

13251

BY THE COMPTROLLER GENERAL

111922

Report To The Congress

OF THE UNITED STATES

U.S. Energy Assistance To Developing Countries: Clarification And Coordination Needed

The United States, through several U.S. agencies and support to international organizations, provides economic assistance to developing countries to help solve their energy problems.

Primary Federal agencies involved include the Departments of State and Energy, the International Development Cooperation Agency, and the Agency for International Development.

Energy assistance activities could be improved with the establishment of a comprehensive U.S. policy, clarification of the roles and relationships of the agencies, and better coordination among involved agencies and international organizations.



111922

009354



ID-80-7
MARCH 28, 1980





COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

B-197741

To the President of the Senate and the
Speaker of the House of Representatives

[This report focuses on United States economic development assistance to developing countries in the energy area. The report contains recommendations directed to the Federal agencies involved. This report also provides information on the status of implementation of Title V of the Nuclear Non-Proliferation Act of 1978.

Copies of this report are being sent to the Secretaries of State, the Treasury and Energy; the Directors of the International Development Cooperation Agency and the Office of Management and Budget; and to the Administrator of the Agency for International Development.

James R. Stata
Comptroller General
of the United States



D I G E S T

The United States does not have a comprehensive policy outlining its energy assistance activities with developing countries although efforts have been and are still being made to develop one.

There is a need for such a policy to clarify the

- type of bilateral assistance the United States will provide
- interrelationships of U.S. agency efforts, and
- interrelationships of U.S. activities with similar activities of international organizations and other donors.

Events of the 1970s have elevated the importance of energy issues and complicated U.S. activities as more agencies became involved in efforts to help developing countries meet their energy needs.

Increases in the cost of petroleum threaten the economic growth of many developing countries. Nuclear proliferation and accidents have increased the debate about developing nuclear power for civil uses. In rural areas, where the majority of people in developing countries live, wood for fuel is becoming scarce and increased demand contributes to deforestation and other environmental problems.

The Agency for International Development has recently focused its energy development assistance activities on renewable energy projects intended to benefit the rural poor. The new International Energy Development Program, guided by the State Department, but funded and managed by

ID-80-7

the Department of Energy, is intended, in part, to help developing countries avoid premature and/or excessive commitments to nuclear power. (See chs. 2 and 3.)

The International Development Cooperation Act of 1979, amending the Foreign Assistance Act of 1961, can help resolve policy and organizational issues. It states that U.S. development assistance is intended to respond to developing-country energy needs by helping increase the use of indigenous energy resources, including renewable sources, that benefit the poor directly. In addition, interagency groups such as the Development Coordination Committee and the recently established Interagency Task Force on Accelerated Energy Production in Oil Importing Developing Countries, are forums for continuing communication which may also support policy development. (See pp. 10, 11, and 23.)

GAO recommends that the Director of the International Development Cooperation Agency, in conjunction with the Secretaries of State, the Treasury, and Energy, and the Administrator of AID, ensure that a comprehensive policy on U.S. energy assistance in developing countries is formulated and promulgated. As an integral part of policy formulation, GAO recommends that the Director--as the principal advisor to the President on international development--seek clarification, in the form of an Executive order from the President, of the roles and responsibilities of involved organizations. The policy should also promote the effective coordination of the many international and bilateral donors involved in energy assistance. (See pp. 15, 16 and ch. 4).

The Administrator, Agency for International Development, should take action to ensure

that a clear AID policy is also developed and promulgated. Needed changes in the International Energy Development Program have been identified and should be incorporated in future program activities. In addition, the global need for the program should be determined and an appropriate long-term plan developed. (See chs. 2 and 3.)

The Nuclear Non-Proliferation Act of 1978, Title V, "United States Assistance to Developing Countries," calls for a variety of energy activities with and for developing countries. Ongoing U.S. activities are partially fulfilling the requirements. Executive branch officials believe that no new programs are required by the title. No new programs have been initiated in response to the title. (See pp. 6 through 9.)

Department of State, Department of Energy, International Development Cooperation Agency, Agency for International Development, and Office of Management and Budget representatives reviewed a draft of this report and generally agreed with the conclusion and recommendation calling for the formulation and promulgation of a comprehensive U.S. energy assistance policy. These officials also generally agreed with our conclusions and recommendation for agency program improvements. (See pp. 16, 17, 18, 37 and 38.)



C o n t e n t s

	<u>Page</u>
DIGEST	i
CHAPTER	
1	COMPREHENSIVE U.S. ENERGY ASSISTANCE POLICY AND MORE ORGANIZATIONAL COOPERATION NEEDED 1
	Introduction 1
	Scope of review 2
	U.S. activities 3
	Disagreement over AID and DOE organizational roles 4
	Title V of Nuclear Non- Proliferation Act of 1978: status unclear 6
	Origins of title V 6
	Status of title V 7
	Major effort to resolve issues 10
	Poor AID-DOE cooperation 11
	Institute for Scientific & Technological Cooperation: energy role unclear 15
	Conclusions and recommendations 15
	Agency comments and our evalu- ation 16
2	MAJOR CHANGES MADE IN AID PROGRAM BUT OVERALL POLICY LACKING 19
	Evolution of the AID program 20
	Bureau programs expanding 23
	Agency comments and our conclusions 27
3	DEPARTMENT OF ENERGY INTERNATIONAL ENERGY DEVELOPMENT PROGRAM--IMPROVEMENTS NEEDED 29
	Country-specific energy assessments-- major program activity 30
	Improvements needed in the energy assessment program 32
	Long-term planning and flexible scheduling 32
	Coordination and cooperation 35
	Conclusions and recommendation 37
	Agency comments 37

CHAPTER

		<u>Page</u>
4	EFFECTIVE INTERNATIONAL COORDINATION IN ENERGY ASSISTANCE NOT YET ESTABLISHED	39
	International organization	
	renewable-energy activities	39
	OECD coordination effort	42
	World Bank coordination meeting	43
	U.N. conference planned	44
	AID Africa Bureau donor workshop	45
	Energy assessments--coordination needed	45
	Agency comments and our conclusions	46

APPENDIX

I	Energy situation in developing countries	48
II	Additional information on the International Energy Development Program	51
III	Title V of the Nuclear Non-Proliferation Act of 1978	61

ABBREVIATIONS

AID	Agency for International Development
DOE	Department of Energy
ERDA	Energy Research and Development Administration
GAO	General Accounting Office
IDCA	International Development Cooperation Agency
IEDP	International Energy Development Program
ISTC	Institute for Scientific & Technological Cooperation
NNPA	Nuclear Non-Proliferation Act of 1978

NPT Treaty on the Non-Proliferation of Nuclear Weapons
OECD Organization for Economic Cooperation and Development
OMB Office of Management and Budget
U.N. United Nations
UNDP United Nations Development Program



CHAPTER 1

COMPREHENSIVE U.S. ENERGY ASSISTANCE POLICY

AND MORE ORGANIZATIONAL COOPERATION NEEDED

INTRODUCTION

Several events relating to petroleum, nuclear power, and traditional energy use coincided in the 1970s, elevating the importance of the energy issue, changing and complicating U.S. organizational involvement in developing-country energy issues, and making clarification of U.S. assistance policy essential. The events included

- the oil embargo in 1973 and subsequent price increases, as well as awareness of possible future shortages of oil;
- the recognized potential for civil nuclear power activities to be subject to accidents and use in weapons programs; and
- the shortages of traditional energy sources, such as wood for cooking, and environmental degradation resulting from accelerated use. (See app. I.)

These events roughly coincided with, or led to, changes in U.S. energy activities in developing countries. In 1973, the Congress mandated a shift in the Agency for International Development (AID) development assistance program that had a major impact on energy activities. Large scale projects that helped meet conventional energy needs, such as large hydro-electric dams, were no longer approved as the focus shifted to projects that more directly benefited the rural poor. Amendments to the Foreign Assistance Act in 1977 stressed renewable energy activities, such as solar water pumps. In addition, in 1977, a Department of Energy (DOE)-managed, national energy-assessment program was initiated, in part, to help selected developing countries avoid premature and/or excessive commitments to civil nuclear power.

U. S. involvement with developing-country energy issues, which may be based on a variety of U.S. objectives, such as conservation of world petroleum supplies, economic development assistance, and nuclear non-proliferation, continued to increase. In 1978, the United States supported initiatives at the Bonn Economic Summit to encourage the coordination of renewable energy assistance activities and the expansion of energy

assistance. (See p. 42.) In January 1979, the United States voted to expand a World Bank program to develop natural gas and petroleum. Most recently, a new U.S. organization, the Institute for Scientific and Technological Cooperation (ISTC), was authorized 1/ within the International Development Cooperation Agency (IDCA) framework to undertake cooperative research, including energy, with developing countries.

In addition to these activities, the United States participates in the energy activities of many international organizations such as: the Organization for Economic Cooperation and Development and the International Energy Agency; the United Nations organizations; and the North Atlantic Treaty Organization Committee on Challenges of Modern Society. The U.S. Export-Import Bank, the Overseas Private Investment Corporation, the Departments of Agriculture and the Interior, International Communication Agency, National Aeronautics and Space Administration, National Science Foundation, and the Peace Corps are also helping developing countries meet their energy needs. The Department of the Treasury manages U.S. participation in the international financial institutions. In addition, the United States plans to participate in the 1981 United Nations Conference on New and Renewable Sources of Energy, and DOE participates in cooperative technical exchange agreements with foreign countries, including a few developing countries. However, the primary U.S. assistance organization is AID, now a constituent of IDCA, and the primary U.S. energy organization is DOE.

SCOPE OF REVIEW

This review focused on the activities of AID and DOE, the primary operational agencies involved in energy assistance. Within DOE the primary economic development assistance type activity has been the pilot International Energy Development Program (IEDP). Internationally, DOE is also involved in many research and development activities which may affect developing countries and a few technical exchange activities with developing countries. Most of these activities (1) are justified on a mutual benefit basis, (2) involve major energy supplying developing countries and/or, (3) are for more general foreign policy purposes.

1/ ISTC was authorized by the International Development Cooperation Act of 1979 in August 1979 and established by Executive Order Number 12163 in September 1979. (See p. 15.)

Our audit work was directed primarily toward AID economic development assistance activities in energy in developing countries and the DOE IEDP. Specifically, we analyzed management of these activities and cooperation among the involved agencies. We also analyzed the coordination between U.S. agencies and selected international organizations. We interviewed officials of the Departments of State, the Treasury and Energy, AID, the Office of Management and Budget (OMB), selected international organizations, and the Peruvian and Philippine Governments. We analyzed reports, memorandums, and other documents at these agencies and organizations. We reviewed existing procedures and practices of AID in Washington, D.C., and at selected overseas locations. We analyzed the DOE IEDP activities in Washington, D.C., and in Peru, one of the countries participating in IEDP. Our examination also included a review of legislation and executive branch directives authorizing U.S. energy assistance activities. Audit work for this review was essentially completed by June 1979.

U.S. ACTIVITIES

The United States has provided support and funds for programs to help developing countries meet their energy needs. However, the United States has not clearly specified the extent to which U.S. activities will focus on the energy needs of the poor majorities, on overall national energy issues, and/or on renewable or other energy forms. Uncertainties over the kinds of activities to be carried out, the roles of involved U.S. organizations, and the intent of legislation, as well as different underlying agency program objectives, have contributed to this situation and to the absence of full and effective cooperation between the key U.S. organizations. Effective assistance to developing countries in energy, as with other assistance activity, depends to a great extent, not only on cooperation between key U.S. organizations but also on cooperation with other major donors and recipient countries. (See ch. 4.)

AID has expanded obligations for renewable energy activities and DOE has continued a pilot foreign policy program of national energy assessments in developing countries. No clear statement on the relationship of these two programs has been made, and full and effective cooperation between the organizations has not been achieved.

AID has been the U.S. foreign assistance organization and DOE is the U.S. energy organization, but other U.S. organizations are, or will be, involved in energy assistance

activities in developing countries. The State Department (State) has primary foreign policy responsibility. State has specific responsibility for coordination and oversight of all major science or science and technology agreements and activities between the United States and foreign countries and international organizations. IDCA was established by a reorganization plan in 1979 to place U.S. overseas economic-development activities under the guidance of a single agency. The IDCA director is the principal international development advisor to the President and to the Secretary of State. AID is a constituent agency of IDCA. Plans also call for IDCA to include the newly established Institute for Scientific and Technological Cooperation (see p. 15) and the Overseas Private Investment Corporation. In addition, IDCA has some responsibility for U.S. participation in certain international organizations, including the international financial institutions for which the Department of the Treasury has primary responsibility.

Furthermore, many developed countries and international organizations are now involved in energy-assistance activities. These activities have increased the need for coordination and although certain steps have been taken, more coordination is needed to insure that assistance is used for maximum effectiveness.

DISAGREEMENT OVER AID AND DOE ORGANIZATIONAL ROLES

In the past few years, AID and DOE have disagreed over their organizational roles with respect to U.S. energy activities in developing countries, despite formal agreements. (See p. 11.) The disagreement has been centered on IEDP, a DOE-funded program that conducts national energy assessments. IEDP is managed by the DOE Office of International Affairs and is guided by a State Department-chaired interagency group. 1/ There have been questions within the executive branch as to whether DOE, AID, or the State Department should manage this program. Disagreement has also existed over the extent to which AID should rely on, and deal directly with, DOE for technical expertise rather than develop its own network of energy experts.

