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PRIVATE POWER DATABASE

COUNTRY PROFILE:

PAKISTAN

A Report of:

Private Sector Energy Development Program
Office of Energy
Bureau for Science and Technology
United States Agency for International Development

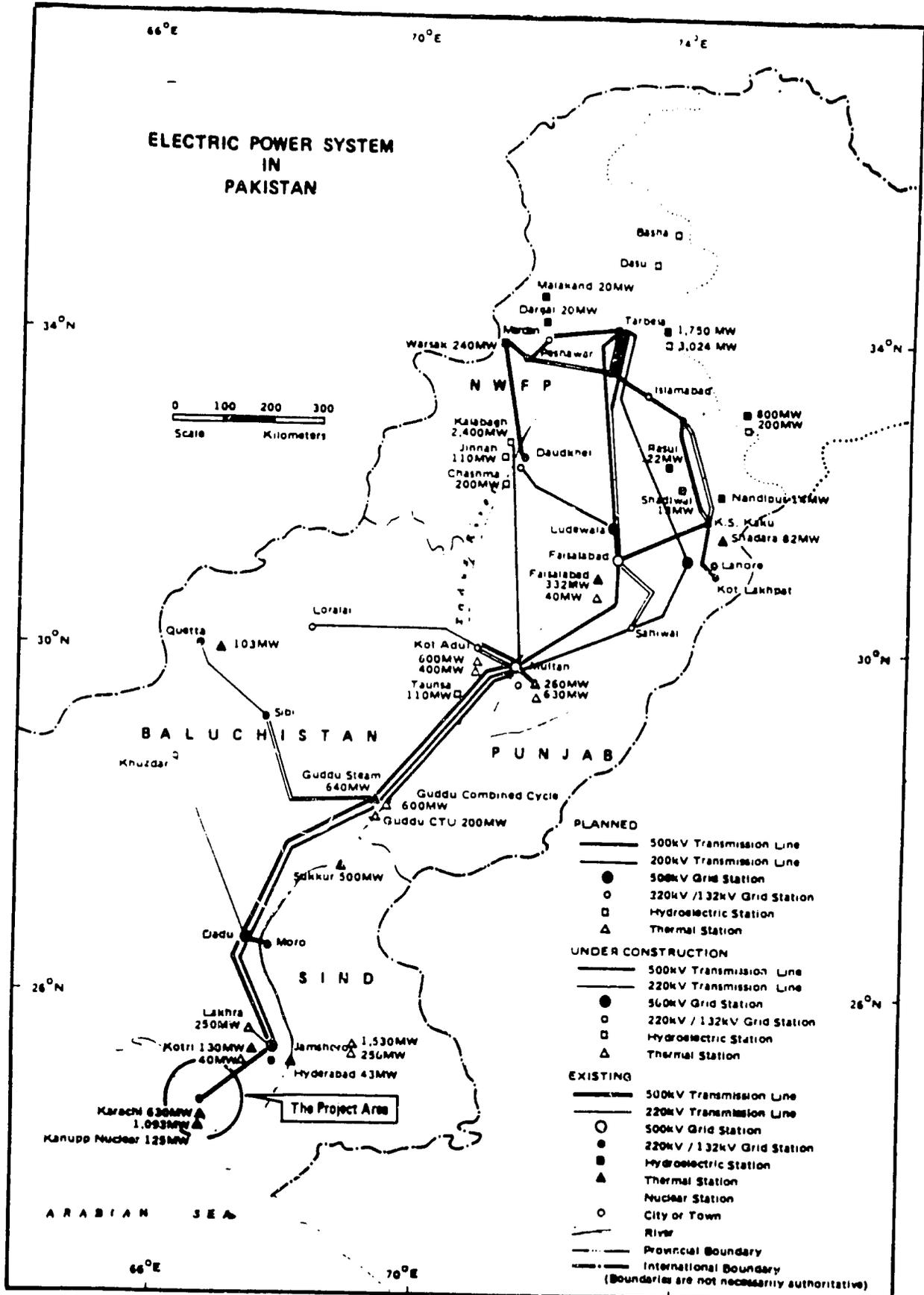
Prepared by:

RCG/Hagler, Bailly, Inc.
370 L'Enfant Promenade, S.W., Suite 700
Washington, D.C. 20024

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INTRODUCTION

This country profile is one of a series of reports generated from the Private Power Database of the Agency for International Development (A.I.D.). Database country profiles are also available for the Dominican Republic, India, and the Philippines. The Private Power Database contains information on power sector developments in A.I.D.-assisted and other countries with private sector involvement or offer opportunity for private sector project development. The database covers government policies, cogeneration projects and opportunities, private power projects and opportunities, government contacts, equipment vendors, and program activities of international development organizations. It also contains a bibliography of private power publications. RCG/Hagler, Bailly, Inc. maintains the database under the A.I.D. Office of Energy's, Private Sector Energy Development Program.

Private Power Database Country Profile: Pakistan is divided into two parts. Part 1 provides a brief overview of the power sector in Pakistan and the status of private sector participation. Part 2, which starts with a glossary of terms to explain the terminology used in the printouts, contains the private power database printouts for Pakistan. It is divided into sections and contains database entries for Pakistan. It is followed by an appendix of the rules and regulations governing the implementation of private power projects in Pakistan.

The information contained in this report is the product of research and data collection, principally from secondary sources. Limited access to data on private sector developments and the dynamic nature of these developments mean that the information contained in this report may not always reflect the most current private power developments. Therefore, readers are encouraged to contact individuals listed in the project profile or private power contacts listing for updates. The Agency for International Development and RCG/Hagler, Bailly make no claims as to the accuracy of the information.

For more information on private power developments, contact:

Private Sector Energy Development Program
T. Head, Inc.
1611 N. Kent Street
Suite 200
Arlington, VA 22209
Phone: (703) 524-4400
Fax: (703) 524-3164

-OR-

RCG/Hagler, Bailly, Inc.
370 L'Enfant Promenade, S.W.
Suite 700
Washington, DC 20024
Phone: (202) 488-1500
Fax: (202) 484-0702

PART 1: OVERVIEW OF THE POWER SECTOR

The following is a brief description of the power sector in Pakistan. It is intended to provide the reader with information on the current status and expected developments in the country, including electricity demand and supply, energy resources, and the status of private power.

BACKGROUND

Pakistan is a country in South Asia with a population of 105 million people. The official languages are Urdu and English. Per capita gross national product (GNP) was \$357 and per capita electricity generation was 281 kilowatt-hours (kWh) in 1987. As of 1987, only 30% of the total population had access to electricity. The Government of Pakistan has established a goal of connecting 90% of the villages by the end of the Seventh Plan (1993). However, actual supply of electricity has limited the amount of power reaching the rural population. The national currency is the Rupee. The average market exchange rate with the U.S. dollar over the period 1987 to 1989 is given in Exhibit 1.

Exhibit 1

Rupee to U.S. Dollar Exchange Rate, 1987-1989

	<u>Rupee</u>		<u>U.S. Dollar</u>
June 1987	Rs. 17.3	=	\$1
June 1988	Rs. 17.7	=	\$1
June 1989	Rs. 20.6	=	\$1

Source: International Monetary Fund

Pakistan's commercial energy availability is likely to become a serious constraint to economic growth, and the quantity of imported energy will continue to increase unless production from indigenous energy resources is enhanced substantially. Therefore, the current national development plan emphasizes the following energy strategy: 1) rapid development of indigenous energy resources; 2) demand management through rational energy pricing and adjustments to achieve a greater degree of efficiency; 3) institutional improvements for long-term least-cost energy planning to avoid expensive ad hoc solutions for meeting shortages; and 4) promotion of greater participation by the private sector in energy related investments. The power sector accounts for 70% of the total public investment in the energy sector during the Seventh Five-Year Plan (1989-1993).

Capital availability has become a critical determinant in the prospects of meeting the required growth in the power sector. Over the next decade, the power sector in Pakistan will require an investment of approximately \$18 billion, of which the local component will be about 46%. The World Bank estimates that the total investment in power generation will be \$12 billion; transmission, \$1.2 billion; distribution, \$3.2 billion; and general expenditures, \$1.6 billion. Understanding the need for foreign investment and private capital, the Government of Pakistan has embarked on a comprehensive private power program.

POWER SECTOR INSTITUTIONS

There are a number of organizations involved in the power sector in Pakistan. The principal institutions and their respective responsibilities are described below.

- **Ministry of Water and Power** formulates power sector policies, allocates resources, and approves all major investment decisions as well as tariff revisions, in consultation with the Ministry of Finance and the Ministry of Planning and Development.
- **Water and Power Development Authority (WAPDA)** is an autonomous government-owned statutory body, licensed under the Electricity Act of 1910. WAPDA is responsible for generation, transmission, and distribution of electricity in all areas outside of the metropolitan Karachi area.
- **Karachi Electric Supply Corporation (KESC)** has been in existence for over 70 years as a joint stock company registered under the Companies Act of Pakistan. About 7% of its shares are owned privately, while the remaining shares are owned by banks, insurance companies and investment houses, in many of which the Government holds majority shares. KESC is responsible for generation, transmission, and distribution of power in Karachi and the surrounding area.
- **Ministry of Planning and Development's Energy Wing** coordinates the government's energy planning activities, including investment planning in the power sector.
- **National Development Finance Corporation (NDFC)** is under the Ministry of Finance and is responsible for approving and administering loans issued from the Private Sector Energy Development Fund.

ELECTRICITY DEMAND

Electricity sales have grown at an average annual rate of 12% during the last 12 years. The industrial sector has remained the dominant consumer of electricity, although its share of total electricity use declined from 38% in 1980 (3,152 gigawatt-hours - GWh) to 33% in 1987 (6,013 GWh). The residential sector's use has grown at an average annual rate of 19%, increasing its share of electricity use from 19% in 1980 (1,564 GWh) to 28% in 1987 (4,970 GWh). Electricity consumption in the agriculture sector, the third largest electricity consuming sector in Pakistan (3,127 GWh in 1987), grew at only 5% per year between 1980 and 1987.

Electricity consumption is forecast to grow by 7% per year to the end of the century. Residential consumption is expected to experience the highest growth rate (9% per year), while agricultural consumption is projected to continue to grow at 5% per year.

ELECTRICITY SUPPLY

The two electric utilities in Pakistan, WAPDA and KESC, account for 7,545 MW of installed capacity in 1989. WAPDA's generation capacity (6,095 MW) is about 59% hydroelectric and 41% thermal capacity. KESC's installed capacity of 1,450 MW is entirely oil-fired. KESC also purchases power from the 125 MW Kanupp nuclear plant on the Arabian sea. Severe power shortages have been experienced in the country, particularly during the dry season when the hydroelectric system is operated well below peak capacity. Current power shortages are estimated at 20% of peak capacity.

The country's generation capacity is expected to increase to 20,518 MW in 1999. Hydroelectric and coal/lignite expansion are to play a major role (see Exhibit 2).

ENERGY RESOURCES

Pakistan has substantial gas reserves, some oil reserves, small coal deposits and a large hydroelectric potential. The country has a large base of renewable energy in the form of agricultural and animal wastes, solar energy and wind energy. The hydropower potential is estimated to be 30,000 MW, of which only 2,893 MW have been developed and 1,928 MW are under construction or under advanced stage of preparation. In addition, another 3,600 MW will be added when the site at Kalabagh in northern Pakistan is fully developed. Natural gas is Pakistan's main commercially exploitable hydrocarbon resource, with proven and probable reserves estimated to be about 340 million tons of oil equivalent (TOE). Proven and probable reserves of oil are estimated to be about 58 million TOE. New oil and gas reserves were recently discovered following the acceleration of the fossil fuel exploration program. The Government of Pakistan (GOP) is offering concessions under license through the Oil and Gas Development Corporation

to private developers on a joint-venture basis to develop the oil and gas resources. Coal and lignite reserves are estimated at about 900 million TOE, of which only 175 million TOE are proven. Pakistan's coal is of low quality, with low heating value and high sulfur and ash content. The GOP is also assessing the potential for stimulating increased private sector involvement in coal production using the reserves at Lakhra as a model.

Exhibit 2:

Installed Generation Capacity 1989 and 1999 (Megawatts)				
	<u>1989</u>	<u>1999</u>	Increase	
			<u>(MW)</u>	<u>(%)</u>
Hydroelectric	2,893	9,027	6,134	212
Geothermal	0	0	0	0
Nuclear	125	125	0	0
Oil				
Steam	1,703	3,983	2,280	134
Combustion turbine	0	0	0	0
Combined cycle	0	0	0	0
Diesel	847	420	(427)	(50)
Natural Gas				
Steam	500	500	0	0
Combustion turbine	865	865	0	0
Combined cycle	600	1,906	1,306	218
Coal/lignite	12	3,692	3,680	30,667
Total Capacity	7,545	20,518	12,973	172

Source: World Bank

STATUS OF PRIVATE POWER

Faced with severe power shortages and the power sector's inability to expand its generation capacity to keep pace with the growing demand, the GOP introduced a new policy in 1985, allowing private sector participation in building and operating power plants and selling electricity to the grid. In the Seventh Five-Year Plan (1989-1993), the Government anticipates that the private sector will supply 30% of all new capacity additions (2,000 MW of a total of 6,600 MW). The policy limited private sector power stations initially to coal and imported oil-fired thermal plants. The policy has since been revised to include low quality gas and hydroelectric plants.

Following this policy development and in light of the growing private sector interest in investing in power projects and the government's intention of facilitating private sector participation in energy projects, the World Bank in association with the U.S. Agency for International Development and other bilateral assistance agencies (i.e., Export Import Bank of Japan, British Overseas Development Administration, West Germany's Kreditanstalt fur Weideraufbau, Canadian International Development Agency, and the Government of Italy) has initiated a program to provide long-term financing for private sector investments at favorable rates through the Private Sector Energy Development Fund (PSEDF). The support is also going toward strengthening the institutions responsible for the evaluation and approval of proposals and monitoring and supervision of private sector power projects. To date, the PSEDF has received commitments of approximately \$550 million that will be used to finance up to 30% of individual private power project costs.

