

INTERNATIONAL  
FORUM ON  
PRIVATE INVESTMENT  
IN BANGLADESH:  
THE POWER SECTOR

*May 8-12, 1994  
Dhaka, Bangladesh*

**FORUM WORKBOOK**

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***International Forum on Private  
Investment in Bangladesh:  
The Power Sector***

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# **FORUM AGENDA**

*A detailed agenda of each day's presentations.*

# **GLOSSARY OF PRIVATE POWER TERMS**

*A glossary of common terms used in  
private power project development  
and project financing.*

# Terms, Abbreviations, and Acronyms

## Terms

**Applicant:** the private party (individual, corporation, partnership, or consortium) submitting a proposal to develop a private power project.

**Backup power:** reserve power for special circumstances, such as an emergency or system failure.

**BOO/BOOT/BLT schemes:** Build-Own-Operate (BOO) and Build-Own-Operate-Transfer (BOOT) schemes are methods by which private sector participation in the power sector is encouraged. Under these approaches, a project company under private ownership, or a joint venture with a minority public participation, is set up to plan, finance under limited recourse, design, construct, and operate power generation facilities. In a BOOT arrangement, ownership of the facility is ultimately transferred to another entity after a specified period of operation. A variant is the Build-Lease-Transfer (BLT) scheme.

**Business interruption:** stoppage of normal business operations.

**Buy-back rate:** the rate charged by a utility to a private power developer for buying back some or all the power the developer is obligated to deliver.

**Counter guarantee:** a third-party guarantee that is used when one party purchases a service or a product for monetary payments and this party's ability to make payments is in question. This guarantee is required by the provider of the service or product to ensure that payments will be made.

**Cross-subsidies:** the allocation of funds provided by one or more products or sectors of the economy to other products or sectors of the economy. Often this process is not transparent (e.g., high prices for industrial users of electricity can be used to provide subsidies to domestic consumers).

**Debt service:** periodic payment of principal and interest on loans, bonds, or fixed/floating-rate notes.

**Devaluation:** a government action to reduce the purchasing power or value of local currency against convertible currencies.

**Easements:** a right given to an individual or group to make limited use of another's real property.

**Expropriation:** a forced transfer of ownership from a private owner to a government institution.

**Financial closing:** occurs when all the conditions of lenders and investors have been met, and financing disbursements can take place.

**Franchise:** the grant of certain rights to an individual group, partnership, or corporation, sometimes called a concession.

**Hard currency:** all major convertible currencies, such as the U.S. dollar, the British pound, the German mark, the Japanese yen, the French franc, the Swiss franc, the Italian lira, the Dutch guilder.

**Home country:** the country in which a private power developer is registered.

**Host country:** the country in which the private power project is taking place.

**Indexed tariff:** an adjusted tariff, based on a variable such as periodic fuel price, interest rates (local or foreign), exchange rate, and/or inflation rate.

**Implementation agreements:** project-specific agreements that provide government assurances and guarantees to private power producers required for successful project development and allocation of risk.

**Implementation team:** the private power developer and its contractors.

**Independent power producers:** private power producers who have developed power plants, typically on a project finance basis, to sell power to an existing utility or directly to distributors or large consumers.

**Investors:** individuals, groups, or companies that invest cash in a private power developer, group, or company.

**Irrevocable liquid credit:** a guarantee by a commercial bank to provide credit on demand up to a specified maximum limit. This service is provided by banks for a fee.

**Least-cost expansion analysis:** analysis of the options available for expansion of the electric system to determine the cheapest option to achieve the intended objectives.

**Lenders:** commercial banks or other lending institutions that provide loans for investors or directly to a private power developer company for the purposes of developing and building a power plant.

**Limited-recourse financing:** a lending arrangement under which repayment of a loan and recourse in the event of a default relies mainly on the project's cash flow.

**Liquidated damages provisions:** specific amounts, with a cap, a construction contractor is obligated to pay the project company in case of nonperformance or schedule delays.

**Nondiscrimination:** avoiding making distinctions between entities outside of any given and specific evaluation criteria.

**Nonrecourse financing:** recourse for debt repayment, default, or both belongs exclusively to the project company.

**Nonutility generators:** power producers other than public utilities.

**Peak power:** the maximum noninstantaneous electric power in a specified period of time.

**Performance bonds:** guarantees purchased by the project developer issued by commercial banks or insurance companies for an entity to guarantee full and successful implementation of a contract according to prespecified performance guidelines.

**Plant downtime:** time when the power plant is not producing power because of scheduled or forced outage or shutdown.

**Power purchaser:** the entity purchasing power from a private power developer. Usually, the public utility of the host country is the power purchaser.

**Private power developer:** an individual, group, or company that develops power plants on a private basis to own, operate, lease, and/or transfer.

**Project company:** the special-purpose entity that assumes legal and financial responsibility for construction and operation of the project. Recourse is limited to the project company.

**Project risk:** the total risk, including commercial, political, and force majeure risks.

**Proposal:** the applicant's written offer, based on the covenants, terms, and conditions as contained in the **RFP**.

**Rate of return:** percentage of return on equity that developers expect from a project.

**Request for proposal (RFP):** issued by a utility or government to solicit bids for a project. It is, collectively, all the covenants, terms, and conditions contained in the following sections and appendixes: Information for Applicants, Instructions to Applicants, Performance Specification and any applicable drawings, draft Implementation Agreement, draft Power Purchase Agreement, and possible draft Fuel Supply Agreement.

**Right of appeal:** the right of specified parties to legal arrangements to request another hearing by a higher authority according to guidelines specified in a governing law.

**Risk profile:** the level of risk due to political, economic, or financial uncertainty to which an investor is exposed. This determines the rate of return that an investor requires in order to tolerate exposure to the level of adversity in any country.

**Rule 144A:** refers to the Security Act of 1993 (United States), in particular to the private placement of investment-grade securities (bonds or notes) to "qualified institutional buyers" but not to the public.

**Sovereign guarantee:** government guarantee (e.g., of the obligations of a purchasing utility under a power purchase agreement).

**Tariff:** the rates charged for the energy, capacity (power), and miscellaneous services included in the Power Purchase Agreement.

**Tax holidays:** exemptions from some or all taxes for a specified period.

**Turnkey contract:** a contract given by the project developer to a prime contractor who will be responsible for the design and implementation of a project from start to finish, and who will provide a completed, operational project on a stipulated date, on a lump-sum basis.

## Abbreviations and Acronyms

<b>BLT</b>	Build-Lease-Transfer
<b>BOO</b>	Build-Own-Operate
<b>BOOT</b>	Build-Own-Operate-Transfer
<b>BOT</b>	Build-Own-Transfer
<b>ECO</b>	Expanded Cofinancing Operations of the World Bank
<b>EPC contract</b>	Engineering, Procurement, and Construction contract
<b>HC</b>	Host Country
<b>IA</b>	Implementation Agreement
<b>IBRD</b>	International Bank for Reconstruction and Development
<b>ICB</b>	International Competitive Bidding
<b>IFC</b>	International Finance Corporation
<b>IPP</b>	Independent Power Producer
<b>IRR</b>	Internal Rate of Return
<b>kWh</b>	kilowatt hour
<b>LCA</b>	Land Conveyance Agreement
<b>MIGA</b>	Multilateral Investment Guarantee Association (member of the World Bank Group)
<b>O&amp;M</b>	Operations and Maintenance
<b>OECD</b>	Organization for Economic Cooperation and Development
<b>OPIC</b>	Overseas Private Investment Corporation
<b>PPA</b>	Power Purchase Agreement
<b>RFP</b>	Request for Proposal
<b>ROE</b>	Return on Equity
<b>SP</b>	Security Package



## ***Additional Terms, Abbreviations, and Acronyms***

**Applicant:** the private party (individual, corporation, partnership, or consortium) submitting a proposal to develop a private power project.

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#### **Abbreviations and Acronyms**

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**BOO** Build-Own-Operate

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**BOT** Build-Own-Transfer

**ECO** Expanded Cofinancing Operations of the World Bank

**EPC contract** Engineering, Procurement, and Construction contract

**HC** Host Country

**IA** Implementation Agreement

**IBRD** International Bank for Reconstruction and Development

**ICB** International Competitive Bidding

**IFC** International Finance Corporation

**IPP** Independent Power Producer

**IRR** Internal Rate of Return

**kWH** kilowatt hour

**LCA** Land Conveyance Agreement

**MIGA** Multilateral Investment Guarantee Association (member of the World Bank Group)

**O & M** Operations and Maintenance

**OECD** Organization for Economic Cooperation and Development

**OPIC** Overseas Private Investment Corporation

**PPA** Power Purchase Agreement

**RFP** Request for Proposal

**ROE** Return on Equity

**SP** Security Package

## **TERMS (continued)**

**Accountability** - The process by which the performance of boards, managers and organizations is measured. It takes place through reporting and audit processes.

**Affirmage** - A partnership arrangement between a government and a foreign firm for management of a public utility.

**Autogeneration** - See self-producers.

**Autonomy** - In the power sector, this means competent management preferably with separation of the board of directors (policy) and management (execution); financial independence especially for formulating investment-plans and pricing policies; power to set wage levels, appoint and dismiss staff; a separate accounting system (accrual basis); legislative power over consumers who default and primary responsibility for procurement.

**Avoided cost** - Costs that a utility can avoid or save by purchasing power from other sources. They are represented by marginal energy and capacity costs.

**BOOT or BOT projects** - Build-own-operate and transfer projects or build-own and transfer projects normally financed and arranged by private investors.

**Buy-back rates** - The price a utility pays for power supplied to it by privately-owned plants.

**Captive plant** - Non-utility generation plant owned and operated primarily for the owner's use.

**Cogeneration** - The production of electricity from privately-owned plants for own use and sale to the grid.

**Competition** - Where more than one source of supply creates the opportunity for market forces to influence the cost of service.

