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U. S. Agency for International Development

PRIVATE POWER PROJECTS IN DEVELOPING COUNTRIES

Summary Report on a Conference in Amman, Jordan

December 12, 1989

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The Jordan Electricity Authority
and
Office of Energy
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SECTION 1

INTRODUCTION AND SUMMARY

An adequate and reliable electricity supply is a fundamental requirement for the economic well-being and sustained economic growth of any country. Over half of the developing countries assisted by the U.S. Agency for International Development (A.I.D.) are experiencing severe electricity shortages. In Pakistan, for example, electricity shortages have exceeded 25 percent of demand over the past several years. Clearly, these developing countries need to expand electric generating capacity and distribution networks to meet present and future electricity demands arising from increasing population, economic growth, and expanding rural electrification.

The electricity crisis is exacerbated by the low efficiency and unreliable performance of many publicly owned electric utilities, by high losses in electricity transmission and distribution (18 percent to 28 percent in four Asian countries), and by excessive consumption of electricity by inefficient end-users especially in the industrial and agricultural sectors.

Large capital expenditures will be needed for additions to generating capacity and transmission and distribution systems and for improvements in the efficiency of present installations. A recent World Bank paper[1] estimates that between 1990 and 1999, the developing countries will require investments in the electricity sector totaling about $760 billion in 1989 U.S. dollars, averaging $76 billion annually. In comparison, the present annual rate of investment in developing countries in the power sector is only approximately $50 billion. In most of these countries the ability of the public sector to finance or guarantee the financing of new power projects is severely limited by debt problems and other financial limitations. Since 1983, official creditors, such as the multilateral and bilateral agencies, have provided the majority of funding for power development, whereas public and publicly guaranteed debt has provided only $7 billion annually. Moreover, official creditors will find it difficult to maintain their past rate of investment.

Spurred by this shortfall in funding, a number of countries are examining policies and programs to increase the role of the private sector in the financing, construction, and operation of power plants. It is also clear that the private sector can and will make commitments when provided with a fair and reasonable environment. The Office of Energy in A.I.D.'s Bureau for Science and Technology strongly supports the role of the private sector as one means of providing additional electricity to the developing countries. As part of their ongoing strategy

[1]E. A. Moore and G. Smith, "Capital Expenditures for Electric Power in the Developing Countries in the 1990's," World Bank, Industry and Energy Department Working Paper, Energy Series Paper No. 21 (February 1990).

to provide assistance to these countries, the Office of Energy is pleased to have co-sponsored this conference entitled, "**Jordan Private Power Conference,**" with the Jordan Electric Authority on December 12, 1989 in Amman, Jordan.

This report summarizes the conference presentations. The agenda is provided in Appendix A. The primary purpose of the conference was to provide Jordan officials and private industry with information on private sector roles in the generation of electric power. The conference was organized to provide a balanced and global perspective of the complex issues involved with private power. Speakers were selected from the private and public sectors having direct experience in private power projects in the United States, Turkey, Pakistan, Malaysia, Philippines and the People's Republic of China.

Interest in such a conference had been stimulated by Jordan's economic and financial difficulties, the need to plan for additional electric generating capacity in Jordan, and a recently completed feasibility study funded by the Office of Energy that evaluated the production of electric power from Jordan's large reserve of oil shale.

The conference was attended by 200 persons including officials of energy and other agencies in Jordan and several other countries and representatives of project developers, lending agencies, banking and investment companies, engineering firms, and equipment suppliers. A list of these attendees is given in Appendix B.

Following welcoming and keynote addresses, which are summarized in Section 2.0, the conference was divided into four sessions. In a session on "**Jordan's Power Needs: Can the Private Sector Help?,**" senior Jordanian officials reviewed Jordan's power needs, the potential role of the private sector, and prospects for the use of Jordan's large reserves of oil shale for power generation. The papers in this session are summarized in Section 3.0.

In a session on "**Private Power in the U.S.: A New Era**" (see Section 4.0.), two speakers from the U.S. electric utility industry and a representative of a state regulatory agency reviewed the rapid growth of independent power generating companies in the 1980s pursuant to the Public Utilities Regulatory Policies Act (PURPA) legislation of 1978.

During a session on "**Private Power Projects: Their Development and Financing**" (see Section 5.0), representatives of four U.S. firms reviewed the organizational, financial, commercial, and risk factors that must be considered in developing private power projects.

A session on "**Private Power: The View of Policy Makers**" (see Section 6.0), included papers delivered or prepared by officials from Turkey, Pakistan, Malaysia, and the Philippines on programs in their respective countries to encourage private sector participation in the electric power projects.

A closed-door session was held the next day with Jordan and Office of Energy officials and the speakers to discuss specific issues regarding private power and

exploiting indigenous oil shale resources. Discussions advanced the views and concepts presented in the conference. The Jordanians were keenly interested in the potential of the private sector to develop the large reserves of oil shale to generate electrical power. Prompted by the heavy reliance upon imported oil and the lack of public funds to develop the oil shale reserves, the Jordan officials sought advice on the steps needed to lay the groundwork for the private sector's involvement.

The consensus from the attendees was quite positive and was seen as a first, but very important, step in a process where government policies and the institutional framework need to be reassessed. The participants and attendees from the private sector were also encouraged by the dialogue and exchange of concerns. A better understanding of these issues can only facilitate the basis for reaching mutually beneficial agreements. In Jordan, for example, additional power capacity may not be needed for several years. The information provided during this conference may well assist the Jordanians to proactively establish a framework that will encourage private sector participation. Moreover, actions taken before demand outstrips supply would allow for meaningful comparisons and, consequently, provide for additional power supplies at the lowest reasonable cost.

Key issues facing the public sector are the growing demand for power, reliable and efficient power supplies, inadequate funds and established policies that did not envision involvement by the private sector. Key issues for the private sector include return on investment and the associated risks. How can the public and private sector reconcile these issues? The Philippines, for example, has constructed a 200 MW gas turbine power station under the build-own-transfer (BOT) structure. Pakistan's private power policy has led to five letters of intent totaling 1,700 MW of additional capacity. To be sure, these projects required compromise and the obstacles were many and far-reaching; however, it is also clear that a steadfast commitment by all involved parties facilitated negotiations. Consequently, past experience points to protracted negotiations. Yet, most of the speakers agree that as the public and private sectors build on past experiences, the process will be streamlined.

Experiences shared during this conference provided the successes, concerns and lessons learned in the international private power marketplace. Jordan, being dependent on imported oil for the majority of electrical production, foresees an increased role for the private sector to develop indigenous resources such as oil shale and is beginning to take such steps as tax breaks and custom duty exemptions to encourage this role. Turkey, Pakistan and the Philippines have enacted legislation that establishes policy for private investments and are moving forward. Speakers from these three countries agree that the process to reach project implementation is arduous and that a strong commitment by the host government at all levels is essential. Mr. Ilias, Ministry of Water and Power, adds that Pakistan's experience indicates the private sector's demands for returns and aversion to risk are high.

