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JUN 3 1991

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR SCIENCE AND TECHNOLOGY

THRU: S&T/EN, Jack Vanderryn

FROM: S&T/EY, James B. Sullivan James Sullivan

SUBJECT: PID for Energy Efficiency Project (EEP) 936-5743

Problem: Your approval is needed on the attached PID in order to proceed with the project paper design.

Background: The Senior Program Review Committee approved the PID on May 14 with major changes to be incorporated into the PP. A copy of the Information Memorandum dated May 23 to you addressing these changes is attached along with the new PID facesheet and supporting documentation.

Recommendation: That you approve the attached PID by signing below and the PID facesheet.

Attachments:
a/s

Approved: [signature]

Disapproved: _____

Date: June 14, 1991

Clearance:
S&T/PO, D. Sheldon DE for Date 6/5/91

S&T/EY:SAToth:5/29/91:235-4057:EEFMEMO

A

Agency for International Development
Washington, D.C. 20523

May 23, 1991

INFORMATION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR SCIENCE AND TECHNOLOGY

FROM: S&T/PO, Douglas L. Sheldon DS for

SUBJECT: Energy Efficiency Project (EEP) 936-5742: Senior Program Review Committee Meeting, May 14, 1991

1. The Senior Program Review Committee met on May 14, 1991, to review the PID for the Energy Efficiency project (936-5734). The meeting was chaired by DAA/S&T, Bradshaw Langmaid. Also in attendance were:

S&T/EN, Jack Vanderryn
S&T/EY, Shirley Toth
S&T/PO, David Erbe
S&T/FENR, James Gallup
APRE/DR/TR, Amar Bhat
Consultant (IDEA), Judy Siegel
S&T/EY, Alberto Sabadell
S&T/EY, Carolyn Kiser
S&T/PO, Garland L. Standrod
WID, Edgar Ariza-Nino
OP/W/R, Gary Kinney

2. The PID was approved with the addition of this cover memorandum (and the changes and comments it represents) and a revised PID face sheet. Major changes in the PID to be incorporated into the PP were as follows:

a. Life of Project and Funding: Rather than planning on a ten year project with a $20 million estimated LOP funding ceiling for S&T core funds, which would have proven to be inadequate for a ten year project, it was decided that the office should plan five, six, or seven year project, with an accurate costing out of the project for this length of time. In addition to the estimated cost, the office can add a 20% contingency cost to the total estimated cost of the project for five or six years.

b. Generic Efficiency Measures Fund: The EEP PID had proposed developing a new "fund" to launch projects or businesses that promote or implement energy efficiency. It was decided that the office should not start another fund similar to the one already administered by Price Waterhouse in the PSED project. If such a fund is needed, the office should explore increasing and buying into the existing fund, rather than starting a new one in another project.

B

It as noted that using one fund makes accountability much easier, especially since the fund can't be managed in-house. Because this is an area of intense sensitivity, it was also noted that the Office of Energy should make sure that objective criteria are used in the selection and approval process, preferably through the use of a peer review process.

3. The following points and concerns were raised with respect to PP development.

a. The PID focuses on efficiency on the power generation side and neglects to consider the consumer side of efficiency. The PID focuses on the technical side of the problem; the PP should look at the broader context and consider the consumer side of the problem. Perhaps, this project could work in conjunction with the GREENCOM project which is under development in the Office of Education.

b. The PP should discuss how this project will use U.S. state-of-the-art equipment and support U.S. technology. One role of the project will be to promote U.S. trade opportunities.

c. The PP should make clear the theory behind the project and how it will go about meeting its objectives. Will the project be assertive or reactive? The PP should show the conceptual framework of the role S&T and the missions will be playing in this endeavor. The missions will need to be cabled during the development of the PP.

d. Care will need to be given to the environmental aspects of this project; for instance, pilot activities will need determinations whether or not they require environmental assessments.

e. Because of the staff constraints in the Office of Energy, the prime contractor will have to provide all of the administrative services under this project, including such arrangements as IPAs, RSSAs, consultants, and subcontracts.

5. The Program Office met with S&T/EY on May 8, 1991 to discuss the project. The results of that meeting are attached.

Attachment: a/s

Clearance:
S&T/EN, Jack Vanderryn [signature] date 5/23/91

Drafted:S&T/PO:GStandrod:#4004d:5/22/91:X54223

ATTACHMENT

SUBJECT: Results of the May 8, 1991 joint S&T/PO and S&T/EY PID review of the Energy Efficiency project (936-5743)

1. This meeting was held in preparation for the Senior Review Program Review Committee scheduled for May 14, 1991. Attending the meeting were:

S&T/EY, Shirley Toth
S&T/PO, David Erbe
S&T/PO, John Giusti
S&T/PO, Frank Alejandro
S&T/EY, Carolyn Kiser
S&T/PO, Betty Roche
S&T/PO, Garland Standrod
Consultants (IDEA): Judy Siegel; Martin Wulfe.

2. Points discussed at this meeting for further development in the PP included:

a. The PP will need to delineate more specifically how this project will differ from the other projects in S&T/EY's portfolio. Also, a description of how the office will coordinate its energy activities needs to be included in the PP.

b. The PP will need to show the line of reasoning used to develop the budget. The PP will need to show how the estimate of buy-ins was derived from the empirical evidence of the precedent project, as well as from cables to the field.

c. The PP will need to be more clear on the selection criteria for choosing countries. The PID gives various selection criteria for use, but it remains unclear how these will be applied. Also, the number of countries which will receive assistance needs to be clarified.

d. The PP should make clear that this project is being developed on the basis of a predecessor project and that specific items in the February 1988 evaluation of the Energy Policy Development and Conservation project, a component of which is the forerunner project to EEP, were used in the development of this project.

e. The PP will need to clarify to what extent research and development activities will be conducted under the project.

f. The PP will need to be quite specific about the differences, if any, in the activities to be covered by core funds versus buy-in funds.

Drafted:GLStandrod:S&T/PO:54223:5/22/91

D

PID BUDGET - Illustrative Life-of-Project Obligation (FY 1992 - FY 1999)

	FY92		FY93		FY94		FY95		FY96		FY97		FY98		FY99		TOTAL	
Components	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in	Core	Buy-in
1. Technical Assistance																		
A. Contract Administration	253	85	525	175	545	180	555	185	582	194	600	200	623	207	322	107	4,005	1,333
B. Nat'l Energy Management Programs	0	0	0	0	400	800	400	800	400	800	400	400	400	400	0	0	2,000	3,200
C. Definitional Missions	50	100	200	150	200	250	250	150	200	150	200	150	150	150	0	150	1,250	1,250
D. Sector Energy Management Programs	0	100	100	300	200	200	200	100	200	100	200	100	100	100	100	100	1,100	1,100
E. Energy Audits	50	100	200	150	200	250	200	150	200	150	150	150	150	150	100	150	1,250	1,250
F. Info. Dissemination Activity	0	0	0	200	200	400	200	400	200	400	200	400	200	200	0	200	1,000	2,200
G. Workshops/Seminars	0	0	150	300	300	300	300	150	150	300	300	150	300	150	150	150	1,650	1,500
H. Pre-Feasibility Studies	0	350	700	1,050	350	1,050	700	700	700	700	350	700	700	700	350	0	3,850	5,250
I. Special Studies	0	150	150	300	300	300	300	300	300	300	300	150	150	150	150	150	1,650	1,800
SUBTOTAL TECHNICAL ASSISTANCE	353	885	2,025	2,625	2,695	3,730	3,105	2,935	2,932	3,094	2,700	2,400	2,773	2,207	1,172	1,007	17,755	18,883
2. OTHER EXISTING CONTRACTS																		
A. Nat'l Energy Management Programs	0	0	0	0	400	0	0	400	0	0	0	0	0	0	0	0	400	400
B. Definitional Missions	0	0	0	0	50	0	0	50	50	0	0	50	0	0	0	0	100	100
C. Sector Energy Management Programs	0	0	0	0	0	100	100	0	0	100	100	0	0	0	0	0	200	200
D. Energy Audits	0	0	0	50	0	50	50	0	0	0	0	0	0	0	0	0	50	100
E. Workshops/Seminars	0	0	0	150	0	0	0	0	150	150	0	0	0	0	0	0	150	300
SUBTOTAL OTHER CONTRACTS	0	0	0	200	450	150	150	450	200	250	100	50	0	0	0	0	900	1,100
3. AUDITS/EVALUATIONS																		
A. Audits	0	0	0	0	50	0	0	0	50	0	0	0	0	0	0	0	100	0
B. Evaluations	0	0	0	0	50	0	0	0	100	0	0	0	0	0	0	0	150	0
SUBTOTAL AUDITS/EVALUATIONS	0	0	0	0	100	0	0	0	150	0	0	0	0	0	0	0	250	0
4. CONTINGENCY/INFLATION	66	0	100	0	162	0	163	0	164	0	140	0	140	0	160	0	1,095	0
5. TOTAL	419	885	2125	2825	3407	3880	3418	3385	3446	3344	2940	2450	2913	2207	1332	1007	20,000	19,983

