboratory staff people and other experts to support

S&T/EY programs. For example, through the PASA arrangement with ORNL, 78 consulting firms, universities, national laboratories and private consultants in addition to ORNL staff members have participated in AID energy projects since 1984. ORNL has provided valuable assistance to ST/EY in its program planning, and has played an important role in ST/EY's collaboration with the World Bank in Madagascar and Zaire. No other institution offers this same combination of diverse energy expertise, multidisciplinary talent, developing country expertise, and demonstrated effectiveness in assembling multi-institutional teams to meet EPDAC project needs.

Since 1984, mission buy-ins have increased dramatically, up to a total of over one million dollars annually. ORNL has produced more than 40 publications, reports and working papers, and the quality of analytical and technical assistance work has been high. ORNL has been commended in writing by the Agency Director of Energy and Natural Resources for its performance, and ST/EY and ORNL have received high praise from the World Bank for pre-investment work in Madagascar and Zaire. ORNL is now leading multi-institutional initiatives in power systems planning, energy price reform, small private power systems for rural development, and renewable energy applications. Because of the recency of program redirection, many of these activities are still formative, but continuity is important, particularly in ST/EY's collaboration with multilateral financial institutions.

For the ECSP component of EPDAC, S&T/FY will choose a contractor by open competitive procurement. The Request for Proposal (RFP) will make clear the responsibilities of the contractor, which include energy conservation assessment, pre-feasibility and pre-investment studies, on-site technical assistance, and information development and dissemination.

As part of being responsive to the RFP, all proposing companies will be required to submit subcontracting plans which address how they will have Gray amendment firms involved in implementation. Offerors should make every effort to seek qualified small disadvantaged sources, and identify such sources by name in their technical and cost proposals. It is AID's belief that an acceptable subcontracting plan will reflect maximum participation of minority and women-oriented organizations.

To ensure effective coordination, accountability and planning, ST/EY will chair regular project review meetings every six months involving the two major contractors, appropriate subcontractors, the geographic bureaus, PPC and others. Contractors will also be responsible for regular and frequent communication and coordination under ST/EY guidance.

An implementation schedule follows.

Implementation Schedule

1. PP Amendment reviewed by Sector Council	02-02-87
2. Congressional Notification Draft	02-02-87
3. RFP Draft	02-02-87
4. Final Draft to Contracts	03-02-87
5. Small and Disadvantaged Business Office	03-10-87
6. Prepare CBD Notice	03-02-87
7. CBD Announcement of RFP	03-16-87
8. Establish Technical Review Panel	03-02-87
9. Close of Proposal Submission	04-17-87
10. Review/Evaluation of Proposals	04-20-87
11. Contract Price Analysis	05-11-87
12. Contract Negotiation	05-26-87
13. Contract Signed	06-05-87

W. FINANCIAL PLAN

Twenty million dollars will be expended over the extended life of the project, which will run from July 31, 1987 to July 31, 1992. Annual ST/EY obligations are planned as follows:

FY 87-	\$1.8 million
FY 88-	\$2.0 million
FY 89-	\$2.2 million
FY 90-	\$2.0 million
FY 91-	\$2.0 million

It is estimated that these outlays will be augmented by \$10 million more with funding from Missions or Regional Bureaus through buy-ins, OYB transfers or co-funding arrangements. Co-funding of activities with other bilateral or multilateral donors will also be encouraged. Host governments are expected to provide in-kind support which will equal approximately \$2 million.

Annual project budget estimates, broken down by level and category of activity are shown in Table 1.

ST/EY financed inputs to the extension of the project as a whole, organized by expenditure category, are shown below.