1/IEDP is discussed in chapter 3 and also in app. II.

In adding the section on "Renewable and Unconventional Energy Technologies" (section 119) to the Foreign Assistance Act in 1977 (see p. 23), the Congress mandated that options for implementing that section be reviewed and that a report with recommendations be submitted. In response, AID asked the National Academy of Public Administration to study the options. This study discussed in detail four organizational options for carrying out section 119 activities: (1) a new International Energy Institute; (2) parallel programs by AID (for poor, developing countries) and DOE (for the more advanced, developing countries); (3) DOE as lead agency; and (4) AID as lead agency. The Academy concluded that the option of AID as lead agency, though not ideal, was preferable, given the unique experience of AID with technology diffusion and its existing capability of working closely with developing-country institutions. The Academy also recommended that if IEDP appears likely to become a substantial program, consideration should be given to merging it with the section 119 program.

The Development Coordination Committee--the U.S. inter-agency group established in 1973 to advise the President regarding the coordination of U.S. policies and programs which affect developing countries--met in January 1978 to discuss the energy issue. The committee accepted the recommendation that the section 119 program be the responsibility of AID, with DOE as the principal technical supporting agency and with the State Department providing overall foreign policy guidance. The then Acting AID Administrator informed the Congress that AID, in cooperation with DOE, had reviewed the options for implementing section 119, including the Committee position, and concluded that

"* * * we recommend that section 119 bilateral programs * * * be the responsibility of AID as the lead agency, with DOE as the principal supporting agency * * *."

In March 1978, the Congress passed the Nuclear Non-Proliferation Act of 1978 (NNPA) which, in title V, authorized assistance-type activities in developing countries. 1/ This

1/A reading of Section 502(d), together with the report on the legislation of the Senate Foreign Relations and Governmental Affairs Committees, (S. Rep. 95-467, p. 26) indicates that the title was intended to be carried out by DOE.

again raised the question regarding the lead organization for energy activities in developing countries.

A December 1978 report prepared by the Brookhaven National Laboratory, "Programmatic Areas for U.S. Assistance for Energy in Developing Countries," also commented on the need for overall policy resolution. The report stated:

"Further analysis, of a broad policy nature, and considering the full range of pertinent U.S. interests is required before firm recommendations can be made on the level and composition of energy assistance."

TITLE V OF THE NUCLEAR NON-PROLIFERATION
ACT OF 1978: STATUS UNCLEAR

More than 1-1/2 years after enactment of NNPA, the status of title V, which authorizes U.S. assistance to developing countries in the non-nuclear energy area, remains unclear. OMB staff believe that title V legal requirements are being fully met through activities funded under other legislation.

Origins of title V

The U.S. foreign policy on nuclear energy has been modified several times since the advent of the nuclear age. The 1946 Atomic Energy Act forbade the export of nuclear technology for industrial purposes. In the early 1950s, "Atoms for Peace" activities were initiated to expand controlled nonmilitary use of nuclear technology. Later, in 1968, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), recognizing that civil uses of nuclear power were subject to diversion to nonpeaceful activities, attempted to reduce nuclear weapon proliferation by agreement. India's 1974 explosion of a nuclear device raised new concern over proliferation and the need to strengthen controls. Subsequently, NNPA was enacted, which represents the most recent U.S. strategy for controlling the spread of nuclear weapons.

Title V of NNPA, "United States Assistance to Developing Countries," first appeared as an amendment to the Senate bill, the Nuclear Non-Proliferation Act of 1977. The amendment was added by the Senate Committees on Foreign Relations and Governmental Affairs because, as they reported:

"Title V stems from the recognition that the first step in any non-proliferation strategy aimed at developing countries should be to cooperate with and aid such countries in identifying non-nuclear alternatives for meeting their energy needs. In general, countries that can meet their energy requirements through indigenous, non-nuclear resources should be encouraged to do so consistent with environmental considerations. Past U.S. policies have emphasized nuclear energy--a natural consequence of our commitment to spread the benefits of nuclear power throughout the world and to fulfill Article IV of the NPT which calls for the fullest possible exchange of nuclear technology with due consideration for the needs of developing countries. The spread of nuclear technology was also facilitated by low-interest Eximbank loans for the purchase of reactors as well as extensive technical training in nuclear technology for foreign students.

"Title V is designed to balance these policies by offering cooperation and assistance in developing indigenous non-nuclear energy technologies, with priority being given to NPT parties. In addition to the contribution which these efforts would make to non-proliferation, such assistance will promote political and economic stabilization in developing countries through reduction of their dependence on foreign oil and highly capital-intensive technology, and will accelerate the availability and utilization of renewable energy technology (i.e., solar and biomass) with accompanying technological improvements." (Emphasis added.)

During congressional deliberations on NNPA, the executive branch position on title V was that:

"The Administration is wholly committed to the purposes of this title but believes that all necessary authority to carry out its programs already exist. The Administration intends to make vigorous use of this authority and does not believe that Title V enhances its ability to implement such programs. We therefore urge deletion of this Title."

Status of title V

Although title V was included in NNPA as passed by the Congress and signed by the President, executive branch offi-

cials have not assigned specific responsibility for implementing provisions of the title.

In March 1978, a State Department-proposed Executive order on NNPA was circulated within the executive branch. Full agreement could not be reached, and only the policy section 501 reporting requirement was assigned to the State Department in the order that was finally issued.

AID officials disagreed with the proposed Executive order because the program activities were not delegated to AID. It appears that AID perceived the title V authorization for DOE activities as a challenge to its traditional development assistance responsibility and has tended to resist rather than cooperate with DOE. State Department and DOE officials have stated that the intra-executive branch controversy over whether AID, DOE, or the State Department should control IEDP has probably contributed to indecision on title V assignment. According to OMB staff, the executive branch continues to consider title V unnecessary.

Title V discusses many activities. Section 501 calls for: U.S. cooperation with other nations, international institutions and private organizations to assist in developing non-nuclear energy; cooperation with, and assistance to developing countries to meet their non-nuclear energy needs by developing their resources and by applying non-nuclear, indigenous, economical, and environmentally sound technologies; cooperation with other nations to protect the environment from contamination arising from energy activities; and promotion of similar commitments for cooperation and assistance to developing countries by other U.S. nations. This section also requires an annual report on U.S. activities.

Section 502 calls for a specific energy cooperation program and section 503 requires another report, this one on the feasibility of establishing an international cooperative technical exchange effort.

While a specific program has not been initiated to implement title V provisions, OMB staff identified the following activities which they believe meet title V requirements:

--AID energy assistance projects in developing countries. (See ch. 2.)

--DOE International Energy Development Program of national energy assessments. (See ch. 3.)

- U.S. Economic Summit initiatives to increase international energy assistance and coordination and OECD followup. (See p. 42.)
- The Institute for Scientific and Technological Cooperation collaborative energy research. (See p. 15.)
- World Bank program to assist developing countries in using their fossil fuel resources. (See p. 41.)
- Overseas Private Investment Corporation loan guarantees for energy activities in developing countries.

These activities were cited in the President's January 1979 report on the entire act titled, "Report of the President to the Congress Pursuant to Section 601 of the Nuclear Non-Proliferation Act of 1978." None of the activities identified by OMB, however, were initiated, funded, or justified as title V programs. For example, the AID program and IEDP were already in effect when NNPA was passed and they have continued to assist developing countries in the energy area. Although not established pursuant to the NNPA, IEDP also claims nuclear non-proliferation benefits. (See p. 29.)

An OMB staff member stated that the President's report also met section 501 reporting requirements. The report included an International Energy Agency-prepared inventory of member-country activities related to renewable-energy assistance to developing countries. It did not, however, address the relationship of other nations' commitments to U.S. efforts, as called for in the section 501 reporting requirement of the act. Specifically, it did not discuss how U.S. activities in developing countries related to such activities of other donors in these countries. Section 503 called for the President to report by March 1979 on the feasibility of establishing an international cooperative technical exchange effort including a scientific peace corps. As of November 1979, the required report had not been submitted. An OMB staff member stated that the Development Coordination Committee had submitted background information relating to the exchange program, but OMB had not yet completed the report.

MAJOR EFFORT TO RESOLVE ISSUES

A major Development Coordination Committee effort requested by OMB to develop and agree upon U.S. energy-assistance activities and organizational roles failed in early 1979. OMB elected to use the preparation of the report called for in NNPA as a vehicle for developing the U.S. energy policy toward developing countries and for reaching agreement on organizational roles. OMB requested that the Development Coordination Committee prepare the report. The Committee, in turn, delegated report preparation to the AID/State/DOE steering group. (See below.) The Committee returned two drafts to that group for revision because organizational role issues, although discussed, were not resolved. At a January 1979 meeting of those U.S. organizations interested in developing countries, the Committee was unable to gain approval of an acceptable final draft that resolved the issues. It did not, therefore, formally submit the report to OMB.

The issue regarding the most appropriate organization to carry out IEDP national energy assessments in developing countries continued as a point of disagreement. Committee officials believe that the fact that DOE was not a regular Committee member did not place it outside the Committee. A 1979 amendment to the Foreign Assistance Act of 1961 directs that DOE become a committee member. Nevertheless, it is unclear whether this action will resolve the organizational issue as long as it is maintained that IEDP has major non-development assistance objectives such as nuclear non-proliferation and reduction in petroleum dependence. A clear, comprehensive U.S. policy specifying organizational roles, however, could help resolve the issue.

The existence of an AID/State/DOE steering group on energy activities in developing countries provides another forum for productive interagency discussions even though its efforts to resolve the organizational issues have also been unsuccessful. The group was established in 1977 as an AID-Energy Research and Development Administration (ERDA) (now DOE) steering group, although a State Department representative routinely attended meetings. In August 1978, the State Department formally became a member. Meetings are held at the AID assistant administrator and equivalent DOE and State Department levels, and at the staff level, with a rotating chairperson. Representatives of the three agencies also attend the interagency group established to guide IEDP. (See p. 29.)

Another interagency group was recently established. Subsequent to completion of our audit work, the National Security Council directed, in October 1979, that an interagency group be established under the leadership of an IDCA designee in order to obtain systematic recommendations and monitor performance by operating agencies with respect to energy development in developing countries. According to an IDCA representative, this interagency group--the Interagency Task Force on Accelerated Energy Production in Oil Importing Developing Countries--has met and is working on recommendations for U.S. policy options with respect to energy development in developing countries. The IDCA representative also stated that agency roles and responsibilities, although not explicitly stated, will be implicitly decided as priorities and U.S. policy are decided.

POOR AID-DOE COOPERATION

AID has not been, generally speaking, using DOE as a primary resource in planning and implementing energy activities even though the Foreign Assistance Act of 1961, as amended, and a formal interagency agreement emphasize that there should be cooperation. Section 119 of the act called for AID to

"* * *coordinate with the Department of Energy, to the maximum extent possible, the planning and implementation of energy programs authorized under this chapter, including Section 107, and shall consult with the Department of Energy, on such planning and implementation."

In January 1978, the AID Acting Administrator informed the Congress that AID and DOE had reviewed options for implementing section 119 as well as the Development Coordination Committee position. (See p. 5.) He stated that

"* * *we recommend that section 119 bilateral programs for cooperation with developing countries in energy production and conservation be the responsibility of AID, as the lead agency, with DOE as the principal supporting agency particularly providing technical services and with the overall foreign policy guidance of the State Department." (Emphasis added.)

In November 1976, AID and ERDA officials signed a Memorandum of Understanding which stated that because of their

"responsibilities and mutual interest in international energy cooperation," they agreed to "cooperate in the formulation and execution of strategies, plans, programs, and projects of mutual interest."

In September 1977, this memorandum was formalized in a General Agreement for cooperation between AID and ERDA, and a steering group was established to coordinate their efforts. This interagency agreement and the legislative mandate, however, have not resulted in full interagency cooperation.

A 1978 report of the House Committee on International Relations commented on the Committee's disappointment with reports of a lack of cooperation and coordination between AID and DOE. During our review, several examples of less-than-complete cooperation and coordination were noted. Even though the Congress instructed AID to coordinate with DOE in planning its energy programs, we learned that officials in the DOE International Affairs Office had difficulty obtaining information from AID. Although these officials said they asked for information on AID energy plans, AID provided only a list of project titles. In early March 1979, they still had not received additional information. AID had not even sent them the project activity sheets included in the AID fiscal year 1980 presentation sent to the Congress in mid-January 1979. (It should also be noted, however, that the congressional presentation is a public document and DOE officials could have taken the initiative to order a copy themselves.) When we asked DOE officials about one new project described in the congressional presentation as a national energy assessment for the Dominican Republic that DOE could implement, they said they did not know about their role in it. AID Office of Energy officials contacted were also unaware of the project.