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE: AA (A = ADD, C = CHANGE, D = DELETE)

PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: Worldwide

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 DIGITS): 936-5743

6. BUREAU/OFFICE: A. SYMBOL: S&T/EY; B. CODE:

7. PROJECT TITLE (MAXIMUM 40 CHARACTERS): Energy Efficiency

8. PROPOSED NEXT DOCUMENT: A. 3 (2 = PRP, 3 = PP); B. DATE MM YY: 06 91

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 92; b. FINAL FY 99

10. ESTIMATED COSTS ($000 OR EQUIVALENT, $1 =)

FUNDING SOURCE	LIFE OF PROJECT
A. AID APPROPRIATED S&T	20,000
B. OTHER U.S. 1.	
2. Buy-ins	20,000
C. HOST COUNTRY	
D. OTHER DONOR(S)	
TOTAL	40,000

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. FIRST FY 92 F. GRANT	E. FIRST FY 92 G. LOAN	LIFE OF PROJECT H. GRANT	LIFE OF PROJECT I. LOAN
(1) PSEE	20			250		5,000	
(2) ARDN	20			750		15,000	
(3)							
(4)							
			TOTAL	1,000		20,000	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

13. SPECIAL CONCERNS CODES (MAXIMUM SIX CODES OF FOUR POSITIONS EACH)

14. SECONDARY PURPOSE CODE

15. PROJECT GOAL (MAXIMUM 240 CHARACTERS)

To increase energy efficiency in order to enhance economic development in an environmentally sound manner.

16. PROJECT PURPOSE (MAXIMUM 480 CHARACTERS)

To provide technical and financing assistance to create the enabling environment for energy management and efficiency.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

18. ORIGINATING OFFICE CLEARANCE

Signature: Richard E. Bissell

Title: Assistant Administrator, Bureau for Science and Technology

Date Signed: MM DD YY 06 14 91

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

AID 1330-2 (3-76)

May 2, 1991

ENERGY EFFICIENCY PROJECT

PROJECT IDENTIFICATION DOCUMENT (PID)

Project Number 936-5743

Office of Energy
Bureau of Science and Technology
U.S. Agency for International Development

G

ENERGY EFFICIENCY PROJECT

PROJECT IDENTIFICATION DOCUMENT (PID)

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I. PROGRAM FACTORS

I.A. Conformity with Legislative Mandate

For the developing world, a critical element to achieving self-sufficiency, social progress, and sustainable development is access to economical, environmentally acceptable, and reliable sources of energy. Energy is an integral component of all sectors -- industrial, commercial, transportation, agricultural, service, or residential -- in both urban and rural areas.

Traditional means of solving the energy needs of the developing world have focussed on increasing supplies, primarily through extension of the utility grid. This has often proven to be an extremely costly, inefficient, ineffective, and unsustainable solution with tremendous environmental consequences. Current electric sector programs throughout much of the developing world are highly subsidized, relying on external funding sources to support what is often unreliable, poor quality power. These countries are frequently characterized by routine blackouts and brownouts, which come at a high cost in terms of reduced industrial output, employment, and productivity. In rural areas, the problems are further exacerbated as utility grid extensions for many rural areas are expensive and may be difficult to build due to rugged terrain or long distances. A recent report by the World Bank states that "most of the rural population in developing countries are not served by electricity and even in those countries where there have been rural electrification programs over the last 10-20 years only a few serve more than 20% of their rural population."[1] Furthermore, diesel and other conventional power options require reliable fuel supplies and service networks, which are costly to develop and maintain. Thus, throughout many rural parts of the developing world, the bulk of the energy for agriculture, transportation, and households comes from human power, animal power, or non-commercial sources such as fuelwood, animal wastes, or agricultural residues. This situation exacerbates the dichotomy between the urban and rural areas of these countries.

Continuing on the traditional power supply path promises to worsen the existing situation. Over the past 20 years developing countries have experienced an enormous growth in electricity demand averaging 7% per annum, and as high as 15% in some Southeast Asian countries. A.I.D. predicts that at a medium rate of economic growth of 4.5% per year over the period 1988 to 2008, capital requirements for additional generating capacity and related transmission and distribution facilities would exceed $2.6 trillion, or an average of $125

[1] Mason, M., "Rural Electrification", Background Paper for the World Bank, April 1990.

billion per year (compared with current funding of $50-60 billion per year).[2] Furthermore, the World Bank cites that developing countries plan to meet their future generating needs with hydropower (35.7% of total capacity) and coal thermal (44.5% of total capacity) plants, both of which have severe environmental impacts.[3] In particular, hydropower facilities can yield flooding, forest submergence, population relocation, and species dislocation/loss, while coal-based thermal plants result in atmospheric pollution and acid rain. Another effect of high energy demand in urban and rural areas is deforestation caused by a high demand for fuelwood for cooking. Deforestation brings with it a number of negative environmental consequences such as soil erosion, species loss, climate change, and global carbon dioxide emissions.

Energy efficiency offers significant prospects for meeting energy demands in a timely, cost-effective, and environmentally benign manner. Use of conservation measures can reduce or slow the need for new capacity additions in the power sector. For example, A.I.D. estimates that adoption of energy efficiency could enable developing countries to satisfy their demand for electricity and reduce the need for additional generating capacity by over 50% to 700 gigawatts.[4] Furthermore, energy efficiency can assist in providing more reliable, efficient, and higher quality services throughout the commercial residential, agricultural, and transportation sectors. It is invariably cheaper to save a kilowatt than to generate a kilowatt[5] -- a fact recognized and operationalized by many utilities throughout the United States. Energy efficiency programs contribute to enhanced social and economic development, contribute to a positive foreign trade balance for the host country by reducing reliance on fuel imports, and discourage the use of environmentally damaging energy technologies such as coal and large hydropower.

The efforts of the Energy Efficiency Project (EEP) will be focused on promoting energy efficiency measures in priority A.I.D.-assisted countries. These countries will be selected on the basis of:

- The potential for energy conservation within the country;
- An analysis of the level and scope of present energy activities within the country by all donors and the host country itself; and
- The level of interest demonstrated by the A.I.D. Mission in the country.

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[2] U.S. Agency for International Development, Power Shortages in Developing Countries: Magnitude, impacts, Solutions, and the Role of the Private Sector, Washington, D.C., March 1988.

[3] Industry and Energy Department, Capital Expenditures for Electric Power in the Developing Countries in the 1990s, Working Paper Energy Series Paper No. 21, World Bank, February 1990.

[4] Ibid, U.S.A.I.D., March 1988.

[5] Reddy, A., Goldemberg, J., "Energy for the Developing World", Scientific American, Special Issue, September 1990.

The EEP is a major component in the A.I.D. Office of Energy's strategy to address the Foreign Assistance Act[6] which recognized the linkage between energy and the key sectors of the developing world. Also, most notably, the EEP responds to the Foreign Assistance Appropriations Act of FY 1990[7] which mandates that the A.I.D. Administrator implement a "global warming initiative" that focuses the Agency's energy assistance on helping to mitigate the increasing contribution of "key" developing countries to greenhouse gas emissions resulting from deforestation and fossil fuel combustion. As part of this legislation, the Congress appropriated funds that are to be used by the Agency to augment its staff with energy and environmental expertise and to focus its assistance on improved energy efficiency, increased use of renewable energy resources, and the development of national energy plans (such as least-cost energy plans) which include investment in end-use energy efficiency and renewable energy.