Illustrative Budget for \$10m

	(Thousands)
Salaries and fringe benefits	3,000
Overhead G&A, fees*	3,000
Travel, transportation and per diem	2,000
Other direct costs	
Commodities**	500
Documents & Publications	250
Conference facilities & Logistics	250
Consultants	1,000

\* Average figures, (PASA G&A's are typically 35-45 percent, with no fees)

\*\* Computers, office equipment, rent and utilities

#### VI. EVALUATION PLAN

An evaluation of the EPDAC project will be conducted during FY 87 to analyze achievements relative to original project expectations and the current international energy and economic situation. The evaluation will be conducted by a team comprised of AID staff, consultants and IQC contractors. The evaluation will include interviews with participants, counterparts, users of work products; examination of financial and administrative records; examinations of reports and publications and consultation with appropriate AID officials in Washington and in the field. Some of the key questions that will be addressed include the following:

- 1) Has the program achieved useful 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 counterpart institutions?
  - d) Helping to bring about policy innovations that contribute to the project's overall goal and purpose?
  - 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 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) Do 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 S&T/EY-funded activities? How important is it in the Mission's overall program?
- 4) Did the project raise important issues, provide important lessons or produce significant new information that can be applied in other A.I.D.-assisted countries? If so, what are they? How can they best be transferred to other settings?
- 5) Were conferences and other activities undertaken to ensure inter-country coordination, shared experiences and learning to

'provide meaningful opportunities for ideas generated in the one country to be tested and applied elsewhere? Were the efforts successful, in the participants' view? What concrete evidence is available to support the conclusions?

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

- (a) Leveraging investments in energy efficiency by the private sector, financial institutions and governments.
- (b) Stimulating changed operation/maintenance practices, retrofits, or energy audit/measurement/management programs?
- (c) Publicizing opportunities for improved energy efficiency?
- (d) Producing data on energy intensity of various processes, or conservation potential of various technologies, that can be used by energy consumers?
- (e) Training LDC technicians and professionals in the techniques of energy management?
- (f) Relating the technical services of the conservation contractor to the policy concerns (e.g. pricing as a stimulant to conservation) of the EPPD component?

In FY 89, a mid-term evaluation will be performed. Over the life of the project, country-level evaluations will be conducted as appropriate, with the largest effort going into an overall final evaluation scheduled for FY 92. Every six month period, reviews of project development status will be conducted in Washington, D.C., by ST/EY, Regional Bureaus and relevant contractors.

## VII. PROJECT ANALYSIS

The project will be formulated in direct response to the Congressional directive issued in Sections 103 and 106 of the Foreign Assistance Act, as amended in 1979, to "furnish assistance . . . for energy programs involving research on and development of . . . energy sources . . . ."

AID's four cornerstones provide the foundation for EPDAC's activities: (i) policy dialogue; (ii) institution building; (iii) research and technology transfer; and (iv) private sector.

The project, with its substantial policy emphasis, will contribute to the achievement of the Agency's objective of helping to ensure an adequate energy supply for economic growth in AID-assisted countries. AID energy programs endeavor to reach this goal by helping to alleviate structural problems that inhibit energy development, and to provide technical assistance to energy producers and consumers in LDCs.

The AID energy program concentrates on promoting private sector activities to develop indigenous energy sources to substitute for fuelwood and imported oil, increase efficiency of existing energy systems, and help countries make wise energy system choices and investment decisions.

The EPDAC program will be tailored to the needs of individual countries depending upon several factors; natural resources, level of development, private sector and other assistance agency investments, and the AID program objectives set forth in the Country Development Strategy Statement (CDSS).

#### A. Economic Analysis

The goal of all AID activities is to help poor people in developing countries through broad and equitable economic growth. Proper policy planning and efficient use of energy contributes to AID's development goals. The EPDAC project activities raise the overall technical, managerial, and institutional capabilities of developing countries, and improve their ability to use energy sources more efficiently.

A balanced energy strategy for developing countries should improve energy planning management capabilities and implement capital investment projects. International financial institutions, such as the World Bank, regional development banks and other private investors, concentrate their resources on large capital-intensive energy sector projects, such as refinery upgrading, thermal and hydro power plants, and high-voltage power transmission lines. AID, on the other hand, has specialized in technical assistance, policy reform, and institution building.

By helping institutions focus on the issue of energy pricing reform, sound energy information systems, training of technicians and other professionals, more efficient technologies, and wise energy investment choices, AID can help to build more effective energy policies and programs. Through its targeted assistance for planning efforts, feasibility studies, pilot projects, and training programs, AID's energy initiatives can enhance the economic viability and sustained impact of energy investments.