In October 1978, AID issued a request for proposal for indefinite quantity contracts to

"* * *provide AID and/or cooperating agencies with short-term advisory services relating to the planning, design, analysis, implementation, performance, and evaluation of programs and projects (both conceptual and technical) and related Agency policies and procedures in the field of Energy."

Services requested were for (1) energy assessment, planning and policy-resources, utilization, and sociological and

institutional development and (2) energy engineering technology-development, implementation, operation, management, and evaluation. The proposal announced the intention of AID to award 14 two-year contracts, with a minimum amount of \$3,000 to \$350,000 per year each. A wide range of energy specialists were to be available, including energy technologists and others in

"* * *specific energy source/resource/trans-
formation/conversion/utilization fields * * *"
fossil fuels * * * solar * * * hydro * * *,"

DOE International Affairs officials told us they were not consulted by AID before the request was issued, nor were they informed by AID that it would be or had been issued. In fact, the DOE officials first learned about the request from officials in Department-administered national laboratories who called to ask if there would be any conflict of interest in bidding for the AID work. Further, the issuance of the request for proposal took place at the same time that AID was arranging a resources support services agreement with DOE. When we asked a responsible AID Office of Energy official why this had occurred, he responded that AID wants to be flexible in acquiring energy expertise and plans to test the cost-effectiveness of two approaches--through the agreement with DOE (see below) and through contracts with other organizations.

On September 29, 1978, DOE and AID signed a resources support services agreement for \$539,000 for fiscal years 1978 and 1979. The purpose of this agreement was

"* * *to secure DOE's technical, engineering and management expertise in energy areas, as required, for the implementation of energy assistance activities in and for developing countries."

The AID Office of Energy has overall management responsibility for the agreement; the DOE implementation unit is under the Office of the Assistant Secretary for International Affairs. We asked the Office of Energy about the status of the agreement halfway through fiscal year 1979 and learned that little use had been made of it.

This agreement calls for DOE to provide AID with four types of support services. The first is for DOE personnel to help formulate solar and urban energy programs. The initial need cited is for "one person knowledgeable in urban energy

needs, in particular, solar heating and cooling of moderate-to-large buildings." AID requested a particular DOE employee in November 1978, but DOE did not feel this person was the most appropriate for the job. As of July 1979, the two organizations were still unable to resolve the issue, and no DOE expert had been assigned to AID. It also called for a "series of reports on the overall general energy situation in and for developing countries." About five studies were anticipated in fiscal year 1979. In our discussions with DOE officials during the first 6 months of fiscal year 1979, they told us that AID had not informed them what five studies would be requested. The responsible AID Office of Energy official acknowledged that study topics had not been determined.

The third part of the agreement is for "short-term technical support and services." As of July 1979, AID had authorized expenditure of only \$26,500, although provision was made for \$98,533 for technical consultants. A major effort to use the agreement did not materialize. In December 1978, AID had requested DOE services in connection with a renewable energy project in Thailand. In February 1979, however, AID notified DOE that because of delays in identifying a team leader and the tight timeframe imposed by AID's desire to fund the project in fiscal year 1979, the request for DOE assistance was withdrawn. In addition, in December 1978, AID requested that DOE review all ongoing and new AID projects to identify (1) energy projects and components, (2) areas where further study is needed, and (3) how each project relates to various U.S. policies regarding energy initiatives in developing countries. DOE proposed a \$30,000 study. An AID Office of Energy official told us this was too costly and that the study was not needed.

AID regional bureaus have made some use of the agreement. The Africa Bureau used personnel from the Solar Energy Research Institute, a DOE national laboratory, in initial planning for a project in Mali, which will be carried out by the institute under a separate, participating-agency service agreement. The Near East Bureau arranged for DOE to study options for renewable energy cooperation in the Middle East. In summer 1979, discussions were underway for DOE to provide experts to a team planning a major AID renewable-energy project in Egypt--a country in which DOE had just completed an energy assessment. (See p. 58.) A responsible DOE official, however, was disappointed that DOE was not playing a large role in the feasibility study.

INSTITUTE FOR SCIENTIFIC AND TECHNOLOGICAL
COOPERATION: ENERGY ROLE UNCLEAR

With authorization for establishment of ISTC as part of IDCA, the basis exists for yet another U.S. organization to become involved in developing-country energy activities. The President established ISTC by Executive order in September 1979. However, as of February 1980, the Congress had not specifically appropriated funds for the Institute. Plans call for this new institute to be able to work with the more advanced developing countries, as well as the poorer countries, and on urban as well as rural problems. ISTC may focus on (1) collaborative energy research with developing countries, (2) assessment of the economic, technical, and social feasibility of new energy technologies, and (3) studies of energy sources for urban areas.

The activities that would be transferred and the relationships and links among the AID, ISTC, and DOE energy activities had not yet been worked out at the time of our audit, but potential for overlap and duplication exists, particularly between ISTC and the AID Office of Energy projects. The AID Office of Energy, for example, plans to test the cost effectiveness and feasibility of solar, hydro (small-scale), and biomass renewable-energy technologies in several incountry projects, and the 1979 amendments to the Foreign Assistance Act authorized up to \$7 million for geological and geophysical energy-survey work. Early ISTC plans also consider areas such as the economic and technical feasibility of renewable (solar, biomass, etc.) and new fossil-fuel technologies.

CONCLUSIONS AND RECOMMENDATIONS

The United States does not have a comprehensive U.S. policy on energy assistance activities in developing countries. A comprehensive U.S. policy on energy assistance to developing countries is needed to help maximize the benefits of U.S. assistance efforts. This policy should clarify roles of involved organizations and promote coordination and cooperation between U.S. agencies and between the United States and other international donors.

At the completion of our audit, we suggested the formulation and promulgation of a comprehensive U.S. energy assistance policy. Since that time, the International Development Cooperation Act of 1979 has been enacted and the executive branch has established an interagency task force to support the development of energy policy. The International Development Cooperation Act of 1979 can help to resolve policy and organizational issues; however, it may

also add to confusion. We recognize that several mechanisms exist, such as the Development Coordination Committee and the previously mentioned Interagency Task Force on Accelerated Energy Production in Oil Importing Developing Countries, which can provide input for developing U.S. policy. We also recognize that efforts have been, and are being, undertaken to develop a U.S. policy. We believe such efforts should be continued.

We recommend that the Director of IDCA--as the principal international development advisor to the President--in conjunction with the Secretaries of State, the Treasury, and Energy, and the Administrator of AID ensure that a comprehensive policy on U.S. energy assistance activities in developing countries is formulated and promulgated. We recommend that the Secretaries of State, the Treasury, and Energy, and the Administrator of AID work with the Director of IDCA to accomplish the recommended actions.

The roles of involved organizations are not completely clear and full coordination and cooperation between the two key operating agencies, AID and DOE, has not occurred. Therefore, as an integral part of policy formulation, we recommend that the Director of IDCA seek clarification, in the form of an Executive order from the President, of the roles and responsibilities of involved organizations. The resulting policy should also promote coordination of the large number of international and bilateral donors also involved in the energy assistance area. (See ch. 4.)

AGENCY COMMENTS AND OUR EVALUATION

We gave a draft of this report to the Secretaries of State and Energy, the Directors of IDCA and OMB, and the Administrator of AID. We obtained comments from these organizations at subsequent meetings and incorporated their comments, suggestions for clarification and updated information as we deemed appropriate in the text and in separate agency comments sections of the report.

In commenting on our draft report, the Departments of State and Energy, AID, and OMB generally agreed with our observations and our suggestion regarding the need for a comprehensive U.S. policy on energy assistance activities in developing countries. IDCA also agreed with our suggestion that a comprehensive policy be formulated and promulgated.

Department of State officials commented that a recent draft report prepared for the Development Coordination Committee (see p. 10) represented a step toward the development of the suggested policy. IDCA commented that it had begun drafting policy options through the Interagency Task Force on Accelerated Energy Production in Oil Importing Developing Countries and added that many of the problems mentioned in this chapter have been, or are being, resolved. OMB commented that the absence of a comprehensive policy on energy assistance should not be unexpected in the relatively new energy area. AID also emphasized the newness of the renewable energy area as an assistance priority and commented that the role of energy in development is evolving. AID added that little more than a year has passed since AID initiated its renewable energy planning and selection activities. We believe this concern about the renewable energy assistance area makes coordination and cooperation--between U.S. agencies, with other donors, and with recipient countries--even more important. Coordination and cooperation can help to prevent duplication and can maximize assistance benefits.

DOE and AID commented that relationships between their organizations had improved significantly since completion of our audit and that officials better understood respective organizational roles. AID added that the role disagreement was limited to the DOE IEDP activity and that in other areas, such as DOE technical cooperative exchanges with developing countries and the AID use of DOE national laboratory expertise, AID officials are clear on respective organizational roles and have not had disagreements with DOE. AID also stated that the AID/State/DOE interagency steering group has been a very successful information exchange and coordination source. Notwithstanding the claims of improvement in DOE-AID relationships, we believe further role clarification is still needed. State Department representatives reflected a similar observation by commenting that, although AID-DOE relationships have improved, more cooperation is still needed.

AID believes that they have been using DOE appropriately as a primary resource in the energy area. AID cited an interagency agreement in which AID had made 10 requests totaling \$375,000 for DOE assistance and AID use of DOE national laboratories as examples of AID use of DOE. We agree that AID has been using DOE as a resource in the energy area but believe legislation and interagency agreements encourage more coordination and cooperation than is occurring. With respect to the above-mentioned interagency

agreement, at the completion of our audit, about half of the requests had resulted in actual activity. Our analysis of DOE-AID cooperation, including the interagency agreement cited, is discussed on page 11.

CHAPTER 2

MAJOR CHANGES MADE IN AID PROGRAM

BUT OVERALL POLICY LACKING

AID has an expanding renewable-energy assistance program, but the extent to which it should assist developing countries with conventional energy needs has been a topic of discussion and disagreement within the agency. This issue became intra-governmental because the IEDP national energy-assessment program was lodged in DOE, and some AID officials believed AID could better manage the program.

The International Development Cooperation Act of 1979, passed by the Congress in August 1979, provides a basis for resolving the issue by authorizing the United States to help countries use indigenous resources (including oil, natural gas, and coal) while continuing to stress renewable-energy sources. Further, AID officials have told us that the agency has been working to develop an energy policy. We believe (1) the major shifts in the AID energy-assistance program (from conventional to renewable-energy activities), (2) the involvement of other U.S. agencies as well as other international donors in providing energy assistance, and (3) the increasing importance of the energy issue, make it important that AID develop a clear agency energy policy. This needs to be done in the context of an overall U.S. policy, discussed in chapter 1. A summary of the energy situation in developing countries is provided in appendix I.

AID has advanced rapidly in the area of renewable energy even without an overall energy policy and program. Obligations in the renewable-energy category rose from only about \$.825 million in fiscal year 1977 to almost \$19 million in fiscal year 1978; planned obligations for fiscal years 1979 and 1980 are about \$26 million and \$43 million, respectively. This dramatic increase reflects the high level of congressional interest, and AID's perception of this interest and its own awareness of the energy needs of developing countries. Energy projects are planned by regional bureaus and the Development Support Bureau. Rounded actual and estimated obligations for renewable-energy activities follow.

AID ENERGY OBLIGATIONS

<u>Bureau</u>	<u>FY 1978</u>	<u>FY 1979</u>	<u>FY 1980</u> (estimated)
	----- (millions) -----		
Asia	\$ 11.0	\$ 6.0	\$ 13.3
Africa	4.7	3.9	6.7
Latin America/Caribbean	.5	3.0	6.5
Near East	.2	2.5	1.4
Development Support (Office of Energy)	2.3	10.5	14.5
Other	<u>-</u>	<u>.1</u>	<u>.3</u>
Total	<u>\$ 18.7</u>	<u>\$ 26.0</u>	<u>\$ 42.7</u>

EVOLUTION OF THE AID PROGRAM

The 1973-77 period was one of transition for the AID energy program. In the 1960-73 period, AID energy assistance totaled about \$815 million, according to our analysis of AID-provided data. About \$520 million was spent on projects identified as power plants or stations, thermal plants or coal projects; over \$175 million on hydro-electric plants; \$25 million on rural electrification projects; and \$45 million on transmission and distribution systems. In addition, nuclear related projects totaled \$3 million, and training and other projects totaled \$47 million.

The Foreign Assistance Act of 1961 was amended in 1973 to focus on the fundamental problems and basic needs of the majority of people in developing countries--the rural poor. The New Directions legislation concentrated development assistance in three major sectors--food and nutrition; education and human resources development; and population planning and health. Assistance projects subsequently proposed for capital-intensive energy activities, such as dams and power plants, were not approved because they were inconsistent with the main emphasis of the new legislation. (Unless otherwise indicated, assistance refers to development assistance. Economic Support Fund--or security-supporting assistance--not limited by the New Directions amendments, continues to be provided for capital-intensive energy projects. Economic Support Fund assistance can be defined as economic assistance provided to certain countries or areas supporting U.S. security and political interests.)

In the early to mid-1970s, AID began a few renewable-energy projects. For example, it contracted with the National Science Foundation for a report, "Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries." AID also contracted with Arthur D. Little, Inc., for the report, "An Overview of Alternative Energy Sources for LDCs."