The most significant private power development since the new policy has been the 1,292 MW oil-fired Hab River Power Station near Karachi. In December 1989, the project sponsors negotiated a power purchase agreement with WAPDA and an implementation agreement with the GOP. The agreements will be signed following financial closure. Commissioning of the plant is envisioned for December 1993. This is expected to be the first private project to be awarded a loan through the PSEDF. Proposals for several other projects have been submitted and are in different stages of negotiation with the GOP. As of June 1990, a total of 15 projects with a combined generating capacity of 2,900 MW had been submitted to the GOP.

The profiles contained in this section are printed directly from the U.S. Agency for International Development Office of Energy's Private Power Database. A *Glossary of Terms* is provided as a key to the terminology used in the database reports. The *Government Policies* section recounts policy developments relevant to private sector interests in the power sector and provides the legal and regulatory framework for private sector involvement. They cover power generation, power sales to the local utility, interaction with the grid, power purchase pricing, fuel use and price, foreign investment, importation of equipment, and environmental and/or safety standards. The *Private Power Projects* and *Cogeneration Projects* sections contain information on projects which have proceeded to some stage of development, such as completion of a feasibility study, application for government clearance, the granting of a letter of intent, or the negotiation of a power purchase agreement with the utility. For both cogeneration and private power projects, an indication of the status of the project is given, i.e., inactive, active or operating. Depending upon a project's status, these sections identify markets for equipment vendors, engineering firms, financiers, and other project development services.

The *Private Power Opportunities* and *Cogeneration Opportunities* sections provide leads on prospective project development opportunities. Cogeneration and private power opportunities are potential projects for which little or no development has occurred. In many cases, there is only limited information available on the location, size and type of power system, since no commitment has been made to the project. The *Government Contacts* list provides names and addresses of key people in the Pakistan to contact on private power issues and opportunities. The last section, the *Bibliography* contains an annotated list of relevant publications for additional reading on the subject of private power in developing countries. Finally, we have added *Appendix A*, which contains the "Opportunities for the Private Sector in Power Generation Projects in Pakistan," prepared by the Private Power Cell of the Ministry of Water and Power.

The following terms are used in one or more of the private power database profiles. For each term, a brief definition is given and, where appropriate, an explanation of the various abbreviations used.

CAPACITY: Nameplate generating capacity of installation in megawatts (MW).

COMPANY: The name of the company sponsoring a cogeneration project.

CONNECTED TO THE GRID: Whether a project is currently or is expected to interconnect with the existing utility transmission system. "Y" - yes; "N" - no; and a blank indicates no interconnection information.

CONSULTANT: The consulting engineering company responsible for conducting the cogeneration or private power project feasibility study.

CONTACT: A point of contact for more information on a cogeneration or private power project.

DATE OF POLICY: The date a given private power policy was issued.

DATE UPDATED: The last date for which information was input into the private power database.

DESCRIPTION: Any information on the project technical details, the project sponsors, the project status, or any other pertinent details.

DESIGN DATE: The date on which the engineering design of a cogeneration or private power project was completed.

ELECTRICITY USAGE: The use of the electricity generated by a private power project (e.g., sell to the grid, self-use).

ENGINEERING FIRM: The company responsible for preparing the engineering design of a cogeneration or private power project.

EQUIPMENT TYPE: The specific power generating equipment which a vendor (see SUPPLIER) supplied to a cogeneration or private power project.

EXPECTED COMMISSIONING DATE: The date, past or expected, on which a cogeneration or private power project begins operations.

EXCHANGE RATE: The currency exchange rate between U.S. dollars and the local currency, including the year in which the exchange rate is given. The rate is based on the average market rate that year as published by the International Monetary Fund.

EXPORT EXCESS ELECTRICITY: Whether or not the project is designed to sell excess power to the grid. "Y" - yes ; "N" - no; and a blank space means no information.

FEASIBILITY STUDY DATE: The date of completion for a cogeneration or private power project feasibility study.

FUEL: The fuel(s) used in the power generating system (i.e., coal, oil, natural gas, diesel, wood, agricultural waste, solid waste, bio-methane, other biomass, waste heat, solar, wind, water, geothermal, ocean energy).

FUEL SUPPLY SOURCES: The source of fuel for the project if known. A blank indicates unknown source of fuel supply.

GOVERNMENT/UTILITY CLEARANCE: Any indication whether the local utility has given a private power project clearance to interconnect with the grid.

INTERCONNECTION ISSUES: Any details pertaining to the interconnection of the installation with the existing grid. A blank indicates no information is available.

LOCATION: The geographic location of the project, including distance to major cities.

MAIN FEATURES: The main provisions of a given private power policy.

NEW INSTALLATION/RETROFIT: "N" - New; "R" - Retrofit.

OWNERSHIP: Information on the rights to develop the site of a specific private power or cogeneration opportunity. This information is incorporated in the "description" of the database reports.

PROJECT COST: The installed cost of a cogeneration or private power project, including the currency and the year in which the cost is given. Costs are given in exponential terms (e.g., 5000 = 5E3), and are divided into foreign exchange and local currency components.

PROJECT FINANCING: Any details pertaining to the financing of the project, including cost estimates.

STATUS: Current status of a cogeneration or private power project. "INACTIVE", "ACTIVE" or "OPERATING" indicate inactive or discontinued development, active development, or operating, respectively.

SUPPLIER: The company responsible for supplying all or part of the power generating equipment used in a project (see EQUIPMENT TYPE).

TITLE: The title of a government policy (in English).

TYPE OF POLICY: The areas covered in a specific government policy. Options include power generation, power sales, interaction with the grid, power purchase pricing, fuel use/price, environment/safety, foreign investment and equipment import. "X" denotes the specific provisions covered under the policy; "-" indicates not covered.

TYPE OF PLANT: The type of industry and commercial operation at the site of the installation in a cogeneration project (e.g., oil refinery, sugar mill).

TYPE OF POWER SYSTEM: The technology employed in the power generating system (i.e., boiler/steam turbine, combined cycle, combustion turbine, diesel generator, hydroelectric, non-conventional).

USE OF HEAT: The application in which the thermal energy output of a cogeneration system is used (e.g., food processing, space heating).

UTILITY/OWNER AGREEMENT: "Y" - indicates that a power purchase agreement exists; "N" indicates that no agreement exists; a blank space indicates that there is no information as to the existence of such an agreement. The year in which a power purchase agreement was signed is listed as the "DATE".

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TITLE: Private Sector Induction in Power Generation

DATE OF POLICY: 06/15/85

TYPE OF POLICY:

POWER GENERATION:	X	ENVIRONMENT/SAFETY:	X
POWER SALE:	X	EQUIPMENT IMPORT:	X
INTERACTION WITH THE GRID:	X	POWER PURCHASE PRICE:	X
FUEL USE/PRICE:	X	FOREIGN INVESTMENT/OWNERSHIP:	-

RESPONSIBLE ORGANIZATION: Ministry of Water and Power

OBJECTIVE:

The objectives of the policy are to reduce power shortages, decentralize power generation, and induce the private sector to participate in power generation. The Government of Pakistan (GOP) plans that over 2,000 MW, of the 6,600 MW additional generating capacity provided for by the Seventh Five Year Plan (1989-1993), be provided by the private sector.

MAIN FEATURES:

The Ministry of Water and Power first issued this policy in 1985 to stipulate that: 1) the Ministry of Water and Power has the authority to specify projects for private power generation as well as entertain power supply proposals from the private sector; 2) the Ministry of Water and Power calculates the power purchase price based on what power production would cost if the utility had made the investment; 3) a suitable return on equity would be allowed and the purchase price and quantity of private power sold to the grid would be guaranteed, but no fixed return would be guaranteed; and 4) bids must include an offer for the bulk power price. Private companies are guaranteed a 60 percent capacity factor on an annual basis and are required to put up 25 percent equity from local and foreign exchange resources. The project will be under limited recourse financing. The GOP is emphasizing private sector development of domestic coal projects, low-quality gas projects, and hyoelectric projects between 30 and 270 MW. Following this initial policy, the World Bank, in association with the U.S. Agency for International Development and other bilateral assistance agencies, initiated a program in June 1989 to provide long-term financing for private sector investments through the Private Sector Energy Development Fund, which will lend up to 30% of the total cost, but no more than 50% of the foreign exchange costs of a project. Proposals are evaluated on the basis of project sponsor qualifications, technical soundness, compliance with the GOP environmental guidelines and occupational health and safety guidelines, financing, and the reasonability of the proposed power purchase price. Under this new program the GOP is also willing to protect the project company against some of the risks which are beyond their control. Subject to specific contractual arrangements the GOP will provide the following securities: protection against specific "force majeure risks" and changes in taxes and duties; indexation of the power price, convertability of rupees and remittability of foreign exchange, foreign exchange insurance; guarantee WAPDA power purchases and fuel supply. In addition, as a further incentive for private sector projects, the GOP has also declared private sector power project companies exempt from corporate tax, and in notified areas they qualify for exemption or partial exemption from customs duties and sales taxes on imports and machinery. The Ministry of Water and Power in Islamabad promotes and evaluates proposals. The National Development Finance Corporation (NOFC) in Karachi administers the Private Sector Energy Development Fund. A Private Power Cell in WAPDA in Lahore is responsible for negotiation and administering Power purchase Agreements.

DATE UPDATED: 07/12/90

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PROJECT NAME: Hab River Power Generation Complex

LOCATION: Khalifa Point, Balochistan
 CONTACT: Mike Kappaz, K&M Engineering, Washington, D.C.
 STATUS: ACTIVE

TECHNICAL DETAILS**FINANCIAL DETAILS**

CAPACITY (MW): 1292.	PROJECT COST (1989) IN U.S. : 1.1E9
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST: 2.3E10
FUEL: Oil	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (1989): U.S. \$1.00 = 20.6

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE: November 1988	ENGINEERING FIRM: K&M Engineering and Consulting Corp.
CONSULTANT: K&M Engineering	EQUIPMENT TYPE: Steam turbine/boilers
UTILITY/OWNER AGREEMENT: (Y) DATE: 12/23/89	SUPPLIER: Mitsui/IHI/HSPE
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE: December 1993

DESCRIPTION:

The proposal for this complex involves the establishment of a 1292 MW thermal power station at the mouth of the Hab River near Khalifa Point, Balochistan. The project is sponsored by the Hab River Power Group comprising Hawker Siddeley Power Engineering (UK), Xenel Corporation (Saudi Arabia), Mitsui and Company, Ltd. (Japan), a joint venture company formed by BEI Ltd. (UK) and Canadian Utilities Power, and K&M Engineering and Consulting Corp. (USA). The power complex will be constructed for the Group under the terms of a construction contract on fixed-price, turnkey basis by a consortium led by Mitsui and Co., and upon completion will be operated and maintained by the BEI/CUP operating company under contract to the Group. An initial proposal was submitted to GOP in August 1987, and revised in January 1988. The Letter of Intent was formally accepted on May 26, 1988. The Implementation Agreement, Power Purchase Agreement and Agreement on Tariffs were signed on December 23, 1989. The power plant will be comprised of four oil fired units of 323 MW each along with associated mechanical and electrical facilities. An agreement with Pakistan State Oil Corporation is currently under discussion to construct a pipeline from Port Bin Qasin to the power complex. The power stations will deliver power through two transmission lines provided by WAPDA. The average purchase price of electricity was agreed at Rs. 1.03 per kWh, with the understanding that the actual price be higher in the early years of the contract, and lower for the following years. The agreement covers a 30-year period, after which the project will be turned over to WAPDA. The completion costs for the complex are estimated to be the equivalent of \$US 1.1 billion. Financing has been arranged so that the shareholders will provide \$220 million in equity, \$335 million of long term debt will come from the Private Energy Development Fund, and the rest will be financed from the International Finance Corporation, supplier's credits, and other commercial loans. In early February 1990, Banker's Equity approved in principle an investment of Rs 2500 million (\$US 116.7 million). The sponsors have solicited proposals for the turbines, generators and balance of plant, according to World Bank International Competitive Bidding Regulations, which are due August 28, 1990. Financial closure should be complete before April 30, 1990. The project is expected to come on line 33 months after financial closure (December 1993).

DATE UPDATED: 06/23/90

PROJECT NAME: Ailai Khwar Hydro Project

LOCATION: Gilgit, Northwest Frontier Province

CONTACT:

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 250.	PROJECT COST (1990) IN \$US : 2.5E8
TYPE OF POWER PLANT: Hydroelectric	FOREIGN EXCHANGE COST:
FUEL: Water	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1990): U.S. \$1.00 =

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This project is planned as a joint venture between Pakistan's FECTO group of companies and the state-owned Sarhad Development Corporation. A feasibility study should be completed by November 1990 as a joint venture between VerbanPlan of Austria and the National Engineering Services Group of Pakistan (NESPAK). The total project cost is \$US 250 million (30% Private Sector Energy Development Fund, 25% commercial loans, 25% equity from project sponsors, with shares being issued for the rest.)

DATE UPDATED: 06/04/90

PROJECT NAME: Fauji Foundation Project

LOCATION: Port Qasim Karachi (Sind)
CONTACT: Fauji Foundation
STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 300.	PROJECT COST (19) IN :
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: oil	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (19) : U.S. \$1.00 =

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE: 07/13/89	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE: September 1992

DESCRIPTION:

This proposal is for a 300 MW furnace-oil-fired steam power plant located at Ziarath Hassan Shah near Port Qasim Karachi in Sind. The Ministry of Water and Power has approved the site and is considering the project as a replacement to the 200 MW Bin Qasim 6. A Letter of Intent (LOI) was issued on December 7, 1988 by the Government of Pakistan (GOP) and was accepted by project sponsors on January 7, 1989. The feasibility study was accepted by WAPDA and the GOP. However, discussions regarding tariffs are currently being delayed by investment partners. The Fauji Foundation is an organization established for the benefit of retired Pakistan Army personnel. The Foundation owns a fertilizer plant, a sugar mill, a textile mill and a number of other small industrial operations. Profits from the Foundation are tax exempt. The project will be a Pakistani Limited Company with 80 percent of the share capital being subscribed by Fauji and the Pakistani public.