Private-sector organizations in both the United States and AID-assisted countries are a key element in implementing effective energy conservation programs. U.S. energy-saving expertise and technology is the technical basis for most AID conservation projects. All AID-supported conservation planning and development projects include the local private sector as a primary component. Many activities, including training, energy audits, energy

awareness campaigns, and demonstrations, are also directed at small- and medium-sized private firms. The project will support the organization of U.S. technology transfer teams, which may lead to increased use of U.S. equipment and services in LDCs.

### B. Technical Feasibility Analysis

As stated in the original paper the EPDAC project functions primarily to transfer knowledge and expertise. The variety of technical approaches used in this project are all based on proven, well-known and established methodologies and technologies.

The project is fully responsive to the Agency's emphasis on private sector, technical assistance, technology transfer and institution-building. It stresses the need for a sound policy environment to encourage wise use of scarce resources, as well as the generation of income and growth. Mechanisms for research, cross-fertilization and synthesis of experience, which include conferences and workshops, outreach and "clearing house" functions are important elements of the project. All activities under this project are coordinated carefully with Missions, Regional Bureaus and multilateral financial institutions such as the World Bank.

### 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 of administrative structures and procedures. These are described in detail in Section IV, Implementation Plan. In summary, the project will employ:

- 1) The part-time project management services of two S&T/EY professional staff members;
- 2) The services of ORNL for the EPPD component;
- 3) A conservation services contractor (to be selected);
- 4) A variety of IQC contractors and/or RSSA/PASA personnel to carry out design activities, evaluations, and studies.

While this administrative arrangement requires 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 part-time project management services of two senior S&T/EY professionals have been sufficient to implement the administrative arrangements required. When buy-ins have been involved, missions personnel have prepared scopes of work and appropriate budgets,

and S&T/EY has taken major responsibility for monitoring and evaluating the work performed by contractors. To strengthen coordination, S&T/EY will chair regular project review meetings every six months involving the major contractors, the geographic bureaus, PPC and others.

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 the 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.

S&T/EY:ASabadell:DJhirad:mj:cw:4044N

**PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK**

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED ON SUBMITTED.)

Life of Project:  
From FY 87 to FY 92  
Total U.S. Funding \$22 million  
Date Prepared: 02/25/87

AID 1020-20 (7-79)  
SUPPLEMENT 1

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

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 increased productivity of developing countries by providing energy and power at the lowest possible economic, financial and social cost.</p>	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> <li>1) Increased investments in innovative systems and approaches;</li> <li>2) pay private and public institutions, policies to promote private sector role in technology commercialization, and capital mobilization;</li> <li>3) increased reliability and availability of energy and electricity;</li> <li>4) greater productivity of industrial and agricultural enterprises;</li> <li>5) lowered capital requirements per unit of delivered energy;</li> <li>6) improved financial performance of LDC utilities;</li> <li>7) enhanced indigenous capability for investment decision-making, policy formulation, enterprise management and technology adaptation and innovation.</li> </ol>	<p>Information and case examples disseminated by the project and published in books, peer-reviewed journals, reports, magazines and news letters.</p>	<p>Assumptions for achieving goal targets:</p> <p>That economic growth and productivity can be accelerated by improving the availability of delivered energy and power.</p>

**PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK**

AID 1970-16 (1-71)  
SUPPLEMENT 1

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

Life of Project: \_\_\_\_\_  
From FY 87 to FY 92  
Total U.S. Funding \$22 million  
Date Prepared: 6/25/87

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><b>Project Purpose:</b></p> <p>To provide technical assistance to develop and introduce policies, R&amp;D approaches and investment strategies that relieve current energy and power problems, while minimizing vulnerability to future energy crises, and to achieve measurable improvements in the technical, financial and managerial performance of energy systems and institutions.</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>Investment commitments from public and private entities; on-the-ground improvements in technical, financial and managerial performance; existence of country policies, laws and incentives.</p>	<p>Evaluations will be conducted periodically. LDC energy and economic reports; budgets and program documents; financial commitments from other international lenders and private capital sources.</p>	<p>Assumptions for achieving purpose:</p> <p>That governments and donor agencies have been motivated by difficulties in mobilizing capital, size of energy investment budgets in relation to gross annual domestic budgets, the indispensable role of energy in ensuring economic growth, uncertainties regarding the future of oil prices and fuelwood depletion, high priority to energy issues in development planning.</p>