The Congress soon began amending the Foreign Assistance Act to focus attention on the energy needs of developing countries. In 1975, the Foreign Assistance Act was amended, as follows.

- Section 103 (Food and Nutrition): A new subsection was added which stated that assistance under that section should be used primarily to increase the production and income of the rural poor, through such means as "* * * expansion of local or small-scale rural infrastructure and utilities such as farm-to-market roads, land improvement, energy and storage facilities * * *."
- Section 106 (Selected Development Problems) was retitled "Technical Assistance, Energy, Research, Reconstruction, and Selected Development Problems" and was rewritten. Whereas it had previously authorized activities in the "power sector," it now called for "programs to help developing countries alleviate their energy problems by increasing their production and conservation of energy through such means as research and development of suitable energy sources and conservation methods, collection and analysis of information concerning countries' potential supplies of and needs for energy, and pilot projects to test new methods of production and conservation of energy."
- A new section 107 was added authorizing activities in the field of intermediate technology to "* * * promote the development and dissemination of technologies appropriate for developing countries* * *." (Emphasis added.)

The Office of Science and Technology in the former AID Technical Assistance Bureau developed AID's first large renewable energy project, energy needs in the food system. As defined in May 1976, the project was to consist of three field hardware activities, four country-specific analyses, and a summary report, at an estimated cost of \$1.1 million. After

it assumed management of the project, the Office of Energy in the new Development Support Bureau extended the completion date from January 1979 to June 1980 and amended the project scope. Project activities were: a solar cooker for use in Haiti; energy-generating systems in Nepal, using methane from human and animal wastes; and a photovoltaic, solar-powered grain grinder and water pump in an Upper Voltan village.

The analysis component of the project began in early fiscal year 1977. Under an AID participating agency service agreement with ERDA (later DOE), Brookhaven National Laboratory was to lead a consortium of institutions in setting up studies that monitor four nations' energy systems and energy's role in the national economies and food systems. Actions AID should take to encourage more efficient use of conventional energy resources and new technologies and actions to provide energy from alternative sources were to be suggested. One study began in July 1978 in Senegal; completion was scheduled for January 1980. Work in the Dominican Republic was to be finished in March 1980. In lieu of one country study, Brookhaven prepared a report required by the Congress on the energy needs, uses, and resources in developing countries. The fourth study may not be done.

In the fall of 1977, AID again engaged the Brookhaven National Laboratory to design, test and evaluate a prototype course in energy management, planning, and assessment for senior-level energy planners and administrators from developing countries. The first course, in the fall of 1978, was attended by 28 senior AID-sponsored officials from 21 developing countries (including some nations not receiving AID assistance). The fiscal year 1979 cost for two classes is estimated to be \$650,000. The project is continuing.

In 1977, a new section (119) was added to the Foreign Assistance Act of 1961 on "Renewable and Unconventional Energy Technologies." Section 119 authorized use of up to \$18 million for

"* * * cooperative programs with developing countries in research, development, and use of small-scale decentralized, renewable energy sources for rural areas carried out as integral parts of rural development efforts in accordance with section 103 of this Act."
(Emphasis added.)

Programs under section 119 were to be carried out in cooperation with the ERDA (or its successor) and in conjunction with intermediate technology activities called for under section 107 of the act. The section also directed that options for its implementation be reviewed. (See p. 5.) In 1978, the section was amended calling for coordination with DOE.

The International Development Cooperation Act of 1979 amended section 102 of the Foreign Assistance Act of 1961 with respect to energy, by stating that:

"* * *energy development and production are vital elements in the development process, that energy shortages in developing countries severely limit the development process in such countries, that two-thirds of the developing countries which import oil depend on it for at least 90 percent of the energy which their economies require, and that the dramatic increase in world oil prices since 1973 has resulted in considerable economic hardship for many developing countries* * *."

The act expressed support for programs to help developing countries improve their use of indigenous energy resources. Such assistance can include "data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production." The act authorized up to \$7 million in fiscal year 1980 for geological and geophysical survey work to locate and encourage exploration of potential oil, natural gas, and coal reserves in developing countries which are not members of the Organization of Petroleum Exporting Countries.

BUREAU PROGRAMS EXPANDING

AID energy projects are developed by the Office of Energy in the Development Support Bureau as well as by regional bureaus working with the AID missions. In March 1978, AID established the Office of Energy in the new Development Support Bureau to have principal responsibility within the Agency for providing technical support to AID missions and regional bureaus on energy matters and for administering energy research and development programs. Policy coordination was to be carried out jointly between the Office of Energy and the AID Bureau for Program and Policy Coordination.

Rapidly expanding support for renewable-energy projects is evident even though an overall agency policy and program have not been defined. In March 1979, AID did send out guidance to the missions summarizing its thinking on developing-country energy problems, describing Office of Energy projects, and encouraging the missions to consider "energy constraints to development" as part of their country programs. This guidance also requested that the missions consider staffing needs and informed the missions of AID arrangements with other organizations. The guidance memo noted that developing-country problems relate to their dependence on imported oil and to the rapid depletion of fuelwood. It said that, in addition to emphasizing development of renewable-energy resources, AID could help developing countries analyze their energy problems and help them formulate energy programs. AID also stated that it had begun to prepare an energy policy and expected to have a draft available for field comment by August 1979. (This draft has been delayed.)

The Office of Energy proposed a major \$89 million program in the fiscal year 1980 congressional presentation, with obligations over the fiscal year 1979-83 period.^{1/} We analyzed

^{1/}In the weeks following the establishment of the Office of Energy in March 1978, the officials formulated seven broad, centrally funded energy projects for inclusion in the FY 1980 congressional presentation. These were:

- (1) Applied energy technology development and utilization (\$10 million.)
- (2) Energy expansion through solar production, conversion, and use of thermal, wind, wave, and photovoltaic (\$16 million.)
- (3) Energy expansion through biomass production, conversion, and use (\$13.7 million.)
- (4) Energy assessment, analysis, and policy development (\$12 million.)
- (5) Energy services and support (\$10.3 million.)
- (6) Energy education and voluntary-organization activity (\$11.7 million.)
- (7) Energy training and institutional development (\$15.7 million.)

these projects and noted several common elements and potential for overlap and duplication. Five projects would support a total of 109 conferences (or an average of over 20 per year): 44 were to be global or region-wide, 45 would relate to specific countries, and 20 are not defined. There were to be 33 solar workshops, but only 2 on hydro-electricity. Approximately 27 workshops were planned on data collection and analysis and energy communications and 6 would provide for consultants. Up to 120 countries were marked as candidates for services under 4 activities. No specific countries or regions had been identified, however, and it was not clear if activities would take place in 40 or 120 countries--or some number in between. Similar observations apply to the use of AID energy advisers in the field and pilot demonstrations or field tests of equipment.

We discussed these observations with a key Office of Energy official and were told that, typically, the activities would most likely be reduced as planning proceeded. In fact, we subsequently learned that most of the projects were only approved by AID for a 2-year, not 5-year, period. AID did obligate approximately \$7.3 million in fiscal year 1979 for the proposed Office of Energy activities (previously listed). This included \$2 million for a photovoltaic project being implemented by the National Aeronautics and Space Administration/Lewis National Laboratory, \$.8 million for energy policy, planning, and assessments project activities to be carried out by Resources for the Future, Inc., and \$1 million for for training in alternate energy technologies at the University of Florida. Significantly, no fiscal year 1979 funds were obligated for the energy services and support project, which is for activities to be carried out by DOE. (See p. 13.)

The four AID regional bureaus have also been developing renewable-energy projects (see p. 20). The Asia Bureau has plans to obligate the most funds. It did not have a full-time energy advisor until June 1979. The Africa Bureau, we found, was furthest along in developing a regional energy strategy and program and was the only bureau to have a full-time energy advisor prior to June 1979. The other two regional bureaus (Near East and Latin America/Caribbean) plan to have full-time energy advisors; other officials have served that function in the interim.

The Africa and Latin America/Caribbean Bureaus have sent out airgrams to the regional Missions for use in reviewing current projects and proposing new projects with respect to energy. The Asia and Near East Bureaus planned to send out such guidance. The scope of energy activities anticipated

by the Latin America/Caribbean Bureau is considerably broader than that of the Africa Bureau, which indicates it will rely on the many other donor organizations to support overall and modern-sector needs in developing countries.

The Africa Bureau airgram stated that the Bureau's program would stress ways of meeting energy needs related to (1) cooking and heating by the rural and urban poor and (2) water supplies, grain grinding, irrigation, handicrafts, and other basic life functions. Such activities, it noted, account for about 80 percent of all energy consumed in Africa for all purposes, and for 90-100 percent of all energy used by the poor. The Bureau noted that it would concentrate its resources on these activities, not modern-sector activities, such as manufacturing and commercial transport. Other donor organizations, such as the World Bank, are geared to support modern-sector activities.

The Latin America/Caribbean Bureau airgram noted that the Bureau was developing a comprehensive energy-assistance strategy and explained that its two broad objectives are to (1) locate and develop indigenous energy resources to reduce the burden of dependence on energy imports and (2) to utilize available energy resources efficiently and distribute them equitably for the purpose of balanced growth and development. Missions were encouraged to consider programs to

- identify energy constraints to development and raise host-country awareness of energy problems;
- assess current and potential energy needs, uses, resources, and costs;
- improve developing-country energy research, planning, and policymaking capabilities necessary to develop national energy strategies; and
- develop, adopt, test, demonstrate, and disseminate renewable-energy technologies and improved conservation techniques.

We found indications that the four AID regional bureaus have been developing energy programs and projects without sufficient awareness of each other's activities, and there has been some uncertainty over the role of the Office of Energy in the Development Support Bureau. Local social customs and practices, climates, and resources, of course, provide projects with unique regional, national, and even local

constraints and opportunities, but exchange of views and data in the planning phases could be of mutual benefit. For example, even though regional projects include establishing or supporting solar-energy institutes in both Mali and Morocco; the energy advisors in the two bureaus (Africa and Near East) were not familiar with each other's projects.

In late 1978, AID initiated regular intra-agency meetings to discuss energy activities. They are chaired by the Assistant Administrator, Development Support Bureau. A review of the minutes, shows that they have provided a forum for a productive exchange of information and views. While the focus was originally more on matters such as proposed legislation, DOE IEDP activities and the proposed Office of Energy fiscal year 1979-83 program, we understand regional bureau energy programs are now also being discussed at these meetings.

AGENCY COMMENTS AND OUR CONCLUSIONS

In commenting on our draft report, AID generally agreed with our observation that within the context of an overall U.S. policy (see ch. 1), AID should develop an Agency policy. AID commented that differing perspectives exist on overall energy assistance priorities within the Agency and added that (1) these perspectives have been discussed at regular intra-agency meetings and (2) steps have been taken to recognize, and more fully appreciate, the unique circumstances between regions and individual developing countries. AID commented that such differences are often productive and that AID is learning from these exchanges and is moving toward development of an agencywide position or policy. In addition, AID believes that, except for the conventional versus renewable emphasis or orientation, the current AID position is clear. AID reiterated that energy as an assistance priority is a relatively recent phenomenon and that renewable energy, new to AID, is an area of flux and experimentation throughout the world.

We believe AID should continue its efforts to develop an Agency policy. AID renewable energy activities are rapidly expanding, with obligations expected to almost double between fiscal years 1979 and 1980. AID is also involved in other types of energy assistance, such as training and non-renewable energy projects. We believe AID needs to clarify and express its own policy and program in order to ensure that its activities are as effective as possible in helping meet the energy needs of developing countries. Although the International Development

Cooperation Act of 1979 can serve as a basis for developing a clear Agency energy assistance policy, we believe the policy must fully complement the overall U.S. policy and should be developed in conjunction with the U.S. policy recommended in chapter 1.

CHAPTER 3

DEPARTMENT OF ENERGY INTERNATIONAL ENERGY

DEVELOPMENT PROGRAM--IMPROVEMENTS NEEDED

International Energy Development Program, established in response to a 1977 Presidential directive, attempts to help developing countries meet their energy needs through increased reliance on indigenous resources, while averting premature and/or excessive commitments to nuclear energy programs. IEDP has also been referred to as: the program for international cooperation in non-nuclear technology; the less-developed countries' (LDC) program; the program for development of non-nuclear energy alternatives; and the Presidential Directive #8 (PD-8) program.

The DOE-managed IEDP receives overall policy guidance from an interagency group chaired by the State Department. 1/ Even though socioeconomic development in developing countries and reduction in their dependence on oil have been listed as program benefits, an important objective of the program is nuclear nonproliferation. Although IEDP activity has been viewed as a pilot effort, \$12 million has been appropriated (including special foreign currency), and plans are being made for a fourth year--fiscal year 1981. If the program is continued, we believe certain improvements are needed, such as long-term planning and more coordination with the international assistance community.