DATE UPDATED: 02/18/90

PROJECT NAME: BS Link Canal Project

LOCATION: 64 km. south of Lahore, Punjab

CONTACT: Army Welfare Trust

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 10.5	PROJECT COST (1988) IN \$US : 1.9E7
TYPE OF POWER PLANT: Hydroelectric	FOREIGN EXCHANGE COST:
FUEL: Water	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (1988): U.S. \$1.00 = 17.7

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: November 15, 1987	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM: Industrial Metalurgical Pescarmona
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

The 10.5 MW hydroelectric project would be built at the Baloki-Sulemanki (BS) Link of the existing canal system. The Ministry of Water and Power issued a Letter of Intent in September 1989. The Project is one of seven identified by a joint Pakistani (WAPDA)/W. German (GTZ)-sponsored program. The original feasibility study put the installed cost at Rs. 450 million and generation cost at Ra. 1/kWh. The sponsors feel the project must be built for Rs. 350 million, or Rs. 0.85/kWh for WAPDA to consider it. The financing that has been discussed involves the use of a Modaraba (Islamic financial instrument) and equity from the Fauji Foundation and the Overseas Pakistanis Foundation. Army Welfare Trust, the project sponsor, is exempt from import duties and corporate income tax. The sponsors have submitted conditional acceptance of the Letter of Intent, which was issued in January 1989, after a one year delay.

DATE UPDATED: 06/12/90

PROJECT NAME: BS Link Tail Project

LOCATION: North of Suleimanki Barrage, Punjab
CONTACT:
STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW):	6.	PROJECT COST (1987) IN US	:	1.6E7
TYPE OF POWER PLANT:	Hydroelectric	FOREIGN EXCHANGE COST:		
FUEL:	Water	DOMESTIC CURRENCY COST:		
SYNCHRONIZED WITH THE GRID:	Y	EXCHANGE RATE (1987): U.S. \$1.00 =		17.3

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This site would allow for a low head hydropower station at the tail of the BS Link Canal in Punjab. This project was one of seven identified by a joint Water and Power Development Authority and GTZ (W. Germany) sponsored program. A Letter of Intent was issued on Feb. 28, 1990, to Altern (USA) on the same terms and conditions as that for the Army Welfare Trust for the BS Link Canal.

DATE UPDATED: 03/21/90

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PROJECT NAME: HML/Seimens Sind Coal Project

LOCATION: Quetta, Sind

CONTACT: Main Saifullah Paracha, Habibullah Mines Ltd.

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 170.	PROJECT COST (1989) IN \$US : 1.9E8
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (1989): U.S. \$1.00 = 18.1

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: September 22, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

The Government of Pakistan has issued a Letter of Intent (LOI) to HML-Seimens for a 100 MW fluidized-bed, coal-fired thermal power plant in November 1987. However this LOI was cancelled when the sponsors failed to respond in time. A revised proposal for a 170 MW power station was submitted on September 22, 1988. A LOI for the revised proposal was issued in October 1989. The coal is to come from the Lakhra mines which is mined by Habibullah Mines Ltd. (HML). The project would be a joint venture between HML and Seimens (West Germany). There has been no progress on this project since the Letter of Intent was issued. This is one of two projects sponsored by HML/Siemens at this site.

DATE UPDATED: 04/07/90

22

PROJECT NAME: HML/Siemens Sind Coal Project II

LOCATION: Sor Range near Quetta, Sind

CONTACT:

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 30.	PROJECT COST (1989) IN \$US : 5.8E7
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1989): U.S. \$1.00 = 18.1

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: September 22, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This project is one of two joint ventures sponsored by HML/Siemens at this site. A revised proposal was submitted on October 1989. The coal is to come from the Sor Range which is mined by Habibullah Mines Ltd. (HML). The sponsors have considered reducing the size of the plant to 12.0 MW.

DATE UPDATED: 07/07/90

PROJECT NAME: Intrag Coal Project

LOCATION: Kallar Kahar, Punjab
CONTACT: Peter Bos, Intrag, Wellesley, MA (USA)
STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 80.	PROJECT COST (1988) IN US \$: 1.13E8
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST: 2.3E9
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (1988): U.S. \$1.00 = 17.7

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: April 14, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT: Intrag	EQUIPMENT TYPE: CFB boiler; turbine
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE: 1994

DESCRIPTION:

The proposal for this 80 MW power plant was submitted to the Government of Pakistan (GOP) in April 1988. The power plant would consist of two 40 MW units using circulating fluidized bed boiler technology. The coal will come from the various coal fields in the Salt Range of the Punjab Province. The Letter of Intent (LOI) was issued April 24, 1989. The LOI was accepted on May 18, 1989. Work is proceeding, particularly on coal studies.

DATE UPDATED: 08/02/90

24

PROJECT NAME: Jamshoro Oil-Fired Power Plant

LOCATION: Jamshoro, Sind Province

CONTACT:

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 420.	PROJECT COST (1990) IN \$US : 8.4E8
TYPE OF POWER PLANT: ACTIVE	FOREIGN EXCHANGE COST:
FUEL: oil	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1990): U.S. \$1.00 =

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER: Soviet Union
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This 2 X 210 MW build-own-operate (BOO) project is to be a joint venture between the Abbotcon Power Generation Group of Companies (based in Hyderabad), WAPDA, and the Soviet Union. The project sponsors will provide 25% of the project's funding, 30 percent will be provided by the World Bank's Private Sector Energy Development Fund (PSEDF), 25% will be offered to Pakistani nationals, 12.5% will come from the Soviet Union, and the remaining funds will be offered to a local group yet to be named. This new plant will be an extension of four other units at this site. The first of which was completed by Mitsui of Japan, while the other three units are being constructed by Metalurgical Corporation of China.

DATE UPDATED: 07/21/90

26

PROJECT NAME: Jamshoro Steam Plant

LOCATION: Jamshoro
CONTACT: Lazarous Lazardis, Thermo Electron Corp., Waltham, MA
STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 200.	PROJECT COST (1990) IN :
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: oil	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1990): U.S. \$1.00 =

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: November 1989	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

Thermo Electron (USA) presented a proposal for a 200 MW, oil-fired plant in November 1989. The project is currently awaiting a Letter-of-Support from the Government of Pakistan.

DATE UPDATED: 04/04/93

76

PROJECT NAME: Jhelum Project

LOCATION: Jhelum, Punjab

CONTACT:

STATUS: INACTIVE

TECHNICAL DETAILS**FINANCIAL DETAILS**

CAPACITY (MW): 60.	PROJECT COST (1987) IN RS : 8.7E8
TYPE OF POWER PLANT: Fluidized Bed Combustion	FOREIGN EXCHANGE COST: 5.423E8
FUEL: Coal	DOMESTIC CURRENCY COST: 3.285E8
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1987): U.S. \$1.00 = 17.3

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: July 1886	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This project is a fluidized bed combustion power plant to be based on coal mined in the Salt Range. The project was initiated by coal mine owners. A pre-feasibility report was prepared by a fact-finding Japanese delegation led by C. Itoh & Company (Japan) in July 1986. The report concluded that the project was feasible at a power purchase price of Rs. 1.046/kwhr. Deliberations have continued between coal miners/local investors, foreign investors and the Government of Pakistan (GOP). Under the proposal, C. Itoh & Co. would be responsible for coordination, equipment procurement, transportation, insurance, securing financing and overall project management. IHI (Japan) would be the equipment manufacturer, turn-key designer, supplier, and operator. The company ownership would be 16.67 percent Saif International Combine Ltd. (Pakistan); 16.67 percent Pakistani mining companies, 8.33 percent C. Itoh & Co., 8.33 percent IHI (Japan), and 50 percent public offering. Proposed debt to equity ratio for the project is 2.3 to 1, with part of the debt financed through the Exim Bank of Japan, at 5.75 percent interest, 5 years grace and a 10 year repayment period. There have been no further developments on this project.

DATE UPDATED: 08/04/88

21

PROJECT NAME: Intrag Nandpur Gas Project

LOCATION: Karbirwala, Punjab
 CONTACT: Peter Bos, Intrag, Wellesley, MA (USA)
 STATUS: ACTIVE

TECHNICAL DETAILS	FINANCIAL DETAILS
CAPACITY (MW): 102.	PROJECT COST (1990) IN \$US : 1.02E8
TYPE OF POWER PLANT: Combustion turbine	FOREIGN EXCHANGE COST:
FUEL: Natural gas	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1990): U.S. \$1.00 = 21.8

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: August 1989	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE: Gas turbine
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY: WAPDA	

EXPECTED COMMISSIONING DATE: 1993

DESCRIPTION:

Intrag, which is owned by Saudi Arabian industrialists, was selected to pursue a 102 MW gas-fired power plant at the Nandpur gas field. Nandpur is a low-Btu gas field located near Karbirwala, 60 kms Northeast of Multan. Explored by the Oil and Gas Development Corporation of Pakistan (OGDC), the field was subsequently committed by the Government of Pakistan (GOP) for power generation by the Water and Power Development Authority (WAPDA). A feasibility study of the project was prepared by Pakistan Engineering Services (PES) and submitted to WAPDA. The GOP first published a solicitation for bids from the private sector for a 90-110 MW combined cycle power plant in June 1988. This was subsequently withdrawn, and a new bid for 100 MW was issued in 1989. The natural gas will be purchased by the plant operator from the Oil and Gas Development Corp. (OGDC). The Asian Development Bank (ADB) funded the reservoir study which was undertaken by SOFRESID (France) and submitted to OGDC on May 7, 1987. ADB is financing the development of Nandpur gas field for a total of \$25.5 million under its Oil and Gas Development Project loan. This project includes workover of existing wells and drilling new wells, surface gathering facilities and technical consulting services. Burns & Roe (USA) and WESPAK (Pakistan) selected Intrag to pursue the project. The Pakistan Board of Investments approved the Intrag proposal in July 1990. The GOP has asked Intrag to submit its financial proposal by December 1990. Construction is expected to begin in 1991 and commissioning is scheduled for 1993.

DATE UPDATED: 08/02/90

PROJECT NAME: Karachi Waste to Energy Project

LOCATION: Clifton, Karachi
CONTACT: Ken Wentzel, K&M Engineering, Washington, D.C.
STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 62.5	PROJECT COST (1989) IN \$US : 1.8E8
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Solid waste	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1989): U.S. \$1.00 = 20.6

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: September 2, 1989	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM: K&M Engineering
CONSULTANT:	EQUIPMENT TYPE: Boilers
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER: KTI (U.S.A.)
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

A multipurpose project has been proposed to process municipal solid waste (MSW), produce potable water, and sell 45 MW of electricity to the grid. The project would process 2300 tons of MSW per day into refuse derived fuel (RDF). The RDF would, in turn, be used to fire a boiler/steam turbine. Part of the plant's output (17.5 MW) would be used to power a reverse osmosis unit to purify 10 million gallons per day of brackish water for the Defense Housing Authority. The remaining power would be sold to the Karachi Electric Supply Co. K&M Engineering and Consulting (USA) is serving as project manager and is also one of the sponsors of the project. The project will use the RDF technology developed by KTI (USA). The project received a Letter of Intent for supply of brackish water and the collection and supply of municipal solid waste. A Memorandum of Understanding has been signed with the Defense Housing Authority to purchase the purified water.

DATE UPDATED: 12/27/89

PROJECT NAME: Pakland Project

LOCATION: Lakhra, Sind

CONTACT: John Fitzpatrick, PyroPower, San Diego, CA

STATUS: ACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 132.	PROJECT COST (1988) IN US \$: 1.31E8
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1988): U.S. \$1.00 = 17.

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: March 19, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM: Bechtel
CONSULTANT:	EQUIPMENT TYPE: Fluidized bed boiler system
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER: Pyropower
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This 132 MW power plant based on Lakhra coal and fluidized bed technology is a joint venture project between: PyroPower (USA), which has developed the circulating fluidized bed technology; Pakland (Pakistan), which possesses substantial limestone resources; and Bechtel (USA), which has experience in project implementation. The proposal for this project was first prepared in 1987 under a U.S. Trade and Development Program grant to Bechtel and Pakland and submitted on March 19, 1988. The preliminary design work is done. As soon as the venture gets a Letter of Intent from the Government of Pakistan (GOP) they will finish the design work. Ownership of the plant would be 25 percent Pakland Corporation; 25 percent consortium of Bechtel, Westinghouse (USA) and Pyropower; and 50 percent public offering. Project financing is expected to come from the Private Sector Energy Development Fund, suppliers' credit, Asian Development Bank, and International Finance Corporation. Bank of America International Ltd. (UK) is arranging the financing. A revised proposal was submitted in August 1989. A Letter of Support (LOS) is now being drafted. (LOS is now the initial document issued by the GOP, rather than the LOI, which is now issued later as project develops.)

DATE UPDATED: 02/28/90

PROJECT NAME: Jinnah Barrage Hydroelectric Project

LOCATION: Jinnah Barrage, Punjab

CONTACT:

STATUS: INACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 120.	PROJECT COST (19) IN :
TYPE OF POWER PLANT: Hydroelectric	FOREIGN EXCHANGE COST:
FUEL: Water	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (19): U.S. \$1.00 =

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE:	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

This is a proposed project for a low head hydropower plant harnessing the difference in water levels on both sides of the existing Jinnah Barrage in Punjab. A private firm has submitted an unsolicited proposal to design, construct, finance, and operate the project. The feasibility study for this project has been reported in the press as awarded to a British consortium headed by Balfour Beatty under an ODA grant. The British Group made a technical presentation to the Prime Minister on April 7, 1987. There has been no further development of this project.