**Competitive Neutrality** - The creation of equal competitive opportunity for producers is in the same industry.

**Commercialization** - The conduct of business activities based on commercial principles as regards accounting standards, market discipline, pay scales, payments of taxes and dividends, etc.

**Concession** - A contract under which a public body assigns to a private party the task of operating a public function.

**Corporatization** - The treatment of a publicly-owned enterprise as a company or corporation operating on commercial principles, i.e. as would be applied to a privately-owned business. It would be permitted to issue shares to the public.

**Corporate Intent** - The establishment or statement of corporate objectives, goals and performance targets developed from a corporate or strategic plan.

**Decentralization** - The transfer of control from central to dispersed administrative units.

**Deregulation** - The reduction in the role of regulatory bodies by reducing the need for or simplifying the regulatory framework.

**Diversified systems** - Systems which permit public and private ownership arrangements to operate together.

**Fixed fee contract** - A contract for services at a pre-determined fixed price.

**Incorporation** - The legal processes involved in establishing a corporate entity.

**Limited recourse** - The provision of loans based on assessment of project risks and cash flows to a borrower without a public guarantee.

**Management information systems** - Systems which provide information to management to facilitate decision making.

**Non-utility generation** - Electricity generation plant which is owned and operated outside the public supply system.

**Performance contract** - An arrangement whereby the contracted party agrees to meet specific performance criteria.

**Private generators** - Power plant owned, operated and financed by the private sector.

**Private participation** - The involvement of private sector parties in a public-sector corporation through financing, sale of assets, contracting, joint ventures, leasing, equity investment etc.

**Quasi-nationalized** - Where a government assigns responsibility for operation of an activity to a national organization but permits some of those activities to be undertaken by other entities.

**Self-producers** - Power plant producers who generate power for their own use.

**Stand-by or back-up power** - Emergency power provided to a self-producer when their own plant is not operating or able to meet their own requirements.

**Twinning agreement** - Contractual arrangement for one utility to provide training services to another.

**OVERVIEW OF  
GLOBAL POWER  
DEMAND AND THE  
RATIONALE FOR  
PRIVATE SECTOR  
PARTICIPATION**

*A Presentation of the USAID Office  
of Energy and Infrastructure.*

**OVERVIEW OF GLOBAL ELECTRIC POWER DEMAND  
AND THE RATIONALE FOR  
PRIVATE SECTOR PARTICIPATION**  
*(Background compiled for the International Forum  
on Private Investment in Bangladesh: The Power Sector)*

*Office of Energy and Infrastructure  
Bureau for Global Programs, Field Support and Research  
U.S. Agency for International Development  
Washington, DC*

## **POWER SHORTAGES IN DEVELOPING COUNTRIES**

An adequate and reliable supply of electricity is essential for social and economic development, be it developed or developing country. The industrial, commercial and service sectors of the economies are highly interdependent on this form of energy. Therefore, it is not surprising that the demand for energy in developing countries has been growing at rates of over 5.5 percent per year during the past 15 years, and the demand for electricity, has been growing at over 7 percent per year.

Yet, developing countries on the average, use only 500 kWh of electricity per capita per year compared to over 10,500 kWh per capita in the U.S. and 6,000 kWh per capita in Europe and Japan. Over 75 percent of the world's population consume only 18 percent of total electricity (Exhibit 1).

Faced with high demand growth rates, many countries now experience power shortages of over 10 percent of their generation capability in Pakistan, for example, during the past 5 years, power shortages have been over 25 percent of the demand, in India, over 10 percent, in the Dominican Republic, over 15 percent, and similar situations exist in many other countries.

Two major factors responsible for the current or projected power supply problems facing publicly-owned utilities in developing countries are:

- o insufficient financial resources to expand power systems to keep up with the growing demand;
- o inefficiencies in generation, transmission and distribution.

The fundamental situation is that developing countries need more electric power for socioeconomic development than their public sector enterprises are now able to deliver.

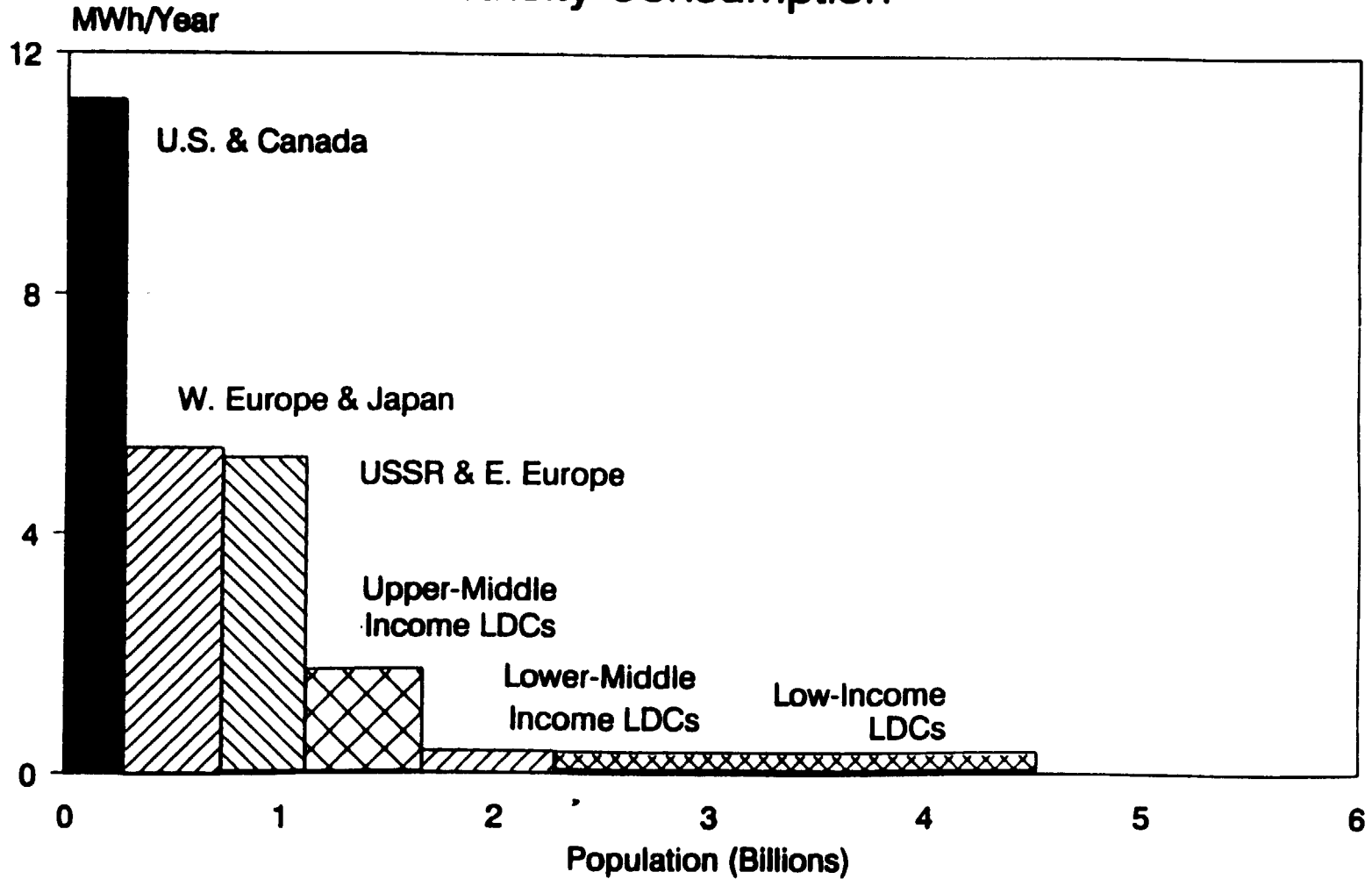
## **EFFECTS OF POWER SHORTAGES**

The negative economic impact of these shortages on developing countries has been tremendous (Exhibit 2). Private industry in developing countries is perhaps hardest hit by power shortages. Various studies have revealed that power outages alone can cause economic losses of approximately US \$1 per kWh not supplied. In Pakistan, for example, load shedding to the industrial sector alone has led to a 1.8 percent decrease in GDP and 4.2 percent decrease in the country's foreign exchange earning. For India, the cost of unreliability in electricity supply to the industrial sector has been estimated at 1.5% of GNP.

These estimates, however, do not include the value of future investments foregone due to unavailable electric power. The installation of backup, oil-dependent diesel generator sets has been the most common answer by industrial and commercial firms to unreliable grid-supplied power. The cost of diesels, however, is quite uneconomic since units operate only part time causing high capital costs per kilowatt hour. It has been estimated that on the order of 10 percent of the total installed generating capacity in many developing countries is in the form of standby generation on customer premises. This also diverts investment capital from other more productive uses.

# EXHIBIT 1

## Distribution of World Per Capita Electricity Consumption



Source: United Nations



## EXHIBIT 2

### COSTS OF POWER SHORTAGES IN SELECT DEVELOPING COUNTRIES

Country	Sector(s)	Cause of Shortage	Shortage Cost
Brazil	Household	Unplanned outage	\$1.95 - 3.00/kWh
Chile	Household	Unplanned outage	\$0.53/kWh
	Industry	Unplanned outage	\$0.25 - 12.00/kWh
Egypt	Industry	Unplanned outage	\$0.40/kWh
India	Industry	Load Shedding	1% to 3% of GDP
Jamaica	Industry	Unplanned outage	\$1.25/kWh
Pakistan	Industry	Load Shedding	\$0.46/kWh
Tanzania	Households		\$0.50/kWh
	Commercial		\$1.00/kWh
	Industry		\$0.70- 1.40/kWh

Clearly, power shortages and supply failures -- particularly in developing countries -- disrupt productive economic activities and threaten future industrial, agricultural and commercial investments.