IEDP attempts to accomplish its objectives by providing unbiased studies and projections of developing-country energy resources and demands--referred to as energy assessments. (Additional data on the program and the first two energy assessments is provided in app. II.) A basic program assumption is that increased information on non-nuclear alternatives will help developing countries avoid premature and/or excessive commitments to nuclear energy programs. Such premature

1/The interagency group, set up under the National Security Council Ad Hoc Group on Nuclear Non-Proliferation, is chaired by a State Department representative and includes officials from the Departments of Energy, the Interior, Commerce, and the Treasury; the Arms Control and Disarmament Agency; the Council on Environmental Quality, AID, the Environmental Protection Agency, OMB, the National Security Council, and the Central Intelligence Agency.

and/or excessive nuclear power commitments, particularly commitments of a magnitude that may eventually involve sensitive technologies--those technologies which produce or can produce nuclear-weapons-grade material, including uranium enrichment and spent-fuel reprocessing--are also assumed to create unwarranted risks of nuclear-weapons proliferation.

In view of the timeframes involved in investment decisions related to future energy sources and the relatively short life of the program to date, we did not attempt to substantiate the nuclear nonproliferation assumptions in this review, but focused on IEDP program management and the program's relation to other U.S. energy assistance-type efforts in developing countries. DOE and State Department officials have stated that the IEDP assessments presented the first two countries assessed (Peru and Egypt) with information making premature, and/or excessive, nuclear commitments less likely in the future.

COUNTRY-SPECIFIC ENERGY ASSESSMENTS-- MAJOR PROGRAM ACTIVITY

IEDP activity has concentrated almost exclusively on country-specific energy assessments. Assessments had been made in Egypt and Peru as of June 1979, and four or five more assessments were planned for fiscal years 1979-80. In November 1979 DOE officials stated that three assessments were underway in Argentina, South Korea, and Portugal. Program appropriations for fiscal years 1978, 1979, and 1980 were about \$3.5 million, \$3.0 million, and \$2.0 million, respectively in addition to local currencies.

The pilot IEDP has been managed in DOE by the Office of the Assistant Secretary for International Affairs, which is responsible for coordination of all DOE international activities. DOE is involved in a variety of international activities, but IEDP is the only DOE program specifically established to support energy activities in developing countries. Other DOE bilateral international activities are generally oriented toward developed countries and energy research and development. The Office is involved in all these activities. With the exception of IEDP, however, its activities basically involve coordination and policy studies rather than program management. IEDP has created some controversy between DOE and AID. It appears that AID has perceived IEDP as a challenge to its historical area of

responsibility, development assistance, and has tended to resist rather than cooperate with DOE. This resistance may have occurred because

--AID is currently developing its own energy activities in developing countries;

--IEDP has been considered by some executive branch officials to be an assistance effort; and

--the first two countries receiving IEDP assessments were also AID assistance recipients.

Development is not the primary objective but is listed in the IEDP plan and has been cited by DOE and State Department officials as a spin-off program benefit. AID officials have stated that AID and DOE roles with respect to IEDP are emerging and the interagency cooperation is improving. (See p. 38.)

In general, IEDP has used three criteria for selecting candidate countries. Candidate countries had to (1) be interested in the nuclear energy option without real economic or political commitments to nuclear power; (2) be receptive to an IEDP assessment; and (3) have viable non-nuclear energy alternatives. According to a State Department official, these criteria were modified in Spring 1979 to include countries that have made economic and/or political commitments to nuclear power. He said the United States wished to be responsive to the energy needs of developing countries in the non-nuclear area even though these countries may have made considerable progress toward nuclear energy systems.

The status of the candidate countries regarding the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) has not been a specific criteria for country selection. Although not initiated in response to title V, IEDP has been cited as a program that carries out the type of activities called for in title V of NNPA. Title V states: "* * * the United States shall give priority to parties to the Treaty * * *" in cooperating with and providing non-nuclear energy assistance to developing countries, and continues by specifically mandating country-specific energy assessments. IEDP does not give priority to Treaty parties. In fact, two countries selected for IEDP assessments as of April 1979 (Egypt and Argentina) were non-treaty countries. State Department officials told us that the treaty-party status of the countries being considered is not relevant

because IEDP is not a reward program for acceptable behavior, but a U.S. foreign policy support program. One official added that there is more reason to work with countries that are reluctant to join NPT or to make similar commitments. The intent is to provide a positive environment for continuing to urge countries to make such commitments.

IMPROVEMENTS NEEDED IN THE ENERGY
ASSESSMENT PROGRAM

The fiscal year 1978 and fiscal year 1979 IEDP activities can be considered a pilot effort and, thus, a learning experience for the planners and participants. We recognize this but nevertheless believe certain changes could improve the program, including

- long-term planning and more flexible scheduling, and
- more coordination and cooperation.

DOE and State Department officials recognize the need for these improvements.

Long-term planning and
flexible scheduling

The State Department and DOE have not attempted to determine the total plan--the number of countries and a priority list or timetable for completion--for IEDP assessments. Officials told us during the early phases of our audit work that because the program was a pilot effort awaiting Presidential approval before continuation, developing a total plan for the program would have been meaningless. In addition, State Department officials said they had not had time for such long-term planning. By June 1979, however, plans were underway and funds had been requested for the third year of this "pilot effort". Funds are now being requested for a fourth year. With several bilateral and international organizations interested in helping developing countries assess their energy needs and resources, it is important that the need for, focus of, and scope of the IEDP effort and its relationship to other U.S. activities be carefully considered and clearly defined. In addition, little flexibility was evident in the scheduling of first year IEDP efforts.

Our review of the management of the second IEDP country assessment--the one undertaken in Peru--indicates problems that can result when an assessment is attempted without long-term planning and scheduling flexibility. Preliminary U.S.

discussions with Peruvian Government officials began in late March 1978 after another interested country reportedly decided at the last minute not to participate in the assessment program. DOE then scheduled work in an attempt to complete the assessment by the end of fiscal year 1978. Even though the team was unable to complete the assessment by then, DOE suspended the Peru assessment activity from October 1978 to January 1979 while awaiting (among other things) decisions on the immediate future of the program and the scope of additional work to be done in Peru. The decisions were made in January. Following minor follow-up work in Peru, the assessment was completed.

Even though IEDP is purported to be a collaborative effort, a U.S. official stated that more host-country participation is necessary to promote the transfer of the assessment methodology. He commented that the relatively short assessment period resulted in little methodology transfer to the Peruvian participants. He also explained that DOE originally believed that the assessment had to be completed by September 30, 1978. DOE later learned that fiscal year 1979 activity was approved. The Vice Minister of Energy and Mines of Peru stated that although more Peruvian participation in future studies would be feasible, the timeframe for the DOE assessment was too short to organize and incorporate private Peruvian expertise into the study. One advantage of long-term planning would be the opportunity to provide special training, in advance, to key developing-country officials who would be involved in an assessment.

In addition to providing for more local participation, long-range planning and more flexible assessment scheduling could also facilitate coordination with other donors and development of needed energy data. UNDP, for example, was funding an energy study similar to the U.S. assessment in Peru at the same time. (See p. 35.) The United Nations was developing information which would have been useful to the U.S. effort, according to DOE officials. Conversely, U.N. officials were interested in analysis aspects of the U.S. assessment study, especially in the area of new energy technologies. Unfortunately, this potentially beneficial mutual exchange did not occur. DOE officials stated that the U.N. team would not cooperate and provide the U.S. team with information from their study; they believed that the U.N. team members were concerned that the U.S. assessment would preempt their study. U.N. team members stated, however, that they had not completed data collection when the United States began its assessment. U.N. members told us that when

they suggested that U.S. officials postpone their assessment for 3 months, until U.N. data was available, DOE officials responded that the assessment report requirements would not allow delay. The U.S. team eventually received a draft copy of the U.N. study in March 1979; by this time, the U.S. team had already completed its analysis. U.N. and U.S. officials have stated that more cooperation could have improved both studies. (See p. 36.)

Energy assessments have provided single, not multiple 1/, development path based energy projections. DOE officials explained that in doing the first two assessments, the U.S. teams reviewed each country's economic development and energy plans to determine whether energy demand projections were consistent with development plans. Within the context of a single projected economic development path, several energy strategies were then defined that balanced energy supply and demand alternatives for 1985 and 2000. The alternative energy supply strategies represent different combinations of energy resources that would meet the projected demand. According to DOE officials, such alternatives help to establish a basis for future energy planning. AID officials, noting the inherent uncertainties in forecasting, commented that single development path projections are less useful to economic development planners than a range of development projections. A country might, for example, if presented with several alternatives, alter its development strategy to reduce the type or quantity of energy required. In commenting on this point, DOE officials stated that developing multiple (economic) development paths is not in their jurisdiction or area of expertise and should be developed by local officials and the international development donors, not IEDP teams. We agree. We also believe assessment participants can better promote total U.S. objectives in developing countries by assisting, when feasible, local government participants with analysis of the energy implications of such alternative economic development paths. DOE officials said they plan to do so, when feasible.

1/In this report, multiple development path analysis refers to an examination of a number of different projections of socioeconomic change in a country. These alternatives are based on different assumptions such as the rate of overall economic growth and that of specific sectors of the economy. For example, the energy demands of a future plan stressing capital-intensive industrial output would differ from those of a plan stressing labor-intensive agricultural production.

Coordination and cooperation

We believe that the funding needs of developing countries, potential uses of the DOE energy assessments, and assistance programs of the international donor community provide excellent opportunities for coordination and cooperation. Such cooperation can also help to prevent duplication or overlap and can maximize effectiveness of donor resources.

The extent and timing of initial DOE contact with potential funding organizations, with respect to the U.S. energy assessments, did not maximize potential supporting activities or followup by other organizations. DOE did contact international organizations, such as the World Bank, the United Nations, and the Inter-American Development Bank, during fiscal year 1978, but for the most part the early contacts were to obtain information on the countries being assessed, not to determine how the DOE assessments could also meet donor organization needs or to coordinate assessment activities. In more recent contacts with World Bank officials, DOE officials have discussed the potential World Bank use of DOE assessments. In commenting on this point, DOE officials told us that they now recognize the need to coordinate IEDP activities with such organizations and that they plan to establish informal coordinating mechanisms to do so.

An example of the need for early coordination to avoid potential overlap or duplication and to use donor resources most effectively occurred in Peru. Upon arrival there in March 1978, DOE officials discovered that the United Nations had been funding a similar energy study since late 1977. The Peru Vice Minister of Energy and Mines, who was responsible for Peruvian participation in both externally funded studies, said that the U.N. study was an energy balance study (an accounting of energy resources and consumption). He said the U.S. assessment identified energy alternatives through the use of a model which can be "dynamically and perpetually applied." He also stated that the two studies complemented each other. U.N. team members, however, stated that their study did basically the same thing as the U.S. assessment but with different methodologies. 1/

The U.S. and the U.N. studies each resulted in national energy projections and strategies for Peru. According to a U.S. team official, the reference U.S. and U.N. projections to the year 2000 were "surprisingly similar." According to the same U.S. team official, the U.S. projections were generally higher because they were based on plans which were more optimistic than the U.N. historically based projections.

Even though the degree of overlap can be questioned, both U.S. and U.N. efforts are recent national energy studies of Peru. A U.N. official estimated the cost of the U.N. study, which had been scheduled to be fully completed by December 1979, to be about \$282,000. DOE has estimated the costs of the U.S. assessment at about \$1,000,000. More coordination and cooperation may well have led to cost savings and improvements in both studies. For example, a U.S. team official stated that U.N. team-member cooperation and data could have reduced the work required by the U.S. team, although he could not estimate how much. Likewise, a U.N. official also surmised that if DOE and the United Nations had collaborated, both studies could have been better, cheaper, and more valuable to the Peruvians. Further, the very fact that two organizations were doing similar studies in the country, also raises a question about whether assistance resources are being used most effectively.

DOE officials have coordinated IEDP activities with AID, but efforts have not been entirely successful in establishing a cooperative working relationship. Coordination has occurred

1/The U.S. assessment took 1976 energy data for Peru and made projections of future energy supply and demand based on sectoral and economic expansion plans and certain assumptions about future energy-technology development, according to a U.S. team member. The U.N. study made projections based on a 1965-76 historical data base. The U.S. assessment used mostly existing data whereas the U.N. study, according to a U.N. team member, developed much of its data. The U.S. study took about a year to complete, using for the most part U.S. experts. The U.N. study is scheduled over 2 years and is being done by local Peruvians and an Argentine consultant.

through the State Department-chaired interagency group (DOE, AID, and Department of State) meetings, requests for AID participation on U.S. assessment teams, and circulation of assessment report drafts to AID. Requests for AID officials to be part of U.S. assessment teams in Peru and Egypt were denied by AID because, according to an AID official, AID did not have sufficient resources to allocate staff as team members. ^{1/} Considering the millions of assistance dollars the United States is providing to Egypt through AID, we believe that more AID involvement in the Egypt assessment would have been particularly beneficial.

CONCLUSIONS AND RECOMMENDATION

IEDP, although still considered a "pilot" effort, is in its third year of implementation, yet a determination of the global need for the program and a long-range plan to meet the need have not been made. We believe such planning can improve the program. Further, additional and earlier coordination with the international assistance community can improve opportunities for supporting activities by assistance organizations, can help reduce the potential for duplication and overlap, and can facilitate assessment follow-up. (See p. 46). DOE has expanded its coordination activity with AID and the World Bank since completion of our audit work.