DATE UPDATED: 03/15/90

PROJECT NAME: Hab Chowki Power Plant

LOCATION: Hab Chowki, Balochistan
 CONTACT: Arshad Bokhari, Karachi Electric Supply Co., Karachi
 STATUS: INACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 120.	PROJECT COST (1988) IN \$US : 6.45E7
TYPE OF POWER PLANT: Diesel generator	FOREIGN EXCHANGE COST:
FUEL: Furnace oil	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID: Y	EXCHANGE RATE (1988): U.S. \$1.00 = 17.7

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: June 30, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: (Y) DATE:	SUPPLIER:
UTILITY: KESC	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

Proposals for a 120 MW diesel power station in Balochistan were invited by the Karachi Electric Supply Company (KESC) in 1986. FECTO, the leading contender was issued a Letter of Intent (LOI) in July 1988. The plant was to use imported furnace oil to fire six diesel generators of 20 MW each. Ownership was to be 20 percent Pakistani sponsor; 20 percent Sulzer (equipment supplier); 10 percent financial institutions; and 50 percent public offering. The LOI was cancelled on December 12, 1988 when the project sponsor failed to accept the terms.

DATE UPDATED: 03/10/90

22

PROJECT NAME: Hadson/Haidria Coal Power Project

LOCATION: Salt Range Chakwal District, Punjab
 CONTACT: James Kelly, Hadson Corporation, Oklahoma City, OK (USA)
 STATUS: INACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 165.	PROJECT COST (1988) IN US \$: 2.37E8
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1988): U.S. \$1.00 = 17.7

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: August 28, 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE: ACFB Boilers
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE: March 1992

DESCRIPTION:

This proposed project consists of 3 X 55 MW (165 MW) atmospheric fluidized bed combustion power generation units to be located in the Salt Range in the Chakwal District of the Punjab Province. The project will be implemented in two phases: Phase I involves the development of one 55 MW power plant and Phase II the development of two additional plants. The sponsors estimate the cost of a 55 MW unit to be \$US 77 million. As an integral part of this project, the sponsors would upgrade existing mining procedures (during Phase I) and develop new mines (during Phase II). The project is sponsored by a joint venture between Hadson Corp. (USA) and Haidria Minerals Pvt. (Pakistan). The original proposal was submitted to the Government of Pakistan (GOP) in 1988. Each power plant will be owned, operated, maintained and managed by a Pakistani company, 50 percent of which will be purchased by local Pakistani investors through public stock offering. The other 50 percent will be owned by Hadson/Haidria. Proposed financing will be a combination of equity (25%) from the project owners and debt (75%) from various Pakistani and foreign lending institutions. A Hadson-team submitted a revised proposal to the government in August 1989 and then withdrew the proposal later in the year. Hadson has told the GOP they are not interested in pursuing the project at the present time, however, they will "revert" to the GOP in September 1990.

DATE UPDATED: 02/05/90

27

PROJECT NAME: ENPAK Project

LOCATION: Lakhra, Sind
 CONTACT:
 STATUS: INACTIVE

TECHNICAL DETAILS

FINANCIAL DETAILS

CAPACITY (MW): 160.	PROJECT COST (1987) IN \$US : 1.87EA
TYPE OF POWER PLANT: Boiler/steam turbine	FOREIGN EXCHANGE COST:
FUEL: Coal	DOMESTIC CURRENCY COST:
SYNCHRONIZED WITH THE GRID:	EXCHANGE RATE (1987): U.S. \$1.00 = 17.7

PROJECT DEVELOPMENT INFORMATION

PROPOSAL DATE: September 1988	DESIGN DATE:
FEASIBILITY STUDY DATE:	ENGINEERING FIRM:
CONSULTANT:	EQUIPMENT TYPE:
UTILITY/OWNER AGREEMENT: () DATE:	SUPPLIER:
UTILITY:	

EXPECTED COMMISSIONING DATE:

DESCRIPTION:

In September 1988, ENPAK, a Pakistan/West German consortium, presented a project proposal to the Ministry for Water and Power for a private sector power plant based on Lakhra coal. The proposed project is a 2 x 80 MW (160 MW) power plant utilizing fluidized bed technology. Development of the Lakhra mining capacity is based on leases from the Mohammed Amir Brothers Ltd. and the Pakistan Mineral Development Corporation. The proposal called for the plant to be owned and operated by the ENPAK consortium which consists of 25% equipment suppliers, 25% local partner, and 50% local investors. Proposed debt to equity ratio for the project is 3 to 1, excluding interest. No coal supplier has been identified as of yet, nor is there any firm proposal. A Letter of Intent was issued on May 5, 1989.

DATE UPDATED: 02/26/90

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PROJECT NAME: Aga Khan University Hospital (AKUH)

LOCATION: Karachi
STATUS: ACTIVE
CONTACT: EMERCON

CAPACITY (MW):	3.	FUEL:	Natural gas
POWER SYSTEM:	Boiler/steam turbine	FUEL SOURCES:	

ELECTRICITY USAGE: Self-generation
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP: Aga Khan University Hospital
PROJECT COST/FINANCING:

DESCRIPTION:
A prefeasibility study has been completed. Feasibility study will be complete in July or August 1990.

DATE UPDATED: 03/27/90

PROJECT NAME: Bambanwala Hydroelectric Project

LOCATION: Bambanwala, 30 km. north of Gufranwala, Punjab
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	4.24	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:

DESCRIPTION:
The provincial Ministry of Irrigation and Power has identified the potential for a 4.24 MW hydroelectric installation on the Upper Chenab Canal located near Gufranwala in Punjab. The project was ranked fourth out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/18/90

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PROJECT NAME: Darwaza Project

LOCATION: Quetta, Balochistan
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	70.	FUEL:	Oil
POWER SYSTEM:	Diesel generator	FUEL SOURCES:	Imported

ELECTRICITY USAGE: Sell to WAPDA national grid.

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimated cost is Rs. 1152 million (US \$68 million). Foreign exchange portion would be Rs. 655 million (US \$39 million); project financing, 30% equity and 70% debt. Private Pakistani investors, Siemens (Pakistan), and Foster Wheeler (U.S.) would provide equity.

DESCRIPTION:

The proposed project is a diesel generator power station based on imported furnace oil. The proposed site is inland and located very close to the major coal mines of Balochistan. This proposal, submitted May 25, 1988, will be considered with other proposals for Nooriabad.

DATE UPDATED: 03/20/90

PROJECT NAME: Deg Fall Hydroelectric Project

LOCATION: Deg Fall, 30 km. west of Lahore, Punjab
STATUS: INACTIVE
CONTACT: Ministry of Irrigation & Power, Punjab

CAPACITY (MW):	3.83	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimate cost is Rs. 100.8 million (US \$6.72 million).

DESCRIPTION:

The provincial Ministry of Irrigation and Power has identified the potential for a 3.83 MW hydroelectric project on the Upper Chenab Canal located near Lahore. The site was ranked first (shared) out of eight projects evaluated by FACE (Lahore). ISL (France) received a grant of 300,000 francs from the French Ministries of Foreign Affairs (50%) and Foreign Trade (50%) to perform the detailed design of the project. A no-objection certificate (NOC) was obtained from the Ministry of Irrigation and Power (Punjab) to this effect. The project is being pushed by the representatives of ESAC (French equipment supplier) who brought in ISL. There has been no development of this project.

DATE UPDATED: 11/24/89

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PROJECT NAME: Dhurnal Project

LOCATION: Dhurnal
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Combustion Turbine	FUEL SOURCES: Dhurnal Associated gas field

ELECTRICITY USAGE: Sell to WAPDA national grid
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP: Occidental owns the gas field.
PROJECT COST/FINANCING:

DESCRIPTION:
There is an opportunity for a gas turbine station to be based on natural gas available at the Dhurnal field (1 million cubic feet/day). The gas field is owned by Occidental. Once successful, the project can lead to quick harnessing of flared associated gases from small fields. There has been no development of this project.

DATE UPDATED: 03/15/90

PROJECT NAME: Khairpur Project

LOCATION: Khairpur, Sind
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Combustion turbine	FUEL SOURCES: Gas wells at Khairpur, Upper Sind

ELECTRICITY USAGE: Sell to national grid or local consumers.
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:

DESCRIPTION:
There is an opportunity for a gas turbine station based on the gas wells owned by the Pakistan Petroleum Limited (PPL) at Khairpur, Upper Sind. The large size of undeveloped field should ultimately draw the attention of prospective developers. Low quality gas makes on-site power generation the only viable use. Khairpur is a mid-size town in upper Sind. Exploitation will require a full 3 year appraisal/development cycle. This will not happen until a buyer of the gas is lined up. There has been no development of this project.

DATE UPDATED: 03/15/90

PROJECT NAME: Leghari Project

LOCATION: Near Leghari oil/gas field in Badin, Sind

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):

POWER SYSTEM: Combustion turbine

FUEL: Natural gas

FUEL SOURCES: Union Texas gas field at Leghari

ELECTRICITY USAGE: Sell to WAPDA national grid.

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

DESCRIPTION:

There is an opportunity for a gas turbine project using the associated gas of the Leghari oil field owned by Union Texas of Pakistan (UTP). The gas is high Btu (998 Btu/cubic ft.) and the size is small (2 million cubic ft./day). It is potentially an ideal site for a resourceful, experienced individual interested in full control of a small/medium operation. Implementation can be expedited by utilizing skid mounted turbines. Gas associated with the production of oil is currently being flared by Union Texas of Pakistan. The gas field is more isolated from the cluster of other oil/gas fields developed by UTP. The gas in this cluster is under negotiation for sale to Sui Gas Transmission Company (SGTC) which will be responsible for laying a special purpose pipeline. The Leghari oil/gas field is available for development by any private or government entity. There has been no development of this project opportunity.

DATE UPDATED: 03/15/90

PROJECT NAME: Lower Bari Doab Canal Hydroelectric Project

LOCATION: 20 km. east of Sahiwal, Punjab

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):	3.77	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimate cost is Rs. 74.6 million (US \$5 million)

DESCRIPTION:

The provincial Ministry of Irrigation and Power has identified the potential for a 3.77 MW hydroelectric installation on the Lower Bari Doab Canal in Punjab. The site was ranked first (shared position) out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/15/90

PROJECT NAME: Lower Bari Doab Hydro Project

LOCATION: 40 km. northeast of Sahiwal, Punjab

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):	1.99	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimated cost is Rs. 101.2 million (US \$6.7 million).

DESCRIPTION:

The provincial Ministry of Irrigation and Power has identified the potential for a 1.99 MW hydroelectric installation on the Lower Bari Doab Canal located near Sahiwal, Punjab. The site was ranked seventh out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/15/90

PROJECT NAME: Main Line Lower Hydro Project

LOCATION: 25 kms northeast of Sheikhpura, Punjab

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):	5.04	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimated cost is Rs. 143.5 million (US \$9.6 million)

DESCRIPTION:

The provincial Ministry of Irrigation and Power has identified the potential for a 5.04 MW hydroelectric installation on the Central Upper Chenab Canal incorporating two sites located near Sheikhpura. The site was ranked third out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/14/90

PROJECT NAME: Mayal Project

LOCATION: Mayal

STATUS: INACTIVE

CONTACT: Pakistan Oil Fields, LTD

CAPACITY (MW):		FUEL:	Natural gas
POWER SYSTEM:	Combustion turbine	FUEL SOURCES:	Mayal gas field

ELECTRICITY USAGE: Sell to WAPDA national grid

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

DESCRIPTION:

There is an opportunity for a gas turbine project based on natural gas available at the Mayal field (1 million cubic ft./day). The field is owned by Pakistan Oil Fields Limited (POL). One successful project, possibly involving fast implementation skid-mounted, off-the-shelf turbines, could lead to quick harnessing of flared associated gases from small fields. There has been no development of this project.

DATE UPDATED: 03/16/90

PROJECT NAME: Mazarini Project

LOCATION: Mazarini
STATUS: INACTIVE
CONTACT: Pakistan Petroleum Limited (PPL)

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Combustion turbine	FUEL SOURCES: Mazarini gas field

ELECTRICITY USAGE: Sell to WAPDA national grid
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:

DESCRIPTION:
There is an opportunity for a gas turbine project to be located near an undeveloped gas field at Mazarini (13 million cubic ft./day). Limestone availability close to site allows the possibility of partial use of gas for cement manufacture. Exploitation will require a full 3 year appraisal/development cycle. This will not happen until a buyer of gas is lined up. The Government of Pakistan has shown an interest in field development.

DATE UPDATED: 03/15/90

PROJECT NAME: Nooriabad Project

LOCATION: Nooriabad Industrial Estate, Sind
STATUS: INACTIVE
CONTACT:

CAPACITY (MW): 120.	FUEL: Oil
POWER SYSTEM: Diesel generator	FUEL SOURCES:

ELECTRICITY USAGE: Sell to Nooriabad Industrial Estates
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:

DESCRIPTION:
Hawker Siddeley (U.K.) and Power Pak (Pakistan) have proposed a 120 MW diesel power plant on March 25, 1988 that would use four stroke diesel generators to be located in the Nooriabad Industrial Estates, Sind. The project proposal was revised and submitted on November 3, 1989. The proposal for this project is being reviewed along with other proposals for Nooriabad.

DATE UPDATED: 03/21/90

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PRIVATE POWER OPPORTUNITIES

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PROJECT NAME: Rohri Hydroelectric Project

LOCATION: Rohri, Sind

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):	12.	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid.

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP: Federal/Provincial Government.