Yet, as demand for electricity has grown in developing countries, many governments have found it increasingly difficult to allocate sufficient resources to the power sector to ensure that demand is met. In many countries, the power sector consumes more than 20 percent of the government's total development budget. Foreign borrowing for the power sector is often greater than 30 percent of total country foreign debt. Due to their financial difficulties, however, many utilities in developing countries do not qualify for loans from international development or commercial banks, making prospects for improved power supply more uncertain.

## **FUTURE POWER SECTOR CAPACITY AND FINANCIAL REQUIREMENTS**

Looking to the future, the problems become even worse. In a recent report, titled *Power Shortages in Developing Countries*, the U.S. Agency for International Development projected that if the current trend in electricity supply expansion in developing countries continues under modest economic growth rate of 4.5 percent per year between 1988 and the year 2008, developing countries will need additional power generation capability of over 1,500 GWs, compared to 1984 installed capability of 450 GWs (Exhibit 3). This will require an annual investment of about \$125 billion per year, compared to current expenditures of about \$50 billion, necessitating a total capital investment of US \$2.5 trillion.

Through dramatic supply and end use efficiency improvements and strict conservation, the need for additional generation capacity may be reduced to 700 GWs during the 1988-2008 period. Nevertheless, there is a growing consensus that publicly-controlled utilities -- because of an inability to secure financing, political influence, lack of spare parts, and inefficient operations -- will not be able to achieve the conservation scenario.

Even if conservation and efficiency improvements are successfully implemented, this "least cost" strategy will require investments on the order of \$70 billion per year for new generating capacity. This portends a capital gap of about \$300 billion during the next 20 years.

For Latin America and the Caribbean, according to recent World Bank reports, electricity supply is projected to grow an average of approximately 6 percent per year from 1990 to 1999 (Exhibit 4). This growth will require over US \$155 billion in additional capital investment.

Assembling the financial resources for this level of expansion and investment is clearly beyond the capabilities of developing countries alone. Investment capital of this magnitude will not be available from the public treasuries of developing countries. Revenues of many, if not most, publicly-owned utilities cover only a small fraction of their operating and capital expansion expenses. International development organizations, such as the World Bank, Inter American Development Bank and bilateral donors can only supply some of the needed capital.

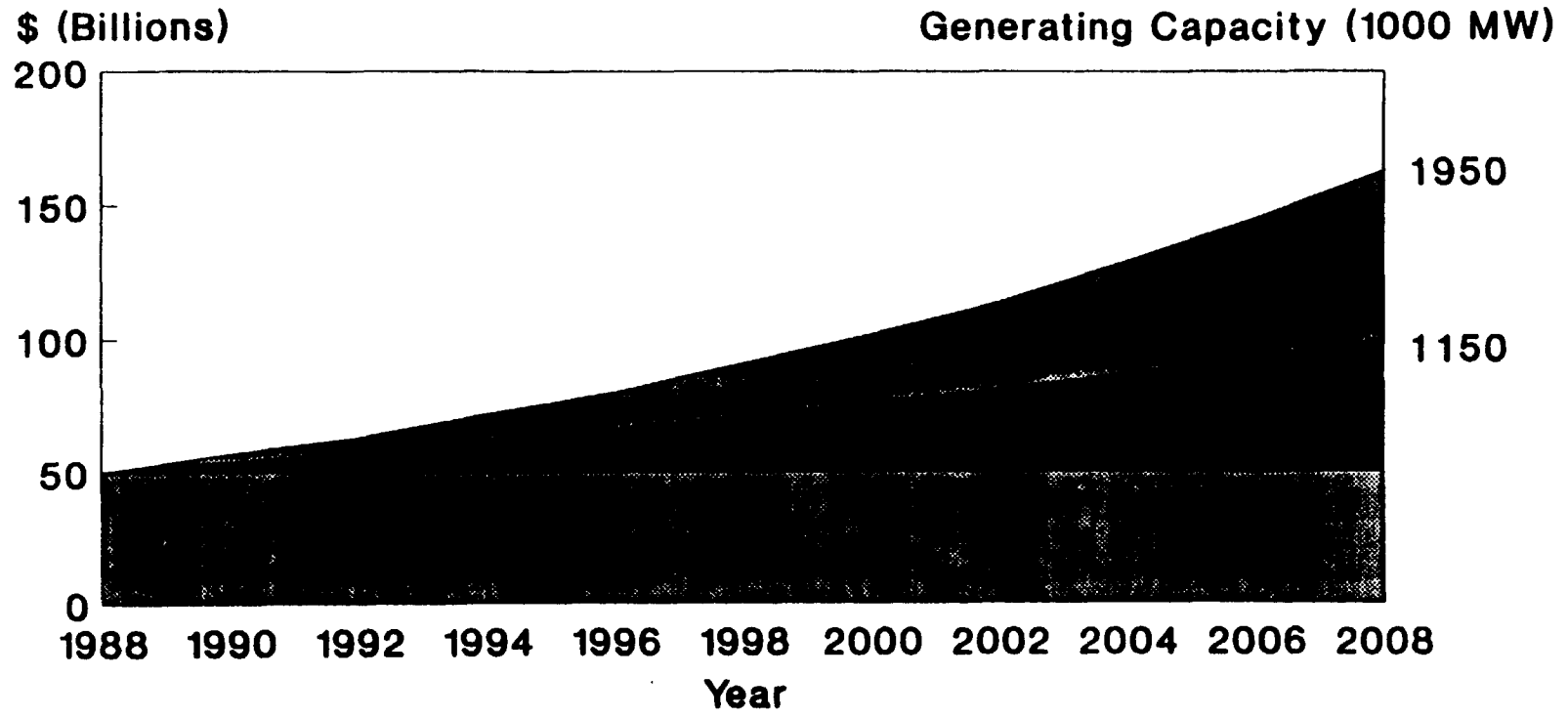
## **SYSTEM INEFFICIENCIES**

One of the major causes of the financial difficulties of publicly-owned utilities is their uneconomic pricing of electricity. Some governments, for a number of social and political reasons, choose to subsidize electricity prices to all or certain groups of consumers. In almost all developing countries, the electricity provided to agricultural and residential consumers is heavily subsidized. Comparison of tariff trends between OECD countries and developing countries (Exhibits 5A and 5B) show that commensurate with price increases for a basket of commodities, the electricity prices in OECD countries have steadily increased whereas in developing countries the electricity prices have steadily decreased. This decline represents a growing disparity between actual production costs and the rates charged consumers that are inconsistent with utility revenue requirement principles. Revenues collected do not adequately cover the costs incurred in producing electricity; pricing becomes more a

# EXHIBIT 3

## Annual Investment Requirements Medium Growth Scenario\*

### 1988-2008



Existing Investment
  Efficiency Scenario  
 Current Trend

•Assumes 6.1% increase in demand  
 Source: Office of Energy

EXHIBIT 4

# ELECTRIC POWER REQUIREMENTS IN THE LATIN AMERICA AND CARIBBEAN REGION

COUNTRY	GENERATING CAPACITY (MW) REQUIRED 1989-1999	ELECTRICITY SUPPLY Avg. Growth Rate	CAPITAL NEEDS FOR POWER 1989 US\$ Millions	\$/KW CAPACITY ADDED 1989 US\$
Argentina	8,535	7.0%	16,237	1,902
Bolivia	369	7.0%	642	1,740
Brazil	28,511	4.9%	75,702	2,655
Chile	1,520	4.5%	2,925	1,924
Colombia	3,026	5.7%	7,759	2,564
Costa Rica	816	6.3%	1,878	2,301
Dominican Republic	1,078	6.2%	2,063	1,914
Ecuador	792	4.6%	2,000	2,439
El Salvador	172	4.0%	683	3,971
Guatemala	427	6.9%	1,779	4,719
Honduras	270	7.1%	579	2,144
Jamaica	309	5.2%	625	2,023
Mexico	18,818	6.7%	36,682	1,949
Nicaragua	35	2.0%	113	3,229
Panama	120	4.4%	410	3,417
Peru	1,136	5.0%	3,855	3,393
Uruguay	585	3.7%	1,040	1,778
Regional Average Growth		5.4%	Total 154,972	Avg. 2,592