Through the EEP, the Office of Energy plans to expand its promotional, planning, and implementation activities to foster greater awareness of energy efficiency, and to provide technical assistance and training services for initiatives to implement energy demand reduction measures as the major means of reducing the threat of global warming, and delaying (or reducing) the need for power generation capacity growth in LDCs. The EEP will also be used to increase energy conservation and demand management in the electric power, industry, building, and transportation sectors of developing countries, and will be responsive to other areas such as the household sector.

The EEP is a natural follow-on to the Energy Conservation Services Project (ECSP) which is a part of the Energy Policy Development and Conservation (EPDAC) Project (see descriptions and relations of EEP to this and other projects in the following sections). The ECSP currently funds S&T/EY efforts in efficiency and conservation as a response to global warming concerns in electric power systems, industry, buildings, and the transportation sector. ECSP will be ending in FY 92.

I.B. Relationship to A.I.D. Policy

A.I.D.'s role is "to help ensure an adequate energy supply to meet its goal in agriculture, rural development, health, and other areas. Through its energy activities, A.I.D. can help to provide substitutions or conserve fuelwood and imported oil, introduce more efficient ways of using existing energy resources, and help countries make economically and environmentally wise energy-system choices and investment decisions."[8] The A.I.D. Office of Energy (S&T/EY) Program Plan further sets goals and corresponding objectives to

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[6]Foreign Assistance Act of 1961, as amended.

[7] FY 1990 Foreign Operations, Export Financing, and Related Programs Appropriations Act, (Public Law 100-167).

[8] Office of Energy Program Plan, Fiscal Years 1990 and 1991, Report No. 90-03, U.S.A.I.D., July, 1990.

increase efficiency of energy systems, and to integrate environmental criteria into the energy planning process in developing countries.

The EEP will address these objectives and support other ongoing A.I.D. projects that deal with these and similar energy concerns. Within the Office of Energy, the EEP will be coordinated with the following as appropriate:

- The Biomass Energy Systems and Technology Project (536-5737)
- The Energy Technology Innovation Project (June FY91 start)
- The Energy Conservation Services Project, part of the Energy Policy Development and Conservation Project (936-5728), which will be replaced by the EEP
- The Renewable Energy Applications and Training Project (936-5730)
- The Energy Training Project (936-5734)
- The Private Sector Energy Development Project (936-5738)

The EEP will emphasize support of projects in key A.I.D. Missions and Offices. The Office of Energy will consult with a number of key Missions during the preparation of the Project Paper for the EEP to ascertain their level of interest, the potential for buy-ins, and how the EEP can coordinate with the specific Mission's current and planned efforts. Listed below are the Missions and Offices currently being considered, however, this list will be continually reviewed and modified, as appropriate, throughout the duration of the project.

USAID/Brasilia
USAID/Cairo
USAID/Dhaka
USAID/Guatemala City
USAID/Jakarta
USAID/Kingston
USAID/Manila
USAID/Mexico
USAID/New Delhi
USAID/Rabat
USAID/San Salvador
USAID/San Jose
USAID/Warsaw
REDSO/Abidjan
REDSO/Nairobi
ROCAP/Guatemala City

I.C. Relationship to Other Agencies and Donors

The EEP will be designed to complement similar energy/power sector activities of other U.S. government agencies, the multilateral development banks, and bilateral donors.

The World Bank, together with the United Nations Development Programme (UNDP), has conducted energy conservation assessments as part of the joint World Bank/UNDP Energy Sector Management Assistance Program (ESMAP), and has provided direct assistance to a number of countries that are also assisted by A.I.D. This support has been directed at both the institutional and operational side of energy conservation at the country, sector, subsector, and power plant levels. The World Bank has supported the establishment of energy conservation institutions in Bangladesh, Indonesia, Jordan, Morocco, Portugal, Senegal, Tunisia, and Turkey[9]. In addition, the World Bank will be providing financing for private power projects in Pakistan and has indicated an interest in financing energy conservation projects that result from the A.I.D.-supported Energy Demand Management Project in Morocco. The World Bank is also financing a number of projects to improve the performance of the power sector, including measures to reduce distribution losses in Indonesia, rehabilitation of power generation equipment in Pakistan, and rehabilitation of the electrical transmission and distribution systems in Senegal, Sri Lanka, Togo, and Zaire.

Under ESMAP, studies on power sector efficiency improvements have been carried out in Bangladesh, Cote d'Ivoire, Indonesia, Kenya, Liberia, Panama, Sri Lanka, Sudan, and Togo. An Africa regional seminar on reducing electric power systems losses was sponsored by ESMAP in 1988. ESMAP-sponsored power sector efficiency studies are planned in Morocco and Tunisia. The World Bank and other lending agencies have also been urging borrowing countries to rationalize energy prices, in some cases making progress with price reform a condition for further development assistance and lending.

Other donors also supported energy conservation activities in A.I.D.-assisted countries. For example, the United Nations has provided funding for energy audits in Bangladesh, Egypt, Pakistan, and the Philippines; information dissemination in Egypt; training and technical support in Egypt, India, Pakistan, the Philippines, Sri Lanka, and Thailand. The Asian Development Bank (ADB) has provided technical support, especially to improve the efficiency of the power sector, in India, Indonesia, Pakistan, Sri Lanka, and Thailand; and energy conservation training in Nepal and Thailand. The ADB supported energy audits in the Philippines and Thailand, and provided financing assistance in Thailand.

In summary, it is anticipated that this project will coordinate its activities with a variety of organizations such as the following:

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[9] John Mulckhuyse. "Barriers and Constraints in Energy Conservation." Paper presented on behalf of the World Bank at the UNDP-World Bank Workshop on Energy Conservation. Amman, Jordan, September 1988.

- Trade and Development Program (TDP)
- Export-Import Bank of the United States (EXIMBANK)
- Overseas Private Investment Corporation (OPIC)
- Foreign Commercial Service (FCS)
- Department of Energy (DOE)
- International Trade Administration (ITA) of the Department of Commerce (DOC)
- Committee on Renewable Energy, Commerce, and Trade (CORECT)
- The World Bank
- United Nations Development Programme (UNDP)
- The Asian Development Bank (ADB)
- The Inter-American Development Bank (IADB)
- The European Development and Reconstruction Bank (EDRB)
- Unilateral donors, i.e. from UK, France, and Germany.

A.I.D. plans to work with these organizations as a catalyst to spur project investment in energy efficient technologies. In particular, A.I.D. will conduct preinvestment work to identify and analyze potential activities through definitional missions, pre-feasibility studies, and feasibility studies. In addition, A.I.D. will provide technical assistance, training, and institutional support and development. A.I.D. will also co-finance viable project activities.

II. PROJECT DESCRIPTION

II.A. Perceived Problem

Developing countries are committed to rapid economic growth, and throughout history such growth has required additional energy input. This commitment to growth, coupled with a desire for modernization, has placed a premium on increasing the supply of energy. In its 1988 Report to Congress, A.I.D. projected the growth in demand for electricity in developing countries at an average annual rate of about 6% - 7%, with some of the "successful" countries (Thailand is the latest example) growing at twice this rate. The demand for transportation and industrial fuels has been increasing nearly as rapidly. As populations increase and urban areas expand, residential needs for cooking and heating fuels grow proportionately. Further, in tropical countries, air conditioning is fast becoming the norm in hotels, offices, and hospitals.

While increased energy supplies are vital, there are a number of actions which can be taken to better manage the demand for energy which achieve the same result, and at a much higher economic rate of return. It has been clearly demonstrated that energy policy which emphasizes the supply side, without first rationalizing prices for energy and maximizing return on energy sector investment, can produce a number of undesirable effects, including:

1. Supply-side emphasis often promotes the inefficient use of energy. Some countries have adopted the theory that energy provides the momentum for economic development. These countries have thus chosen to subsidize energy prices. In fact, the waste that ensues can reduce their economic competitiveness more than subsidized energy prices enhance it. For example, in Egypt, which has a history of subsidized energy prices, the industrial sector requires 60% more energy per unit of output than in similar developing countries.

2. Meeting the cost of growing demand for energy is more than the economies of many developing countries can bear. In the electricity sector, the investment capital required for infrastructure additions can account for 25% to 40% of many countries' development budgets, and has been a crushing weight in the LDC debt crisis. As observed in A.I.D.'s 1988 Report to Congress, given the debt crisis, sufficient investment capital is unlikely to be available from traditional sources to support a continuation of historical growth rates in electrical generation capacity.