In the United States, public utilities have experienced significant interest by independent power producers when bids have been solicited. In California, for

example, 6,000 MW of power are now being produced by independent generators. The perspective of U.S. developers and equipment manufacturers points to the benefits of the BOT concept as a means for developing countries to shift risk, attract foreign investment, and improve delivery and plant efficiency. These same U.S. speakers also concur with speakers from the public sector about the need to streamline negotiations and the high front-end costs of developing projects. All parties, however, agree that the host government needs to establish the policies and framework that encourage private investment and be committed to this approach.

The conference was funded by the A.I.D. Office of Energy under the Conventional Energy Technical Assistance (CETA) Project and was organized by the CETA contractor, Bechtel National, Inc. This project serves as a vehicle for marshaling private sector interest, experience, and financing for conventional energy projects in developing countries. It covers power projects using oil, gas, coal, oil shale, solid wastes, and geothermal energy.

SECTION 2

WELCOMING AND KEYNOTE ADDRESSES

The Honorable R. S. Suddarth,
American Ambassador to Jordan

Electricity is of vital importance to economic development in all nations. In developing countries, continued agricultural improvements, rural development, industrial growth, and general economic progress are fundamentally linked to increased electricity production.

Over the past 15 years, energy production in developing countries has become costly and often unreliable. Governments and bilateral and multilateral lending institutions are having difficulty in meeting the financial requirements of power sector expansion. A role for the private sector in meeting some of the future power supply requirements must be explored. A strong private sector is necessary to attract needed foreign investment for all forms of productive enterprise in developing countries. A partnership between the private sector and the government is the solution to the challenges faced by the country in the energy sector.

His Excellency Thabet El-Taher
Minister of Energy and Mineral Resources
Hashemite Kingdom of Jordan

Although Jordan Electricity Authority is a government agency, it operates on a commercial basis. Its total value is approximately JD400 million,[1] of which JD360 million is held by the Government and the remainder by two public shareholding companies.

The Government estimates that investments totaling JD50 million will be required for power generation prior to the year 2000. Over the last few years there have been intensive efforts in Jordan to reduce fuel imports, increase exploration for oil and natural gas, develop energy conservation measures, enact new energy price policies, use solar energy for heating, and use other alternative resources including solar and wind energy and oil shale. A recent discovery of natural gas is promising.

The general policy of the Government of Jordan is to encourage private sector investments. Such investments in the electric power sector are welcome.

[1]U.S. $1 = JD .635 at the time of the conference.

Dr. James B. Sullivan
Director, Office of Energy
Bureau for Science and Technology
U.S. Agency for International Development

Although 75 percent of the world's population lives in developing countries, these countries account for only 18 percent of the world's electricity consumption. Industry uses over half of the power generated in developing countries, compared with only one third of the power in the United States.

Over the past 20 years, the demand for electric power in developing countries has been growing by over 7 percent per year due to increased industrialization, the rapid growth of population and urbanization, and inefficient systems for the generation, delivery, and use of electric power.

The mix of energy sources for power generation is changing. The role of oil is declining in relative terms and also may decline in absolute terms. The use of natural gas is expected to increase by about 10 percent in the 1990s, and the use of coal also will increase modestly. Nuclear power will contribute less than 3 percent of the power for developing countries through the mid-1990s, with most of this capacity in South Korea and Taiwan. Geothermal energy will provide about 1 percent of the power for developing countries by the mid-1990s.

World Bank data indicate that nearly three-quarters of the financing of electric power projects and activities has come from export revenues or credits or from commercial loans from private institutions. International debt crises have constrained previous lending patterns and limited sources of funding. Greater reliance on the commercial and private sectors requires adequate provision for bearing the costs. Alternative options for financing private power projects include system ownership and operation by private firms, contracting for construction and operation of power plants, and lease-back arrangements.

The program areas of A.I.D. Office of Energy include the funding of feasibility studies for private sector participation in power projects, the investigation of fossil and renewable energy technologies for specific applications, energy training, promotion of energy efficiency and conservation, and assistance with energy policy, planning and development.

SECTION 3

JORDAN'S POWER NEEDS: CAN THE PRIVATE SECTOR HELP?

Dipl. Ing. M. Arafah
Director General
Jordan Electricity Authority

The primary objective of the Jordan Electricity Authority (JEA) is to build a reliable and environmentally safe energy system that will permit an increasing standard of living in Jordan.

At present, JEA generates 623 MW in oil-fired steam plants, 180 MW in oil-fired gas turbines, and 56 MW in diesel generating sets. JEA seeks to reduce the economic burden of oil imports by increasing the utilization of indigenous energy resources including natural gas, oil shale, and solar and wind energy.

Following the recent discovery of natural gas in eastern Jordan, some of the gas is being used in a 60 MW gas turbine power station at Risha that is reducing the country's oil imports by about 15 percent. Gas reserves in Jordan have been estimated at 400 billion cubic feet. Several other options for the use of gas are being evaluated, including a pipeline to bring the gas to a power station and industrial locations and permit the substitution of gas for oil in boilers. If reserves prove to be large enough, the distribution network may be extended to supply gas to households.

Hydro power provides 7 MW. A pilot wind farm produces .3 MW. JEA's total installed capacity is 928 MW. Electricity demand is expected to grow by 6 percent to 8 percent per year during the 1990s. According to present forecasts, new capacity will not be needed until at least 1994 and interconnection with Egypt may delay the construction of new capacity for two more years.

Jordan has large reserves of oil shale. Feasibility studies completed in 1989 indicated that the shale can be burned to generate power and that a 50 MW prototype plant would demonstrate that shale power plants are a viable alternative to meeting Jordan's future energy needs. Commercial use of the shale is not expected prior to the year 2000.

JEA is a wholly government-owned utility. Although the private sector has played an important role in Jordan, the Government's role has been expanding. Government ownership extends to a number of sectors including manufacturing, industry, mining, transportation, telecommunication, energy, and marketing. The Government has implemented measures to convert some government-owned corporations to public shareholding companies. Some of the shares of these companies will gradually be sold to the private sector.

Eng. Mustafa A. Zahran
Director, Productive Projects Department
Ministry of Planning, Jordan

Remedial measures are under way to limit expenditures and correct imbalances in the Jordanian economy. These measures include stringent controls on expenditures, reform of the legal structure, reduced reliance on domestic bank borrowing, tight credit policies for the private sector, and increased discipline in all financial actions.

Enhancement of the private sector's role is an essential part of the response to this economic challenge. The Government of Jordan is privatizing selected public enterprises and is divesting itself of equity shareholdings in other enterprises. It is also improving the climate for private investment through selective deregulation measures, government incentives to private investment, and reform of the legal structure governing economic activities.

To encourage investors, the Government has authorized tax breaks on new investments and customs duty exemptions for new capital machinery and equipment. Various steps have been taken to abolish regulatory constraints and to attract foreign competition and free trade. The combined effect of these measures will be an investment climate in which private power projects are able to flourish.