PROJECT COST/FINANCING:

Estimated cost is US \$31 million

DESCRIPTION:

This proposed project is a low head hydroelectric station harnessing two sites in the Rohri Canal in Sind. It was one of seven identified by a joint Water and Power Development Authority (WAPDA) and GTZ (W. Germany) sponsored program. Given the small size of the project, WAPDA's limited resources, and the trend towards privately-owned power generation, it is reasonable to assume that this site can be developed by the private sector.

DATE UPDATED: 03/16/90

PROJECT NAME: Sari/Hundi/Khothare Project

LOCATION: Sari/Hundi gas wells Dadu District, Sind

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):		FUEL:	Natural gas
POWER SYSTEM:	Combustion turbine	FUEL SOURCES:	Sari/Hundi/Kohtar gas field

ELECTRICITY USAGE: Sell to WAPDA national grid

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

DESCRIPTION:

There is an opportunity for a gas turbine project to be based on medium-Btu gas available at the Sari/Hundi/Khothar gas fields. The gas fields were offered for power generation to FECTO by Oil and Gas Development Corp. (OGDC) in September 1986. FECTO turned down the invitation because the project was too small. It appears that SOFRESID (France) undertook a reservoir analysis of Sari/Hundi along with Mandpur. Sari and Hundi are already connected to Indus Right Bank pipeline feeding into Karechi. However because of low pressure in Sari/Hundi, the offtake into the main pipeline was minimal and the field was shut in 1985. Sari/Hundi are going through work-overs which may result in higher reserves, flow rate and pressure. To help with this development, the Asian Development Bank (ADB) has approved a \$4.3 million loan for an Oil and Gas Development Project part of which will go towards developing these gas fields. The repayment period of the loan is 18 years with a three year grace period. There has been no power project development at the fields.

DATE UPDATED: 06/01/88

PROJECT NAME: Tando Alam Project

LOCATION: Tando Alam
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Combustion turbine	FUEL SOURCES: Tando Alam associate gas field

ELECTRICITY USAGE: Sell to WAPDA national grid.
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:
The Asian Development Bank has provided funding for developing the gas field

DESCRIPTION:
There is an opportunity for a gas turbine project to be based on natural gas available at the Tando Alam field (1.5 million cubic feet/day). Once successful, the project could possibly involve skid-mounted off-the-shelf turbines leading to quick harnessing of flared associated gases from small fields. A private company has submitted a proposal to harness the flared gas into compressed natural gas (CNG) and market the cylinders. Furthermore, the Asian Development Bank (ADB) has approved a loan for \$4.3 million for an Oil and Gas Development Project part of which will be put towards the development of the Tando Alam field (see Sari/Hundi/Khothar and Nandpur). The loan has a repayment period of 18 years with a three year grace period. In addition, co-financing has been arranged by the ADB for a \$7.3 million loan from Mitsui Bank Ltd. (Japan) to finance a portion of the Tando Alam field. This complementary loan has a 12 year maturity period including a three year grace period. There has been no development of the power project.

DATE UPDATED: 01/22/88

PROJECT NAME: Toot Project

LOCATION: Toot
STATUS: INACTIVE
CONTACT:

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Gas turbine	FUEL SOURCES: Toot field

ELECTRICITY USAGE: Sell to WAPDA national grid
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP: Oil and Gas Development Project
PROJECT COST/FINANCING:

DESCRIPTION:
This project would be a gas turbine based on natural gas available at the Toot field (1.5 million cubic ft./day). One successful project, possibly involving fast implementation of skid-mounted, off-the-shelf turbines, could lead to quick harnessing of flared associated gases from small fields. There has been no development of this project.

DATE UPDATED: 03/16/90

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PROJECT NAME: Ucch Project

LOCATION: Ucch, Nasirabad district, Balochistan
STATUS: ACTIVE
CONTACT: Kohlu Agency, Balochistan

CAPACITY (MW):	FUEL: Natural gas
POWER SYSTEM: Combustion turbine	FUEL SOURCES:

ELECTRICITY USAGE:
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:
The project cost in 1987 was \$US 126 million.

DESCRIPTION:
There is an opportunity for a gas turbine project based on low-btu gas at Ucch in Balochistan. At 2.5 trillion cubic feet/day, it is the third largest gas field in Pakistan. Exploitation will require a full 3 year appraisal/development cycle. This will not happen until a buyer of the gas is lined up.

DATE UPDATED: 03/20/90

PROJECT NAME: Upper Gujera Canal Hydro Project

LOCATION: 25 km. west of Sheikhpura, Punjab
STATUS: INACTIVE
CONTACT:

CAPACITY (MW): 1.9	FUEL: Water
POWER SYSTEM: Hydroelectric	FUEL SOURCES:

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government
GOVERNMENT/UTILITY CLEARANCE:
OWNERSHIP:
PROJECT COST/FINANCING:
Cost is estimated to be Rs. 77.5 million (US \$5.2 million)

DESCRIPTION:
The provincial Ministry of Irrigation and Power has identified the potential for a 1.9 MW hydroelectric installation on the Upper Gujera Canal located near Sheikhpura, Punjab. The site was ranked sixth out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/16/90

PROJECT NAME: Upper Pakpattan Canal Hydro Project

LOCATION: 50 km. east of Sulemanki Barrage, Punjab

STATUS: INACTIVE

CONTACT:

CAPACITY (MW):	2.4	FUEL:	Water
POWER SYSTEM:	Hydroelectric	FUEL SOURCES:	

ELECTRICITY USAGE: Sell to WAPDA national grid or to provincial government

GOVERNMENT/UTILITY CLEARANCE:

OWNERSHIP:

PROJECT COST/FINANCING:

Estimated cost is Rs. 75.1 million (US \$5 million)

DESCRIPTION:

The provincial Ministry of Irrigation and Power has identified the potential for a 2.4 MW hydroelectric installation on the Upper Pakpattan Canal located near Sulemanki Barrage, Punjab. The site was ranked fifth out of eight projects evaluated by FACE (Lahore). There has been no development of this project.

DATE UPDATED: 03/16/90

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PROJECT NAME: Finance & Trade Center Cogeneration

COMPANY: Finance & Trade Center
CONTACT:
TYPE OF PLANT: Office building
LOCATION: Shahrah-e-Faisal, Karachi
STATUS: OPERATING

CAPACITY (MW): 2.8	PROJECT COST (1987 IN US\$): 3.29E6
POWER SYSTEM: Boiler/steam turbine	FOREIGN EXCHANGE: 2125000.
FUEL: Oil/natural gas	DOMESTIC CURRENCY: 1161073.
USE OF HEAT: Air-conditioning	EXCHANGE RATE (1987): US \$1.00 =
HEATING MEDIUM: Gas	
CONNECTED TO THE GRID: N	
EXPORT EXCESS ELECTRICITY: N	

PROJECT DEVELOPMENT STATUS:

FEASIBILITY STUDY DATE: April 1985	DESIGN DATE: July 1985
CONSULTANT: PES	ENGINEERING FIRM: PES
UTILITY/OWNER AGREEMENT () DATE:	EQUIPMENT TYPE: Turbines/boilers
UTILITY:	SUPPLIER: AEG/Germany; Greshan/Pakistan

EXPECTED COMMISSIONING DATE: January 1987

DESCRIPTION:

The cogeneration system provides electricity and air-conditioning for a major commercial building. The technology is a dual fuel 2.8 MW, 50,000 lbs/hr system. The project is being 100 percent financed by its owners and was the first cogeneration application in a building in Pakistan. Installation has been completed and the project is operating.

DATE UPDATED: 08/02/88

PROJECT NAME: Packages Ltd. Cogeneration Project

COMPANY: Packages Ltd.
CONTACT: Suleman Elahi, Technical Director
TYPE OF PLANT: Material packaging
LOCATION: Lahore
STATUS: ACTIVE

CAPACITY (MW): 12.	PROJECT COST (19 IN):
POWER SYSTEM: Boiler/steam turbine	FOREIGN EXCHANGE:
FUEL: Natural gas	DOMESTIC CURRENCY:
USE OF HEAT:	EXCHANGE RATE (19): US \$1.00 =
HEATING MEDIUM:	
CONNECTED TO THE GRID: N	
EXPORT EXCESS ELECTRICITY: N	

PROJECT DEVELOPMENT STATUS:

FEASIBILITY STUDY DATE: 1988	DESIGN DATE:
CONSULTANT: In-house	ENGINEERING FIRM:
UTILITY/OWNER AGREEMENT (N) DATE:	EQUIPMENT TYPE:
UTILITY:	SUPPLIER:

EXPECTED COMMISSIONING DATE:**DESCRIPTION:**

Packages, Ltd., a private manufacturer of packing materials is developing a 12 MW gas-fired, extract/condense, steam turbine unit to provide power at their Lahore facility. An in-house feasibility study was completed in 1988 and implementation of the project is in progress.

DATE UPDATED: 03/27/90

PROJECT NAME: Sui Northern Cogeneration

COMPANY: Sui Northern Gas Pipeline Co.

CONTACT:

TYPE OF PLANT: Office building

LOCATION: Lahore, Punjab

STATUS: ACTIVE

CAPACITY (MW):	1.6
POWER SYSTEM:	Combustion turbine
FUEL:	Natural gas
USE OF HEAT:	Total energy system
HEATING MEDIUM:	Gas
CONNECTED TO THE GRID:	
EXPORT EXCESS ELECTRICITY:	

PROJECT COST (19 IN):
FOREIGN EXCHANGE:
DOMESTIC CURRENCY:
EXCHANGE RATE (19): US \$1.00 =

PROJECT DEVELOPMENT STATUS:

FEASIBILITY STUDY DATE:
CONSULTANT:
UTILITY/OWNER AGREEMENT () DATE:
UTILITY:

DESIGN DATE:
ENGINEERING FIRM:
EQUIPMENT TYPE: Gas turbine
SUPPLIER: Solar, USA

EXPECTED COMMISSIONING DATE:**DESCRIPTION:**

This is a total energy system providing electrical energy from gas turbines and air-conditioning from waste heat recovery at a major commercial building. Project financing will use Sui Northern Gas Pipeline Co. (SNGPC) funds. Actual costs are not available. This will be the first waste heat recovery (from gas turbines) project in Pakistan. Sui Northern is going ahead with this project.

DATE UPDATED: 08/02/88

5)

PROJECT NAME: Adamjee Paper & Board Ltd. Cogeneration

LOCATION: Nowshera, NWFP

CONTACT: ENERCOM

TYPE OF PLANT: Paper Mill

TYPE OF SYSTEM: Boiler/steam turbine

NEW INSTALLATION/RETROFIT:

CAPACITY (MW): 3.7

FUEL: Oil/natural gas

USE OF HEAT: Paper processing

CONNECTED TO THE GRID:

EXPORT EXCESS ELECTRICITY :

INTERCONNECTION ISSUES:

PROJECT FINANCING:

DESCRIPTION:

The project feasibility study was done by the Energy Conservation Centre of Pakistan (ENERCOM) in 1988. A 3.7 MW extraction-condensing steam turbine unit will replace an existing 1.0 MW unit and will use natural gas/furnace oil to generate power for the plant's own use. The feasibility study has been completed, and is being reviewed by the management. They are interested in generating their own electricity to reduce costs and to improve reliability of power supply, however, they are not willing to invest in a cogeneration project. There has been no further development on this project.

DATE UPDATED: 08/02/88

PROJECT NAME: Rafhan Maize Cogeneration Plant

LOCATION: Faisalabad

CONTACT: ENERCOM

TYPE OF PLANT: Food processing

TYPE OF SYSTEM: Boiler/steam turbine

NEW INSTALLATION/RETROFIT:

CAPACITY (MW): 0.8

FUEL: Natural gas

USE OF HEAT: Product drying

CONNECTED TO THE GRID: N

EXPORT EXCESS ELECTRICITY : N

INTERCONNECTION ISSUES:

PROJECT FINANCING:

DESCRIPTION:

The Rafhan Maize Company Ltd. is located in Faisalabad and produces corn-based products such as starch, glucose, and corn oil. The National Energy Conservation Centre (ENERCOM) conducted a cogeneration feasibility study and recommended that Rafhan Maize Co. proceed with the installation of a new boiler (15 million tons/hr of steam at 40.0 bar and a back pressure turbine) to produce 800 kW of electrical power. Total cost of the system and installation would be Rs. 26.98 million (US \$ 1.3 million) and would have a payback of 2.64 years and an internal rate of return of 26.21 (after tax). There has been no further development on this project.

DATE UPDATED: 03/08/90

PROJECT NAME: Utilization of Sugar Cane By-Products

LOCATION: Various

CONTACT: Pakistan Society of Sugar Technologists

TYPE OF PLANT:

TYPE OF SYSTEM: Boiler/steam turbine

NEW INSTALLATION/RETROFIT:	USE OF HEAT:
CAPACITY (MW): 150.	CONNECTED TO THE GRID: Y
FUEL: Ag. waste	EXPORT EXCESS ELECTRICITY : Y

INTERCONNECTION ISSUES:

PROJECT FINANCING:

DESCRIPTION:

The Pakistan Society of Sugar Technologists (PSST) has proposed to utilize on-season surplus electric power and idle capacity during the off-season by connecting to the grid. The president of PSST, Hasan Askari Naqvi has stated that the utilization of by-products is feasible and profitable. The sugar industry has about 150 MW idle generating capacity available during the off-season. Additional capacity could be available if the plants were operated more efficiently, providing a viable alternative source of electricity to address capacity shortages in the country. PSST may also want to encourage new sugar factories to plan for selling power.