**EXHIBIT 5A**

# **Trends in Average Electricity Prices Developing & OECD Countries**

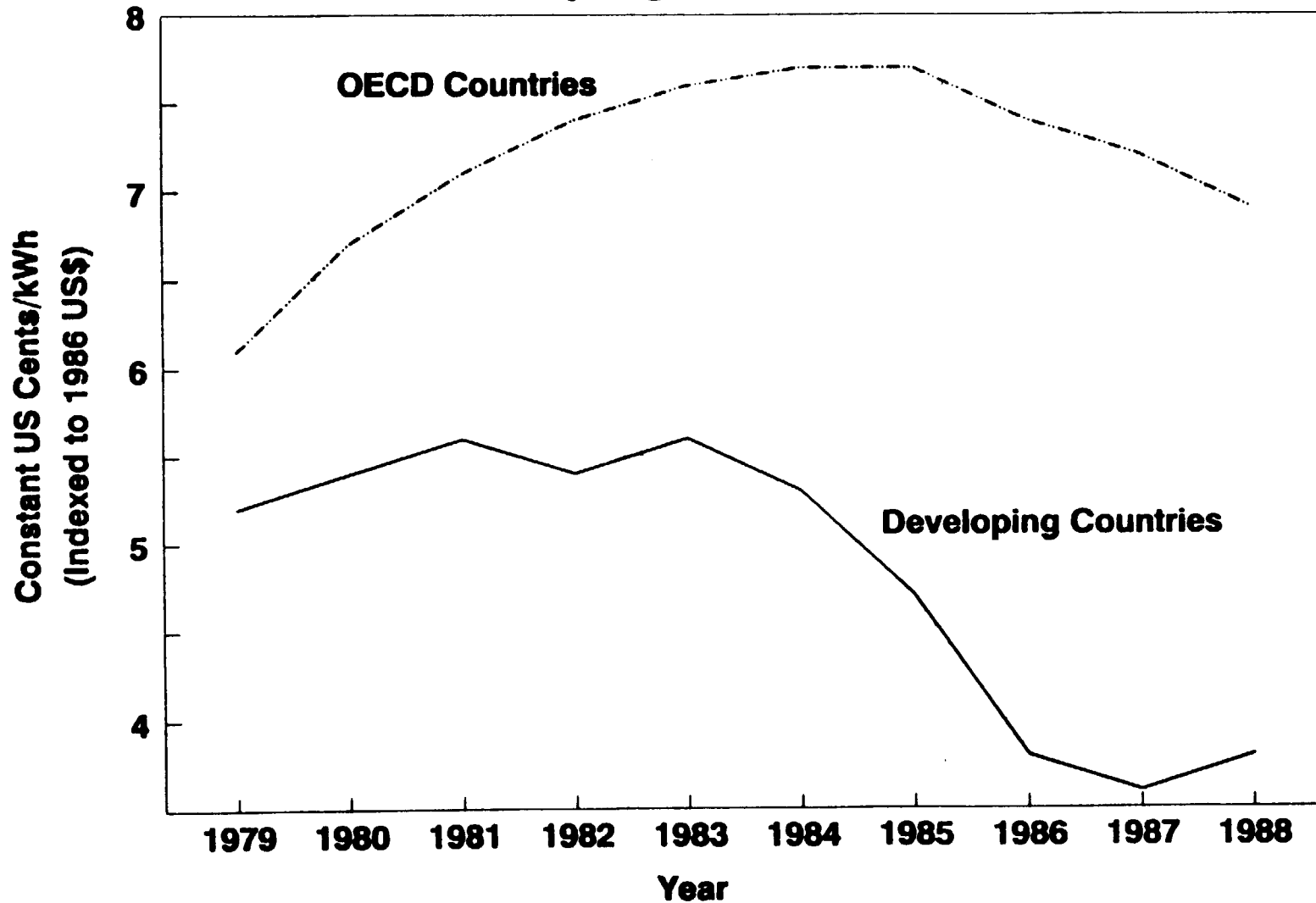
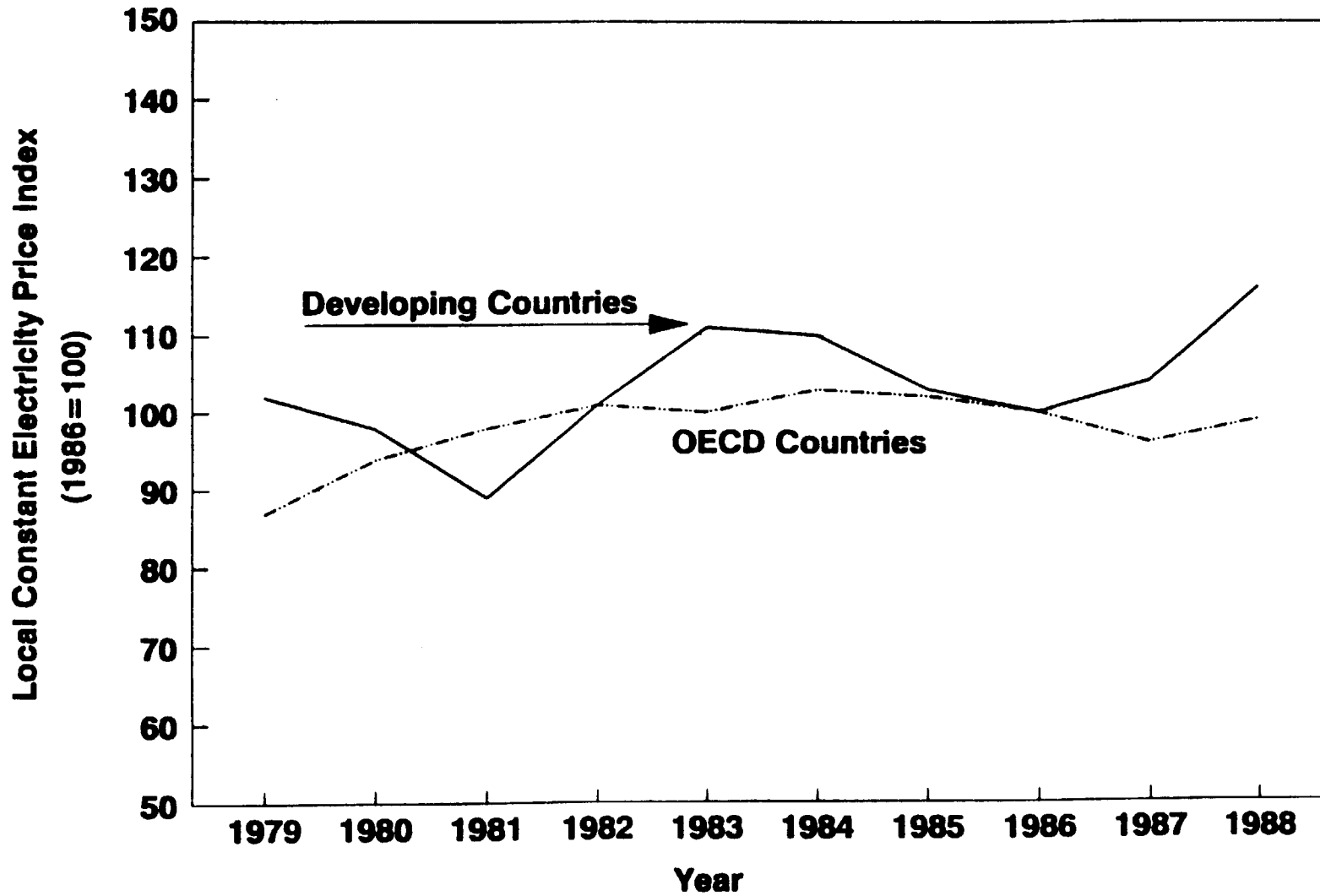


EXHIBIT 5B

# Trends in Average Electricity Prices Developing & OECD Countries



political and socioeconomic determination rather than one on cost accounting principles.

In some countries, the amount of the subsidy to agricultural and residential consumers is staggering. In India, for example the cost of supplying one kWh of electricity to an agricultural customer is over 14 U.S. cents, while the customer is charged less than 3 U.S. cents.

Many publicly-owned utilities in developing countries are large, entrenched institutions. They are often overstaffed, pay low salaries and have inadequate management. One measure of institutional efficiency is the customer-to-employee ration. In Japan, for example the ratio is one employee to 429 customers; in the United States, the ratio is about one employee to 175 customers.

In Latin America, based on recent World Bank reports, the average ration is one employee to 89 customers (Exhibit 6). This ratio is very similar to that of other developing countries, where the publicly-owned utilities are required to perform social service and employment functions that often conflict with their mission to provide efficient electric service.

Many utilities in developing countries are also characterized by inefficient planning and management. In part, this results from the inability of publicly-owned utilities to attract and retain a sufficient number of qualified engineers, planners and managers. This has restricted the ability of these utilities to adopt modern least-cost system planning and dispatch techniques, energy conservation programs and demand management programs.

Furthermore, power supply in developing countries is characterized by low fuel-use efficiency and low capacity factors, especially for thermal plants. While typical steam plants in developed countries require 9,000 to 11,000 Btu of fuel per kWh, in many developing countries the fuel requirement is over 13,000 Btu per kWh. In addition, because of the frequent breakdown of power plants and lack of proper maintenance, many power plants in developing countries have low capacity factors. In Latin America, the average capacity factor for thermal plants has been 40 percent versus 70+ percent in developed countries (Exhibit 6).

Another common problem is the extremely high losses of electricity in the transmission and distribution (T&D) network. While T&D losses should normally be below 10 percent of gross generation (economically optimal losses may be as low as 5 percent), in many developing countries, losses exceed 20 percent. In Latin America, the average T&D loss was 18 percent (Exhibit 6). These losses are attributable to technical problems and unauthorized use of power, i.e., theft.

## **ROLE OF PRIVATE PARTICIPATION IN THE POWER SECTOR**

The central theme of this paper is that, for many developed and developing countries, private participation in the electric power sector can assist in resolving the recurring problems of insufficient financing and inefficient operations. Private participation can come in many forms: independent generation plants; industrial cogeneration and self-generation with sales to the public grid; privatization of utility ownership through partial or complete sale of assets; privatization of distinct utility services such as generation; distribution, or transmission functions through management contracting and leasing. Privatization can also mean cut-backs in government power project investments to allow greater private sector participation in ownership and operation of future power generation projects. Needless to say, no one approach is best suited for all countries.

The topic of independent, private power generation has become an extremely important not only in the United States, but also throughout the world. Since 1978, the United States, under the Public Utilities Regulatory Policies Act (PURPA) has seen the rapid growth of private, non-utility power generation.

Non-utility generating capacity now comprises over 21,000 MWs or 3.2 percent of total U.S. generating capacity of 681,200 MW. In 1990, 30 percent of the total capacity additions for generation, over 2,800 MWs, came from private investors independent power plants (Exhibit 7).