SECTION 4

PRIVATE POWER IN THE UNITED STATES: A NEW ERA

Mr. Bruce S. Edelston
Director, Bulk Power Policy
Edison Electric Institute
Washington, D.C.

The U.S. electric utility industry traditionally has consisted mainly of vertically integrated private companies owning generation, transmission and distribution facilities and providing power to all customers in a given area under an exclusive franchise. Such companies account for 75 percent of the power generation in the United States.

By the mid-1970s, this industry structure faced serious problems due to the oil price shocks of the 1970s, a sudden reduction in the growth of electric demand, severe inflation, and increased environmental activism. Among the results were excess generating capacity, increased power prices, and increased risks and costs associated with the construction of large new power plants.

In 1978, the Congress passed the Public Utilities Regulatory Policies Act (PURPA). The goals of PURPA were increased efficiency in the production and use of electricity and increased use of renewable energy resources. This act required utilities to purchase power generated by private parties who met certain specified standards at prices based on the costs avoided by the utility as a result of the purchase. This act began to break down the utility industry's monopoly on power generation, while retaining the monopoly on transmission and distribution.

In nine states implementation of PURPA has led to competitive bidding procedures under which other firms and entrepreneurs submit bids for contracts to meet power needs specified by the utility company. Competitive procurement can reduce some of the risks the utility would otherwise face in constructing new generating capacity. These risks are transferred to the private developer. Also, responsibility for raising capital is placed on the private developer.

In developing competitive procurement processes, attention must be paid to non-price factors including the financial security and stability of the project developer, the long-term availability and price of the fuel, prior experience with the proposed generating technology, environmental impacts, and others. Careful consideration also must be given to laws and regulations that will prevent destructive competition at the customer level.

Effective use of independent generators requires sharing of risks by the utility and project developers and cooperation to protect the reliability of the power supply.

Mr. C. William Meyer
California Public Utilities Commission
San Francisco, California

The PURPA legislation of 1978 encouraged the development of independent power generators in two ways. First, independent generators were exempted from traditional cost-of-service ratemaking, which would not have provided enough incentive to investors to take the risks involved in tapping alternative sources of energy. Political resistance to rising energy rates in the 1970s made it hard for utilities to raise money for new energy development. Exempting independent generators from traditional regulation was intended to make it easier for them to tap new sources of capital, to profit from efficient construction and operation, and to take advantage of innovative small-scale generating technologies.

Second, independent generators were to receive prices for power equal to the costs utilities avoid by purchasing the power.

California's program has been very successful. About 6,000 MW of power are now being produced by independent generators. Almost half of the contracts with independent generators are for power from non-petroleum sources such as wind, solar, and biomass fuels.

Independent generators add flexibility to the power system. In the U.S. regulatory environment, independent power projects can come on line much more quickly than large conventional power plants. Independent power is often available from modular, small-scale technologies, which can be exploited when needed, and avoids the surplus capacity problems that can arise when large plants are built in advance of load growth.

The California Public Utilities Commission developed a set of standardized contracts that utilities were required to provide to independent generators. Solid contracts with utilities for the purchase of power are essential for the financing of independent power projects. In addition to the usual "avoided cost" payments, some of the contracts offer "capacity" payments to independent generators who meet specified performance standards. The contracts also provide penalties if the generator fails to meet the performance standard. The development of long-term contracts with fixed prices has proved essential for the development of renewable technologies with high ratios of fixed to variable costs.

Mr. John L. Levett
Project Director
New England Power Service Company
Westborough, Massachusetts

U.S. utilities have successfully integrated private power into their mix of power sources. The benefits that can be achieved with private power purchases include: (a) increased diversity of power supply, (b) lower costs due to competition among suppliers, (c) incentives for utilities to improve their competitiveness,

(d) minimization of capital spending by the utilities, and (e) encouragement of the development of new technology.

Private power contracts in the United States focus intently on concerns about reliability of performance by the independent generator. Concerns about completion of new plants have led to contracts with progress milestones and financial commitments that are forfeited by the contractor if the project is canceled. U.S. utilities assume that not all projects under contract will be completed, and they contract for sufficient private power purchases to cover their expected needs. Contracts provide specific standards for interconnection with the utility's transmission system, voltage control, maintenance scheduling, and other operational requirements. Payments are made only for energy delivered to the utility or, in certain cases, for periods when the private power plant is available to come on line if needed.

Following a solicitation for bids by private power companies, the utility begins an evaluation process that considers life cycle costs of the project, debt service, return on investment, taxes, operating and maintenance costs, and fuel costs including expected escalation of fuel and other costs. Also evaluated are a number of non-price elements including technology, likelihood of completion, and on-line data.

Recently the New England Public Service Company solicited bids for 200 MW of capacity and received responses covering over 4,700 MW of capacity. Although such a high ratio of bids to solicit power is unusual, a 10-to-1 ratio is common. This level of response offers tremendous opportunities to utilities to obtain economic and diverse power supplies. All of the power contracted for by the utility was at prices less than the cost of additional power from a plant built and operated by the utility.

SECTION 5

PRIVATE POWER PROJECTS: THEIR DEVELOPMENT AND FINANCING

Mr. Stephen R. Wilson
Vice President
Bechtel Enterprises, Inc.
San Francisco, California

In the build-own-transfer (BOT) type of power project, the power plant is developed, financed, built, owned, and operated by the private sector within a specified period, after which the project is transferred to the public sector. During the period of private sector ownership, the company's cash flows will pay all of the project's operating costs and the debt plus returns on equity. At the end of the period, the public sector receives a "paid for" plant with a trained staff and 15 to 20 years of additional economic life.

The operational benefits of BOT power projects to the host government include: (a) improved delivery and plant efficiency, (b) accountability of suppliers, and (c) flexibility in ownership and financing. Financial benefits to the host government include: (a) transfer of risks to the private sector, (b) lack of impact on the government's capacity for credit, and (c) ability in certain circumstances to attract a greater pool of equity investment.

Under a BOT project, the private sector assumes risks that are within its control and the government stands behind risks that are political or force majeure in nature. The government must provide some sort of credit support or other backstop mechanism and offer reasonable economic incentives to project participants. Such a structure is necessary to attract private sector equity, commercial bank funding, export and supplier credits, and other forms of financing in developing countries in which the government plays the dominant role in the country's economy.

A number of issues must be addressed before the BOT model can be implemented. The high front-end costs associated with a BOT project are a problem for the private sector. An exclusive award to the consortium or sovereign undertaking by the government may be required before the participants will be willing to spend the funds necessary to develop the project. Large BOT electric projects require that payments to the consortium for electric power include substantial amounts of foreign currency. Country credit issues therefore become important.

The government must decide the degree of participation it desires and the amount of risk it is willing to assume. The government also must be willing to allow an acceptable balance between risks and rewards for the commercial participants. A successful project requires a clear commitment on the part of the government and the participation of a capable group from the private sector including engineer-constructor, major equipment suppliers, and local participants.