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PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: \_\_\_\_\_ to FY 92  
From FY 85  
Total U.S. Funding: 22 million  
Date Prepared: 07/25/87

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

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Outputs:</p> <p>Country-specific energy investment plans, pre-investment feasibility studies, market and policy analyses. Conferences, workshops, seminars, and studies on R&amp;D strategy and technology commercialization involving U.S. and LDC manufactures, utilities, R&amp;D organization and financial institutions. Dissemination of refereed journal articles book; reports and newsletters.</p>	<p>Magnitude of Outputs:</p> <p>An estimated 10 country-specific pre-investment packages, 15 reports on technology commercialization, R&amp;D strategy, private sector opportunities, and pricing policy, and 5 major international workshops, seminars or conferences.</p>	<p>Project implementation documents, including P10/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 purpose.</p>

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project: \_\_\_\_\_ to FY 92  
From FY 87  
Total U.S. Funding: \$22 million  
Date Prepared: 02/25/87

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

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Inputs:</p> <p>Data on energy markets, resources, conversion systems, prices and capital requirements. Analytic tools for investment decision-making, social and environmental impact assessment, and least-cost energy and power planning. Expertise drawn from U.S. and LDC R&amp;D organizations and private sector entities.</p>	<p>Implementation Target (Type and Quantity)</p> <p>Major activities will continue in energy analysis, assessment and institution building; power systems investment planning, energy pricing and household fuels.</p> <p>Major conservation activities will be conducted in such areas such as electric power, household fuels and efficient use of energy for rural enterprises.</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>

## ANNEX E

### SUMMARY OF EPDAC ACCOMPLISHMENTS 1982-1986

#### A. Energy Planning and Policy Development (EPPD) Program

##### 1. Institution-building for National Energy Planning:

- Developed, conducted, and successfully completed collaborative energy planning projects in Sundan, Morocco, Liberia, and Haiti.
- Produced national energy strategy for Liberia.
- Developed energy investment choice methodology.
- Assessed lessons from national energy planning experience at an international conference in Reston, VA, February 27-March 4, 1983, involving representatives of 25 developing countries, plus officials from multilateral donors and U.S. experts; the lessons have contributed to a rethinking of energy planning strategies.

##### 2. Assistance to AID Missions

- Project development assistance to AID missions in Pakistan, Madagascar, and India.
- Project evaluation assistance (in most cases supported by mission buy-ins) to Morocco, Ecuador, Philippines, Bangladesh, Sundan, and Guatemala.
- Project bridging assistance to Somalia.
- Requests from AID's Africa Bureau and ROCAP to use EPDAC project resources to meet mission requirements in FY 1987 and beyond.
- Inquiries from 8 missions about future assistance currently under discussion.

##### 3. Assisting AID's Office of Energy with energy planning-related functions:

- Background white papers on energy problems in developing countries in the 1980's, to help clarify program priorities.

- Assistance in developing draft program plan for S&T/EY (1985).
  - Improvement of information support for program planning and implementation.
  - Development of improved project management tools.
  - Technical advice on energy planning and policy issues, such as implications of lower world oil prices for developing countries, and energy for agriculture.
4. Research and analysis on priority energy policy issues for AID-assisted countries:
- A continuing energy policy research program which has produced three sets of projects and reports by top experts from private sector firms and universities, maintaining links between AID and the research community.
  - Improved household fuel alternatives for developing countries.
  - Investigation of clean-burning coal briquettes for wood-scarce countries with a coal resource.
  - Development of a standardized assessment approach.
  - Development of a standardized assessment approach.
  - Completion of a prototype integrated assessment of Haiti, which has generated U.S. private sector interest.
  - Assessment of markets in Pakistan.
  - Evaluation of health risks.
  - In collaboration with the World Bank, assessments of household fuel alternatives in Madagascar and Zaire, including analysis of a pinewood carbonization option in Madagascar.
5. Innovative approaches to power system planning, reducing capital supply requirements:
- New prototype project in collaboration with AID/New Delhi to accelerate the adoption of appropriate innovations by electric utilities in developing countries.