3. Fossil fuel-based energy systems stress the environment, jeopardizing human health from deteriorated air quality in many cities. The recently-revealed environmental catastrophe in Eastern Europe clearly illustrates the danger. Local actions will lead to local, regional and global consequences as Eastern Europe "gears up" to enter the markets and China, India, Indonesia, Thailand and many other developing countries

turn to coal and lignite to meet increasing proportions of their energy supply.

Energy management and efficiency improvements represent the least-cost strategy for most developing countries to meet incremental, near-term units of energy demand. Energy management opportunities are often low in cost, with a high local value-added component, and can be implemented far more quickly than traditional supply-side investments. By producing more output with the same energy cost input, energy management promotes economic efficiency and improves the productivity and competitiveness of energy-consuming enterprises.

While improvements in energy efficiency of the economy have been realized in most industrialized countries, most developing countries have not shared this experience. This is true in part because there are many barriers to energy management in LDCs, many of which did not exist in industrialized countries.

These barriers may be classified as economic and social/institutional. Economic barriers to the use of energy management generally result in the under-valuing of the savings (or benefits) that may be derived from reduced energy consumption, the over-valuing of the costs of energy management practices or devices, or distortions during the computation of decision parameters (such as net present value, internal rate of return, and payback period) that use these benefits and costs. Economic barriers include:

- Ineffective or non-existing energy pricing and other policies;
- Protectionist import restrictions which prevent efficient technologies from reaching the marketplace;
- Requirements for high rates of return or short payback periods on capital investments; and
- Low capacity utilization factors for plant and equipment.

Social barriers are policy issues relating to the availability of appropriate human resources:

- Shortages of technically-skilled manpower;
- Lack of public and private sector institutions with capabilities in energy efficiency;
- A weak utility regulatory environment;
- Lack of public accountability of energy supply companies;
- Cultural constraints and resistance to change;
- Inefficient marketing structures for distribution of energy efficient technologies; and
- Widespread use of poor materials in construction and manufacturing.

Due to these barriers, many LDCs will improve their energy efficiency at a slow pace without additional insight, training, and technical and financial assistance.

II.B. Project Goal and Purpose

II.B.1. Project Goal

The goal of the EEP is to increase energy efficiency in order to enhance economic development in an environmentally sound manner.

II.B.2. Project Purpose

The purpose of the EEP is to provide technical and financing assistance to create the enabling environment for energy management and efficiency. EEP activities will

- Promote energy management technologies and techniques by providing a broad range of technical assistance, training, and information services;
- Develop and implement energy management measures; and
- Help A.I.D.-assisted countries use energy more efficiently by developing lasting local technical and management capabilities that can be applied to identify and implement cost-effective energy efficiency measures.

II. C. Expected Achievements and Accomplishments

In the recent past, a narrow focus on the growth of energy capacity to meet an increasing energy demand, when combined with low or subsidized prices, resulted in the installation and operation of systems or technologies that use energy inefficiently or in an environmentally unacceptable manner. When the price of fuel increases (as in the late 1970s), the financial demand on a country to continue to provide expected levels of service becomes excessive. In developed countries, the cost of these inefficiencies and concern over the environment led to legislation (such as mandated fuel efficiency for automobiles) and, when and where the increased prices were passed on to the consumer, voluntary efficiency improvement, conservation, or the installation of cleaner burning fuels/equipment (in terms of technological improvement or behavioral change).

In developing countries, this type of reaction is not always possible. Subsidized fuel prices cannot prudently be immediately removed, money for capital expenditures is not always available to institute technological advances even though the longer-term energy supply cost is less, and behavioral change is more difficult to institute when the social status is already at or below a minimally acceptable level. For these reasons, a consensus has developed in the scientific, donor, and environmental communities that energy efficiency improvements represent the most important near-term response to a host of energy-related problems, including the threat of global warming and the critical need to provide an increased supply of energy in a socially and fiscally responsible manner.

The EEP is designed to address these specific issues. The EEP will apply the advances made in the United States in energy efficiency to A.I.D.-assisted countries. The purpose of the EEP will be to create the enabling environment for the implementation of energy management technologies and techniques by providing a broad range of technical assistance, training, and information services that will include information dissemination; public education and awareness programs; technical training, energy audits and feasibility studies; policy development and institutional support; and technology demonstration projects. The EEP will be designed to help A.I.D.- assisted countries use energy more efficiently by developing lasting local technical and management capabilities which can be applied to identify and implement cost-effective energy efficiency measures.

On a sectoral basis, the EEP will target its assistance to four sectors: electric power, industrial, buildings (commercial and institutional), and transportation. In the power sector, EEP activities will be aimed at helping electric utilities to restructure their tariffs based on long-run marginal costs and to institute demand-side management programs to encourage load management and end-use efficiency. In the industrial sector, EEP will emphasize a multiple-benefit approach in information programs, management and technical training, technology transfer and "technical audits" designed to improve productivity, minimize waste, control emissions, and save energy. In the buildings sector, EEP will carry out similar technical audits and will also focus on new construction, through training of architects, development of building codes, and design of energy-efficient buildings. In the transportation sector, EEP will carry out studies of transportation efficiency, evaluate the energy impacts of transportation plans, and provide training and technical assistance in energy efficiency to fleet managers. Training that is provided under EEP for all four sectors will be primarily local and on-the-job, to complement the training provided under the Energy Training Program (ETP).

Anticipated accomplishments under EEP are presented below.

- Promote Energy Efficiency Awareness. The EEP will promote the awareness of the need for energy efficiency by disseminating information through preparation of regular publications and reports designed for a worldwide or regional audience.

- Provide Support for the Global Energy Efficiency Initiative. The Office of Energy is participating in the Global Energy Efficiency Initiative, a broad-based, worldwide program designed to create a dialogue by which support can be obtained from donor agencies on local policies and programs that address the threat of global warming. This program is being launched jointly by several U.S. government agencies (including A.I.D., the Department of Energy, the Environmental Protection Agency, and the Office of Technology Assessment), bilateral development agencies, multilateral development banks, nongovernmental organizations, and private voluntary organizations. The Initiative will be lead by a high-level steering committee whose role will be to provide concrete ideas on policy and project interventions to assist in controlling the emissions of greenhouse gases in developing countries and Eastern Europe. The EEP will support appropriate activities identified by the Steering Committee.

- Transfer Energy Efficiency Techniques. The EEP will transfer know-how on energy efficiency techniques through training courses such as workshops and seminars, to be provided in-country to national, regional, and global target groups. These could include planners, industrial and fleet managers, architects, engineers, equipment and operators. Transfer will also be achieved through trade missions.

- Conduct Energy Management Policy Studies. The EEP will create the enabling environment for energy efficiency in key countries by carrying out energy management policy studies designed to restructure energy prices, develop efficiency standards for energy-using plant and equipment, revise taxation policies, and determine the energy demand, and air quality impacts, of transportation and industrial development programs.

- Conduct Utility Demand-Side Management Programs. The EEP will design and implement electric utility-based demand-side management programs in the electric sector to promote the concepts of load management and the efficient use of electricity among the utility's customers.

- Support National Energy Management Programs. The EEP will identify, design, and promote national-scale energy management programs, such as least-cost energy planning programs or capital investments funded by multi-lateral development banks, by conducting pre-feasibility studies, technical audits, and preliminary engineering designs.

- Establish and Implement Generic Efficiency Measures Fund. As part of the EEP, a Generic Efficiency Measures (GEM) Fund will be established to carry out demonstrations of energy management investments that have wide applicability. In this way, the GEM fund supports the local private sector in its efforts to launch projects or businesses which promote or implement energy efficiency. Additionally, the GEM fund will support projects to serve as case studies for information dissemination to other developing countries.

II.D. Project Outline and Structure

The Energy Efficiency Project (EEP) is designed to apply the advances made in the United States to reduce end-use energy consumption to developing countries. Activities funded by the EEP to identify and correct inefficient energy end-use are focussed in two complementary areas: (1) those related to more efficient end-use hardware; and (2) those related to inefficient manufacturing and production processes. In both of these areas, emphasis will be placed on providing a broad range of services: technical assistance, information services, hardware sales, technology transfer, and training.