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Mr. James S. Cox
International Treasurer
Westinghouse Electric Corporation
Pittsburgh, Pennsylvania

BOT projects offer several elements that make them attractive to all participants. They include: (a) leveraged financing, (b) operating efficiency incentives, (c) the ability to attract foreign investors, and (d) opportunities for suppliers to earn returns on investments.

Essential elements in a typical BOT project include: (a) an experienced group of suppliers who will build and operate the plant, (b) a long-term contract for fuel supply with an agreed pricing mechanism, (c) long-term contracts for plant operations and maintenance with guaranteed levels of plant availability, (d) "take or pay" contracts for power sales to ensure that electricity is purchased or, if not, paid for if available, and (e) foreign equity investment with limited-resource debt financing.

Four requirements for structuring the financing arrangement for a typical BOT project are (a) the government's definition and authorization of a joint-venture company, (b) motivation of shareholders to earn a return on their investments, (c) reconciliation of debt from multilateral lending institutions, export/import agencies of supplier countries, and commercial loans, and (d) determination of tariff payments for electric power to the joint venture company.

Mr. George M. Knapp
Partner, Project Finance Group
McDermott, Will & Emery
Washington, D.C.

Local law influences the success of a private power project. Potential participants in a project must determine whether the necessary legal framework is in place for private power development and ownership and for related contractual obligations.

Two groups of legal documents are required for power projects. The first group includes contracts for construction, operation, fuel supply, and power generation. The second group includes government approvals for all contracts, permits, and partnership development agreements. There must be a sufficient sovereign commitment by the government to maintain a solid legal framework over the term of the project and, most importantly, over the term of its debt.

Risk profiles differ substantially from project to project. All parties in the contractual and financial process must have a realistic understanding of project risks and a willingness to accept the necessary allocation of risks. These include risks associated with market conditions, currency and tax considerations, finance structures, and factors related to project development, completion, and operations.

Mr. William Dykes
Managing Director
Citicorp International Ltd.
Hong Kong

BOT power projects have several advantages, including utilizing private entrepreneurial energy and capital, shifting debt from the government sector to the private sector, and assigning responsibility to the private developer for financing, supplier contracts, and operation and maintenance of the power plants.

The minimum security structure likely to be required by lenders includes firm contracts for fuel supply and power sales, all necessary government consents and approvals, and arrangements for foreign currency payments.

The sources of financing available for the development of private sector power plants include: (a) equity capital, (b) supplier credit/buyer credit (loans or insured credit from export credit agencies), (c) credit from export credit agencies at subsidized interest rates, (e) direct loans from the International Finance Corporation (Washington) or the Asian Development Bank (Manila), (f) complementary financing alongside IFC or ADB loans from commercial banks seeking protection from sovereign risk of the host country, and (f) syndicated loans from commercial banks, with limited recourse or non-recourse to shareholders.

Citicorp has assisted the Hopewell Group with the development of two BOT power projects. The first is a 700 MW (2 x 350) coal-fired power station at Guangdong in the People's Republic of China. The plant was built under a fixed-price, turnkey contract, at a total cost of $512 million. The bulk of the financing came in the form of a Japanese supplier credit of Yen 52 billion backed by the Export Import Bank of Japan. Both of the 350 MW units were in operation 28 months after the start of construction. The project has proved very successful for both Guangdong Province and the Hopewell Group. The plant is now operated by a joint venture between Fluor Daniel and the UK Central Electricity Generating Board.

In 1988, Hopewell submitted a proposal for a BOT project in response to an invitation from the National Power Corporation in the Philippines for bids for a 200 MW gas turbine plant to be used as a peaking plant. Hopewell offered a 12-year period of private ownership and a fixed price of $41 million. Despite project delays, financing is now in place and work has begun at the site. The financing includes IFC and ADB loans ($10 million each), complementary commercial financing ($10 million), and $11 million of equity. Equity shareholders include Hopewell, Citicorp, ADB, and IFC.

SECTION 6

PRIVATE POWER: THE VIEW OF POLICY MAKERS

Dr. Ibrahim Cakir
Foreign Investment Directorate
State Planning Organization, Turkey

[Note: Dr. Cakir's paper was presented by His Excellency Oktay Aksoy, Turkish Ambassador to Jordan.]

The BOT concept provides a number of direct and indirect advantages. The advantages include completion of projects on time without cost overruns, good management and efficient operation, transfer of new and advanced technology, cheaper and sound procurements, injection into the economy of fresh foreign capital, additional source of financing for priority projects, no inroads on public debt, no burden on public budget for infrastructural development, and positive effect on the creditability of the country.

Two proposed BOT projects for nuclear power plants failed in the mid-1980s because the Turkish Government was not willing to give sovereign guarantees to loans required to finance the projects. Subsequently, the Turkish Government requested proposals on the BOT basis for four coal-fired thermal power projects. Five consortia led by firms in the United States (Bechtel), Australia, Switzerland, Japan, and France have submitted proposals. The BOT model is being used for several other types of infrastructure projects in Turkey, including small to medium dams and hydroelectric plants, airport facilities, the Ankara Metro, an Ankara-Istanbul fast-train project, and a number of others.

Principles adopted by the Turkish Government for BOT projects include, among others: (a) conduct of the project by a joint-venture company pursuant to a turnkey, fixed-price contract, (b) a debt/equity ratio of not less than 80/20, (c) investment by the Turkish Government of up to 30 percent of the equity in the joint-venture company, (d) non-equity financing arranged by the private sector sponsors but as obligations of the joint-venture company, (e) joint-venture company to have full liability for failure to complete the project for reasons other than force majeure and default by the Turkish Government, (f) equity capital to be repatriated after all senior debt has been repaid, and (g) ownership of plant to be transferred to the Government following repayment of debt and repatriation of equity capital, unless parties agree that company should operate plant for a specified additional period.

Experience in Turkey has shown that project success depends on several factors. There must be a strong commitment at every level of the host government to complete the project. Cost-benefit terms must be more attractive than alternative public sector investments. The project must provide a safe environment for foreign investments, and the host country must be able to service its debt. A security package must be devised that satisfies lenders on revenue flow and convertibility of local currency. Finally, the project investors must demonstrate to the host government their technical, corporate, and financial ability and their commitment

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to carry the project through the development, construction, and operational phases. The BOT model is an extremely attractive alternative to classic project financing. It is a new instrument to inject dynamism into the development efforts of many countries.

Mr. Ghulam Murtaza Ilias
Director General, Private Power Cell
Ministry of Water & Power
Islamabad, Pakistan

The total installed power generating capacity in Pakistan is 7,226 MW. Hydroelectric plants provide 2,897 MW, and 4,329 MW is generated in oil-fired thermal plants. Large dams at Tarbela and Mangla account for 2,250 MW of the hydro capacity, but output depends on the use of water for irrigation. Between December and June each year, the country faces a power shortage of about 1,900 MW, which is about 30 percent of the demand for power. The percentage of the population of Pakistan having electrical service is above 40 percent.