## EXHIBIT 6

# ELECTRIC POWER SYSTEM PERFORMANCE IN LATIN AMERICA AND CARIBBEAN REGION

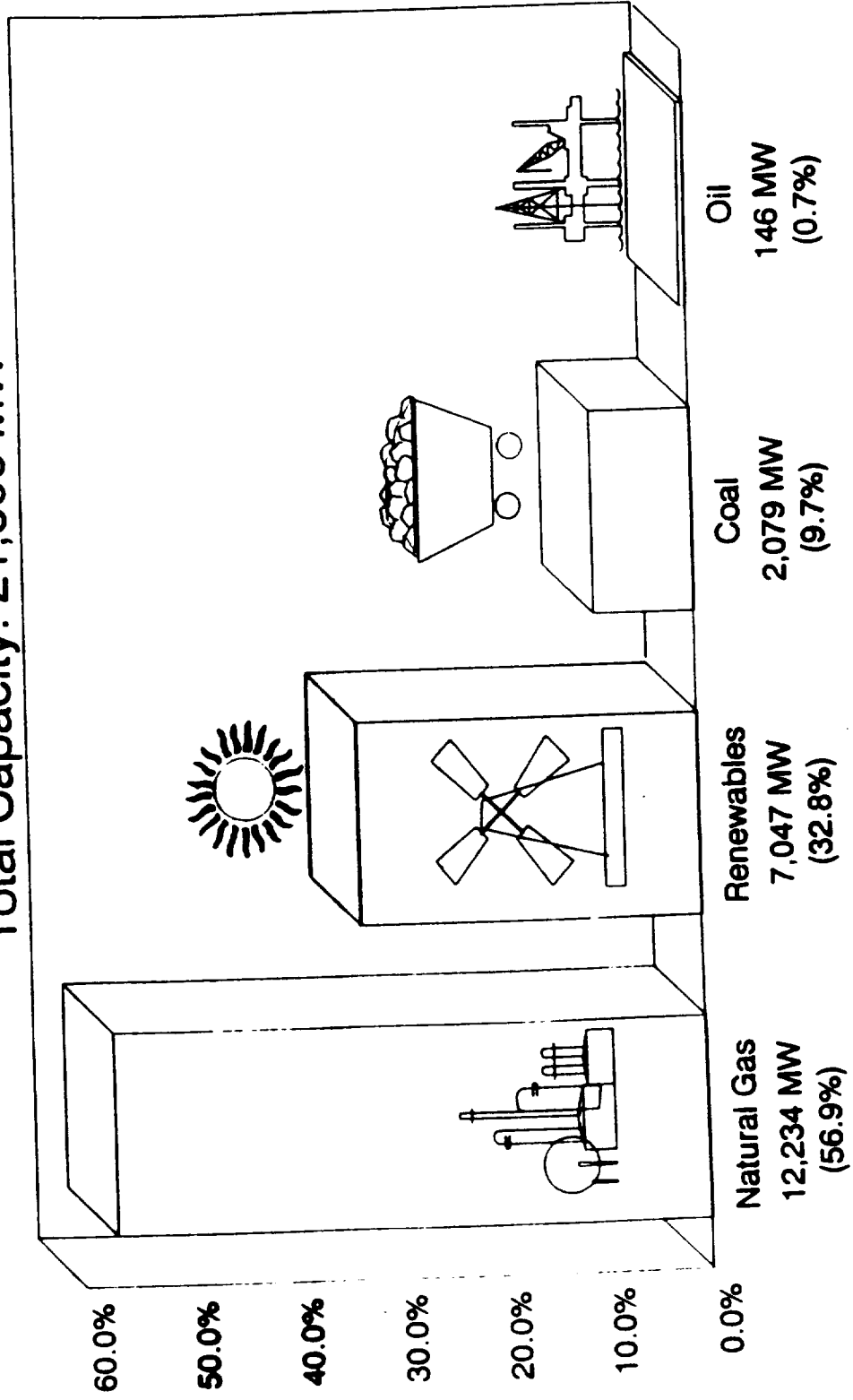
CO	CUSTOMERS PER EMPLOYEE	TOTAL SYSTEM LOSSES	CAPACITY FACTOR
Argentina	122.51	17	37
Bolivia	-	21	36
Brazil	119.64	19	50
Chile	-	17	45
Colombia	179.89	24	57
Costa Rica	94.96	10	43
Dominican Republic	92.11	30	51
Ecuador	-	21	34
El Salvador	175.46	14	32
Guatemala	66.36	16	27
Honduras	74.09	15	36
Jamaica	141.57	24	36
Mexico	161.17	13	47
Nicaragua	57.02	17	39
Panama	52.55	19	35
Peru	118.99	19	47
Uruguay	25.73	19	36
Venezuela	127.65	9	32
Average	89	18	40



# EXHIBIT 7

## Non-utility Generating Capacity Additions By Fuel Type

**Total Capacity: 21,506 MW**



Overseas favorable policies toward private participation in power have been adopted in the United Kingdom, Malaysia, Pakistan, the Philippines, Costa Rica, Thailand, Indonesia, Turkey, Chile, India, and other countries.

## **RATIONALE FOR PRIVATE PARTICIPATION**

Given the state of the power sector in so many developing countries, and given the huge financial requirement that the power sector imposes on national treasuries, more and more developing countries are looking to the private sector to help develop needed power sector improvements and expansion.

The rationale most often given by developing countries for increasing private sector involvement can be classified under one or more of three general reasons: financing; efficiency; and innovation.

### **Financing**

Private investment, if it can mobilize additional sources of funds, can help alleviate the serious drain on the public treasury now imposed by the power sector. This would free up resources for expenditure for other sectors such as education, health or agriculture. It would also provide a new capital market for local private investment. A power station or stock in a utility is one of the few areas in which a major substitution of private investment for public investment can be made quickly. Also, the private sector assumes responsibility for the equity and debt, which are then carried on the balance sheet of the private company rather than the government or the publicly-owned utility.

The private sector can also access sources of capital that are not normally available to the government-owned energy sector. This assists developing country governments to expand their energy production and delivery capacity.

### **Efficiency**

Efficiency-related arguments for private participation are rooted in the fact that many developing country utilities are state-owned monopolies where investment decisions are dictated by the monopoly supplier with ratepayers having little influence. Private participation would end this monopoly. Under the assumption that competition would dictate that profit margins of the plant depend on the efficiency of the operations, private participation would thus create savings that could be shared between the plant owner and the utility's customers.

The extent of the savings generated by private participation depend on how well the efficiency improvements counterbalance the higher cost of capital from private, rather than public sources. Capital charges per kilowatt-hour relate directly to interest rates for capital and to the number of hours per year the plant is operating. A private plant built with commercial financing at 15 percent interest would have to sell 50 percent more electricity than a plant built with 10 percent financing to have an equal capital charge per kilowatt-hour, everything else being equal.

With private participation, however, all other factors are not held equal, because the private sector can introduce efficiency improvements to its power plants. Private participation can lead to rapid power plan development, and higher capacity and availability factors. This not only decreases the overall need for new generation in a country, but could also reduce fuel consumption and related foreign exchange requirements. In addition, private power plants, if they were well run, would set a standard for publicly-owned plants to emulate.

Privately owned and operated power companies increase the probability of management autonomy thereby helping shield the power sector from undue political influence, which is now so prevalent. With autonomy, power system optimization becomes possible. Inefficient procurement and employment requirements can be removed.

A final efficiency-related argument is that the private sector can quickly respond to problems. Once it has government approval, it can construct new plants, and transmission and distribution lines faster than can the public sector, and can better undertake load management and other innovative means to meet demand growth.

## **Innovation**

The private sector, rather than the public sector, has been the source of most technological and system management innovation in the power sector. With its focus on efficient operations and enhancing its rate of return, private sector firms have invested heavily in technological and system management innovation. Private power companies are constantly seeking for new measures to improve plant performance, such as more efficient boiler configurations, exhaust heat recovery, combined cycle gas turbines, fluidized bed combustion systems, and modular design. Private sector innovation has additionally led to the installation of cost-effective pollution control technologies and the design environmentally benign generation facilities.

Also, private companies have also led the way in the adoption of innovative techniques for system management. They led the move toward the use of computer technology for system planning and load forecasting, generation dispatch, and personnel management.

## **APPROACHES TO PRIVATE SECTOR PARTICIPATION**

Private participation has many forms:

- (1) privatization of utility ownership through the partial or whole sale of assets;
- (2) independent private generation plants; and
- (3) contracting out the operation of discrete utility services, such as generation, distribution, or transmission functions.

This presentation will focus on the recent privatization efforts in Latin America and the Caribbean in some of the infrastructure industries. Presentation on the mechanics of privatization, management contracts, and joint ventures is covered by other speakers at this conference.

Privatization of publicly-owned electric utilities represents the most complete involvement of the private sector. In this case, a discreet portion, or the entire assets of the utility operations, including generation, distribution and transmission, are sold to private investors. Privatization is emerging as a major economic restructuring process in both the developed countries, including Australia, Canada, France, Japan, New Zealand, and Spain, in privatizing a host of government-owned companies. Chile and the United Kingdom have recently undertaken privatization of their electric utilities, and Malaysia is currently in the process of privatizing its utility. A number of other countries, such as Brazil, Argentina, Venezuela and Thailand, are considering privatization of their publicly-owned electric utilities.

In the Caribbean, Central America, and Latin America, the privatization is being implemented in a number of sectors. Mexico has been the pioneer in privatization in this region with more than 200 industries and services being targeted for privatization. Mexicana de Cobre was sold to the private sector US \$1.4 billion in 1988, making this the largest Latin American privatization transaction to-date. Jamaica privatized the financial services sector and a cement company while the Dominican Republic is assessing the market for potential privatization of specific municipal and electric utility services. The privatization of the electric utility in Buenos Aires is under active consideration by the Argentinian government. In Chile, the electric utility system, telecommunications, and insurance industry have all been privatized.