DATE UPDATED: 02/01/88

GOVERNMENT CONTACTS

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GOVERNMENT CONTACTS

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Terence T.D. Souza
Director, Private Sector Power Projects
AID/Islamabad
18-6th Avenue
G-5
Islamabad,
Pakistan

TELEPHONE: 824071 x 256, 3

TELEX:

FAX:

Arshad Bokhari
Managing Director
Karachi Electric Supply Company
Aimai House
Abdulla Haroon Rd.
Karachi,
Pakistan

TELEPHONE: 513696, 515473

TELEX: 25601 KESCO PK

FAX:

Bashir Ahmed
Joint Secretary, Development
Ministry of Finance
House No. 11
Street 48 FB/4
Islamabad,
Pakistan

TELEPHONE: 821255

TELEX: 54202 MIFIN

FAX:

A.G.W. Kazi
Secretary General of the Economic Affairs Division
Ministry of Finance
House No. 11
Street U8 FB/4
Islamabad,
Pakistan

TELEPHONE: 821255

TELEX: 54202 MIFIN

FAX:

Taj Mohammed Samo
Deputy Secretary, Planning
Ministry of Industries
Room No. 135 Block A
Secretariat
Islamabad,
Pakistan

TELEPHONE: 823408

TELEX:

FAX:

GOVERNMENT CONTACTS

2.47

Asfaq Mahmood-
Senior Chief, ENERPLAN
Ministry of Planning and Development
33 Blue Area

Buland Markaz, Islamabad
Pakistan

TELEPHONE: 813003

TELEX: 54128 MPLAN

FAX:

Shahid Ahmed
Director of Production
Ministry of Planning, Natural Resources
23/N
Markaz, G/6
Islamabad,
Pakistan

TELEPHONE: 827696

TELEX: 5862

FAX:

Daud Beg
Additional Secretary
Ministry of Water and Power
Pakistan Secretariat
Block A Room 208
Islamabad,
Pakistan

TELEPHONE: 823153

TELEX:

FAX:

Farouq Laghari
Minister
Ministry of Water and Power
Pakistan Secretariat
Block A
Islamabad,
Pakistan

TELEPHONE:

TELEX:

FAX:

S.G. Abbas

National Development Finance Corporation
PNSC Building
P.O. Box 5094
Karachi,
Pakistan

TELEPHONE: -0-

TELEX:

FAX:

GOVERNMENT CONTACTS

2.48

Muhammed Chaudhry Bashir
Executive Vice President, Project Division
National Development Finance Corporation
P.O. Box 5094

Karachi,
Pakistan

TELEPHONE: 551076 55222128

TELEX: 23842 NDFC PK

FAX:

Arif Allauddin
Managing Director, ENERCOM
National Energy Conservation Centre
33 Blue Area
Buland Markaz
Islamabad,
Pakistan

TELEPHONE: 813003

TELEX: 54128 NPLAN PK

FAX:

Lt. Gen. Zahid Ali Akbar
Chairman
Water and Power Development Authority
WAPDA House

Lahore,
Pakistan

TELEPHONE: 214969

TELEX:

FAX:

Khawaja Dawood
General Manager Thermal Plants
Water and Power Development Authority
197, WAPDA House

Lahore,
Pakistan

TELEPHONE: 213676/594

TELEX:

FAX:

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TITLE: Case Studies in Private Power**AUTHOR:**

CORPORATE AUTHOR: RCG/Hagler, Bailly, Inc.
SPONSOR: A.I.D./Office of Energy
PUBLISHER: Energy Conservation Services Program
PUBLICATION DATE: March 1988
DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

The objectives of this study are to: 1) identify the important debt financing parameters associated with the development of private power in Pakistan; 2) evaluate the impact of each parameter on the likelihood of development and financial performance of private power in Pakistan; and 3) recommend measures to A.I.D. to insure the most effective means of providing financial assistance to private power project sponsors and investors in Pakistan. To achieve these objectives, an analysis was done of the financial performance of five typical private power projects in Pakistan.

KEYWORDS: Pakistan, case studies, financing, private power

TITLE: Cogeneration in Developing Countries**AUTHOR:**

CORPORATE AUTHOR: RCG/Hagler, Bailly, Inc.
SPONSOR: A.I.D./Office of Energy
PUBLISHER: Energy Conservation Services Program
PUBLICATION DATE: May 1986
DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

This report analyzes the prospects and problems of cogeneration as an alternative power supply and energy conservation scheme in developing countries. The report first estimates the cogeneration potential in selected A.I.D.-assisted countries; reviews the involvement of international development organizations, and American manufacturers; and discusses the economic, technical, and institutional factors that affect cogeneration development in developing countries. Finally, the report discusses the role of A.I.D. in promoting private sector involvement in cogeneration development as a way to expand power supply and improve fuel efficiency in developing countries.

KEYWORDS: Cogeneration, LDC, private power

TITLE: Country Privatization Strategy

AUTHOR:

CORPORATE AUTHOR: Center for Privatization

SPONSOR: A.I.D.

PUBLISHER:

PUBLICATION DATE: June 1987

DOCUMENT HOLDER: Center for Privatization

ABSTRACT:

This paper provides a framework and guidelines for use by A.I.D. Missions and governments in less developed countries (LDCs) to: 1) shape and pursue a country privatization strategy; 2) identify and bring about needed policy changes; 3) increase public awareness and understanding; 4) privatize a specific government enterprise/facility/activity; and 5) institutionalize the privatization process within an LDC.

KEYWORDS: Privatization, LDC

TITLE: Enerplan Project Special Study

AUTHOR: Dr. James Westfield

CORPORATE AUTHOR: Mathtech Inc.

SPONSOR: AID

PUBLISHER:

PUBLICATION DATE: December 1987

DOCUMENT HOLDER: Meridian Corp.

ABSTRACT:

This study explores the current status of renewable energy in Pakistan, including data on resources (biomass, solar, wind, hydro, etc.), and applications and technologies. The study provides a broad overview of the status of use, development, commercialization and contribution of renewable energy in Pakistan; it then goes on to identify those applications and technologies most opportune for implementing in Pakistan. And finally, actions are proposed that will promote renewable energy in Pakistan.

KEYWORDS: Pakistan, renewable resources, private power

**TITLE: Opportunities for Private Sector Power Generation
in Developing Countries: Pakistan, Thailand,
India, and the Dominican Republic**

AUTHOR: Henri-Claude Bailly, Pirooz Sharafi

CORPORATE AUTHOR: RCG/Hagler, Bailly, Inc.

SPONSOR:

PUBLISHER:

PUBLICATION DATE: November 1987

DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

The objective of this document, presented at The Eighteenth National Conference on the Outlook for Cogeneration, is to examine the prospects for private sector power generation in developing countries, specifically, Pakistan, Thailand, India and the Dominican Republic. The document first summarizes the results of studies done on each of these countries. It then goes on to discuss the implications of these results on other developing countries as well as U.S. suppliers of power generation equipment and services. The paper concludes that there is a sizable potential for private power generation in developing countries. It also claims that industrial cogeneration in and power production from waste fuels represent the most attractive options for small scale power systems. It then goes on to identify the impediments to private power development and how these impediments can be overcome.

KEYWORDS: Cogeneration, Pakistan, Thailand, India, Dominican Republic, private power, opportunities

**TITLE: Opportunities for the Private Sector in Power
Generation Projects in Pakistan**

AUTHOR:

CORPORATE AUTHOR: Ministry of Water and Power

SPONSOR:

PUBLISHER:

PUBLICATION DATE: June 1989

DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

The document discusses the Government of Pakistan's private power program and the Private Sector Energy Development Fund. It describes the process for both solicited and unsolicited project proposals including all agreements and contract requirements. Finally, it provides an overview of the institutional structure within the Government of Pakistan and various organizations such as the Water and Power Development Authority, and the National Development Finance Corp.

KEYWORDS: Pakistan, private power, WAPDA, MDPC, finance, security

**TITLE: Power Shortages in Developing Countries:
Magnitude, Impacts, Solutions, and the Role of
the Private Sector**

AUTHOR:

CORPORATE AUTHOR:

SPONSOR: U.S. Agency for International Development

PUBLISHER:

PUBLICATION DATE: March 1988

DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

Recognizing that "energy shortfalls are causing a serious constraint to development in over half of all A.I.D.-assisted countries," the Committee on Appropriations of the U.S. House of Representatives requested a report from the U.S. Agency for International Development on the "magnitude of the crisis, its implications for future economic and social development and the potential for U.S. technologies and services to address this problem," including an assessment of "appropriate incentives for private sector participation and the feasibility of an Energy Guaranty Program modeled on A.I.D.'s Housing Guaranty Program." This report analyzes the magnitude, causes, and impacts of power shortages in developing countries, identifies possible solutions, describes a role for the private sector, and identifies an appropriate role for A.I.D.

KEYWORDS: Power sector, LDC, electricity demand, private sector

TITLE: Private Sector Participation in Electric Power

AUTHOR:

CORPORATE AUTHOR: Asian Development Bank

SPONSOR: Asian Development Bank

PUBLISHER:

PUBLICATION DATE: February 1989

DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

The report surveys the private power activities in India, Indonesia, Malaysia, Pakistan, Philippines, and Thailand. The report addresses issues related to private sector participation in the power sector in terms of the additionality of resources available through the private sector, balance-of-payment implications, resource planning, the role of the national utility, and impacts on tariffs.

KEYWORDS: Asia, India, Pakistan, Philippines, Indonesia, Malaysia, Thailand, private power, privatization, captive power, cogeneration

**TITLE: Private-Sector Power Generation in Pakistan:
Potential, Impediments, and Policy Issues**

AUTHOR:

CORPORATE AUTHOR: RCG/Hagler, Bailly, Inc.
SPONSOR: A.I.D./Office of Energy and Asia Near East Bureau
PUBLISHER: Energy Conservation Services Program
PUBLICATION DATE: July 1986
DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

This report presents the results of a study of the potential for and impediments to the development of non-utility power generation in Pakistan. The power generation options considered in this study include cogeneration, agro-waste fired systems, and small and medium hydro facilities. The study recommends the first steps required to design and implement a program to exploit the economically viable non-utility power generation potential. The study was carried out by a team of consultants during a 3-week trip to Pakistan, from October 12-31, 1985.

KEYWORDS: Pakistan, cogeneration, private power, policy, impediments, potential

TITLE: Privatization: A Technical Assessment

AUTHOR: L. Gray Cowan

CORPORATE AUTHOR:
SPONSOR: A.I.D./Office of Policy Development and Program Review
PUBLISHER: Center for Privatization
PUBLICATION DATE: August 1987
DOCUMENT HOLDER: A.I.D./Center for Privatization

ABSTRACT:

This study outlines the advantages of privatization and the barriers that governments in less developed countries (LDCs) face when trying to implement a privatization strategy. The study goes on to define the role that the AID Missions can play in planning the privatization strategy.

KEYWORDS: Privatization, impediments, strategies, LDC

TITLE: The A.I.D. Experience With Independent Power Generation

AUTHOR: James B. Sullivan

CORPORATE AUTHOR:

SPONSOR: A.I.D./Office of Energy

PUBLISHER:

PUBLICATION DATE: August 1988

DOCUMENT HOLDER: RCG/Hagler, Bailly, Inc.

ABSTRACT:

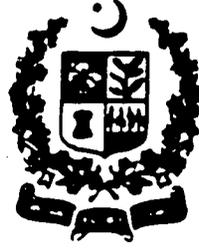
This paper, presented at the Central American and Caribbean Workshop on Private Power and Demand Management, discusses A.I.D.'s involvement in energy and energy conservation and demand management, as well as independent power production in developing countries.

KEYWORDS: Caribbean, Central America, private power, A.I.D., LDC

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**APPENDIX A: OPPORTUNITIES FOR THE PRIVATE SECTOR IN POWER
GENERATION IN PAKISTAN**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Government of Pakistan
MINISTRY OF WATER AND POWER
(Private Power Cell)

**OPPORTUNITIES FOR THE PRIVATE SECTOR
IN POWER GENERATION PROJECTS
IN PAKISTAN**

**ISLAMABAD
JUNE 1989**

This brochure is issued by the Ministry of Water and Power, Government of Pakistan, for the purpose of providing preliminary information concerning opportunities for the private sector involvement in the power sector in Pakistan. The information herein is given as of June 1989.

FOREWORD

As a result of Pakistan's rapid economic growth in recent years, the country is in urgent need of new power stations to meet increases in electricity demand.

The Government has launched a bold new policy to involve the private sector in building, financing and operating new power stations. This initiative has met with considerable interest from investors and power station contractors and equipment suppliers, both at home and overseas. A number of proposals are being actively pursued and I am confident that our policy objectives will come to fruition.

Considerable experience has been gained on how to implement the policy in a way which best meets the interests of the private sector and the Government. The purpose of this brochure is to explain clearly the measures which have been taken to give effect to the policy initiative, the types of project which are suitable, and the thoughtful arrangements made for advancing such projects from their identification to operation.

I hope that this brochure will indicate the seriousness of the Government's intention to involve the private sector in power generation, and will stimulate additional interest.

Further information and advice is available from the Private Power Cell in the Ministry of Water and Power. This Cell has been specifically established to promote and give effect to the Government's initiative.



(Sardar Farooq Ahmad Khan Leghari)
Minister of Water and Power

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THE OPPORTUNITIES

Background and General Policy

1. It is the policy of the Government of Pakistan to involve the private sector in the development of power generation. In pursuance of this policy the Government announced in November 1985 measures to encourage such private sector participation. This brochure describes the development of the Government's November 1985 initiative, the measures taken to give effect to its policy and the opportunities in power generation that this has created for the private sector.
2. Large increases in investment in power generation are required during the Seventh and Eighth Five Year Plans to remove existing power shortages and to meet expected increases in demand. The Seventh Plan, covering fiscal years 1989 to 1993, provides for additional generating capacity of about 6,600 MW. The Government plans that over 2,000 MW of this should be provided by the private sector. The indicative figures for the Eighth Plan are similar.
3. To achieve this level of private investment, the Government is offering the private sector the opportunity to earn real rates of return after tax which are competitive with the returns available from similar activities internationally.
4. The project will involve limited recourse financing, and the funds for the project will be raised without any direct sovereign guarantee of repayment. Instead the investors in, and lenders to, the project company must look to the revenues earned by the sales of electricity for their returns on equity and the servicing of their loans.
5. The output of the power station will be sold to Wapda¹ under a long term contract covering the concession period.
5. Initially, private sector power stations were restricted to thermal stations fuelled by fuel oil and indigenous coal. The policy has since been extended to include thermal stations using low calorific value gas and hydroelectric stations. In principle the Government will give consideration to the use of any fuel, having regard to both economy and fuel diversity.
6. Specific private sector projects may be solicited by the Government, or private sector sponsors may put forward unsolicited proposals.