The 7th Five Year Plan (1988-1993) set a target for the generation of 6,558 MW of additional power, but lack of financial resources has limited the implementation of these plans. While Pakistan has substantial coal reserves, coal has not yet been exploited for power generation. Energy imports have a very negative impact on the country's balance of payments.

In 1985, the Government announced a basic policy for attracting foreign investment, which now includes the following major principles related to power projects: (a) new power projects are sited and approved in accordance with medium- and long-term plans for expanding generating capacity, (b) power will be purchased from private projects at prices similar to the cost of production of Pakistan's two principal electric utilities, (c) the tariff calculations provide for a suitable return on equity, but such return is not guaranteed, (d) power purchase agreements provide penalties and bonuses for performance below and above the agreed plant factor, (e) all concessions to other industries at a particular site will also be allowed to the power project, (f) power projects are exempt from corporate tax on a permanent basis, and (g) power projects are based on 25 percent equity and 75 percent debt financing, both split with no fixed limits between foreign and local sources.

The World Bank is playing a major role in the private sector energy development in Pakistan, with strong support from USAID. A Private Sector Energy Development Fund has been created within the National Development Finance Corporation of Pakistan, with funding from the World Bank, USAID, other development assistance agencies, and other sources. The fund will lend up to 30 percent of the capital cost of a power project with an 8-year grace period and 15-year repayment period. Private entrepreneurs, with the support of the Government, are seeking new ways of tapping available sources of local financing without loans from the banking system. The USAID funding is available for feasibility studies and institution building in Pakistan, including foreign training and technical assistance.

The World Bank has developed an elaborate security package, which includes limited recourse financing, protection against changes in duties and taxes, indexation of specific costs as per the consumer price index, repatriation of foreign exchange, foreign risk insurance through the State Bank of Pakistan, a government guarantee of power purchases, and (in the case of plants fired with fossil fuels) a government guarantee for performance of the public sector fuel supplier.

Letters of intent have been issued covering five private power projects. They include a 1,200 MW coal-fired power plant, a 300 MW oil-fired plant, a 10.5 MW hydroelectric plant, an 80 MW coal-fired plant, and a 100 MW gasification combined cycle power plant.

Three types of problems have been encountered in implementing the private power policy: (a) proposals have not been adequately prepared, and bidders have been reluctant to accept necessary changes in the proposals, (b) the costs of equipment, financing, and insurance in the bids are very high, and protracted negotiations have been necessary to arrive at a reasonable tariff, (c) extreme positions taken by bidders on risk allocation, definition of force majeure, mode of operation of the plant, bonuses, penalties, and other matters have delayed the negotiating process. These problems are expected to diminish as a result of greater experience with private power projects.

Mr. Haji Ahmad Zaidee Bin Laidin
Director, Management Services and Development
National Electricity Board, Malaysia

Since 1985, the Government of Malaysia has been carrying out a privatization program in a number of major sectors. Objectives of the program are to reduce the financial and administrative burden of the Government, to reduce the size and involvement of the Government in the economic sector, and to encourage competition, efficiency, productivity, and economic growth.

In September 1989, the Government decided that the National Electricity Board (NEB) should be converted to a corporation. While the Government will retain a major equity ownership in the new company, shares will be sold to local institutional investors, NEB employees, the general public, and foreign investors. Large private companies involved in electricity supply within and outside the country will be invited to own equity in the new company. The volume of overseas ownership will be limited to ensure the protection of the nation's strategic interests. Overseas investors will be selected on the basis of their expertise, transfer of technology, research and development capabilities, and ability to contribute to the well-being of the nation.

Several companies have expressed interest in BOT power projects in Malaysia. This concept could provide a way to increase the funds available for the power sector without increasing the debt burden of the country. It also could provide one means of comparing the efficiency of publicly owned and private utilities. At present, however, priority is being given to the corporatization of the electric utility in Malaysia.

Atty. Wenceslao R. de la Paz
Executive Director, Office of Energy Affairs
Office of the President
Manila, Philippines

[NOTE: Attorney de la Paz's paper was read by Mr. R. R. Buta, Bechtel National, Inc.]

The National Power Corporation (NPC) of the Philippines is responsible for generating and distributing bulk power through seven separate grids on Luzon, Mindanao, and five other islands. NPC's installed capacity of 5,782 MW at the end of 1988 accounted for 85 percent of the country's generating capacity. In addition, a number of investor-owned utilities produce about 311 MW, and 102 MW are generated by rural electric cooperatives. About 49 percent of the rural population has access to electricity.

Great demands have been placed on NPC by the Government's decision to mothball the 620 MW Bataan nuclear power plant completed in 1985, the upsurge in load growth induced by economic recovery, and the need to reduce the power sector's share of public investment and foreign borrowing. The need to implement NPC's power expansion program is urgent, as lack of generating capacity may lead to widespread load shedding.

In 1987, the Government decided to allow private sector participation in the power sector. The new policy was designed to increase power capacity, reduce government financial guarantees in the power sector, promote the development of indigenous energy resources, and rationalize the operation of electric generating facilities.

A process is under way that is leading to the privatization of Manila Electric Company (MERALCO), the largest power distribution company in the Philippines. Efforts are being made to re-establish the private character of the 117 rural electrification cooperatives in the Philippines.

Executive Order 215 of July 10, 1987 allows private corporations and cooperatives to build and operate (a) cogeneration units, (b) industrial power plants producing power for internal use but selling surplus power to NPC, (c) generating plants that sell their entire output to the NPC, and (d) generating plants producing power for sale directly to end users.

The private companies must obtain accreditation as Private Sector Generation Facilities (PSGF) from the NPC in areas served by the NPC grid or from the National Electrification Administration (NEA) in off-grid areas. The utility (NPC or NEA) is required to provide connections to the PSGF and to purchase both its power and generating capacity at the utility's avoided cost. To date, six companies have received accreditation for nine projects involving 271 MW.

The Government has invited the private sector to submit proposals for several specified projects, and a number of BOT projects have been proposed by the

private sector. Twelve foreign firms have applied for prequalification for a BOT project involving a 300 MW coal-fired plant to supply power for the Luzon grid. A 200 MW gas turbine power station is being built in Metro Manila by the Hopewell Group based in Hong Kong. Negotiations began in May 1988, but were stalled when Hopewell demanded sovereign guarantees by the Government. Under a new plan, the Government will prevail upon the NPC to fulfill its obligations to Hopewell, but will not itself assume these obligations. Construction began in October 1989; commissioning is scheduled for April 1990. The plant will be operated by Hopewell for 10 years and then turned over to NPC without any further cost to the Government. [Editor's note: Additional information on this project is provided in the summary of the paper by Mr. William Dykes on page 15 of this report.]

Under the BOT project, a 220 MW coal-fired cogeneration facility in Batangas is being proposed by Cogentrix USA. The plant will have a life of 30 years and will be guaranteed to operate at 90 percent availability. NPC will be obligated to purchase the entire output for 20 years, after which it will have an option to buy the plant. Negotiations centering on pricing were continuing at the time this paper was prepared.