Privatization of infrastructure industries such as the electric utility requires the political stamina to withstand strong counter pressures from labor unions and the general public. Total privatization of electric utilities requires a strong commitment on the part of the government, a well-developed capital market, access to electric services for a large proportion of the population, and, finally, having the utility itself in investment grade condition. Because electricity is a basic input to the manufacturing sectors, the price and reliability of supply affects the international competitiveness of domestic products for export earnings. Privatization of electric utility systems must focus on improving efficiency and promoting competition for new generation plants. When privatizing an electric utility, these factors prove even more important because of the central role the utility plays in the economy.

The successful privatization of publicly-owned utilities requires generally that they first be placed on a sound financial and operational footing. Efforts to totally privatize a company in relatively poor financial condition may not be possible since assets may be in severely deteriorated conditions, prices may not cover capital and operating costs and operations may not be efficient. Chile, for example, had to invest significant amounts of government equity into its publicly-owned utilities to make them attractive to private investors.

The purchase of existing utility generating capacity and/or service areas by the private sector generates the following considerations. Divestment of state-owned entities can be facilitated by tender, auction, fixed price offer, or management/employee buy-out. The publicly-owned utility removes the debt from their books and may obtain some foreign exchange in the process. The utility may also realize an incremental gain in capacity, either through expansion or repowering. The private sector group is purchasing what is likely to be a proven generating unit and may lower its risks associated with construction and start-up delays.

After having reviewed the problem of power shortages, identified a role for the private sector, and defined various approaches for private participation, we will now look more closely at the trends in international private power capital in developing countries.

## **Dominican Republic**

Faced with severe shortages of electricity, the government of the Dominican Republic passed Law 14-90 which permits and encourages private power. The legislation enables the private sector, both national and foreign, to participate in the generation, transmission, and distribution of electricity. It includes tax exemptions for both domestic and foreign investments, as well as government guarantees of the contractual performance of the national utility.

Corporacion Dominica de Electricidad (CDE), the national utility, is already purchasing power from a privately-owned and financed 43 MW diesel power barge. Furthermore, other private and state enterprises generate another 136 MW for their own use and for occasional sales to the national grid.

The Dominican Republic's expansion plan for the years 1991-2005 calls for the addition of 1668 MW to the current total installed capacity of 822 MW. Private power is seen as instrumental in attracting new sources of capital to finance much of this expansion.

## **Costa Rica**

Until recently, Costa Rica appeared to be able to meet the projected demand growth in both the short- and medium-term. However, an unforeseen combination of drought and 1987's surge in demand has made this questionable. The country's dependable capacity dropped to between 650-700 MW, compared with a peak load of 612 MW. Although reservoirs are now at near normal levels because of recent rains, any changes in this level would directly affect the overall power situation. At the same time, the publicly-owned utility, ICE, is facing serious financial constraints in providing future

capacity.

The National Energy Plan (approved in 1987) specifically states that privately financed power generation initiatives will be considered. Recently, a new private power law, Law No. 7200, established the basic prices and procedures for non-utility power projects, focusing on cogeneration projects of less than 20 MW. In addition, private power projects must use nonconventional energy sources as fuel and have at least 65 percent ownership equity by citizens of Costa Rica. Legal and institutional aspects of cogeneration and independent power are being actively discussed and debated within the Ministry of Natural Resources, Energy and Mines.

In March 1991, the El Viejo Sugar Cane Mill began selling up to 5.5 MW of power to the national utility. El Viejo has a renewable ten-year contract for power sales to the grid and projects that annual sales will increase by 7 MW over the next three years. In addition, over 22 proposals for cogeneration and independent power projects are under consideration by the government, including several mini-hydro projects totalling over 100 MW, a 26 MW wind project and a 12 MW waste-to-energy project.

The growth potential of cogeneration and independent power projects in Costa Rica depends on government initiatives to provide incentives to cogeneration and independent power producers. A study conducted by USAID found that there is a potential market for 443 MW of cogeneration and independent generation capacity. With effective policies and initiatives, the bulk of this capacity would come from hydropower and sugar processing waste cogeneration.

## **Mexico**

Mexico has already enlisted the private sector in the development of its power sector, but with a twist to the usual BOO or BOOT scheme. Six units with a total of 3,700 MW in generating capacity have been financed and built by international investors but remain under the operational control of the Commission Federal de Electricidad (CFE), the national utility. Title to the plants will transfer to CFE within 10 to 15 years.

In addition, in May 1991, Mexico began purchasing 40 MW of electric power from El Paso Electric (EPE), a private U.S. utility, to serve consumers in northeastern Mexico.

Due to a new amendment to Mexico's electric power law, industry in Mexico can now develop, own and operate as much cogeneration as needed to serve a company's industrial site. The amendment also provides for the sale of excess industrial capacity to the national grid. Direct sale to consumers is prohibited.

## **Jamaica**

The state-owned utility of Jamaica, the Jamaica Public Service Company, Ltd. (JPS) currently has 443 MW of installed capacity. The Government of Jamaica's current five year plan forecasts average annual electric power demand growth rates of 10 percent which means that the power sector will require an additional 1,052 MW by the year 2008.

Recognizing that increased capital investment is required to develop the electric power sector, the Government of Jamaica has requested assistance from the USAID Office of Energy in drafting model power purchase and implementation agreements in preparation for private power development. This past spring, private investors were asked to bid on the construction of a 3x20 MW low speed diesel Build-Own-Operate (BOO) in Jamaica. In addition, General Electric has signed a memorandum or agreement to build a 100 MW power plant based upon a barter arrangement for bauxite.

Even though Jamaica does not yet have legislation specifically designed for private power development, under Section Seven of the Electric Lighting Act, JPS can purchase excess power from private suppliers.

## **Panama**

The Instituto de Recursos Hidraulicos y Electrificación (IRHE), Panama's state-owned utility, estimates that the demand for power will increase five percent annually. This will necessitate the addition of 374 MW to the existing installed capacity of 891 MW by the year 2000. Present law permits IRHE to purchase power from private sector power generators -- as it currently does from industrial concerns and the Panama Canal Zone Commission.

This summer, IRHE issued solicitations directed towards the private sector for the development of various power projects -- one for the lease, rehabilitation, and operation of the 40 MW San Francisco diesel and steam generating facility in Panama City; the other a non-specific solicitation for various hydro and thermal generating facilities throughout Panama in accordance with IRHE's expansion plan. Power will be sold to the IRHE grid.

## **El Salvador**

El Salvador's national energy expansion plan calls for the addition of 1087.6 MWs by the year 2005 to the current total capacity of 660.4 MWs, most of that in the form of hydro and geothermal energy.

El Salvador's power sector legislation already permits private power generation but to date there have been no private power projects initiated. However, at a recent conference on power sector privatization issued in El Salvador, the Government committed to the involvement of the private sector in the development of the electric power sector. Proposed projects for private power development are sugarcane biomass fuel projects, hydro projects with a potential of up to 60 MW, and a geothermal waste steam cogeneration project. In addition, the state-owned utility, CEL, has announced plans to allow the private sector to develop an 80 MW power plant.

## **India**

In developing the Eighth Five Year (1990-1995) Plan, the Indian Planning Commission is calling for the addition of 38,369 MW by the end of the Plan. This capacity addition will bring India's installed capacity to more than 100,000 MW. Recognizing that it is unlikely to obtain investment funds for this capacity expansion, the Government of India has embarked on an economic liberalization program to attract Indian and foreign private investment to the power sector.

The new policy initiatives announced in June 1990 open up the Indian power sector to foreign participation by allowing up to 40% equity holding. The incentives for private sector participation include: (1) a higher debt to equity ratio, from 2:1 to 4:1; (2) a higher rate of return, from the existing 12% to 15%; (3) capitalization of interest during construction; (4) a license validity period for up to 30 years; (5) allowing private sector to seek up to 40% of project outlay from public financial institutions; and (6) requiring the project developer to take at least 11% equity holding and mobilize at least 60% of the project outlay from sources other than public financial institutions. The initiative also calls for the setting up of a high-powered board for single point clearance of private power proposals.

There are already five private electric utilities in India that are planning to build additional generating capacity - Ahmedabad Electric, Bombay Suburban Electric Supply Company, Calcutta Electric Supply Corporation, Surat Electricity Corporation, and Tata Electric Company. The Bombay Suburban Electric Supply Company, traditionally a distribution company, is building its first generation plant, a 500 MW coal-fired power plant.

A number of industrial plants are already selling excess power to the State Electricity Boards (SEBs), while several large investment houses in India have also expressed interest in power supply projects. Over 17,258 MWs slated for development by the private sector have already been publicly advertised by the State Electricity Boards. Additionally, private sector developers have expressed interest in developing an additional 5,773.5 MWs. The Government is also considering the option of converting some existing government-owned facilities into private projects.

## **Pakistan**

Pakistan was one of the first developing countries to implement policy initiatives to encourage private sector investment in power production. To assist the government of Pakistan with these initiatives, the World Bank, in conjunction with bilateral donors, established a Private Sector Energy Fund capitalized at \$550 million to finance up to 30 percent of cogeneration and independent power project costs. USAID has contributed \$125 million to the fund, with the balance from the World Bank, Japan, Britain, and Germany.

So far, over 5,200 MW of generating capacity has been proposed by the private sector, including:

- 1,292 MW oil-fired Hab River project;
- 80 MW fluidized-bed coal-fired Salt Range project;
- 115 MW gas turbine plant fueled by low Btu gas;
- 200 MW gas turbine plant fueled by low Btu gas;
- 345 MW low BUT combined cycle gas turbine project; and
- Expressions of interest requested for 1,200 MW coal-fired BOO or BOOT project near Karachi.