6. Implementing energy price reform in developing countries:
  - \* Draft white paper on price reform issues and options
  - \* Program outline for information dissemination and technical assistance to priority missions.
7. Policy and Institutional Aspects of Coal Resource Development:
  - \* First national coal conference in Pakistan.
  - \* Institution-building assistance for coal R&D in India.
  - \* EPDAC accomplishments are proving of value to AID missions in the field, as indicated by mission buy-ins to the EPDAC project.
  - Total buy-in commitments increased from zero in FY 1982-84 to 85 in FY 1985 and over 900K in FY 1986.
  - Included buy-ins from five missions in three regions: Pakistan, India, Bangladesh, Ecuador, and Sundan.

## B. ENERGY CONSERVATION SERVICES PROGRAM

### 1. Overview

The Energy Conservation Services Program provides a broad range of technical advisory services, training, and information dissemination activities to AID-assisted countries. ECSP's activities have ranged from energy demand management and energy auditing training projects to cogeneration feasibility studies to transportation energy conservation projects. It's primary goal is to achieve a large and immediate reduction in the amount of energy wasted in AID-assisted countries and to improve to efficiency of energy use. ECSP's primary strategy is to focus on high-payoff areas in countries that are likely to achieve large and immediate improvements in their energy efficiency, and thus accelerate their development in the near term.

Throughout the course of this program, ECSP has initiated 37 major projects to provide direct assistance to 16 countries: Costa Rica, Djibouti, Dominican Republic, Ecuador, Egypt, Haiti, India, Indonesia, Guatemala, Morocco, Pakistan, Peru, Philippines, Singapore, Sri Lanka, Thailand. It has provided indirect assistance to many more through its reports, manuals, workshops, and seminars distributed in its information dissemination activities.

In order to ensure that USAID's efforts have the broadest possible impact and prove as useful as possible, ECSP has published more than 70 reports, presentations, manuals, and other papers. In addition to its country-specific studies described below, ECSP undertook several issue-specific studies, such as Financing Energy Conservation in Developing Countries, Cogeneration in Developing Countries: Prospects and Problems, and Road Transportation energy Conservation: Needs and Options in Developing Countries, and created several manuals for training and project implementation, such as the Industrial Energy Audit Manual, the Energy Demand Management and Conservation Manual, and the Energy Equipment Cost Directory.

ECSP concentrates on five major types of activities:

- \* Fostering and ongoing dialogue within AID and with AID-assisted countries on energy conservation and its benefits for development
- \* Conducting basic and applied technical and institutional research to support energy conservation policy development and program and project implementation
- \* Developing and demonstrating energy conservation tools that can be applied to solving institutional and technological problems common to AID-assisted countries
- \* Providing training and technical support to the Missions
- \* Building a central information exchange network that can also serve as a basis for setting up collaborative research activities.

## 2. World-Wide Initiatives

Regional Workshops: ECSP has planned and conducted workshops in the Latin America/Caribbean and Asia/Near East regions to facilitate the exchange of ideas and experiences on energy conservation and private power generation and to encourage private sector investments in these areas.

Barriers to Energy Conservation: Involving the private sector in energy conservation activities is one of the primary goals of ECSP's activities in the industry sector. To this end, the program has undertaken a detailed study of the barriers to energy conservation in developing countries in order to develop strategies for eliminating those barriers and implement projects to eliminate those barriers.

Technology Transfer Team: ECSP has formed a Technology Transfer Team that target the private sector. Industry representatives from the United States are analyzing the constraints to installing cogeneration systems in developing countries. The team is evaluating specific potential cogeneration sites, analyzing electricity pricing programs and the structure of the power system, and developing an information program with the goal of fostering cooperation and technology transfer between the U.S. private sector and companies in developing countries.

Transportation Energy Conservation: ECSP staff undertook a detailed examination of the measures available for increasing the energy efficiency of transportation in developing countries. The study analyzed the importance of increasing energy efficiency in transportation, evaluated energy conservation initiatives in developing countries, and listed and evaluated all potential transportation energy conservation measures to facilitate selecting indentifying important and effective activities for AID-assisted countries.

### 3. Country-Specific Activities

ECSP has conducted a wide variety of country-specific programs. Several of the most important are outlined below:

Sri Lanka: ECSP organized, prepared, and presented a 2-week energy demand management and conservation training course and a 4-week energy auditing course in Sri Lanka for the Ministry of Power and Technology. It also completed full audit reports and a feasibility study of energy conservation projects for the Sri Lanka Tyre Corporation and the Thulhiriya Textile Mills.