To help improve both coordination and planning, we recommend that the Secretaries of State and Energy, together with the Director of IDCA, determine the global need for the program and establish a plan to meet this need. Such a plan should specify the number of countries and a timetable for planned assessments.

AGENCY COMMENTS

In commenting on our draft report, the Departments of State and Energy and IDCA generally agreed with our observation that more planning and coordination can improve the program. DOE also noted that it plans to continue its

^{1/}AID did provide some staff input and two AID-funded technical consultants on the U.S. team in Peru, but DOE officials believe that more AID involvement would have been useful.

coordination efforts with AID and World Bank officials to promote a smooth transition from assessment completion to eventual funding of projects and activities expected to result from the assessments.

State Department commented that the IEDP helps to fill a gap in U.S. energy activity with developing countries by providing another base for cooperative activities with countries not receiving assistance through AID.

AID commented that although disagreements over AID-DOE roles with respect to IEDP activity have occurred, AID believes the respective roles are now emerging and reiterated that, since completion of our audit, the situation had substantially improved. Notwithstanding the claims of improvement in AID-DOE relations, we believe roles can be further clarified. Aid also cited, as examples of clearer roles, AID/DOE/State Department agreement on, and support of, the AID Indonesia energy assessment and the fact that recent IEDP assessments have been in countries without active AID missions.

AID noted that although AID was underutilized in Egypt--the first IEDP-assessed country--collaboration has improved between AID and DOE, and AID has been more involved in Peru--the second IEDP-assessed country.

CHAPTER 4

EFFECTIVE INTERNATIONAL COORDINATION

IN ENERGY ASSISTANCE NOT YET ESTABLISHED

Many developed countries and international organizations are providing substantial resources to developing countries, including renewable-energy assistance. Although first steps have been taken to coordinate these activities, vigorous efforts must continue to attain effective coordination and cooperation of major donors and recipient countries to ensure that available resources are used in the most economical, efficient, and effective manner. Representatives from AID and other international donors have stated that the renewable energy assistance area is a relatively new area for all donors. This condition makes coordination of effort even more important to prevent duplication and maximize assistance benefits.

INTERNATIONAL ORGANIZATIONS RENEWABLE-ENERGY ACTIVITIES

Among the international organizations active in the energy assistance area, are

- the United Nations Development Program;
- the United Nations Environment Program;
- the United Nations Center for Natural Resources, Energy, and Transport;
- the United Nations Economic Commission for Asia and the Pacific;
- the World Bank, the Asian Development Bank; and
- the Inter-American Development Bank.

U.S. funds are contributed to all these organizations. The Secretaries of State and the Treasury, respectively, are responsible for U.S. foreign policy and for U.S. participation in the international financial institutions. The Organization for Economic Cooperation and Development and the International Energy Agency--the United States is a member in both organizations--have also been involved in coordinating renewable-energy activities of member governments.

UNDP has traditionally financed energy projects, most of which are implemented by other U.N. organizations. In the January 1970 - April 1978 period, UNDP provided funds for projects, as outlined here.

General energy projects	\$ 5,153,481
Oil, petroleum, and gas energy projects	20,996,566
Carbon energy projects	3,666,153
Electrical energy projects	31,385,046
Nuclear energy projects	9,373,868
Geothermal energy projects	8,193,068
Nonconventional energy projects	<u>551,039</u>
Total	\$ <u>79,319,221</u>

Support of renewable-energy activities, as indicated by the above table, has been limited. One project conducted by UNESCO, for example, received \$173,000 to develop solar-energy applications in Algeria. More recently, a project to test and demonstrate small-scale, solar-powered pumps was funded; this project is being implemented by the World Bank. (See p. 41.) UNDP has also funded energy studies. (See p. 45.)

The United Nations Center for Natural Resources, Energy, and Transport energy projects have averaged about \$10 million annually in the past few years; about half the projects were financed by UNDP. The center has undertaken studies as well as projects. In the 1960s, the center began a geothermal program and is now conducting solar and other nonconventional energy projects. Among these projects is a pilot project financed by the U.N. Environment Program to establish rural energy centers in three countries (Sri Lanka, Senegal, and a third country to be selected). The project will focus on meeting rural energy needs through renewable-energy resources. The center has been named as the focal body and secretariat for the 1981 U.N. Conference on New and Renewable Sources of Energy. (See p. 44.)

The U.N. Environment Program views its main function in the energy area as a catalyst to encourage development of renewable-energy resources. It focuses on environmental implications of energy-development projects--the extent to which supply and demand issues have environmental results--and encouragement of alternative fuels and better designs to utilize fuels.

The U.N. Economic and Social Commission for Asia the Pacific has actively pursued energy development since 1973. In 1974 the Commission obtained information on the energy needs of 14 developing countries in the region, and hoped to support programs (1) evaluating indigenous resources, (2) assisting energy planning at national levels, and (3) preparing feasibility studies for selected priority projects. We were told that preparations for these activities were halted when UNDP advised that no funds would be available. Subsequently, the Commission arranged a working group meeting on energy planning and programming and a meeting on energy issues, including prospects for use of nonconventional energy resources.

In addition to these U.N. and international financial organizations, the Organization for Economic Cooperation and Development (OECD) has had some recent involvement with developing-country, renewable-energy issues. In November 1978, OECD established a working party to develop "* * * a coordinated effort to help developing countries bring into use technologies related to renewable energy." In May 1979, OECD issued a report addressing the energy issue and listing OECD-member renewable-energy activities. (See p. 43.) In addition, in 1978, the International Energy Agency--an autonomous body within OECD--began assembling a list of the renewable-energy activities of its member nations. This data was also included in the President's January 1979 report to the Congress on the Nuclear Non-Proliferation Act of 1978 (See p. 9.)

The World Bank has financed about \$10 billion in power generation and distribution, accounting for about one-fifth of Bank financing. Following the 1973 oil-price increases, the Bank reappraised its energy-lending activities and, in 1977, lending for fuel and non-fuel mineral development was approved. Accelerated lending for oil and natural gas exploration and development was approved in early 1979; lending may reach \$500 million annually from fiscal year 1981 onward. With respect to renewable energy, we were told the Bank focuses on integrating such energy components into other development programs and is also emphasizing reforestation. A Bank official stated that renewable-energy technologies had not advanced to the stage where they could make a significant contribution to energy supplies and had not proven sufficiently economical to warrant strong direct financial investment by the Bank. The Bank is, however, executing a \$1.2 million UNDP-funded project, testing small (one-third horsepower), solar-powered pumps in the Philippines, India, Mali, and the Sudan. These pilot irrigation projects are geared for small peasant farms.

Inter-American Development Bank energy-sector loans, which totaled about \$2.7 billion in the 1961-77 period, were primarily for electricity generation and transmission and development of proven resources, such as hydropower and coal. Officials said the role of renewable-energy resources would be to supplement traditional sources, rather than replace commercial fuels. Bank efforts to make developing-country officials aware of these resources have included grants sponsoring pilot projects, such as \$10,000 in support of the design of a solar irrigation activity in the Dominican Republic.

The Asian Development Bank has focused on developing proven indigenous energy resources and on expanding transmission and distribution facilities. Of the nine loans made in 1977 which totaled about \$218 million, five were for hydropower generation facilities, three were for transmission and distribution and one loan was for a feasibility study on a large thermal generating unit. A mini-hydropower project is the only nonconventional energy project. A Bank energy official told us he believed AID should initiate nonconventional energy assistance because of its focus on small-scale technologies.

OECD COORDINATION EFFORT

A major initiative to coordinate renewable-energy assistance came as a result of the 1978 Economic Summit in Bonn. The communique of that Summit stated

"To help developing countries, we 1/ will intensify our national development assistance program in the energy field and we will develop a coordinated effort to bring into use renewable energy technologies and to elaborate the details within one year. We suggest that the OECD will provide the medium for cooperation with other countries.

"We stress the need for improvement and coordination of assistance for developing countries in the energy field. We suggest that the World Bank explore ways in which its activities in this field can be

1/"We" refers to the heads of State and Government of Canada, the Federal Republic of Germany, France, Italy, Japan, the United Kingdom of Great Britain and Northern Ireland, and the United States and other representatives of the European Community.

made increasingly responsive to the needs of the developing countries, and to examine whether new approaches, particularly to financing hydrocarbon exploration, would be useful." (Emphasis added.)

Following the 1978 Economic Summit in Bonn, a working party was established by the OECD council to carry out the mandate. In May 1979, OECD issued a report on the energy situation in developing countries, the opportunities for and status of renewable-energy activities, and the prospects for cooperation. The report noted that OECD-member countries 1/ planned or current renewable-energy projects or programs with and for developing countries, totaled 383 in 77 developing countries. Of the total, 161 were solar and 75 were biomass projects/programs. (This list does not include international financial institution and U.N. organization energy programs.) The OECD report said that

"* * * in considering the possibilities for assisting in ascertaining the needs and capabilities of developing countries in the renewable energy field and for assisting in both operational and pilot projects, developed countries will wish to ensure that there is adequate co-ordination, bilaterally and on a broader international basis, in order to avoid unnecessary duplication of effort. Partnership and co-operation will also facilitate comparisons of net benefits resulting from the application of the same renewable technology in different projects and of the use of different technologies in like projects." (Emphasis added.)

WORLD BANK COORDINATION MEETING

The World Bank also saw a need for the various donors to discuss the energy situation in developing countries. In June 1979, the Bank hosted a meeting in Paris for that purpose. Chaired by the Bank's Vice President of Operations, the meeting was attended by delegates from assistance and other involved organizations from the United States, Canada,

1/OECD member countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, the Federal Republic of Germany, Greece, Ireland, Iceland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

France, Germany, Norway, the United Kingdom, the African, Asian and Inter-American Development Banks, the Kuwait Fund, OECD, the Organization for Petroleum Exporting Countries, the United Nations, and the United Nations Center for Natural Resources, Energy and Transport, in addition to an observer from the Netherlands.

According to AID officials, there was (1) general endorsement of the World Bank's hydrocarbon exploration and development program, (2) broad consensus on the need for institution building, and (3) broad consensus that the traditional sector faced great difficulty in meeting future energy needs, as evidenced by severe deforestation. With respect to the traditional sector, it was agreed that the following factors were evident. There is

- a dearth of survey data on the traditional energy sector;
- limited potential to develop projects;
- a general lack of agreement on courses of action and priorities to address the problem; and
- an apparent, great need for increased coordination on approaches.

There was, however, no definition of a possible continuing World Bank coordination role or follow-up to the meeting.

U.N. CONFERENCE PLANNED

Even though many U.N. organizations are involved in renewable-energy activities, there has been no focal point for energy within the U.N. system. Preparations for the 1981 U.N. Conference on New and Renewable Sources of Energy provide an opportunity, however, to improve coordination both within the United Nations and the international donor community. Further, a U.N. unit has been surveying U.N. organizations to determine what energy activities the United Nations as a whole, is engaged in.

The 1981 U.N. conference is to take a global perspective on the energy situation and will examine prospects for solar and geothermal energy, wind power, biomass conversion--including charcoal and wood--energy from oil shale and tar sands, micro-hydropower, and tidal and wave power. The U.N. Center on Natural Resources, Energy and Technology has been named secretariat for the conference. The preparatory process will include several technical panel meetings.

AID AFRICA BUREAU DONOR WORKSHOP

The AID Africa Bureau has taken the initiative and proposed a donor workshop on renewable-energy and fuelwood programs in Africa for late 1979. Bureau officials stated that for some time they had been interested in establishing better and closer working relationships with other major donors financing renewable-energy and fuelwood programs in Africa. These officials said:

"From what information we have, most of the donors are expanding their own programs in these fields rapidly, partly in response to African demands, partly in response to donors' growing perceptions as to the magnitude of the problem."

Noting that "it is becoming increasingly important that each of the donor agencies achieves a better understanding of the directions and plans of their counterparts," Bureau officials proposed the workshop and continuing contact for information exchange at the program and technical levels.

ENERGY ASSESSMENTS--COORDINATION NEEDED

Many donor organizations are interested in helping developing countries assess their energy resources, uses, and needs. Coordinated efforts would contribute to the most effective use of donor funds. DOE and AID as well as the international financial institutions and a U.N. organization are carrying out energy assessments. The United States conducts national energy assessments under IEDP managed by DOE (see ch. 3), and AID also plans national assessments. The AID Office of Energy has proposed undertaking 30 national energy assessments in addition to rural-energy studies. The World Bank plans to conduct 60 energy-sector surveys in the 1979-84 period, and the Asian Development Bank also carries out such surveys.

In addition, as an executing agency for UNDP, the U.N. Center for Natural Resources, Energy and Transport conducts energy studies. The center is conducting projects geared to help governments prepare forecasts on energy demand, determine possible supply sources, and develop energy policies. In Pakistan, an energy-resource survey showed the need for more intensive exploration for oil and gas and for greater use of low-grade coal. In Bolivia and Peru there are projects assessing primary energy resources and overall energy balances. The Bolivian project included design of an electrification plan for the period 1980-90 as well as a training component. The center canvassed 100 developing countries to determine

interest in energy surveys. As of spring 1979, 27 countries had responded positively. Subsequently, about six countries agreed to proceed with the studies, which are intended to determine the expenditures needed for mineral and energy exploration and will, for the most part, concentrate on oil and gas.