Assessments of these projects indicated that significant delays in project implementation resulted from a laborious framework of multi-agency approvals for project implementation. The Government learned that if institutional requirements are not properly defined, private sector power generation will be slow to materialize. Experience has shown that the pricing formula should be introduced early in the project development process.

Appendix A

JORDAN PRIVATE POWER CONFERENCE ELECTRICITY OPTIONS FOR THE FUTURE

TUESDAY, DECEMBER 12, 1989
8:00 AM — 5:00 PM

HOTEL JORDAN INTER-CONTINENTAL
AMMAN, JORDAN

CO-SPONSORED BY:
THE JORDAN ELECTRICITY AUTHORITY
AMMAN, JORDAN

AND

THE U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT (A.I.D.)
OFFICE OF ENERGY
WASHINGTON, DC

JORDAN PRIVATE POWER CONFERENCE

OBJECTIVES:

The conference will provide a forum for the presentation and discussion of developing country and U.S. experience in the organization, financing, construction, and operation of private electric power projects. The conference will also explore opportunities for private participation in the power sector of Jordan and other countries in the region.

PARTICIPANTS:

- Policy and decision makers
- Bilateral and multilateral lending agencies
- Private banking and investment groups
- Equipment suppliers
- Project developers
- Engineering companies

Agenda
Tuesday, December 12, 1989

MORNING

8:00 AM Registration

8:15 AM Conference Background and Objectives

Richard R. Buta, Manager
Conventional Energy Technical Assistance Project, Office of Energy, A.I.D. Washington, DC

8:30 AM Welcoming Remarks

The Honorable R. S. Suddarth
American Ambassador to Jordan

8:40 AM Keynote Addresses

Energy and Jordan's Future

His Excellency Hisham El Khatib
Ministry of Energy and Mineral Resources
Hashemite Kingdom of Jordan

Private Power: Partnership with the Private Sector

James B. Sullivan
Director, Office of Energy
A.I.D. Washington, DC

The World Bank: A New Role in Private Power Development

Ibrahim Elwan
Chief, Energy Operations
World Bank, Washington, DC

10:00 AM Coffee Break

10:30 AM Jordan's Power Needs: Can the Private Sector Help?

Power sector requirements, financial implications for the country, and Jordan's private sector as a possible resource will be reviewed.

Dipl. Ing. M. Arafah, Director General
Jordanian Electricity Authority

Eng. Mustafa A. Zahran, Director
Productive Projects Department
Ministry of Planning

11:00 AM Private Power in the U.S.: A New Era

The experience of the U.S. utility industry with private power generation under PURPA legislation, utility purchases of private power, and the regulatory considerations of safeguarding the public interest will be discussed.

INVITED SPEAKERS:

Bruce S. Edelston, Director
Bulk Power Policy
Edison Electric Institute
Washington, DC

C. William Meyer
Public Utilities Commission
State of California
San Francisco, CA

John L. Levett
Project Director
New England Power Service Company
Westborough, MA

12:00 PM Lunch

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Agenda (Continued)
Tuesday, December 12, 1989

AFTERNOON

1:30 PM **Private Power Projects: Their Development and Financing**

The organizational, financial, commercial, and risk guarantee considerations of structuring private power projects will be reviewed and contrasted with the traditional public sector financing approach. The potential role of such projects in helping to meet the power supply requirements of the region will also be discussed.

INVITED SPEAKERS:

Stephen R. Wilson, Vice President
Bechtel Financial Services, Inc.
San Francisco, CA

James Cox, International Treasurer
Westinghouse Electric Corp.
Pittsburgh, PA

George M. Knapp, Partner
McDermott Will & Emery
Washington, DC

William Dykes, Vice President
Citibank
Hong Kong

3:15 PM **Coffee Break**

3:30 PM **Private Power: The View of Policy Makers**

The experience of developing countries in the formulation of legislation and the enactment of laws and regulations to facilitate private sector involvement in power system investments will be reviewed, including the progress of current BOT solicitations and negotiations.

INVITED SPEAKERS:

Wenceslao de la Paz
Executive Director
Office of Energy Affairs
Manila, Philippines

G. M. Ilyas
Director Private Power
Ministry of Water and Power
Islamabad, Pakistan

Haji Ahmad Zaidee Bin Laidin
National Electricity Board
Kuala Lumpur, Malaysia

Ibrahim Cakir
Foreign Investment Directorate
State Planning Organization
Ankara, Turkey

5:00 PM **Conference Summary and Open Discussion**

5:30 PM **Adjournment**

6:00 PM **Reception**

Appendix B

PARTICIPANTS
JORDAN PRIVATE POWER CONFERENCE

Attendee	Position	Organization
Ababni, Mr. Adnan	Deputy General Manager	Amman Financial Market
Abdullatif, Mr. Faud	Representative	SAM Engineering and Trade Co.
Abu Ajamieh, Mr. Mohammad	Assistant General Manager	Natural Resources Authority
Abu Ayyash, Mr. Ibrahim	General Manager	Arabtech
Abu Ghazaleh, Mr. Hussam	Director General	ALIA, Royal Jordanian Airlines
Abu Hassan, Mr. Khaldoun	President	Amman Chamber of Industry
Abu Hassan, Mr. Mamdouh	President	Businessman's Association
Abu Lugud, Mr. Samir	Auditor	Dajani and Aladdin Co.
Abu Nijm, Mr. Wasfi	Deputy General Manager	Universal Insurance Co.
Abu Raghib, Mr. Musa	General Manager	The Arab Steel Industries Co.
Abu Shhaab, Mr. Ahmad	General Manager	Jerusalem Insurance Co.
Aied, Mr. Ibrahim	General Manager	The Jordan Gulf Insurance Co.
Al-Dhahir, Dr. Khaldoun	General Manager	Jordan Cement Factories Co.
Al-Hassan, Mr. Amin	Legal Advisor	JEA
Ali Bdeir, Mr. Mohammad	Director General	JEPCO
Anani, Dr. Jawad	President	Jawas Anani Establishment for Tech. and Econ. Studies
Arafeh, Dipl. Ing. Mohamad S.	Director General	Jordanian Electricity Authority
Asfour, Mr. Mithkal	General Manager	Asfour Commercial and Marketing Enterprises
Asfour, Mr. Mohammad	President	Federation of Jordanian Chambers of Commerce
Atari, Mr. Bassam	General Manager	Petra Bank
Attiya, Dr. Ali	Representative	UNDP in Jordan
Aub Ziad, Mr. Hussein	General Manager	Electrical Lighting Co.