Initially, efforts in the A.I.D. Office of Energy will be used to introduce technologies related to load reduction, load control, and the monitoring of energy consumption. Energy efficient devices will be installed when inefficiencies are identified in selected applications. These efforts could range from straightforward low-cost/no-cost items such as high-efficiency lighting or piping insulation to more complex retrofitting with high-efficiency motors or combustors. At the same time, technologies must be introduced to allow end-users to identify sources and measure the magnitude of energy waste. For this type of demand-side energy reduction to have a significant effect on reducing the need for additional capacity growth, however, initial demonstration efforts must be followed by widespread implementation. For this to be cost-effective for a developing country, it must be followed by transfer of the technology with the necessary training element to allow host country private sector industry to manufacture and install a significant number of the energy efficient devices. The widespread implementation of end-use energy reduction technologies may require changes in government policies and/or the implementation of incentives to encourage investment in greater long-term national benefits rather than short-term individual savings. The EEP will also promote this type of initiative through the encouragement of national-scale energy management and planning programs.

Industrial process technology and control systems are continuously undergoing improvements that are relevant to developing countries for both the design of new plants and the retrofitting of existing plants. The manufacture of an energy efficient product in an energy inefficient process can consume more energy than the product will save over its useful lifetime. A complete "systems approach" must be taken to energy savings on a national scale. The EEP will apply U.S. expertise in process technology to identify "generic efficiency measures" (GEMs) that have wide applicability across industry in many developing countries.

Energy efficient technologies employ designs which provide the same level of service at a reduced energy input. High efficiency motors, air conditioners, refrigerators, pumps, compressors, lighting fixtures, and vehicles are not used in most LDCs. Load reduction equipment eliminates the need for some energy input to provide the same level of service. Load reduction can be achieved by upgrading insulation, building shading or orientation, window treatments, and improved process quality control. Load control equipment adjusts the timing and quantity of energy use to conform to the availability of lower cost energy supplies. Load control, or load management, is especially applicable to LDCs experiencing electricity shortages, as it stretches the available capacity. Industrial process technology and control systems are continuously being improved, and these improvements are relevant to LDCs in both the design of new plants and as possible revamping of existing plants. LDCs will benefit if new plants are built using modern processes and existing plants are upgraded to increase capacity, improve reliability, minimize wastes, and save energy. The objectives of GEMs will be to introduce advanced U.S. technologies in applications related to energy end-use, load reduction, load control, process technology, and the monitoring of energy consumption.

EEP activities will be balanced over all A.I.D. regions and will be focused on those countries with the greatest need within specific regions. The selection of a specific country will be based on many factors including economic development need, current levels of energy efficiency, level of expertise of counterparts and institutions, greenhouse gas emissions, level of installed technology, etc. In these efforts, the EEP will serve as a quick-reaction project, immediately responsive to requests for technical assistance from A.I.D. regional bureaus and missions and host country governments. The EEP will be executed in two parts:

(1) a services component implemented through one competitively bid technical assistance contract; and
(2) a funding component for generic efficiency measures (GEM Fund), implemented through a second competitively bid administrative contract.

The technical assistance contractor will provide assistance in project planning and tasking, technical support, information dissemination, policy research, specific activity identification and evaluation, technical audits, feasibility studies, research and development, and commercialization of energy efficient technologies, manufacturing processes, and management practices.

The fund administrator will provide assistance to promote investment in generic efficiency measures and to promote private enterprise development for the energy efficiency market. Grant/subcontract applications will be received from non-governmental organizations (NGOs) and the private sector in the U.S. and/or developing countries, on a first-come-first served basis. The proposals will be evaluated by an examining board based on technical merit, economic benefit, value to the country, fund matching, and replicability. The administrator of the GEM Fund will award grants/subcontracts, perform monitoring and follow-up assistance, and publish case studies. Typical EEP grants/subcontracts are

expected to be less than $200 K.

For PID approval, the Office of Energy intends to follow the Program Guidance as outlined in the October 1990 memorandum from S&T/PO. As per this memorandum, the Office will first obtain approval from the Sector Council. Still adhering to the S&T/PO memorandum, the Office will then form a Senior Program Review Committee composed of the Deputy Assistant Administrator, the Agency Director, and the Director of the Program Office. Other parties invited to review the process will include:

- The Director and staff of the Office of Energy;
- Office Directors with direct interest in energy conservation;
- S&T/PO staff to record the results of the review; and
- Representatives from PPC, General Counsel, Contracts Office, and the regional bureaus.

Over the 10-year EEP life-of-project, the energy sector can be expected to change substantially both worldwide and in each developing country assisted under this project. As stated in Section II, the EEP objectives apply to more efficient energy generation as well as more efficient energy end-use. Technologies will undoubtedly undergo improvement and upgrade as new options become cost effective and commercially available. The planned objectives, accomplishments and schedules enumerated in this PID and in the EEP Logframe must remain flexible enough to accommodate changes that reflect these improvements.

The project evaluation process is designed to keep USAID abreast of changes in technology and/or energy supply and demand requirements. Internal and external evaluations of the EEP will be used as means to improve the performance of all activities and to keep project accomplishments current with the most recent advances. On the lowest level, the evaluations of each project element will compare performance with expected achievements to assess the level of progress and the extent of realization of the estimated benefits. On a broader level, the evaluations will compare the current EEP project status with project purpose, broad project objectives, and goals, to ensure that they are still relevant to the current energy situation and any new projections for future changes.

In addition, scheduled external evaluations of the EEP will take place at 3, 6, and 9 year intervals. These formal evaluations will be conducted by teams of engineers, economists, and energy planners who are expert in state-of-the-art technologies and methods for increased efficiency in all aspects of the energy sectors of developing countries. They will be conducted in addition to the normal S&T/EY procedures of periodic internal review of the accomplishments and progress of all S&T/EY projects. The external EEP evaluations will investigate the activity of all organizations responsible for respective elements of the EEP: the technical assistance contractor and subcontractors, the host USAID Mission, and the cooperating country governmental and/or private sector institutions.

The primary purpose of these evaluations is to measure the extent to which EEP assistance

has contributed to the establishment of an environment conducive to energy management and efficiency in the A.I.D.-assisted developing countries. Quantification of energy efficiency improvements often requires careful monitoring over a long period of time. Even then, the causal relationship among improvements and the many factors that influence them is difficult to accurately assign to a specific project element. Nonetheless, advances in technology and changes in methodologies that result in energy efficiency improvements should be apparent over the EEP time frame. Periodic assessments of the EEP activities should be able to determine, in a general sense, if the advancements that were made approach those that were expected, and to offer options for changes and/or additions to the EEP to improve the effectiveness of future EEP activities.

The EEP will allow for unlimited buy-ins for all project elements, and in turn will permit the EEP to buy-in to Regional Bureau and other Mission projects and to tap the expertise of outside institutions on a specific case-by-case basis. Provision will be made in the EEP for Participating Agency Service Agreements (PASAs) and Resources Support Services Agreements (RSSAs) to help implement the program. In addition, the Office of Energy will use purchase orders, indefinite quantity contracts, and 8(a) contracts to carry out small tasks when necessary for the efficient conduct of the project.

The EEP has a 10-year life-of-project and a centrally-funded budget of $ 20 million. An additional $ 20 million is projected from unlimited buy-ins by USAID Missions for all project elements. Central funds are expected to "lead" to buy-ins, hence the ratio of buy-ins to central funding will increase over the life-of-project.

III. FACTORS AFFECTING PROJECT SELECTION AND FURTHER DEVELOPMENT

III.A. Social Considerations

Energy shortages in developing countries continue to have a significant impact on social development. The need to meet the demands of growing urban and industrial sectors is draining limited budgets and causing a reduction in the commitment of capital to other sectors such as agriculture, housing, health and education. Similarly, short-term considerations based on lower initial capital expenditure requirements or a desire for current power generation technologies often result in unwise decisions to provide additional energy sources which in the long-term causes a recurring cost drain on national budgets.

Energy conservation and efficiency offer a partial and extremely attractive solution to these problems. Conservation is an inexpensive, rapid way for most developing countries to reduce energy costs, stretch energy supplies, and save foreign exchange, thereby enabling these countries to focus their limited funds on other high-priority development needs. By producing more output with the same energy cost input, energy conservation promotes economic efficiency and improves the productivity and competitiveness of energy-consuming enterprises.