There is a need for all organizations supporting national energy studies to, at a minimum, coordinate their plans early in the planning process. If different objectives and techniques are involved, such early planning could help assure that studies done by one organization meet the needs of other organizations as well.

For example, when we did a review in 1978 of the coordination of population assistance, an area that had begun rapidly expanding in the late 1960s, we found that several improvements were needed. (See our report "Population Growth Problems in Developing Countries: Coordinated Assistance Essential" Dec. 29, 1978, ID-78-54.) In particular, we noted the need for close collaboration by AID with the two other major population assistance donors (World Bank and United Nations Fund for Population Activities) in undertaking country-specific assessments of population situations.

AGENCY COMMENTS AND OUR CONCLUSIONS

In commenting on our draft report, the Departments of State and Energy, IDCA, and AID generally agreed with our observation that with respect to energy, more coordination is needed within the international assistance community.

Renewable-energy assistance activities of the international community are expanding, and the energy sector will likely continue growing in importance. In view of the fact that these activities are in relatively early stages, we believe that now is the time to arrange for effective coordination. In particular, we believe that the United States should coordinate its energy assessment efforts in developing countries with similar activities of bilateral and international organizations. Such coordination could help minimize overlap and could facilitate the most effective use of energy-assistance funds.

State Department representatives commented that they believed the United States should take a lead role in international coordination efforts. They added that several international organizations or forums could act as coordinating mechanisms.

IDCA commented that IDCA has taken initial steps toward developing the needed coordination. As an example of such an initial U.S. step, IDCA stated that the United States is encouraging the World Bank to take a more active role in donor-community coordination and is investigating the possibilities of other international forums. IDCA added that IDCA intends to continue to take a leadership role in calling for coordination of donor activities in the future. We believe the Department of State and IDCA should continue the coordination efforts mentioned above and incorporate the need for such coordination into the overall U.S. policy formulation recommended in chapter 1.

ENERGY SITUATION IN
DEVELOPING COUNTRIES

Energy problems are threatening development efforts in many developing nations. The rate of growth of commercial energy consumption in recent years in these countries has been considerably higher than that of the developed countries, and population and other pressures have led to expanded rural use of traditional energy sources, such as fuelwood. The 1970s have seen dramatic increases in the price of petroleum, recognition that petroleum is an exhaustible resource, growing awareness that rural use of traditional resources is contributing to environmental degradation, and concern about the nuclear weapons proliferation potential of the once-encouraged nuclear power alternative.

COMMERCIAL ENERGY CONSUMPTION
AND DEVELOPMENT EFFORTS

Energy is generally recognized as an essential element of economic development. The relationship is dynamic. The amount, type, and speed of economic growth relate to the quantity, type, and price of energy available, but the relationships are not always clearly defined. As noted in the International Development Cooperation Act of 1979,

"* * * energy development and production are vital elements in the development process, that energy shortages in developing countries severely limit the development process in such countries, that two thirds of the developing countries which import oil depend on it for at least 90 percent of the energy which their economies require, and the dramatic increase in world oil prices since 1973 has resulted in considerable economic hardship for many developing countries."

The energy consumption growth rate in developing countries has been considerably higher than that of developed countries during the past quarter century. In 1950, developing countries consumed about 5.5 percent of world commercial energy; by 1976 their share had risen to about 10 percent. It has been projected that by the year 2000 they may consume 25 percent of world commercial energy.

U.N.-compiled statistics show that total energy consumption in developing countries increased about 6 times in the 1950-75 period. Consumption in developed countries increased only two and one-half times in that period. Electricity consumption advanced 11.7 times in developing countries, compared to about 5.7 times in developed countries. It has been estimated that in 1976 almost 65 percent of commercial energy consumed in developing countries, but only about 50 percent in developed countries, came from petroleum. Apparent consumption in developing countries of energy petroleum products (excluding non-energy use such as fertilizer) rose about 6.4 times in the 1950-75 period. In developed countries the increase was only about 4.3 times.

The immediate, direct effect of the 1973-74 oil price escalation on non-Organization of Petroleum Exporting Countries on developing countries (which are non members of the Organization of Petroleum Exporting Countries) was a sharp rise in the cost of imported oil and in the share of scarce foreign exchange needed to finance the imports. It has been estimated that energy-use growth rates slowed from 7.6 percent in 1973 to about 3 percent in 1975. Needs for foreign exchange to pay for petroleum rose dramatically.

At the same time, there has been a reduction in industrialized country demand for (non-petroleum) raw materials, an important Third World source of foreign earnings, and an increase in the prices of imported food and manufactured goods. Terms of trade have reportedly deteriorated for at least 50 developing countries since the 1973-74 petroleum price escalation. The Overseas Development Council has reported that the outstanding public debt of non-oil exporting developing countries was about \$137 billion at the end of 1975 but is estimated to have reached \$165 billion by the end of 1976. Debt service payments are placing an increasing claim on developing-country export earnings.

RURAL ENERGY CONSUMPTION

The great majority of people in developing countries live in rural areas and account for only a small share of commercial energy consumption. Some two and a half billion people are believed to depend on traditional or nonconventional energy sources (fuelwood, crop residues, dung, charcoal, human labor and animal draft power). One study estimated non-commercial energy use as a percentage of total energy use and found that in 16 developing countries and in 38 others, the percentage was between 40 and 60 percent.

Although little is known about energy consumption in rural areas, studies done in a limited number of countries, such as India, provide some indications of consumption. Energy use in rural areas of India is estimated to be:

<u>India Energy Use</u>	<u>Percent</u>
Food preparation and domestic activities	64
Agriculture	22
Pottery, brickmaking, metalwork	7
Lighting, transportation, other	<u>7</u>
Total	<u>100</u>

It is estimated that from 80 to 90 percent of the rural populations in developing countries use firewood as the primary fuel. Decreasing availability and increasing cost, however, have led to what is referred to as a fuelwood crisis. In Africa, Asia, and Latin America, wooded areas are declining annually by at least 4.5 million acres. At the present rate of deforestation, Ethiopia could be treeless in only 20 years. The rural poor in India and Pakistan could once gather wood for free; wood is now being carted into town for sale by landlords. Fuelwood is also becoming a problem for the urban poor. For example, inhabitants of Upper Volta's capital city must now pay from 20 to 30 percent of their income for wood.

Demand for traditional fuels is growing as population increases, and further population increases are expected. The population of Asia, Latin America, and Africa could rise from the 1975 level of almost 3 billion to over 5 billion by the year 2000 (U.N. medium estimates). Data has been compiled showing that Tanzania, Gambia, and Thailand per capita wood use is already 1.8, 1.2, and 1.1 tons per year, respectively. In addition, as growing populations require more food, farmers are clearing marginal lands for cultivation, further reducing forests and facilitating erosion.

An additional result of the growing scarcity of fuelwood has been the substitution of animal dung. It has been reported that the use of dung for fuel in the Indian subcontinent is increasing. This practice robs the soil of traditional nutrients, damaging its structure and quality. Dung is also burned in the Sahelian zone of Africa, Iraq, and in Bolivia and Peru.

ADDITIONAL INFORMATION ON THE INTERNATIONAL
ENERGY DEVELOPMENT PROGRAM

IEDP - HISTORY

The original concept for the IEDP can be traced back to a July 1975 State Department paper on the then proposed International Energy Institute. The concept did not come to fruition as a program at that time and later in early 1976 ERDA, a DOE predecessor agency, and the Department of State began planning activities that have since evolved into the current IEDP. According to an October 1976 ERDA policy statement, the ERDA interest in developing countries was based on: its mission to encourage and participate in international cooperation in energy; its responsibility to develop and increase the efficiency and reliability of future energy sources; recognition of developing countries' needs for rural area technologies; and recognition of a cooperative energy program's potential contribution to world stability. This early ERDA interest in developing countries was also stimulated by ERDA-AID discussions on the energy needs of developing countries.

The 1976 ERDA policy on developing countries contained many of the elements in the current IEDP, however it emphasized mutual benefit. It stated that ERDA

"* * * will seek technological solutions appropriate to the resources and the social, economic, and political goals of the developing countries. By providing a vehicle for consideration of alternatives that combine exploitation of renewable energy resources with technologies of use on a scale suited to rural community and single-family needs, the activities work to achieve maximum mutual benefit for both the United States and developing countries." (Emphasis added.)

The stated purposes of the proposed program were to

--"strengthen the analytical and energy planning capabilities of developing countries and broaden their energy information base;

- encourage the development of technologies for tapping indigenous, especially renewable, energy resources in the LDCs that will also have application in the U.S.;
- promote the consideration of renewable-resource, decentralized energy technology for rural and community use in the developing countries and the U.S. and as an alternative to nuclear - and fossil-fueled central power systems; and
- stimulate commercialization of small-scale power systems by U.S. private industry, to the mutual benefit of the U.S. and the developing countries."
(Emphasis added)

Working with the State Department, ERDA developed a draft U.S.-Less Developed Country Technical Energy Program Plan (LDC Program Plan) in April 1977 to implement its policy. While they were developing the plan, the President directed that the executive branch prepare a program to assist developing countries in the energy area. According to State Department and DOE officials, the IEDP concept became a reality largely as a result of the President's concern with the proliferation of nuclear weapons and the energy needs of developing countries. Even though the degree of risk is unknown, premature or excessive nuclear commitments by developing countries, especially toward sensitive technologies, could create new nuclear weapons proliferation risks.

As a result of the President's directive and under the direction of the National Security Council Ad Hoc Group on Nuclear Non-Proliferation, ERDA and State Department officials reworked the LDC program plan with more of an orientation toward nuclear nonproliferation. The reworked plan, Program for Development of Non-Nuclear Energy Alternatives, was recommended to the President by the ad hoc group in May 1977. The plan called for: formulating a program strategy to meet the program objective; obtaining information on global energy resources and technologies; and performing country-specific energy assessments. Although nonproliferation was a motivation, the program was also expected to help developing countries in their attempts to increase economic and social development and reduce their dependence on oil.

The President approved this program in September 1977 with the condition, according to OMB, DOE, and State Department officials, that first-year program results be reviewed before the program was continued. DOE and State Department officials interpreted this condition as a requirement for a 1978 fiscal year-end report to the President and anticipated an explicit approval for program continuation. The inter-agency group under the National Security Council Ad Hoc group sent the 1978 fiscal year-end report on IEDP to the National Security Council for the President in December 1978. We were told in June 1979 that IEDP was approved through fiscal year 1980 when funds were included in the fiscal year budget request and that an explicit program continuation decision was no longer expected.

IEDP activity has concentrated almost exclusively on country-specific energy assessments. The other two major activities called for in the program plan (formulating program strategy and obtaining information on global energy resources and technologies) were dealt with as follows. According to a State Department official, the strategy for program implementation was developed for the first assessment in Egypt and has since evolved into the current strategy. A DOE official also stated that experiences from the first two assessments have provided a basis for strategy formulation and implementation. Development of information on global energy resources and technologies was unnecessary, he added, because enough information was already available. A State Department official commented that the selection of team members, all experts in their fields, also alleviates the need for development of global information on energy technologies.

By the end of fiscal year 1978, one country assessment (Egypt) was considered complete and was later published in November 1978. DOE officials said the major portion of the Peru assessment was also complete by September 30, 1978. However, uncertainty from October 1978 to January 1979 over continuation of the program and the extent of additional activity that would be approved in Peru, contributed to delays. In January 1979, program continuation was approved and guidance was received from the State Department on the scope of additional Peru assessment activity. As a result, DOE analyzed the financial impact of the various energy strategies for Peru--developed during the fiscal year 1978 assessment--and completed the assessment in the summer of 1979.

The first two country energy assessments consisted of establishing two teams of U.S. specialists that studied and reported on--in collaboration with host-country officials--the present and projected energy situation in Egypt and Peru. A DOE International Affairs Office official was assigned as U.S. team leader, and DOE selected 40 and 34 team members for Egypt and Peru, respectively. U.S. teams were designed to include specialists in energy technologies, resources, and development. They included members from government-owned, contractor-operated laboratories (30 percent), government (35 percent), private industry (32 percent) and universities (3 percent). Most of the work was contracted to government-owned, contractor-operated laboratories and private consultants. The host countries established group counterparts to collaborate in the assessment, which mostly consisted of representatives from the host country in the energy field.

PERU: ECONOMY, ENERGY, AND THE ASSESSMENT

Peru faces a challenge in meeting its need for expanded and secure energy sources through the year 2000. The Peru IEDP assessment report notes that, "Petroleum will continue to be the dominant element in Peru's energy system through the year 2000." In addition, the report states that other sources, such as hydropower and solar, have potential for development. Nuclear energy is not expected to play a role in the energy picture until after the year 2000.

Although the abundance of Peru's energy resources offers it a wide variety of opportunities, realizing them may be difficult in Peru's current economic climate, which is characterized by economic stagnation, spiraling inflation (32.4 percent in 1977 and over 70 percent in 1978), and a large external debt. Peru has had balance-of-payment problems, due largely to declining copper prices, declining fish-meal production, and increasing food imports. External debt has increased from \$1.5 billion in 1973 to \$8.27 billion in 1978. AID considers the central long-term development problem in Peru to be massive and persistent poverty.