Appendix B (Continued)

Attendee	Position	Organization
Ayyoub, Mr. Fuad	General Manager	The Arab Aluminum Industries Co.
Azar, Mr. Wasef	General Manager	The Jordan Phosphate Mines Co.
Belbeisi, Mr. Ibrahim	Director General	Amman Financial Market
Biltaji, Mr. Akel	Assistant Director General	ALIA, Royal Jordanian Airlines
Bushnaq, Mr. Marwan	Board of Directors	JEC
Bushnaq, Mr. Riad	Assistant Manager	The Jordan Petroleum Refinery Co.
Buta, Mr. Richard R.	Manager	CETA Project, Washington, D.C., USA
Cakir, Dr. I.	Dir. Foreign Investment Dept.	State Planning Organization, Turkey
Cox, Mr. James S.	International Treasurer	Westinghouse Electric Corp., Pittsburgh, PA, USA
Doss, Eng. Samir Georgy	General Manager of Planning	Egyptian Electricity Authority, Cairo, Egypt
Dubian, Mr. Muawiyah	General Manager	Beit Al-Mal Saving and Investment for Housing
Duwaik, Mr. Walid	Assistant General Manager	Telecommunication Corporation
Dykes, Mr. William	Vice President	Citibank, Hong Kong
Edelston, Mr. Bruce S.	Director Bulk Power Policy	Edison Electric Institute, Washington, D.C., USA
Ejoilat, Mr. Sameen	Representative	Irbid District Electricity Co.
El-Dajani, Mr. Mazen	Principal	Saba and Partners
El-Fanek, Dr. Fahd	Representative	El-Rai Newspaper
El-Fayez, Mr. Fayez	Head of Oil Shale Section	Natural Resources Authority
El-Hassan, Mr. Afif	General Manager	Jordan Financial House
El-Karmi, Dr. Fawaz	Director of Energy Sector	The Higher Council for Science and Technology
El-Khatib, H. E. Hisham	Minister Emeritus	Ministry of Energy and Mineral Resources, Jordan
El-Mufleh, Mr. Riyad	General Manager	Irbid District Electricity Co.
El-Omari, Mr. Kasim	Director of Mining Dept.	Natural Resources Authority
El-Qaissi, Mr. Quais	Director of Geophysics Dept.	Natural Resources Authority
El-Rahim Taha, Mr. Abd	General Manager	Mechanical Engineering and Contracting Co.

Appendix B (Continued)

Attendee	Position	Organization
El-Russan, Mr. Abdullah	Director of Petroleum Dept.	Natural Resources Authority
El-Shami, Mr. Jaffar	Representative	Jordan Tractors and Equipment Co.
El-Sharkawy, Dr. Emad	Consultant	Ministry of Electricity and Energy
El-Taher, H. E. Thabet	Minister	Ministry of Energy and Mineral Resources, Jordan
Fakhouri, Mr. Tawfig	General Manager	Bank of Jordan
Farraj, Mr. Sameh	General Manager	The Jordan Bank for Investment and Finance
Ghawi, Mr. Salim	Director	Economic & Technical Corp. Dept., Ministry of Planning
Grace, Mr. Charlie	General Manager	Al-Mashreq Bank
Haddadin, Mr. Mansour	Representative	Ministry of Finance
Hakki, Mr. Hani	General Manager	Sigma Consulting Engineering Co.
Hamadi, Mr. Maja	Deputy General Manager	The Phosphate Mines Co.
Hamarneh, Dr. Yousef	Director of Laboratories Dept.	Natural Resources Authority
Hamo, Mr. Musa	General Manager	Arabian Seas Insurance Co.
Hamoudi, Mr. Munther	Auditor	Talal Abu Ghazaleh & Co.
Hanoush, Dr. Mahdi	Secretary General	Arab Organization for Standards and Measures
Hariri, Mr. Rafiq	General Manager	Grindlays Bank
Hassan, Mr. S. Z.	General Manager	Dhabi Trading
Hawamdi, Mr. Tayseer	Legal Advisor	JEA
Hijazi, Mr. Fakhri	General Manager	United Industries Co.
Hilwani, Mr. Hatim	Representative	Middle East Development Co.
Hourani, Mr. Mohammad	Deputy Governor	The Central Bank
Husseini, Mr. Amin	Secretary General	Federation of Jordanian Chambers of Commerce
Ihsan, Mr. Khalid	General Manager	International Bank of Credit and Commerce
Ilias, Mr. G. M.	Director Private Power	Ministry of Water and Power, Islamabad, Pakistan
Irkiran, Mr. Afifdem	Foreign Investment Directorate	State Planning Organization, Turkey

Appendix B (Continued)

Attendee	Position	Organization
Jacobs, Mr. Alan B.	Consultant	CETA Project, Washington, D.C., USA
Jamou, Mr. Sami	General Manager	Middle East Insurance Co.
Jouzy, Mr. Raja	Principal Partner	Jouzy and Partners
Kanaan, Dr. Taher	General Manager	The Jordan Phosphate Mines Co.
Kanaan, Mr. Khalid	General Manager	The Jordan Pipes Manufacturing Co.
Karmoul, Mr. Akram	Representative	Agricultural, Commercial, and Industrial Co.
Khair Alla, Mr. Walid	General Manager	The Jordan Gulf Bank
Khalaf, Dr. Rima	Director of Planning Dept.	Ministry of Planning
Khalidi, Mr. Riyad	Representative	JEPCO
Khalifeh, Mr. Mohammad	General Manager	Albert Srouji Contracting Co.
Khatib, Mr. Fathi	Representative	JEPCO
Khatib, Mrs. Maha	Representative	Ministry of Planning
Khatib, Mr. Walid	Director General	Amman Chamber of Industry
Khoury, Mr. Naim	Representative	Saba & Partners
Knapp, Mr. George M.	Partner	McDermott, Will & Emery, Washington, D.C., USA
Kurd, Mr. Ziad	Deputy General Manager	Arab Insurance Co.
Levett, Mr. John L.	Project Director	New England Power Service Co., Westborough, MA, USA
Mahdi, Mr. Samir	General Manager	Arab Land Bank
Malhees, Mr. Ramiz	Manager	The Jordan Petroleum Refinery Co.
Malki, Dr. Abdullah	Representative	Sawt Al-Shaab Newspaper
Mango, Dr. Ahmad	Representative	The Real Estate Financing Corporation
Marto, Mr. Michael	Deputy Governor	The Central Bank
Meyer, Mr. C. William	Commissioner	Public Utilities Commission, CA, USA
Mohamed Osman, Eng. Said Abdel Latif	General Manager of Research	Egyptian Electricity Authority, Cairo, Egypt
Muasher, Dr. Rajai	General Manager	National Financial Investment Co.