Philippines: ECSP assisted the USAID mission in Manila and the Philippine government and private sector design and implement a project for improving the energy efficiency of the industrial, commercial, and transportation sectors. The project focused on encouraging the Philippine private sector to develop energy conservation services by supporting studies, seminars, and workshops, by providing technical assistance, and by supporting technology demonstrations.

Pakistan: ECSP assisted the Pakistan government and the USAID mission in Islamabad in some of the early work which led to the definition of the national Energy Conservation Center (ENERCON), a semi-private, semi-public center designed to develop and implement a national energy conservation program. The ENERCON program, currently under implementation, is the largest energy conservation project in all AID-assisted countries and aims at mobilizing more

.. than \$500 million in capital investments. It includes institutional development support; planning/legislation/special studies; database development; surveys/audits/technical support; training; outreach/information dissemination; investment promotion; and monitoring and evaluation activities.

Pakistan, India Thailand, and the Dominican Republic:

Cogeneration and other private power generation options: ECSP targets both the private sector and public utilities for projects to improve energy efficiency, reduce power shortages, increase private sector investment, and transfer knowledge and technology. ECSP staff carried out country-specific assessments of the potential for and barriers to private power generation in four countries: Thailand, Pakistan, India, and the Dominican Republic. These studies concentrated on industrial cogeneration and power generation using domestic resources such as agricultural waste or locally available fossil fuels. The team performed numerous tasks to evaluate the power situation in each country, among other things they: interview government officials; made site visits to the major energy consuming industries; reviewed the literature on the power sector and energy demand statistic; evaluated the public utility capacity, efficiency, expansion plans, and financial health; measured the private sector interest in the capability of financing, building, and operating cogeneration and private power plants; and identified the financial, regulatory, institutional, and social barriers to stimulating private-sector activities in the power sector.

Costa Rica: ECSP designed and implemented a driver training and vehicle maintenance project in Costa Rica to demonstrate the fuel savings potential in privately owned and operated bus and taxi companies. Driver training and fuel efficiency enhancing maintenance training and scheduling produced impressive savings in the test fleets. Driver training produced savings of 15.1 percent in taxis, while proper maintenance produced savings of 6.5 percent in buses.

Dominican Republic: ECSP staff are helping the government of the Dominican Republic develop and comprehensive diagnosis of the current and expected energy consumption in the transport sector and identify policy options for energy efficiency improvement. The primary goal of this project is to provide guidance to the government of the Dominican Republic and to international development organizations to help them identify and implement programs that will improve the energy efficiency of the transportation sector. The ECSP team interviewed private and public transportation officials, surveyed the transportation network, and evaluated available transportation statistics in

order to design the project. The role of the ECSP consultants is to provide overall guidance, knowledge transfer, and on-the-job training to the Dominican National Energy Policy Commission ENERCON, which will carry out the project.

Morocco: ECSP assisted the USAID mission in Rabat by assessing the potential for energy demand management activities in Morocco. The study identified financially and economically justified energy demand management actions and investments at the energy end-use level. The ECSP team projected potential fuel savings, by sector; identified and analyzed barriers to project implementation; selected program targets; defined technical assistance components (information and awareness, training, technical support, technology transfer, general policy guidance); defined possible institutional arrangements; defined program benefits and costs; and developed recommendations and an action plan.

Egypt: ECSP is providing technical assistance to the USAID mission in Cairo in assessing the means to promote and accelerate the adoption of energy-efficient technologies and operational practices by energy consumers who are heavily dependent on fossil fuels and electricity. The assistance also includes the analysis needed to establish an institutional capacity to undertake and manage conservation-related investments and programs.

ANNEX C

LEVERAGING CAPITAL INVESTMENTS IN ENERGY  
PROJECTS: A CASE EXAMPLE

S&T/EY Identifies Hydropower Investment in Madagascar: U.S. Trade and Development Program (TDP) and the World Bank to Provide Financing.