The Peruvian Government is taking measures to remedy its economic problems, such as efforts to cut imports, budget cutbacks, and a reduction in real money supply to fight inflation. Peru plans to regain its historical Gross Domestic Product growth rate of 5 percent per year by 1985.

Planning for the energy sector is the responsibility of Peru's Ministry of Energy and Mines, which prepares Peru's energy plans in relation to the national development plan developed by the National Institute of Planning.

Peru's two primary commercial energy sources are oil and water or hydro power. In 1976, these sources supplied 48 and 13 percent of all energy consumption, respectively. In 1978, Peru became virtually self-sufficient in oil, and production is expected to exceed consumption through 1985; longer term production will depend on new exploration and development. (Recent estimates of undiscovered recoverable reserves range up to 26 billion barrels of oil.) Hydro also has much potential for further development. Data for 1976 shows that coal and natural gas together provide 7 percent and other non-commercial sources meet about one-third of Peru's energy needs. Wood, which accounts for most noncommercial consumption (over 80 percent) is used for cooking and heating.

The U.S. assessment

According to the Peru assessment report, the assessment is

"* * * a technical energy analysis rather than a policy study. It provides a comprehensive picture of Peru's projected energy demand through the year 2000, as well as an evaluation of the quality of the basic fuels and energy resources that are potentially available to meet that demand and some indication of the extent of those resources. It also includes several alternative projections of the energy supply/demand balance for the year 2000 that could serve as a basis for the Government of Peru to prepare energy strategies."

"The assessment is not intended to be an energy plan. That is, it neither attempts to optimize the planning options and strategies that were examined nor offers value judgments about those alternative courses of action. On the other hand, through the cooperative assessment process, the Government of Peru has been exposed to and shared in the use of the analytical tools, evaluation factors, and data that has been used in the assessment. This has provided an information base on which Peru planners can formulate energy plans and develop comprehensive energy policies."

Within the context of a single development path, five energy strategies were identified and compared with the Peruvian reference case, which represented Peruvian economic development plans and assumed achievement of a 5-percent growth rate during the 1985 to 2000 time period. The five strategies are strategies of increased efficiency, increased renewable energy, increased hydropower, increased coal, and a combined strategy.

The Peru assessment report made many major observations such as the following.

1. "Petroleum will continue to be the dominant element in Peru's energy system through the year 2000."
2. "Peru has other, additional energy resources that could be exploited to supplement its energy supply and offset the demand for oil."
3. "Hydropower is the key energy resource for electricity generation in Peru over the foreseeable future. The current electric system expansion plans of ElectroPeru (the state-owned electric utility) envision that the bulk of new generating capacity will be hydroelectric. Many opportunities also exist to use small hydro systems to supply small amounts of power to isolated communities, although this would largely satisfy new (rather than existing) demand for electricity."
4. "Better knowledge of both the extent of Peru's coal reserves and the feasibility of their development and use is needed, and such efforts warrant priority attention in Peru's near-term energy programs."
5. "Certain regions of Peru offer some potential for near-term applications of solar technologies."
6. "Although the Government of Peru is actively considering nuclear energy systems and is pursuing a balanced nuclear technology program, it now envisions no use of nuclear power plants before the year 2000. Peruvian efforts over that interval will focus on research, radioisotope applications in medicine, agriculture, and industry, and the construction of a research reactor at a recently

authorized research center. Current plans call for the decision on the construction of Peru's first nuclear power plant to be made some time before 1995, but only if nuclear energy enjoys economic advantages over hydroelectricity. If that decision is favorable, construction of the plant would start in 1995."

The Peru assessment report summarized the Peru energy situation as follows.

"Peru is blessed with indigenous energy resources that could meet its needs well beyond the year 2000. Significant opportunities for increased effectiveness in the current and projected use of energy exist in the transportation and industry sectors. More work is needed both to confirm its oil and coal reserves and to determine the ability of its large hydroelectric resources to provide economically competitive energy. The use of direct solar and wind energy technologies is expected to make only a limited contribution by the end of this century. Effective use of its indigenous energy resources through existing and well-proven energy technologies should make it unnecessary for Peru to utilize the nuclear option until some time after the year 2000, if then."

"Because significant differences exist between the geographic regions of the country, Peru should undertake detailed regional planning studies to support comprehensive national energy planning efforts. In addition, greater integration of Peru's energy analysis and planning activities with its broader development plans and programs is needed. Continuation of the measures that were recently initiated to correct the causes of Peru's financial difficulties and related economic stagnation is crucial to the successful implementation of its energy plans."

EGYPT: THE ASSESSMENT

The Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment (Egypt Assessment

Report) is a 5-volume report on Egypt's energy supply and demand situation. According to the report, the assessment is a technical analysis that provides (1) a comprehensive picture of Egypt's projected energy demand through the year 2000, (2) an assessment of the basic fuels and energy resources potentially available, (3) alternative energy supply/demand balances for 1985 and 2000 which could be used to establish goals for Egypt's energy plans, (4) examination of alternative energy planning strategies, (5) aggregate estimates of costs, manpower and equipment for each energy supply/demand balance, (6) identification of factors that should be considered in evaluating various energy options, and (7) suggestions for steps needed to continue comprehensive and systematic energy planning. DOE officials believe that the assessment provides a base from which future Egyptian energy planning can be originated.

In Egypt, the U.S. team in collaboration with Egyptian counterparts developed four basic strategies and a comparison or reference case. The comparison or reference case is an energy projection that balances energy supply and demand for 1975, 1985, and 2000. It is based on a variety of assumptions about energy supply and demand, such as, 1 million barrel/day oil production by 1985, and equal gas production and demand. The projection is intended as a point of comparison for the effects of other strategies--not as the most probable prediction. The maximum gas use strategy attempts to make full use of indigenous gas. The improved efficiency strategy attempts to reduce energy use through conservation, such as an improved transportation system and improved industrial energy use. The accelerated renewable resources strategy is designed to aggressively promote renewable resources through government encouragement of solar, wind, and biomass electric systems and development of the Qattara Depression hydroelectric project. The Qattara Depression Project would involve the excavation of a canal or tunnel and the generation of electricity from the flow of water from the Mediterranean Sea into the Depression. The nuclear strategy was designed with three options which reduced the quantity of nuclear power from the level in the comparison case.

The assessment report made many major observations, such as:

--Gaps and inconsistencies exist in Egypt's current energy data and related planning. Subsequent planning should more fully address Egypt's development goals.

- Egypt should give priority attention to measures which can provide a better technical basis and improved incentives for exploration for fuels and energy-related commodities.
- Egypt's favorable solar resources should be aggressively developed.
- Egypt should consider initiating steps to achieve improved energy planning.

The Egypt assessment report confirmed Egyptian needs for nuclear power investments. Nevertheless, the extent of such nuclear commitments was based on electricity growth rates which, according to the assessment report, appeared unreasonably high. The report also stated that if preliminary indications of the possible existence of economically recoverable uranium prove valid, Egypt may be able to meet its own uranium fuel needs or even export uranium. The report judged Egyptian uranium enrichment uneconomical even for the maximum projected nuclear capacity through the year 2000 (assuming use of a commercial gaseous diffusion plant), but added that Egypt plans to continue monitoring development of smaller capacity enrichment plants and will re-examine uranium enrichment if an economical, smaller scale system is developed. Spent-fuel reprocessing was considered an unattractive, uneconomical option for Egypt.

The Egypt assessment report summarized Egypt's energy situation as follows.

"In summary, although solar and wind resources in Egypt are abundant, the contribution that such renewable sources can make toward meeting Egypt's increasing needs for commercial energy is judged to be quite limited through the year 2000. Therefore, conventional fuels will need to provide the bulk of Egypt's growing energy requirements during this period, in large measure, using existing energy conversion and delivery technologies. Decisions on preferable courses of action for this period are complicated by uncertainties in Egypt's oil, gas and uranium reserves, in the economic viability of imported oil or coal for energy use, and in foreign exchange and capital requirements. Inadequacies in Egypt's current plans compound this complexity in view of the need to also build during this

period the basis for expanded economic development and the foundations with which Egypt will supply its energy needs after the year 2000."

"Egypt's current ability to expand its energy supply capacity needs strengthening and the use of nuclear and other advanced technology energy systems will exacerbate this need. In this light, it would be prudent for Egypt to reassess all of the available energy options, both demand and supply. This reassessment should focus on Egypt's capability to effectively implement those options and the need for early commitment of resources to the selected courses of action. In any event, Egypt needs continuing assistance in establishing a comprehensive energy planning capability and in preparing to implement those plans effectively."

NUCLEAR NON-PROLIFERATION ACT OF 1978

PUBLIC LAW 95-242—MAR. 10, 1978

TITLE V--UNITED STATES ASSISTANCE TO DEVELOPING COUNTRIES

POLICY; REPORT

SEC. 501. The United States shall endeavor to cooperate with other nations, international institutions, and private organizations in establishing programs to assist in the development of non-nuclear energy resources, to cooperate with both developing and industrialized nations in protecting the international environment from contamination arising from both nuclear and non-nuclear energy activities, and shall seek to cooperate with and aid developing countries in meeting their energy needs through the development of such resources and the application of non-nuclear technologies consistent with the economic factors, the material resources of those countries, and environmental protection. The United States shall additionally seek to encourage other industrialized nations and groups of nations to make commitments for similar cooperation and aid to developing countries. The President shall report annually to Congress on the level of other nations' and groups of nations' commitments under such program and the relation of any such commitments to United States efforts under this title. In cooperating with and providing such assistance to developing countries, the United States shall give priority to parties to the Treaty.

Nuclear and non-nuclear energy resource development.
22 USC 3261.

Presidential report to Congress.

PROGRAMS

SEC. 502. (a) The United States shall initiate a program, consistent with the aims of section 501, to cooperate with developing countries for the purpose of—

Developing countries, energy development programs.

(1) meeting the energy needs required for the development of such countries;

(2) reducing the dependence of such countries on petroleum fuels, with emphasis given to utilizing solar and other renewable energy resources; and

(3) expanding the energy alternatives available to such countries.

(b) Such program shall include cooperation in evaluating the energy alternatives of developing countries, facilitating international trade in energy commodities, developing energy resources, and applying suitable energy technologies. The program shall include both general and country-specific energy assessments and cooperative projects in resource exploration and production, training, research and development.

Assessment and cooperative projects.

(c) As an integral part of such program, the Department of Energy, under the general policy guidance of the Department of State and in cooperation with the Agency for International Development and other Federal agencies as appropriate, shall initiate, as soon as practicable, a program for the exchange of United States scientists, technicians, and energy experts with those of developing countries to implement the purposes of this section.

Experts exchange.

(d) For the purposes of carrying out this section, there is authorized to be appropriated such sums as are contained in annual authorization Acts for the Department of Energy, including such sums which have been authorized for such purposes under previous legislation.

Appropriation authorization

(e) Under the direction of the President, the Secretary of State shall ensure the coordination of the activities authorized by this title with other related activities of the United States conducted abroad, including the programs authorized by sections 103(c), 106(a)(2), and 119 of the Foreign Assistance Act of 1961.

22 USC 2151a, 2151d, 2151q

PUBLIC LAW 95-242—MAR. 10, 1978

REPORT

SEC. 503. Not later than twelve months after the date of enactment of this Act, the President shall report to the Congress on the feasibility of expanding the cooperative activities established pursuant to section 502(c) into an international cooperative effort to include a scientific peace corps designed to encourage large numbers of technically trained volunteers to live and work in developing countries for varying periods of time for the purpose of engaging in projects to aid in meeting the energy needs of such countries through the search for and utilization of indigenous energy resources and the application of suitable technology, including the widespread utilization of renewable and unconventional energy technologies. Such report shall also include a discussion of other mechanisms to conduct a coordinated international effort to develop, demonstrate, and encourage the utilization of such technologies in developing countries.

Presidential
report to
Congress.
22 USC 3262
note.

Single copies of GAO reports are available free of charge. Requests (except by Members of Congress) for additional quantities should be accompanied by payment of \$1.00 per copy.

Requests for single copies (without charge) should be sent to:

U.S. General Accounting Office
Distribution Section, Room 1518
441 G Street, NW.
Washington, DC 20548

Requests for multiple copies should be sent with checks or money orders to:

U.S. General Accounting Office
Distribution Section
P.O. Box 1020
Washington, DC 20013

Checks or money orders should be made payable to the U.S. General Accounting Office. NOTE: Stamps or Superintendent of Documents coupons will not be accepted.

PLEASE DO NOT SEND CASH

To expedite filling your order, use the report number and date in the lower right corner of the front cover.

GAO reports are now available on microfiche. If such copies will meet your needs, be sure to specify that you want microfiche copies.

AN EQUAL OPPORTUNITY EMPLOYER

**UNITED STATES
GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548**

**OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300**

**POSTAGE AND FEES PAID
U. S. GENERAL ACCOUNTING OFFICE**



THIRD CLASS