Energy conservation is also an excellent catalyst for increasing private sector involvement in the energy sector, by creating a niche that can be filled by local entrepreneurs. In addition, since international oil prices may continue to rise over the next ten years, all of the energy security issues that existed in the 1980's may become even more compelling during the next decade, forcing many governments to institute appropriate policy, institutional, and financial frameworks for promoting energy efficiency.

Energy efficiency measures also provide an important alternative for assisting countries in their search for energy solutions that do not contribute to global warming and environmental degradation. These technologies are environmentally benign and enable countries to provide the same level and quality of energy service, yet in a more efficient manner, and without harmful emissions of conventional energy options. By utilizing energy efficient technologies, countries are able to postpone expensive and time consuming capacity additions that may rely on fossil fuel.

III.B. Financial and Economic Considerations

The correlation between economic growth and energy supply has historically been based on the premise that increased per capita energy consumption is a measure of societal well-being. One reason for this premise was the strong historical correlation between energy use and gross domestic product (GDP). In 1980, primary energy use per capita averaged 6.3 kilowatts in industrialized countries but only 0.55 kilowatts in developing countries. Enticed by this apparent relationship, low- and medium-income developing countries, respectively, spent 61 percent and 37 percent of their export earnings on oil imports by 1981.[10] The budgetary effect is not just on imported fuel expense. In the electricity sector, the investment capital required for infrastructure additions can account for 25 to 40 percent of many developing country's budgets. Since export earnings are used to purchase technologies for industrialization and agricultural modernization, the effect of increased energy supply has actually been negative with regard to national development given their restricted capital. The reliance on energy supply as the catalyst for increased development has had a devastating effect on the economies of developing countries.

The assumption that improving human welfare necessarily requires greatly increased energy use should not be blindly accepted anymore. A decoupling of energy and economic growth is becoming apparent: between 1973 and 1985, total energy use per capita in industrialized countries fell an average of 6 percent while per capita GDP increased 21 percent. In some specific countries the difference was even more impressive: in Japan, a 6 percent reduction in per capita energy use was accompanied by a 46 percent increase in per capita GDP; in the United States the per capita percentages were a 12 percent reduction in energy use accompanied by a 17 percent increase in GDP.

This apparent de-coupling of energy supply and economic growth has been accomplished in large part by the exploitation of cost-effective opportunities for more efficient energy use. The relevance of these energy efficient technologies in developing countries has been questioned and their commercialization has been widely viewed as an inappropriate activity for developing countries. Two economic-related questions are asked: (1) would pursuing them not imply technological dependency on industrialized countries because most energy efficient technology is imported the same as fossil fuels, and (2) given the extra investment usually required to improve energy efficiency, isn't the use of this technology inappropriate where capital is scarce?

To address the first question, one must look at the implications of both energy supply and improved end-use efficiency. In most cases, the extra foreign exchange required for a more efficient end-use device will be more than offset by the resulting reduced foreign exchange requirements for new energy supplies. Also, in the more advanced developing countries, the

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10 J. Goldemberg, T. Johansson, A. Reddy and R. Williams, Energy for Development, World Resou rces Institute, September 1987.

manufacturing capability for many efficient end-use devices could be readily developed with technology transfer and the establishment of sufficient markets to interest the private sector. For example, the most efficient refrigerator-freezer available in the United States uses a Brazilian compressor - ironically, the Brazilian manufacturer markets a less efficient one domestically[11].

With regard to the second question, consumers usually do have to pay more for energy-efficient devices. However, from a national perspective, the savings in reduced energy supply far surpass the higher initial cost for these devices. This is partly due to the fact that energy supply costs increase with the discount rate because of interest charges accumulated during construction while the cost of energy efficiency devices declines with the discount rates because replacement devices need not be purchased until they are needed. Energy policy planning and infrastructure development will have to encompass this type of occurrence - financial incentives (subsidies) to consumers for the purchase of energy efficient devices makes more sense than subsidized fuel prices (which encourage energy waste) that are intended to reduce manufacturing costs and thereby increase the production of durable goods for export.

Innovative cost recovery and financing methods, changes to legislation and regulations, and movement away from traditional energy planning policy will most likely be required to encourage and sustain the implementation of energy efficient practices. Many of these implementations involve dedicated repetition of small changes - one builder installing energy efficient lighting has a negligible effect on reducing energy supply, but national regulations for all new construction that are rigidly enforced will have a great financial and economic effect. As a logical follow-on to the Energy Conservation Services Program (ECSP), it is an objective of the Energy Efficiency Project (EEP) to facilitate such changes on a national scale in cooperation with other A.I.D. projects such as the Private Sector Energy Development Project (PSED) and the Energy Training Project.

III.C. Relevant Experience with Similar Projects

The ultimate goal of A.I.D. is a world in which economic growth and development are self-sustaining and the extremes of poverty have been eliminated. A critical input to achieving this goal is adequate and affordable energy supplies. Several of the more traditional energy options used to satisfy these energy needs, such as coal and large-scale hydropower, require large capital expenditures that the host countries do not have (estimated in the hundreds of billions of dollars between 1988 and 2008[12]), and furthermore yield substantial negative environmental impacts. Energy conservation and

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11 H.S. Geller, The Potential for Electricity Conservation in Brazil, Companhia Energetica de Sao Paulo, 1985.

12 See U.S. Agency for International Development. Power Shortages in Developing Countries: Magnitude Impacts, Solutions, and the Role of the Private Sector. Report to Congress. March 1988. pp.9-10.

efficiency offer a partial, and extremely attractive solution to the problem of providing the energy necessary to fuel economic development while minimizing its economic and environmental impacts.

A.I.D. has structured its energy development programs to provide a balanced approach in assisting developing countries to meet their energy needs that seeks to (1) introduce more efficient ways of using existing energy resources, and (2) helps countries make economically and environmentally wise energy-system choices and investment decisions. In the conservation and efficiency area there are four major activities on-going within the A.I.D. Office of Energy that relate to the initiatives proposed under the EEP. These are

- the Energy Planning and Policy Development (EPPD) Project, which is expected to be completed in September 1992;
- the Private Sector Energy Development (PSED) Project, which was initiated in FY89 and has a project completion date of September 1994;
- the Energy Technology Innovation Project (ETIP), which was recently initiated and has a planned completion date of September 2000; and
- the Energy Training Project (ETP), which began in FY 87 and has a projected completion date of September 1992.

In addition to these A.I.D. Office of Energy activities, the EEP also relates to energy conservation and efficiency activities on-going at the mission-level. Each of these activities, and their relevance to the EEP, are discussed below.

1. EPPD Overview (936-5728). EPPD provides policy and planning support in all areas pertaining to the energy sector. The main focus of its more recent efforts, however, has been in least-cost investment planning in the power sector, environmental management, energy price reform, and the implementation of energy efficiency strategies related to these approaches. EPPD is one of two efforts under the Office of Energy's Energy Policy Development and Conservation Project (EPDAC); the second is the Energy Conservation Services Project (ECSP). The EEP is a natural follow-on to the ECSP activities.

EPPD provides technical assistance in seven areas:

- strengthening and expanding the Multi-Agency Group on Power Sector Innovation (MAGPI);
- promoting the concept of least-cost investment planning under capital constraints by accounting for risk and uncertainty;
- improving the efficiency and performance of electric power systems in developing countries and coordinating the A.I.D./New Delhi $15 million power efficiency program in India;
- encouraging price reform policies through the use of successful case examples;
- developing and strengthening institutions to promote technology innovation and commercialization programs, such as the Program for the Acceleration of Commercial Energy Research (PACER) in India;

- supporting technology assessment and pre-feasibility studies, including options for rural power delivery; and
- developing a program in environmental management.

Relevance to EEP. EPPD focuses on a broad range of policy and planning efforts in the power sector, whereas the EEP efforts are primarily demand-side in nature, in that they have impacts on a much wider range of end-users. These include the industrial, buildings (commercial and institutional), and transportation sectors, as well as the electric power sector.