The U.S. Trade and Development Program (TDP) has provided a \$325,000 grant to the Government of Madagascar to finance a detailed engineering feasibility study for a 15 megawatt hydropower project identified by an S&T/EY preseasibility study. The World Bank will lend the funds for construction if the feasibility study confirms the economic attractiveness demonstrated by S&T/EY's prefeasibility work. The Government of Madagascar has given high priority to this project and the U.S. Ambassador, USAID/Madagascar, and REDSO/EA have expressed strong support for this S&T/TDP initiative.

The total investment cost for the project is approximately \$30 million, with \$15 million expected from the International Development Association (IDA), \$ 8 million as co-financing from other official sources, and \$7 million from local sources.

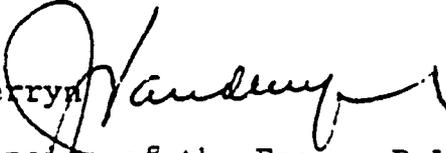
The innovative approach adopted by S&T/EY provides several important benefits, and could be a model for future power projects in Sub-Saharan Africa. First, the project minimizes the foreign exchange burden placed on Madagascar by constructing capacity increments in stages to match the increasing power demands of development, and by substituting for imported diesel fuel. Second, local private companies will be strengthened through significant involvement in the feasibility study and plant construction. Third, the hydro project will accelerate regional development by providing power for the textile industry and agro-processing. It will avoid the adverse environmental implications of large dam projects, and will provide for flood and sediment control, irrigation, domestic and industrial water supply, and navigation and recreation.

The TDP and World Bank follow-up of the S&T/EY initiative provides an important opening for U.S. engineering and project management services and equipment suppliers, strengthens the local private sector, and leads to a tangible project with significant economic and developmental benefits.

AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

NOV 04 1986

ACTION MEMORANDUM FOR THE SENIOR ASSISTANT ADMINISTRATOR FOR  
SCIENCE AND TECHNOLOGY

FROM: S&T/EN, Jack Vanderryn   
SUBJECT: Concept Paper-Extension of the Energy Policy  
Development and Conservation (EPDAC) Project

Problem: Your approval of the concept for extending the EPDAC project, 936-5728, is needed.

Discussion: The Office of Energy (S&T/EY) is financing the EPDAC Project which will end on July 31, 1987. The project's two principal areas of activity are: technical assistance to institutions engaged in energy planning, analysis and policy development; and technical assistance to both public and private sector entities aimed at improving the efficiency with which scarce energy resources are utilized.

During the past several years, the EPDAC Project has been the heart of our effort to define and implement new thrusts for the energy programs of AID, so that they are relevant to Agency roles and developing country realities of the 1980's. From this project have come our resources for technical assistance in such priority areas as power sector performance improvement, energy pricing reform, expanded private sector roles in the energy sector, and energy systems for productive enterprises in rural areas. Mission interest in such assistance is growing rapidly. For example, in the energy policy portion of the project alone, Mission buy-ins soared from \$80,000 in FY 85 to \$922,000 in FY 86, including funding commitments from Pakistan, India, Bangladesh, and Ecuador. Further major commitments are under discussion with India, Egypt, Morocco, and the Africa Bureau.

The EPDAC program was authorized in FY 82. In the past four years, energy conditions in AID-assisted countries have changed considerably. Most notably, petroleum prices on the world market have declined, which is a blessing to many countries. Whether this decline is sustained or not, however, energy problems in developing countries have not disappeared. Power system expansion to meet development needs is making immense

demands on scarce capital resources, for instance. Energy price reform is an urgent requirement in many countries. Efficient private sector solutions are needed for institutional problems that are beyond the capabilities of indigenous public sector institutions. Abundant, affordable, and available energy is needed for economic development in rural areas.

AID should provide continuing support in alleviating these energy problems. In particular, AID has come to play the leading role among development assistance agencies in encouraging the emergence of the private sector in these connections and in providing technical assistance for investment choices in the energy sector. These roles especially need to be continued. We propose, therefore, to extend the EPDAC Project by five years, broaden its scope to reflect the new thrusts that the project itself has developed, and estimate a budget level of \$20 million. This assumes \$10 million from S&T/EY funds and \$10 million from Missions. The \$10 million will be incrementally funded in the following amounts:

FY 87	- - -	\$1.8 million
Fy 88	- - -	\$2.0 million
FY 89	- - -	\$2.2 million
FY 90	- - -	\$2.1 million
FY 91	- - -	\$1.9 million

The major areas of concern of the project will continue to be energy planning and policy development, and energy conservation. In the energy planning and policy development area activities that will have priority include the following:

1. Power System Planning. The most promising approaches to solutions to the emerging capital supply crisis for power expansion are least-cost planning and private sector initiatives. Least-cost planning identifies investment alternatives to power plant additions which offer much cheaper improvements in electricity services. Private sector initiatives include privatization, cogeneration, and private sector power generation in rural areas.