Several of the developers of these projects have received Letters of Support of Intent and/or power purchase agreements from the Government of Pakistan.

## **Philippines**

On July 10, 1987, President Corazon Aquino signed Executive Order No. 215 to deregulate the monopolistic authority of the national utility, the National Power Corporation (NPC). NPC has developed draft rules and regulations to implement E.O. 215, and public hearings were recently held to finalize their content. NPC is proceeding with private sector proposals to develop power projects from its expansion plan, including two gas turbine facilities of 200 and 300 MW, respectively, and a 300 MW coal-fired plant.

Meanwhile, several private sector interests have proposed to build and operate power plant:

- Hopewell Holdings of Hong Kong constructed a 210 MW gas turbine project, which is now fully operational. They were also recently selected to develop two 350 MW coal-fired private power plants;
- Leyte Geothermal Power, Inc. recently received approval to construct a 440 MW geothermal power project in Leyte on a BOOT basis; and
- Northern Mini Hydro Corporation (MNHC) received approval to build a series of mini-hydro plants in Benguet Province with a total combined capacity of 11,500 MW.

## **Indonesia**

In Indonesia, Law No. 215, passed in 1985, stipulates that a holder of an "electricity undertaking license/authorization" is given authority to supply electric power for the public interest. There are currently several large private industries that sell power to the national utility, Perusahaan Umum

Listrik Negara (PLN). These stations have a generation capacity of 1,440 MW. Small captive power plants used in industry provide an additional capacity of 3,500 MW, almost 1,500 of which is connected to the grid and used as standby power by PLN.

Indonesia recently instituted a pre-qualification process for Indonesian private power development. Details are available through the Indonesian Directorate General for Electricity and New Energy. PLN will accept proposals for turnkey or the build-operate-transfer (BOT) arrangement for development. Unusually, PLN provides the opportunity for private developers to sell power, not only to PLN, but directly to consumers in areas where PLN isn't currently operating. PLN also projects that over the next few years that private power investment will account for a third, or \$1 billion, of PLN's investment expansion requirements.

Solicitations for two private power projects have already been issued. The tender for the 1200 MW Paiton Build-Own-Operate (BOO) private power project was recently issued with final proposal due September 1991. In addition, an invitation to pre-qualify for a second BOO project was issued the summer. This project consists of two coal-fired facilities with a total generating capacity of 1600 MW, a peat-fired facility of 100 MW and two geothermal facilities of 40 MW each.

## **Thailand**

Thailand is exploring two options vis-a-vis the private sector. One is the corporatization and eventual privations of the national electric utility, EGAT. A study is being conducted to determine the feasibility of this first option. The other is purchasing power from privately developed generating plants.

The National Energy Policy Office in Thailand is currently developing guidelines for industrial cogeneration and sale to the grid. Several projects are currently under development, such as the National Petrochemical corporation's 55 MW cogeneration plant which will sell excess electricity to EGAT and a cogeneration project at the Nongyai sugar mill, financed in part by plants at Khanom in the province of Nakhon Si Thammarat on Thailand's peninsula and at Nampong in the province of Khon Kaen in northeastern Thailand and for a 700 MW coal-fired plant at Ao Phai in the province of Chantaburi in southeastern Thailand.

A USAID-funded study estimated that over 1,200 MW of Thailand's total generation expansion need of 6,200 MW by 1996 can be developed by the private sector, mostly in cogeneration and agro-industrial power systems.

## **China**

Although there is no official policy on private sector participation in power supply in China, two 350 MW coal-fired power plants have been operating in the Guangdong province since 1987. The plant was built as a joint venture between Hopewell Power, Ltd. and the Shenzhen Special Economic Zone. This project is notable because it is the first BOOT power project to become operational.

## **Malaysia**

Malaysia's installed capacity is around 6000 MW, with an annual growth in demand of 9 percent. Malaysia decided to corporatize the National Electricity Board (NEB), which supplies power on Peninsular Malaysia, in order to alleviate the public sector financial burden. These initial steps will make it possible to offer share for sale in the new corporate utility in the near future, leading to full privatization by the mid-1990s.



## **Chile**

In 1980, Chile began the almost total privation of its electric power sector. At that time, two of ENDESA's (the major publicly-owned utility) distribution companies were sold at public auction. In 1983, two CHILECTRA distribution companies were privatized and then two years later, ENDESA and CHILECTRA themselves were privatized.

The primary motivation was the government's firm commitment to private sector enterprise. There was a strong belief in private initiative given a free and open economic system in which the State plays a subsidiary role.

## **CONCLUSION**

Privation and private participation in the electric power sector for many developed and developing countries can assist in resolving the recurring problems of insufficient financing and inefficient operations. Private participation can come in many forms: privatization; independent generation plants; industrial cogeneration and self-generation; and contracting out existing services.

The process of power sector privatization is a unique experience for all countries. A successful privatization process must maintain a sense of urgency and momentum, yet set realistic goals and deadlines. Countries with well-developed capital markets and securities trading regulations may choose the total privatization path. For a majority of the developing countries that do not have the requisite absorptive capacity in their capital markets, partial privatization techniques, such as independent power generation and contracting out, may be the most beneficial.

Regardless of the approach, LAC countries committed to privatization must be able to pay the competitive market cost of capital. Both equity and debt require rates of return that have not historically been achieved in the publicly-owned power sectors of most nations. A willingness to pay market prices for capital must accompany any commitment to private participation in the power sector.

# EXECUTIVE SUMMARY

*Excerpted from Submission and  
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oping Countries - A World Bank/  
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**Industry and Energy Department  
Occasional Paper No. 2**

**Submission and Evaluation of Proposals for  
Private Power Generation Projects in  
Developing Countries**

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The World Bank and  
The United States Agency for International Development (USAID)

**April 1994**

The World Bank  
Industry and Energy Department

USAID  
Office of Energy and Infrastructure

## **Preface**

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## **Executive Summary**

1 This report has been prepared to help governments of developing countries address some of the constraints that have impeded development of private power generation projects.

2 Both the World Bank and the IFC explicitly support a major role for the private sector in power supply. The private sector can be an important source of financing for power, a factor that is especially relevant for the financially pressed public sectors of many developing countries. Private power producers also tend to operate more efficiently than publicly owned facilities, since they normally accept responsibility for project risks, such as construction cost overruns and efficient operation of the plant. However, the macroeconomic, legal, and regulatory environments of developing countries frequently do not encourage competitive proposals for investment in private generation. At the same time, these countries often receive unsolicited bids for power development that do not take account of the full system costs and, more importantly, may not provide least-cost power.

3 This document therefore seeks to assist developing countries both in cultivating the requisite investment environment and in developing the mechanisms and procedures they need to solicit and evaluate internationally competitive proposals for orderly private power development. In particular, the report discusses how to prepare bidding documents and undertake effective technical and commercial evaluation of bids.

### **Host-Country Business Environment**

4 Crucial to the success or failure of privatization in the power industry of developing countries is the stability of a host country's macroeconomic environment. In particular, the host country's policymakers and political leaders must agree on the role that the private sector should have in the electric power industry, and they must then develop the laws, regulations, and mechanisms to facilitate private power projects.

5 Initiation of the first private power projects in a developing country can set the stage for the creation of a legal framework for the sector that will help attract investors and lenders to private power development in the country. Governments wishing to encourage private power development should structure the sector to create competition. In the initial stage, competition can be established without restructuring by permitting the existing public utility to purchase power from private producers on a competitive basis.

6 Since power generation activities can be competitive, it should be possible to reduce the need for regulation. On the other hand, power transmission, which is considered to retain the characteristics of a monopoly, should be subject to regulation. A separate transmission company can be responsible for purchasing power on a competitive basis, for operating the grid, and for load dispatch.

7 Governments should eventually institutionalize the regulatory process to reduce the number of conditions that need to be included in the contractual agreements for private power projects, and they should provide published procedures, including the specific steps and approvals needed for project processing. Professional management, institutional independence, and predictable pricing mechanisms are essential to an effective regulatory function. The regulatory structure should ensure the financial viability and creditworthiness of utilities purchasing power from private producers.

### **Financial and Commercial Issues**

8 The most important consideration for a developer of a private power project is that the project is “bankable,” or capable of being financed.

9 Established electric utilities finance new projects on the basis of their credit standing in capital markets, a method called *balance-sheet financing*. Private power projects, however, are usually undertaken with *project financing*. This involves the formation of a private company or joint venture to plan, finance on a *limited-recourse* or *nonrecourse* basis, design, construct (or lease), and operate power developments. With project financing, lenders and investors look to the project’s cash flow for repayment of principal and interest, and for returns on investment. They look to the assets as collateral in the event of a default. Private power projects are financed on a “project” basis because they are normally developed by forming a new company that has no other assets and no previous performance or credit standing.

10 The report discusses project financing in relation to the specific problems and conditions of developing countries. Although project finance would seem to have advantages over traditional balance-sheet financing, experience in developing countries has not confirmed this. The reason is that project sponsors, lenders, and governments often have difficulty in reaching agreement on the sharing of risks, which are often much greater in developing countries. Moreover, agreeing on the project structure and contractual arrangements can be a lengthy process. Each country and project has unique circumstances that will affect the final structure, agreements, and terms of the project. Recently, some new sources of nonrecourse funding have become available, but the long-term availability of such sources has not yet been established.

11 Another vital issue for the commercial viability of power projects is the tariff structure. The most common pricing approach followed in private power agreements is the two-part tariff, comprising a *capacity charge*, which is designed to recover the capital or fixed costs of the plant, and an *energy charge*, which varies with the net amount of energy in kilowatt hours actually delivered by the power producer to the purchasing utility. These rates may be adjusted by various incentives and penalties and through indexation, which provides the producer, operations and maintenance operator, and the project’s debt and equity sponsors with greater certainty that their costs and earnings will not erode during the life of the project because of factors beyond their control.