Measures Taken to Promote BOO Projects

Suitable Projects for the Private Sector

4. The projects covered by the November 1985 statement—commonly referred to as "build-own-operate" (BOO) projects—have the following main features:
 - o The private sector—through a special project company incorporated in Pakistan—will finance and build a power station and operate it for a concession period, typically more than 20 years. Extension of the concession period may be negotiated.
7. The Government has, in collaboration with several multi-lateral and bi-lateral aid agencies, developed an innovative approach to encourage private sector investment in BOO power generation schemes. The key elements of this are :
 - o the careful allocation of risk between the public and private sectors.
 - o the availability of loans to improve the debt service profile of projects.

(1) The Government may authorise other power purchasers and, where appropriate, other references to Wapda in this brochure should be interpreted to mean Wapda or other authorised power purchaser as applicable.

8. Measures have been taken on four fronts to pursue this approach. In summary the Government has :

- o formed the *Private Sector Energy Development Fund*. This Fund is able to extend loans to the private sector as an important source of finance for qualifying projects. Both the grace period and the repayment period of these loans are attractive with the result that a project's debt service profile will typically be more commensurate with the long life of power projects than would be feasible given commercial finance alone.
- o expressed itself willing to protect the project company against certain risks which are beyond the control of the project company. *This enhances the value of the lenders' 'Security Package'* and increases the attractiveness of the investment to both lenders and sponsors.
- o granted power generation schemes several *fiscal and other incentives*.
put in place a *new institutional framework* to facilitate the preparation, execution and operation of private sector generation projects.

Further details of these measures are described below.

The Private Sector Energy Development Fund

9. The Private Sector Energy Development Fund (The Fund) has been established to utilise the proceeds of loans and grants from several multi-lateral and bi-lateral aid agencies. The Fund is administered by the National Development Finance Corporation.
10. Either firm commitments or indications of support have been received from :

World Bank
Export Import Bank of Japan

U.S. Agency for International Development
UK Overseas Development Administration
Kreditanstalt für Wiederaufbau, Federal
Republic of Germany
Canadian International Development
Agencies
Government of the Republic of Italy

So far firm commitments total US \$ 320 million equivalent. Confirmation of current indications of support would add US\$ 330 million equivalent to the funds available.

11. The Fund will lend up to 30% of the total cost of approved projects, but no more than 50% of the foreign exchange costs. Loans may have a maturity of up to 23 years, with grace periods on repayments of up to 8 years. Currently the applicable interest rate is 14% pa.
12. The general arrangements for obtaining finance from the Fund are described in subsequent sections.

Enhancement of the Security Package

13. As noted above it is anticipated that private sector power generation projects will be undertaken with limited recourse financing. Such limited recourse financing requires a comprehensive set of interlocking agreements and provisions (the security package) to give security to lenders. While details will generally need to be agreed on a case by case basis, the Government is committed to enhancing the value of the security package by assuming or providing protection against certain risks that would otherwise be borne by the project company.
14. Subject to specific contractual arrangements the Government will :
 - o provide protection against specific force majeure risks
 - o provide protection against changes in taxes and duties

- o allow indexation of the price of power to protect the project company from inflation in specific cost items and changes in the rupee exchange rate
- o ensure the convertability of Rupees and remittability of foreign exchange to cover necessary imports, debt service, dividends and, ultimately, capital repatriation
- o offer, through the State Bank of Pakistan, foreign exchange insurance to allow the project company to determine in advance the Rupee cost of foreign debt service commitments
- o guarantee the performance of Wapda under the Power Purchase Agreement, which will include protection for the project company against failure by Wapda to take the expected amount of power
- o where fuel will be supplied from a public sector organisation, guarantee the performance of the fuel supplier under the Fuel Supply Agreement
- o arrange, subject to certain limitations, to finance a proportion of project cost overruns through the Fund
- o arrange for commercial loans and/or export credits to have priority over loans from the Fund.

Other Incentives

15. In addition to the enhancements of the security package described above, the Government has established a number of incentives that will benefit private sector power projects. In particular the Government has:
 - o declared that private sector power project companies shall be exempt from corporate tax
 - o declared that private sector power generation is an 'industry'. This means that private sector power projects in notified

areas qualify for exemption or partial exemption from customs duties and sales taxes on imports of machinery (unless of a type manufactured locally)

- o made available preferential loans for the purchase of locally manufactured machinery (currently the interest rate payable on such loans is 6% pa).

Institutional Framework

16. A new institutional framework has been established to facilitate the development of private sector power projects. This comprises:
 - o a Private Power Cell (PPC) in the Ministry of Water and Power (MWP) in Islamabad that will promote and evaluate proposals for, and conclude agreements on, private sector power schemes
 - o a Private Energy Division (PED) of the National Development Finance Corporation (NDFC) in Karachi that will administer the Private Sector Energy Development Fund on behalf of the Government
 - o a Private Power Cell in Wapda (WPPC) in Lahore that will be responsible for negotiating and administering Power Purchase Agreements.
17. Guidelines and procedures for the operations of the institutions have been prepared. These have been designed to:
 - o streamline project processing
 - o define clear roles and responsibilities
 - o reduce the number of Government Departments with which the private sector will need to deal.
18. The roles of these institutions and the arrangements for project processing are described in the next section.

THE ARRANGEMENTS

Overview

19. Specific arrangements have been put in place for processing projects from identification through implementation to operation. The arrangements up to the start of construction fall into two broad phases:

- o Phase 1: from project identification up to the issue of a Letter of Intent (LOI) from the Government
- o Phase 2: from the issue of the LOI up to the start of construction.

20. Phase 1 is different for solicited and unsolicited proposals. From the end of Phase 1 the arrangements are similar for all proposals. The major components of both phases are summarised in Figure 1 and are discussed below:

PHASE 1—SOLICITED PROPOSALS

Project Identification

21. Planned future power stations are identified from a least cost development plan which is reviewed periodically. The Government will select specific projects from the plan for private sector implementation and invite competitive proposals. The projects which are selected will have been the subject of a pre-feasibility or feasibility study.

Invitation for Proposals

22. For all solicited projects the PPC will prepare and issue an Invitation for Proposals. A documentation fee will be charged.

23. The Invitation for Proposals is an important document. Its purpose is to set out in detail:

- o the background information required to prepare a proposal, covering relevant aspects of the project and the general

financial, contractual and regulatory arrangements

- o instructions on the information to be provided by proposers and the form in which it should be submitted
- o the terms and conditions of the invitation.

24. The information to be provided by proposers falls into four broad categories:

- o information on the project sponsors, the main contractor(s) and equipment supplier(s) together with their relevant qualifications
- o technical details of the proposal and the programme for implementation
- o the price at which the power would be sold to Wapda, supported by detailed cost estimates for each year
- o the proposed financial plan and financing package

25. The price of power which is offered should be a firm price, subject only to variation in accordance with clear principles for:

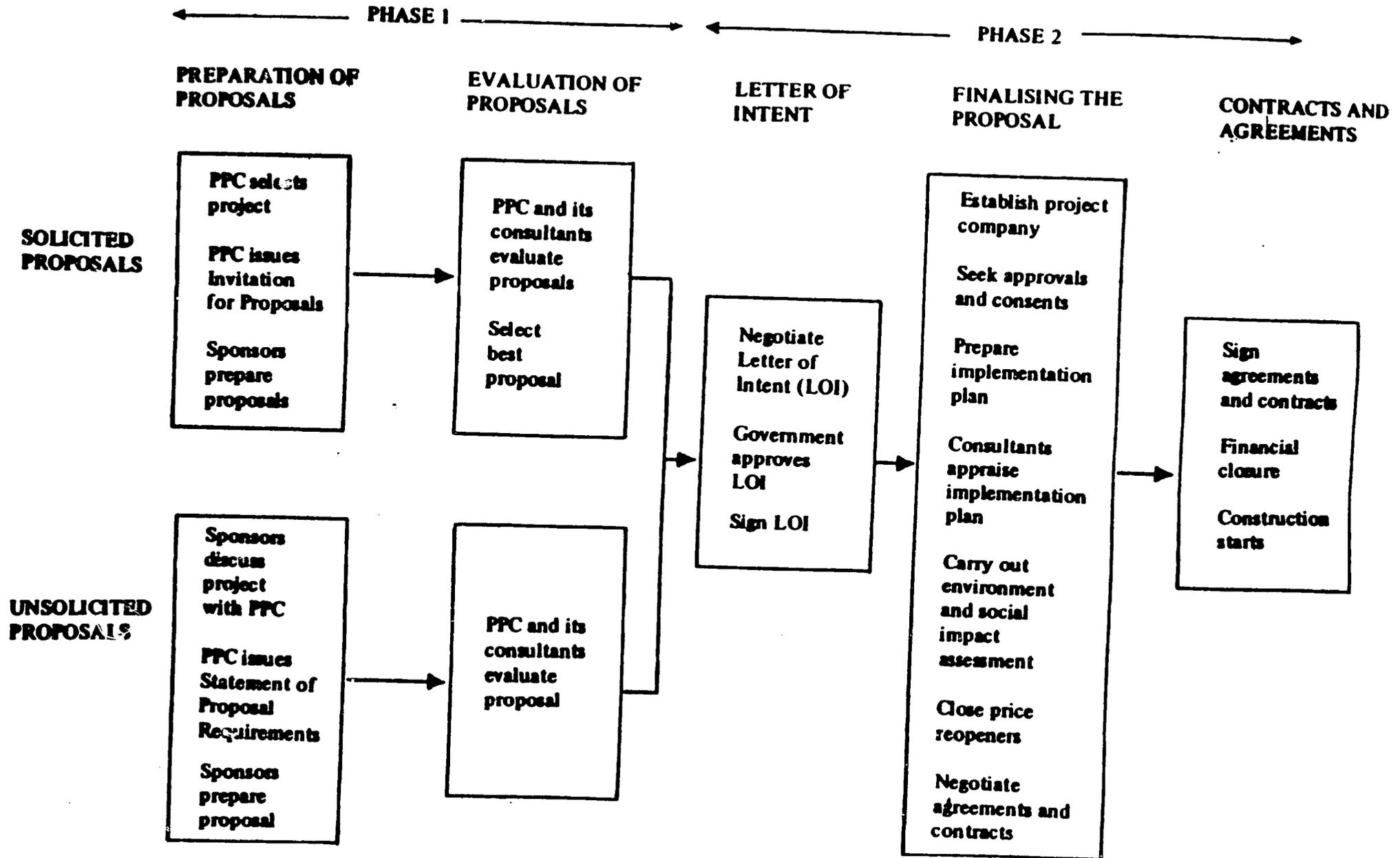
- o price indexation
- o price reopeners

26. *Price indexation* is a mechanistic adjustment to the price of energy to allow for inflation in specific costs and changes in the rupee exchange rate. Proposers will be asked to put forward their own proposals for indexation, within a framework specified in the Invitation for Proposals.

27. *Price reopeners* provide an arrangement for adjustment of the price offered in the proposal to take account of the results of more detailed

Figure 1

TYPICAL PROJECT STAGES



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investigations undertaken after the submission of the proposal. Reopeners will be strictly limited to cost items which cannot be estimated reliably by the time the proposal is submitted. One example is the cost of finance: firm commitments for finance are unlikely to be obtained before a proposer has been issued with a Letter of Intent. However, according to the current practice, the cost of finance proposed by the sponsors at the time of their proposal cannot be subsequently revised upward. Other examples might be cost items which are dependent on detailed site investigation or environmental impact assessments that cannot be completed before the proposal is submitted.

28. Notice will be given, in the national and international press, of the issue of an Invitation for Proposals. Copies of the notice will be sent to all diplomatic missions in Islamabad, and to all companies who have registered with the PPC their interest in the type of project for which proposals are to be invited.

29. Before submitting their proposals, proposers will be given the opportunity to seek clarification of any matter from the PPC, either in writing or at a proposers' conference. The period for preparing a proposal will typically be between four and six months depending on the size and nature of the project.

Evaluation of Proposals

30. The basis for the evaluation of proposals will be described in the Invitation for Proposals. The PPC will be responsible for the evaluation assisted by firms of financial and technical consultants of international repute.

31. The first step in the evaluation will be to screen all proposals to assess whether :

- the project sponsors, contractors and equipment suppliers have the necessary qualifications

- the proposed project is capable of performing to the technical standards required
- the proposed project is capable of complying with the Government's 'Environmental Guidelines' and 'Occupational Health and Safety Guidelines'
- the proposed project is capable of being successfully financed
- the cost estimates presented as the basis for the offer price for the sale of electricity are soundly based, and reasonable compared with the costs that would be incurred if Wapda were to undertake the project.

32. Proposals will be included in the next-step of the evaluation only if they meet the screening requirements above. The next step will be to compare the acceptable proposals on the basis of specific criteria. For the selection of the best proposal, the offer price for the sale of electricity will be the predominant, but not the only, criterion. Others will include price-related factors (e.g. the extent of the price reopeners required), technical factors (e.g. the reliability of the plant) environmental factors and financial factors (e.g. the strength of the proposed financing plan). The evaluation stage will generally be completed within 3 months of the receipt of proposals.

The Letter of Intent

33. The next stage is to reach agreement between the sponsors of the proposal selected from the evaluation stage and the PPC on the terms of a Letter of Intent (LOI). When agreement has been reached the draft LOI will be submitted to the Government for approval.