2. Energy Pricing Reform. In many AID-assisted countries, a decade of government interventions has led to commercial energy prices--electricity, petroleum products, or both--which are well below the actual cost of supply. Reducing this unacceptable economic burden is a high priority, which calls for realistic but effective price reform programs. The challenge is to develop implementation approaches which reduce

subsidies without destabilizing government, which will require innovative combinations of gradual real price increases, efficiency improvements in supply institutions (which reduce the actual cost of supply), and efficiency improvements in energy use (which reduce the impacts of price increases).

3. Energy Investment Choice. An original objective of the EPDAC Project was to improve the quality of energy investment decisionmaking in AID-assisted countries through technical assistance and institution-building. The focus of this assistance has shifted away from national energy planning groups in central government to institutions which play active roles in energy systems: those who borrow money and use it to provide energy services and those who determine the policy environment for such choices. Often working in collaboration with lending institutions such as the World Bank, this helps assisted countries prepare sound proposals and at the same time reduce their dependence over time on such external assistance.

In the energy conservation area, activities that will have priority consideration include the following:

1. Power. Because of the importance of increasing the use of electricity in rural areas and reducing capital requirements for power system expansion, increasing the efficiency of electric power supply and use will be the top priority. Efficient irrigation pumping for agriculture, agro-industries and other rural enterprises, are examples of key areas for sustained conservation efforts. Increasing the efficiency of power generation, load management and end use of electricity are the least capital intensive ways of extending the supply of electricity in the short term.

2. Household fuels. The second major activity will be the conservation of household fuels. Deforestation is likely to continue to be a major problem in a large number of AID-assisted countries. Conservation of fuelwood is, and will continue to be, a necessary complement to supply options such as reforestation, coal and agro-waste briquetting.

3. Rural enterprises. The rural sector needs support to achieve lasting productivity improvements in order to compete in world markets, create jobs and increase the income of rural populations, especially the rural poor. Conservation of energy, including cogeneration, is one of the most cost-effective ways of achieving such improvements.

These program areas represent the logical next step for the energy planning and policy development, and energy conservation activities of the EPDAC Project, considering the experience of the 1983-87 period and the requests being received from Missions. They also capitalize on the programs and results of other initiatives undertaken by the Office of Energy during the same period.

The project will be formulated in direct response to the Congressional directive issued in Sections 103 and 106 of the Foreign Assistance Act as amended in 1979 to "furnish assistance . . . for energy programs involving research on and development of . . . energy sources . . . ."

The project is fully responsive to the Agency's emphasis on private sector, technical assistance, technology transfer and institution-building. It stresses the need for sound policy environment to encourage wise use of scarce resources, as well as the generation of income and growth. Mechanisms for research, cross-fertilization and synthesis of experience, which include conferences and workshops, outreach and "clearing house" functions are important elements of the project. All activities under this project are coordinated carefully with Missions, Regional Bureaus and other donors including (but not limited to) the World Bank. The Office of Energy's strategy is to "cost share" its activities to the maximum extent possible with other S&T programs and with Regional Bureaus and Missions.

Recommendation: That you approve the concept and authorize the office of Energy to proceed with design of an amendment for the EPDAC project.

Approved: \_\_\_\_\_

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

Date: \_\_\_\_\_

Clearance:

S&T/EY:JSullivan	<u>JS</u>	Date	<u>10/31/86</u>
S&T/PO:CColeman	<u>CC</u>	Date	<u>10/31/86</u>
S&T/PO:VAnderson	<u>Call for</u>	Date	<u>10/31/86</u>
S&T/PO:GGower		Date	_____

S&T/EY:ASabadell:cak:10/29/86:3965N