Appendix B (Continued)

Attendee	Position	Organization
Mufti, Mr. Yazid	General Manager	Amman Cairo Bank
Mussallam, Dr. Ghassan	Director of Investment Dept.	Social Security Corporation
Mustafa, Mr. Zein Al-Abedin	Representative	Kuwait Fund for Arab Economic Development
Nimri, Mr. Yousif	General Manager	Public Mining Co.
Nsour, Mr. Ali	General Manager	The Arab Potash Co.
Obedat, Mr. Mazen	Representative	Ministry of Planning
Reade, Mr. Lewis P.	Mission Director	USAID Office, Amman, Jordan
Sabadell, Dr. Alberto J.	Deputy Director	Office of Energy, A.I.D., Washington, D.C., USA
Sadoun, Mr. Nasir	General Manager	Potash Industries
Salahi, Mr. Farid A.	Projects Officer	USAID Office, Amman, Jordan
Salfiti, Mr. Issam	General Manager	Arab Finance Corporation
Salim, Dr. Khalil	Representative	Arab Finance Corporation
Sartawi, Mr. Sufyan	General Manager	Jordan-Kuwait Bank
Sayegh, Dr. Nasser Mohammad	Representative	The Arab Organization for Scientific Administration
Sha'ban, Mr. Abdullah	General Manager	The Arab Pipes Co.
Shahid, Mr. Walid	General Manager	Arabco Contracting Co.
Shoman, Mr. Abdul Majeed	General Manager	The Arab Bank
Smadi, Mr. Ali	General Manager	Islamic Investment House
Stetieh, Mr. Zakariya	Representative	The Commercial and Industrial Co.
Stockton, Mr. George E.	Administrative Manager	CETA Project, Washington, D.C., USA
Suddarth, Mr. R. S.	American Ambassador to Jordan	United States Embassy, Jordan
Suheimat, Dr. Fayez	Director General	Industrial Cities Corporation
Sukhtian, Mr. Nidal	Representative	Munir Sukhtian Co.
Sullivan, Dr. James B.	Director	Office of Energy, A.I.D., Washington, D.C., USA
Sunna, Mr. Bassam	Director of Geology Dept.	Natural Resources Authority

Appendix B (Continued)

Attendee	Position	Organization
Sweis, Mr. Rukni	Representative	Rukn El-Handasah Co.
Sweis, Mr. Nabil	Assistant Secretary General	Ministry of Planning
Taash, Mr. Abdul Khadir	General Manager	The Jordan National Bank
Termanini, Mr. Radwan M.	General Manager	Arabian General Investment Corp.
Tet, Mr. David	General Manager	The British Bank for the Middle East
Tijani, Mr. Mohammad	Director General	Amman Chamber of Commerce
Wehbeh, Mr. Tayseer	General Manager	The Industrial Development Bank
Weiss, Mr. Lyle A.	Chief Engineer	USAID Office, Amman, Jordan
Wilson, Mr. Stephen R.	Vice President	Bechtel Enterprises, Inc., San Francisco, CA, USA
Zahran, Mr. Mustafa	Representative	Ministry of Planning
Zahran, Eng. Mustafa A.	Director Productive Projects Dept.	Ministry of Planning, Jordan
Zaidee Bin Laidin, Mr. Haji Ahmad	National Electricity Board	Kuala Lumpur, Malaysia
Zaki, Mr. Nabil	General Manager	The Steel Manufacturing Co.
Zarkiyeh, Mr. Mohammad	General Manager	National Cable and Wire Manufacturing Co.
Zurut, Mr. Wael	General Manager	Jordan French Insurance Co.

Appendix B (Continued)

The meeting was also attended by representatives of ministries of the Hashemite Kingdom of Jordan and by representatives of other interested organizations, including the following individuals:

Position	Organization
Auditor	Shaer and Partners
Auditor	Talal Abu Ghazaleh and Co.
Commander	The Royal Corps of Engineers
Directors	Ministry of Energy and Mineral Resources
Directors	Ministry of Industry and Trade
Director General	Social Security Corporation
Director General	Natural Resources Authority
Director General	Ministry of Finance
Director General	The Jordan Petroleum Refinery Co.
Director General	Telecommunication Corporation
General Manager	The Housing Bank
Minister	Ministry of Planning
Minister	Ministry of Industry and Trade
Representatives	Munir Sukhtian Co. Ltd.
Secretary General	Ministry of Energy and Mineral Resources
Secretary General	Ministry of Finance
Secretary General	Ministry of Public Works and Housing
Secretary General	Ministry of Youth
Secretary General	Ministry of Planning
Secretary General	Ministry of Trade and Industry
Secretaries General	Ministry of Water and Irrigation
Secretary General	The Higher Council for Science & Technology

The Office of Energy

The Agency for International Development's (A.I.D.) central Office of Energy plays an increasingly important role in providing innovative mechanisms and approaches for solving the growing energy and environmental crisis in A.I.D.-assisted countries. Situated in A.I.D.'s Bureau for Science and Technology, the Office helps to set energy policy direction for the Agency, while making its projects available to meet the generic and short-term needs of A.I.D.'s field offices in assisted countries.

Three problems drive the Office's programs: high rates of energy demand and economic growth accompanied by a lack of energy, especially power in rural areas; severe financial problems, including a lack of investment capital, especially in the electricity sector; and growing energy-related environmental threats, especially global climate change, acid rain, and urban air pollution.

To address these problems, the Office of Energy leverages financial resources of multilateral development banks such as the World Bank and the Inter-American Development Bank, the private sector, and bilateral donors to increase energy efficiency, expand energy supplies, and enhance the role of private power. The Office strategy involves implementing novel energy sector approaches through research, adaptation, and innovation. These approaches include improving power sector investment planning ("least-cost" planning) and encouraging the application of cleaner technologies that use both conventional fossil fuels and renewable energy sources. Promotion of greater private sector participation in the power sector and a wide-ranging training program also help to build the institutional infrastructure necessary to sustain cost-effective, reliable, and environmentally sound energy systems that are integral to broad-based economic growth.

Much of the Office strategy focuses on abatement of the increasingly severe environmental problems associated with the energy cycle, especially those involving fossil fuels, which pollute land and water during the extraction stage and cause atmospheric degradation--air pollution, acid deposition, and global CO_2 buildup--principally from power plant emissions during the conversion process. The Office's environmentally related assistance efforts have also anticipated and support recently enacted congressional legislation directing the Office and A.I.D. to undertake a "Global Warming Initiative" to mitigate the increasing contribution of key developing countries to greenhouse gas emissions. This strategy includes the following elements: expanding least-cost planning activities conducted in collaboration with the multilateral development banks to incorporate environmental concerns; increasing support for feasibility studies in renewable energy, end-use energy efficiency, and cleaner fossil energy technologies that focus on site-specific commercial applications; launching a multilateral global energy efficiency initiative; and enhancing training of host country nationals and A.I.D. staff in areas of energy that can help to reduce expected global warming and other environmental problems.

To pursue all of its activities, the Office of Energy implements the following seven projects: (1) The Energy Policy Development and Conservation Project (EPDAC); (2) The Biomass Energy Systems and Technology Project (BEST); (3) The Renewable Energy Applications and Training Project (REAT); (4) The Private Sector Energy Development Project (PSED); (5) The Energy Training Project (ETP); (6) The Conventional Energy Technical Assistance Project (CETA); and (7) its follow-on Energy Technology Innovation Project (ETIP).

Further information regarding the Office of Energy's projects and activities is available in our Program Plan and our Office Directory (both updated annually), which can be requested by using the following address:

Office of Energy
Bureau of Science and Technology
U.S. Agency for International Development
Room 508, SA-18, Washington, D.C. 20523-1810