34. The LOI will confer on the sponsors exclusivity in relation to the project for a period long enough to enable them to complete all further preparation leading up to the signing of final contracts and agreements.

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35. The LOI will refer to the proposal submitted by the selected sponsors and:

- o stipulate the period for which project exclusivity is conferred
- o set out any amendments to the initial proposal which are agreed between the sponsors and the Government
- o describe what is required of the project sponsors to finalise the project.

The LOI will be issued by the Ministry of Water and Power and countersignature by the sponsors will be required within a specified periods. The sponsors will be required to provide a guarantee that they will fulfil their obligations under the LOI:

PHASE 1 – UNSOLICITED PROPOSALS

Project Identification

36. Most future private sector power projects are likely to arise from solicited proposals. However, unsolicited proposals will also be entertained provided they:

- o are consistent with Government policy
- o would form part of the least cost development plan
- o do not conflict with the Government's plans for solicited proposals.

37. Sponsors of an unsolicited project are urged to discuss it at an early stage with the PPC who will give guidance as to whether these conditions appear to be fulfilled.

Preparation of Proposals

38. If the unsolicited project meets the initial conditions described above, and if the sponsors wish to proceed with the preparation of a proposal, the PPC will provide the sponsors

with a Statement of Proposal Requirements. This statement will give:

- o background information on the technical and environmental requirements of power generation projects, and more detailed information on the general financial, contractual and regulatory arrangements on which any formal proposal should be based
- o instructions on the information to be provided in a formal proposal and the format in which it should be submitted
- o any other terms and conditions which would pertain to a proposal.

39. More details of the content of the Statement of Proposal Requirements are given in Annex-A.

40. The issue of a Statement of Proposal Requirements represents no commitment by the Government to the project. The preparation of an unsolicited proposal is undertaken by the sponsors at their own expense and risk.

Evaluation of Proposals

41. The evaluation of unsolicited proposals will generally address the same factors as described earlier for solicited proposals. However, in the absence of tariff competition, more attention will be paid to the reasonableness of disaggregated cost data and the required rate of return. In addition more detailed technical review may be required as all the technical and site information relating to an unsolicited proposal will have emanated from the sponsors rather than the PPC.

42. The evaluation of unsolicited proposals will include an assessment of whether the proposed costs are competitive with those that Wapda would incur in undertaking a similar project, after allowing for differences in the cost of finance. The evaluation will also assess whether the project forms part of the least cost develop-

ment plan. A proposal will only be accepted if it passes these two criteria.

The Letter of Intent

43. The arrangements for the negotiation and issue of the Letter of Intent for unsolicited proposals are the same as for solicited.

PHASE 2— ALL PROPOSALS

Finalising the Proposal

44. After the issue of the Letter of Intent, the project sponsors will need to finalise their proposal by:
- o establishing the project company
 - o applying for, and where appropriate obtaining, all necessary approvals and consents
 - o preparing a feasibility study/implementation plan
 - o preparing an environmental and social soundness assessment.
 - o undertaking any other studies or investigations necessary to close the price re-openers.
45. The project company must be incorporated in Pakistan under the Companies Ordinance. At least 25% of the capital of the project company must be in the form of equity. There is no limit on the proportion of the equity that can be held by foreign companies. If a project company makes maximum use of the availability of finance from the Fund, the capital structure of a typical project company would be:

Equity	25%
Loan from the Fund	30%
Other debt financing	45%

46. *Approvals and consents.* The Project company will need to apply for—and where possible obtain—all necessary approvals and consents, although some may be conditional on the signing of the project contracts and agreements. The Letter of Intent will, through its approval by the Government, facilitate the necessary approvals and consents, so long as all normal conditions and procedures for their issuance are complied with.

47. *Feasibility study/implementation plan:* The project company must prepare a comprehensive feasibility study and implementation plan. The plan should set out the final details of the project and its financing. The plan will be reviewed by the PPC and PED, with the assistance of technical and financial consultants of international repute, to assess the full technical and financial viability of the project.
48. The feasibility study/implementation plan can be used as the basis for applying for a loan from the Fund. If finance from the Fund is requested, the PED will send to the project company a draft term sheet setting out the finance available and the terms and conditions which will apply. This draft term sheet would then form the basis for loan negotiations between the PED and the project company. The PED will also advise on the procurement guidelines to be followed, and will assist the project company to prepare a procurement plan which satisfies these guidelines.
49. *Environmental and social soundness assessment:* All projects will be required to have an assessment prepared by an independent consultant in compliance with Pakistan/World Bank Environmental and Occupational Health and Safety Guidelines. These guidelines are available from the PPC.
50. The assessment should be carried out in consultation with the environmental staff of the Government and will require the Government's specific approval of *inter alia*:
- o the scope of work

- o the consultants that will prepare the assessment.
- o the final impact assessment and mitigation plan.

Proposers should anticipate that it will take approximately 18 months to collect and analyse background and impact data, prepare the assessment report, and secure the required technical clearances. Further details of environmental requirements are given in Annex-B.

51. *Closing the price reopeners:* If the proposal for which the Letter of Intent was issued contained price reopeners for certain items of cost, the project company will need to give firm estimates of those cost items and provide justification for any request for an adjustment to the electricity price offered in the proposal. In general such adjustments will need to be agreed with the PPC prior to contract signature. (There may be limited exceptions that depend on the completion of the environmental assessment).

Contracts and Agreements

52. The contracts and agreements that will need to be signed before financial closure and the start of construction will typically include:

- o the Implementation Agreement between the Government and the project company
- o the Power Purchase Agreement between Wapda and the project company
- o for thermal power stations, a Fuel Supply Agreement between a fuel supplier and the project company
- o loan Agreements and other documents required to implement the financing obligations of the project company (usually including a Loan Agreement with the Fund).

- o a Turnkey Construction Contract between the turnkey contractor and the project company
- o where the project company intends to engage an operation and maintenance (O&M) contractor, an O&M Contract between the O&M contractor and the project company
- o The shareholders' Agreement among the project sponsors.

53. The Implementation Agreement and Power Purchase Agreement, and (where appropriate) a Fuel Supply Agreement with a public sector fuel supplier, will be negotiated with the concerned agencies under the overall auspices of the PPC.

54. The *Implementation Agreement* defines the relationship between the project company and the Government throughout the project life. The Agreement will set out in detail:

- o the general obligations to be performed and the conditions to be satisfied by the project company and project sponsors
- o the assurances and assistance to be given by the Government
- o the arrangements which will apply in the event that either party is unable to fulfil its obligations.

55. The assurances and assistance to be given by the Government will include:

- o granting the right to the project company to construct and operate the project
- o guaranteeing Wapda's performance in accordance with its obligations under the Power Purchase Agreement.
- o guaranteeing, where appropriate, the performance by a public sector fuel

supplier in accordance with its obligations under the Fuel Supply Agreement.

- maintaining the arrangements for currency convertibility and remittability.

56. The Implementation Agreement will also set out which risks will be borne by the Government and which by the project company.

57. The *Power Purchase Agreement* will be negotiated with the Wapda Private Power Cell (WPPC). The WPPC will also administer the power Purchase Agreement and facilitate the coordinated operation of privately owned power stations with the Wapda system.

58. The general form of the Power Purchase Agreement will be to set out:

- the obligations of the project company to design, construct, operate and maintain the project, and to supply energy to Wapda.
- the obligations of Wapda to purchase and pay for the energy.

59. A *Fuel Supply Agreement* will need to be negotiated with the Pakistan State Oil Company Limited for all Oil-Fired power stations. In the case of gas fired power stations fuel supply agreements will need to be negotiated with the owners of the relevant reserves. In the case

of coal fired stations, integrated development of the mine and power station will generally be preferred. However, if stand alone coal fired power stations are proposed, fuel supply agreements will need to be negotiated with the owners of the relevant reserves.

Implementation

60. After the signing of the agreements, the project company will be responsible for constructing, commissioning, operating and maintaining the project in accordance with the terms of the Implementation Agreement and Power Purchase Agreement. At the end of an agreed operating period, which will typically be 20 years or more, transfer to Government or continued operation may be negotiated.

61. The PED will be responsible for supervising the construction and operating phases of the project. The Government will not become directly involved in the implementation of the project unless difficulties arise in the context of the Government's or the project company's obligations under the terms of the Implementation Agreement.

62. During the operating phase, the project company will be in regular contact with the WPPC in relation to the supply of the electricity and payment for it. The project company will also need to coordinate with WPPC the interconnection of the station to the grid.

FURTHER ACTION

63. Anyone interested in receiving further information should contact: receive notification of solicited projects for which Invitations for proposals are issued.

Director General,
Private Power Cell,
Ministry of Water and Power,
Government of Pakistan,
House No. 41, Street No. 56, F-6/4
Islamabad,
Pakistan
Telex: 952-5851

Potential project sponsors are encouraged to register with the Private Power Cell to ensure that they

This brochure was prepared with the assistance of Coopers and Lybrand.

STATEMENT OF PROPOSAL REQUIREMENTS

Structure of a Typical Statement of Proposal Requirements

The Statement will typically contain:

- o a covering letter which will set out the general terms and conditions under which the sponsors may submit an unsolicited proposal
- o Schedules giving
 - further information for proposers on the technical requirements of the project, environmental guidelines, pricing arrangements, financial and contractual requirements and the operation of the Private Sector Energy Development Fund
 - detailed instructions on the format and structure of the information required from proposers (see below).
- o Appendices giving proforma drafts of independent documents which are ultimately likely to have contractual status (e.g. LOI and Power Purchase Agreement).

Information required from proposers

The information which will be required from proposers will typically cover the following:

- o Organisation, qualifications and experience
 - project sponsors
 - proposed project company
 - main contractors and suppliers
 - organisation chart
- o Technical and environmental
 - detailed technical information
 - environmental considerations
 - implementation programme

- o Costs and pricing
 - detailed capital costs by item and year (and for imports f.o.b. price, insurance and freight, erection and commissioning).
 - detailed operating costs by item and year
 - summary of financing cost projections
 - proposed tariff and tariff structure*
 - price indexation proposals
 - proposed price reopeners
- * details should be given for each year over the life of the project. Tariffs may be stepped to reflect changes in debt service.

o Financial Plan

- operating statements, balance sheets, and sources and application of funds
- financing package (see below)
- taxation implications
- financial package
- capital structure (equity and loans)
- loan sources (local and foreign)
- timing of loans
- bridging finance
- repayment terms
- interest terms

The proposed charges for the sale of electricity form a key element in the evaluation of proposals. Proposers will be requested to set out how their proposed charges are derived from the costs and other elements in their financial plan.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

The environmental and social soundness assessment required for each project comprises the following components.

The affected environment

A description of the affected environment including physical, biological, and socio-economic resources of the project area.

The proposed project

A brief description of the proposed project including the power plant, primary and secondary infrastructure, type and source of fuel supply, and labour requirements for construction and operation.

Analysis of Impacts

A review of potential environmental impacts, both positive and negative, resulting from implementation of the proposed project. This should examine both primary impacts which are the direct result of the proposed project and secondary impacts which are an indirect result. The review should include, but not be limited to, the following:

- o the collection of on-site meteorological data for a period of at least one year to provide an adequate data base for the preparation of air quality studies using approved dispersion models
- o the collection of on-site data to support the preparation of thermal discharge impact studies when cooling water is to be discharged into a surface water body
- o the analysis of potential socio-economic impacts of the proposed project, especially with regard to infrastructure and labour force requirements
- o the analysis of required resettlement of local populations, including those without formal title to the project site

- o the analysis of potential impacts on tribal peoples, including those relating to traditional land and water rights
- o the preparation of a site-specific survey of potential impacts on rare and/or endangered plant and animal species and/or their critical habitat
- o the preparation of a site-specific survey of potential impacts on archaeological and/or historical sites
- o a review of the handling of hazardous materials during construction and operation (note that no PCB's can be used)
- o a review of the industrial health and safety standards and procedures which will be adopted
- o a review of the emergency prevention, planning, and management procedures which will be adopted.

Mitigation Plan

A mitigation plan should be prepared identifying actions which can be adopted in the project design and implementation to eliminate or reduce potential negative environmental and social impacts. Where resettlement is involved this must include a resettlement plan. All mitigating measures should be evaluated with regard to their cost, duration, implementing organisation, institutional development and training requirements, and reliability under local conditions.

Monitoring Plan

A monitoring plan should be prepared for the protection of air and water quality, industrial health and safety, emergency management, and other issues (e.g. resettlement) as appropriate. The elements of the monitoring plan should be evaluated with regard to cost, duration, implementing organisation, institutional development and training requirements, and reliability under local conditions.

The Office of Energy

The Agency for International Development's Office of Energy plays an increasingly important role in providing innovative approaches to solving the continuing energy crisis in developing countries. Three problems drive the Office's assistance programs: high rates of energy 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, including 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 InterAmerican Development Bank, the private sector, and bilateral donors to increase energy efficiency and expand energy supplies, enhance the role of private power, and implement novel 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 integral to broad-based economic growth.

Much of the Office's strategic focus has anticipated and supports 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 expanding least-cost planning activities to incorporate additional countries and environmental concerns, increasing support for feasibility studies in renewable and cleaner fossil energy technologies that focus on site-specific commercial applications, launching a multilateral global energy efficiency initiative, and improving the training of host country nationals and overseas A.I.D. staff in areas of energy that can help to reduce expected global warming and other environmental problems.

To pursue these 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).

The Office of Energy helps set energy policy direction for the Agency, making its projects available to meet generic needs (such as training), and responding to short-term needs of A.I.D.'s field offices in assisted countries.

Further information regarding the Office of Energy's projects and activities is available in our Program Plan, which can be requested by contacting:

Office of Energy
Bureau for Science and Technology
U.S. Agency for International Development
Room 508, SA-18
Washington, D.C. 20523-1810
Tel: (703) 875-4052