(2). PSED Overview (936-5738). PSED has as its goal to stimulate and accelerate the development of private sector energy projects in developing countries. This entails identifying the potential for and the impediments to private energy development in selected countries, providing technical support in developing and implementing private energy policies and projects, cost-sharing feasibility studies, and collecting and disseminating information pertinent to private energy. The Office of Energy's efforts in promoting private participation in the energy sector address the following problems: shortage of public investment capital; inefficient parastatal institutions; policy barriers; lack of experience with private sector involvement; high risk and expense of developing private energy projects; and global climate change.

Relevance to EEP. PSED sets the stage for enhanced private sector project activities in the energy sector, particularly in power generation. In the course of these activities, private sector generators of electricity selling to a national grid for a contracted price will have an incentive to make their generation facilities as efficient as possible. EEP, by promoting energy management technologies and techniques in developing countries, can assist in providing the private sector with the information and support they need to identify, design, and implement cost-effective energy efficiency measures. EEP will also provide additional opportunities for trade in the U.S. private sector.

(3). ETIP Overview (936-5741). This new project will assist developing countries in the use of advanced commercial energy conversion technologies, power system control and management techniques, and conventional and alternative indigenous energy resources. As part of its activities, ETIP will help to reduce the discrepancy between energy demand and power sector growth in an environmentally benign and cost-effective manner. ETIP will support pre-feasibility studies, develop and implement innovative approaches to technology transfer, conduct management/operational assistance workshops, and catalyze economic/financial project components for private sector involvement within an acceptable institutional framework. Specific technologies and methodologies will be chosen for their applicability to indigenous energy resources, relevance to improving existing systems throughout the power sector, minimum impact on the environment, and economic suitability to specific conditions in developing countries. Implementation of these technologies and related activities will occur under four project components: clean energy technologies; innovation in efficient power generation, transmission, and distribution; technology transfer to rehabilitate current power systems; and improvement of power sector institutional

structures.

Relevance to EEP. ETIP focuses on innovative energy efficiency improvements in the supply and distribution stages of the power sector. ETIP complements activities planned under EEP that center on the demand side. EEP is also more focused on commercially available efficiency improvements in the electric power as well as other sectors.

(4). ETP Overview (936-5734). ETP offers formal training for practicing professionals in a variety of energy areas. These include energy management, exploration, engineering, production, utilization, policy and planning, conservation, and related topics. ETP designs energy-related training programs to meet the specific needs of governmental, parastatal, and private employers in developing nations. Additionally, in the future, ETP will expand its program to provide A.I.D. regional offices and mission staff with training in the energy and electric power fields. Training courses are usually provided in the U.S. and typically last from two to seven months.

Relevance to EEP. ETP offers a vehicle for providing comprehensive, formal training courses in energy conservation and efficiency to public and/or private sector officials that may be designated as requiring this assistance. Training and technology transfer proposed under EEP, however, will generally be on-the-job shorter-term courses, workshops, seminars, and hands-on instruction geared to the particular needs of a specific audience. The participants could include national, regional, and global target groups such as planners, industrial and fleet managers, architects, engineers, and equipment operators. Unlike the ETP courses that take place mainly in the U.S., the EEP technology transfer and training initiatives will occur overseas, in appropriate developing country locations.

(5). A.I.D. Missions. A number of missions are undertaking activities in their respective host countries involving energy conservation and efficiency. Some of these Mission activities have been designed and initiated under the predecessor to EEP. In some cases these are separate project initiatives, in other cases they have been conducted in cooperation with the Office of Energy.

Relevance to EEP. The EEP will provide expertise in the energy conservation and efficiency field to complement mission-level activities at several levels. First, at the macro-level, EEP will work with the missions and host countries to develop a policy and institutional framework conducive to conservation. Second, at the micro-level, EEP will assist countries to design and implement specific energy conservation and efficiency projects. Third, EEP will work on a cross-country basis to conduct specific analyses and applied research on major energy conservation issues, policies, and problems, such as energy pricing, innovative financing, private power, load management, and energy conservation investment decision-making. The EEP contract will enable the Office of Energy, and its contractors, to work with the missions and host countries either on an independent basis or through buy-ins.

In summary, EEP fills an important niche for energy conservation services at two levels within A.I.D. project and program activities. First, it provides support and technical

assistance for existing projects of the Office of Energy and the missions that have as an objective the consideration of conservation and efficiency components. Second, it expands conservation into a number of sectors (i.e., industry, buildings, power sector, transport, agriculture) that are either not being addressed, or are receiving insufficient attention, within existing or planned A.I.D. projects.

III.D. Implementing Agency

Within A.I.D., the EEP will become the management responsibility of a Project Officer in the Office of Energy. Activities completed will be in support of the energy efficiency and conservation theme of A.I.D.[13] Technical assistance will be provided to the Project Officer by the successful EEP contractor and selected independent consultants with specific expertise as required on a task-by-task basis.

The Office of Energy will share implementation responsibility for joint efforts through formal memoranda of understanding and/or contractual arrangements as appropriate. The broad range of activity that will be pursued under the EEP cross-cuts the entire set of A.I.D. Office of Energy goals and objectives. In addition, the EEP will be active in areas that are continually supported and funded by other international donor organizations. Therefore, close coordination within the Office of Energy in the planning and implementation of all energy-related projects is mandatory to maximize complementary returns and eliminate unnecessary overlap. Internationally, past ECSP collaboration with bilateral and multilateral donors and lenders will be continued to: leverage funds, develop practical projects, implement energy management projects, and identify private sector investments for bankable projects.

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13 Ibid. Program Plan: Fiscal Years 1990 and 1991.

III.E. A.I.D. Support Requirements and Capability

The EEP will be managed by S&T/EY, which will provide centralized project supervision and a mechanism for dissemination of project results as needed in the broader A.I.D. policy and programming process. The project staff will report directly to the A.I.D. Project Manager appointed by the Office of Energy. Provision will be made in the project budget for travel of A.I.D. direct hire personnel for project management purposes, including helping to negotiate grants/buy-in agreements, monitoring of contractor work, and staying abreast of developments in end-use energy efficient technologies and practices.

In cases of buy-ins, the EEP, as proposed, will not significantly affect the Mission staff requirements since the core staff and consultants will be sufficient to undertake project activities. Project support services on the part of participating USAID Missions are expected to be minimal.

III.F. Estimated Costs and Methods of Funding

The EEP will have a life of 10 years and an estimated budget of $40 million, with $20 million funded by S&T/EY, and $20 million from USAID Mission unlimited buy-ins and cost-sharing with private sector contractors. The project will be incrementally funded as shown below:

Fiscal Year	S&T/EY ($ Millions)	Buy-Ins ($ Millions)
1992	1.0	.05
1993	2.0	2.0
1994	2.5	2.5
1995	3.0	3.0
1996	3.0	3.0
1997	3.0	3.0
1998	2.0	2.5
1999	2.0	2.0
2000	1.0	1.0
2001	0.5	0.5
TOTAL	$20.0	$20.0

III.G. Design Strategy

The Project Paper will be developed under the direct guidance of A.I.D. S&T/EY by a team consisting of a Senior Energy Engineer, a Senior Energy Economic Advisor, and a Research Assistant. Following review and approval of the PID, the Project Paper team will precisely define project elements and incorporate information and comment from discussions with key A.I.D. Personnel (Deputy Director, Senior Physical Scientist, Energy Systems Analysts and Advisors, selected A.I.D. consultants) and other governmental and international agencies (CORECT, Departments of Energy and Commerce, the World Bank, the Inter-American Development Bank, etc.). The team will also analyze, and incorporate when appropriate, responses to facsimiles sent to key USAID Missions and Regional Bureaus.

To ensure close coordination within A.I.D., S&T/EY will assemble a Project Review Panel composed of one person from each Regional Bureau, one from PPC/PDPR, one from S&T/PO, and two from S&T/EY.

The Project Paper Design schedule is as follows:

PID Approval:	May 24, 1991
Draft PP for Review:	June 17, 1991
PP Approval:	July 15, 1991

S&T/EY recommends approval of this Project Identification Document (PID) and authorization to initiate the effort to develop the EEP Project Paper.

III.H. A.I.D. Policy Issues

Issues for further consideration during the Project Paper design phase of the EEP have been noted throughout the text of this PID. These include:

1. Financial and programmatic responsibility among the EEP and other related projects in the Office of Energy portfolio.
2. Coordination mechanism to establish the relationship of the EEP with country Mission and Regional Bureau energy efficiency projects, and among country Missions.
3. Interactions with the World Bank and other Multi-Lateral Development Banks.
4. The role of the private sector in both the host country and the U.S. in the EEP.
5. Strengthening the promotion of energy technology transfer.
6. Office of Energy and host country Mission management options and staffing needs for efficient implementation of the EEP.
7. Coordination with Office of Energy program evaluations, completion expected at approximately the same time as approval of the EEP PID.

III.I. Recommended Environmental Threshold Decision

Section 216.2(c)(2) of the Agency Environmental Procedures (22 CFR 216) lists the categories of Agency activities for which an Initial Environmental Examination, Environmental Assessment, and Environmental Impact Assessment are not required. This covers "(i) Education, technical assistance or training programs except to the extent such programs include activities directly affecting the environment (such as the construction of facilities); (iii) Analyses, studies, academic or research workshops and meetings; (xiv) Studies, projects or programs intended to develop the capability of recipient countries to engage in development planning, except to the extent designed to result in activities directly affecting the environment (such as the construction of facilities)."

Since this project encompasses technical assistance, training programs, analyses, studies, and development planning activities, it therefore falls under the categorical exclusions provisions of the Environmental Procedures. The EEP will not fund any activities that do not meet this exclusion. The Director of the Office of Energy therefore recommends that a negative determination be granted and that no further environmental investigations be taken.

RECOMMENDATION: _____ _____ 6-10-91

Negative Determination | Positive Determination | Date

III.J. Women in Development

In many parts of the developing world, policy decisions continue to be made affecting energy resource use which fail to take into adequate consideration the effects on all segments of society, including women. For example, changes in the power sector often impact cottage industry; both negatively, as with urban schemes to implement municipal solid waste as a feedstock, and positively, as with the introduction of rural village electrification using alternative energy sources. Since women are the primary persons involved with many of these cottage industries, the effects on them can be substantial. These effects can be measured by the degree of participation in cottage industries and the levels of income among urban and rural women, while controlling for other economic factors.

The lack of awareness of how people use natural indigenous resources, as well as the different gender impacts of policies, technologies, and institutional actions, has often led to poor investments in energy/power sector expansion. Often misunderstanding with regard to end-user customs and sensitivities (both male and female) has significantly reduced the benefits that should accrue from energy conservation methods throughout the energy/power sectors of developing countries.

As part of the EEP, policy analyses will be conducted which address some of these issues and, when relevant, specifically with regard to the impact on women. On-the-job training opportunities and attendance at workshops will be available to both men and women on an equal basis.

RECOMMENDATION: _____ Negative Determination _____ Positive Determination 6/10/91 Date

ATTACHMENTS

A. Logical Framework

PROJECT DESIGN SUMMARY - LOGICAL FRAMEWORK FOR THE ENERGY EFFICIENCY PROJECT (EEP)			
NARRATIVE SUMMARY	**OBJECTIVELY VERIFIABLE INDICATORS**	**MEANS OF VERIFICATION**	**IMPORTANT ASSUMPTIONS**
Project Goal: To increase energy efficiency in order to enhance economic development in an environmentally sound manner.	**Measures of Goal Achievement:** 1. 10% increase in product output for a unit of energy input. 2. 20% increase in efficiency of power generation, transmission and distribution. 3. 10% increase in end-use efficiency.	**Verification Through:** 1. Three, six, and nine year project evaluations. 2. Reports and statistics from relevant host country Ministries. 3. Annual reports on environmental quality. 4. Annual reports on energy usage and national productivity. 5. Periodic contractor reports.	**Assumptions for Achieving Goal Targets:** 1. Developing countries acknowledge that energy efficiency is a problem and that improvement can have a positive long-term cost-benefit. 2. Developing countries realize that environmental impact is a valid factor in the evaluation of energy supply and end-use. 3. Developing countries have a commitment to institute policies and programs at the national level to support energy efficiency measures in all sectors of the economy.
Project Purpose: To provide technical and financing assistance to create the enabling environment for energy management and efficiency.	**End of Project Status:** 1. The use of advances in energy efficiency and the implementation of energy conservation practices delays the need for new capacity expansion in at least 5 A.I.D.-assisted countries by 5 years. 2. The efficiency of the power sector is improved by at least 20 percent overall by improvements in generation, transmission, and distribution; load management; and end-use efficiency in at least 5 A.I.D.-assisted countries by FY97. 3. Host governments initiate dialogue and develop policies and programs that result in significant private sector involvement in energy conservation and the institution of demand management in large industrial facilities in at least 5 A.I.D.-assisted countries. 4. A better understanding of energy use patterns in buildings and the effectiveness of conservation in the transport sector is achieved in at least 5 A.I.D.-assisted countries.	**Verification Through:** 1. Three, six, and nine year project evaluations. 2. Reports and statistics from relevant host country Ministries. 3. Periodic contractor reports.	**Assumptions for Achieving Purpose:** 1. Sufficient number of A.I.D.-assisted countries and Missions are interested in the project. 2. Cooperation of host country governmental agencies, research institutions, financial institutions, and private sector companies in the power, industrial, building, and transportation sectors.

PROJECT DESIGN SUMMARY - LOGICAL FRAMEWORK FOR THE ENERGY EFFICIENCY PROJECT (EEP)			
NARRATIVE SUMMARY	**OBJECTIVELY VERIFIABLE INDICATORS**	**MEANS OF VERIFICATION**	**IMPORTANT ASSUMPTIONS**
Inputs: 1. Project Officer and support staff. 2. Technical Assistance Contractor and Generic Efficiency Measures (GEM) Fund Administrator. 3. Subcontractors and consultants for technical assistance. 4. Host country non-governmental organizations applying for GEM Fund grants. 5. Mission buy-ins. 6. Travel for A.I.D. direct hire personnel for project management purposes.	**Implementation Targets:** 1. Promotion of Energy Awareness: $2 M S&T/EY funding 2. Support for the Global Energy Initiative: $2 M S&T/EY funding 3. Energy Efficiency Technology Transfer: $2 M S&T/EY & $3 M Buy-Ins 4. Energy Management Policy Studies: $2 M S&T/EY & $3 M Buy-Ins 5. Utility Demand-Side Management Programs: $2 M S&T/EY & $3 M Buy-Ins 6. Support for National Energy Management Programs: $5 M S&T/EY & $6 M Buy-Ins 7. Generic Efficiency Measures (GEM) Fund: $5 M S&T/EY & $5 M Buy-Ins	**Verification Through:** 1. Three, six, and nine year project evaluations. 2. Reports and statistics from relevant host country Ministries. 3. Periodic contractor reports.	**Assumptions for Inputs:** 1. A.I.D. commitment of resources, both centrally funded and buy-ins. 2. Availability of appropriate management personnel, contractors, and consultants. 3. Approval and funding for necessary travel of A.I.D. personnel for project design and management purposes. 4. Approval for direct hires if required to support program expansion.
Outputs: 1. Generic analytical and practical planning tools and technical assistance methodologies to identify efficiency improvements that can be applied to country-specific problems. 2. Design, finance and implementation of energy management and conservation programs to reduce fossil fuel and electricity consumption. 3. Energy audits, building energy analyses, and analyses of the transport sector to develop data bases of country-specific energy use patterns for a better understanding of energy conservation potential. 4. Publication of informational material and completion of training programs that will develop lasting local technical and management capabilities to identify and implement cost-effective energy efficiency measures.	**Magnitude of Outputs:** 1. Five national-scale energy management programs. 2. Twenty Definitional Missions to identify possible energy efficiency measures. 3. Ten sector-specific energy management and conservation programs. 4. Fifty comprehensive energy audits and/or building energy analyses. 5. Five significant publications to increase awareness of energy efficiency and to inform host countries of U.S. technology and capabilities. 6. Ten in-country workshops and/or seminars in energy efficiency practices to update and maintain technical and managerial capabilities in host-countries.	**Verification Through:** 1. Three, six, and nine year project evaluations. 2. Reports and statistics from relevant host country Ministries. 3. Periodic contractor reports.	**Assumptions for Options:** 1. Cooperation of host country governments, non-governmental institutions, financial institutions, and private sector industry. 2. Ability to hire qualified staff, consultants, and long-term contractors. 3. Mission interest, cooperation, and buy-ins. 4. Approval and funding for necessary travel of A.I.D. personnel for project management purposes.