12 The bottom line in any project is the return to equity participants. Although the specific internal rate of return (IRR) varies among countries and projects, power plant developers normally require an IRR of 15 to 20 percent on the total project or at least 20 to 30 percent on invested capital. The specific IRR and return on equity sought will depend on macroeconomic and country risk factors in each case.

## **Risk**

13 Power generation projects involve risks for all parties—the power purchaser, the project developer, and the lenders. Risks fall into three general categories. *Commercial risks* relate to potential problems during construction, such as cost and schedule variations (completion risks); to problems in the operation of the plant, such as might stem from faulty operation or poor performance (operational risks); and to potential failures to generate cash flow or meet demand (supply and market risks). *Political or country risks* are specific to the host country and may include currency and foreign exchange risks, government default on contractual obligations, expropriation, and civil turmoil. Finally, projects must be prepared for *nonpolitical or force majeure risks*. These are caused mainly by natural disasters such as fires, floods, storms, or earthquakes.

14 The development of private projects can proceed successfully only with an appropriate allocation of risks. Generally, project developers take risks that are foreseeable and manageable or for which they are adequately rewarded. However, when developers are not able to provide guarantees that are adequate in the judgment of the lenders, the lenders will seek such guarantees from the host government. One of the main reasons many private power projects in developing countries have not progressed has been an inability to meet the requirements of lenders, notably the provision of guarantees from governments covering the power purchasers' obligations, foreign exchange risk, and so on.

15 A well-structured project implemented by an experienced power producer selling to a creditworthy purchaser that has a good record of meeting debt-service commitments should not require a government guarantee when the country's political and economic environment is favorable. However, this is seldom the case, and that is why most lenders require some form of sovereign guarantee. Comprehensive coverage of all project risks through a blanket government guarantee is not feasible, however.

16 The ability of the parties to agree on how risks will be shared is often the key to initiating a successful project. The important element is that risks be accepted by the project parties most suited to bear them, as outlined in the security package for the project.

## **The Security Package**

17 The security package is established through various contractual arrangements and comprises the key agreements, contracts, and government

undertakings. These seek to reduce lenders' and investors' risk by establishing legally binding obligations, financial structures, and operational procedures. Before loan funds can be disbursed, the lenders will wish to be satisfied that all the main agreements meet their requirements and have been executed.

18 The implementation agreement (or state support agreement) is between the project company and the government agencies that have the authority to provide the guarantees, assurances, and support necessary for private power development.

19 The power purchase agreement (PPA) is the central contract in a private power project. From the obligations set forth in the PPA the project generates revenues. The sale of power provides the revenues or cash flow to meet debt service, operating costs, maintenance, and return on investment. For this reason, the creditworthiness of the power purchaser is a key factor in assessing commercial risk.

20 Once the parties to the PPA have been established, a contract must be structured to provide an uninterrupted cash flow when the power producers are fulfilling their obligations. Often a take-or-pay or firm-capacity sale arrangement is sought by developers to assure a minimum cash flow. From the perspective of a purchasing utility, however, it is more desirable to have plant that is "dispatchable." This enables it to operate its entire system on the basis of merit-order dispatch.

21 Other formal agreements in the security package include the land conveyance agreement, which ensures that the power producer will have control of the land needed for the power plant and switchyard; ownership agreements, which delineate the obligations among the entities composing the project company; the construction contract and operations and maintenance agreements; and the fuel supply agreement, which ensures security of a long-term fuel supply.

### **Project Procurement and Selection**

22 Before calling for bids for provision of private power, the power purchaser should have a comprehensive prefeasibility study prepared to establish the requirements of the project.

23 Selection among potential private power suppliers is best based on competitive solicitations, since these are most likely to lead to least-cost supply. Solicited proposals can be obtained by calling for competitive bids for development of projects for a specific and proven technology, size, and location. These are described as *structured requests for proposals* (RFPs). *Unsolicited proposals* are those that have been prepared and submitted solely at the initiative of the party interested in providing privatized power, and not in response to an official RFP. Host countries should view unsolicited proposals with a fair degree of circumspection; proposals outside the competitive process, where such a process has been established, may seriously undermine the success of competitive solicitations. In addition, it is strongly recommended that



before calling for bids for private power the host-country government should prepare a “short list” of three or four qualified developers.

24 Well-defined evaluation criteria and transparent evaluation processes lend credibility to the procurement effort. Responding to an RFP is expensive, so if the evaluation criteria are not clearly defined, potential bidders may be reluctant to submit proposals. The security package and financial structure sections of the RFP outline an applicant’s responsibilities to the power purchaser regarding the implementation agreement, power purchase agreement, fuel supply agreement, land conveyance agreement, insurance requirements, government approvals, O&M agreement, and project financing. Regardless of the scope of the RFP, however, all evaluations will be concerned with two general types of factors: price and nonprice. The specific prices for capacity and energy are the starting point. The specific nonprice factors that are considered will reflect the power purchaser’s priorities and other concerns.

25 The selection and evaluation of bids should be a two-step process. The first step, selection, should determine whether bidders can demonstrate relevant experience. The second step, evaluation, should be based on price. Financial close occurs when all agreements have been executed and financing arranged and disbursements from the proceeds of the financing can take place. This process is the final step before implementation of the project.

26 The ultimate goal of any private power effort is a project that operates well, has been completed on time and within budget, and generates the expected revenues. Although much of the onus for achieving this objective is on developers, not even the most experienced and seasoned will be able to complete a project successfully without an enabling political, legal, and regulatory environment or the requisite financial climate to encourage investors.

# 1

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## Introduction

### **Purpose of the Report**

1.1 A severe shortage of finance for public power development has led to a dramatic increase in interest in private power development around the world. It has been estimated that there are more than 500 proposals under consideration in developing countries. Governments in developing countries, particularly in Latin America and Asia, are restructuring their power sectors to encourage competition and attract greater private sector participation, especially in generation. Private power producers not only attract new financing sources for developing countries power sectors but also assume the risks of construction cost overruns and operations. Moreover, they have already demonstrated an ability to complete projects on time and operate them more efficiently than publicly owned facilities. Yet despite the advantages of private power production, very few private power projects have been successfully implemented in developing countries. This report seeks to help governments of developing countries address some of the constraints that so far have impeded development of private power generation projects.

1.2 The U.S. Agency for International Development (USAID), Office of Energy and Infrastructure, provides technical assistance to promote private sector participation in the energy sectors of developing countries through its Private Sector Energy Development (PSED) program. The PSED program assists developing countries in designing and implementing policy and regulatory reforms needed to attract private power developers. It also provides technical experts to assist in these areas and with solicitations, requests for proposals, and evaluation of private power proposals. USAID's program also advises on sources of financing, structuring of private projects, and risk mitigation, and it arranges study tours and training. See Annex 1 for an overview of the PSED program.

1.3 Like USAID, the World Bank and the International Finance Corporation (IFC) have also established new policies to assist and support private power project investment in developing countries. The World Bank's support, through its new lending policies, aims at assisting its borrowers in establishing a regulatory environment that will provide opportunities for competition for supply between private power producers and

## 2 Submission and Evaluation of Proposals for Private Power Generation Projects

existing public utilities. Most of the Bank's assistance for private power projects has been through financial intermediaries or loans guaranteed by governments, as required under its charter. The Bank also considers financial support for power sector reform, including sector restructuring and regulation, and provides advice on structuring of projects, processes of bidding, and the like. IFC's participation, on the other hand, has been in the form of direct loans, equity, and mobilization of financing from other sources, including syndication of IFC loans among commercial banks and provision of advice on project preparation and private sector policies. Unlike World Bank loans, IFC loans and investments are not guaranteed by host countries' governments.

1.4 Both the Bank and IFC explicitly support a major role for the private sector in power supply. However, solicitation of proposals for development has not been systematic, and developing countries have been receiving many unsolicited bids that do not take account of the full system costs and, more importantly, may not provide least-cost power. Moreover, although many projects are being approved through negotiated contracts based on a memorandum of understanding or a power purchase agreement, few of them have actually gained financing because governments have underestimated their complexity and the difficulty of meeting lenders' requirements.

1.5 This report is intended to provide a starting point for the formation of the requisite environment to foster private power and the mechanisms and procedures necessary to facilitate the request, submission, and evaluation of private power proposals. The topics include some of the policy directions and associated legislative, regulatory, and institutional frameworks essential to the development of private power. In addition, the report addresses the concern of the power purchaser that power projects be consistent with the country's resource-use plans and expected needs for power. Also discussed are the financial mechanisms, agreements, and contracts used to convey the fundamental commitments and obligations that are the basis for private power projects.

1.6 The report also seeks to assist governments in developing countries to solicit internationally competitive proposals for orderly private power developments and to obtain suitable financing on reasonable terms. It discusses how to prepare bidding documents and how to undertake technical and commercial evaluations of bids. This, it is hoped, should help developing countries obtain private power at the lowest possible cost. Host countries should also be enabled to meet demands for power and, it is hoped, avoid excess capacity and the need to retire existing plants prematurely. Facing the reality that traditional sources of funding from multilateral and bilateral organizations cannot meet all the rapidly increasing demands for electric power financing, developing countries are recognizing that private sector involvement can help.

1.7 This document incorporates information extracted from pertinent documents and experiences of the World Bank, USAID, and other international agencies; procedures and directives issued by U.S. and state-level regulatory agencies related to the establishment and operation of independent power producers; and knowledge obtained through the review of recent competitive bidding for private power projects in developing countries.

## Overview of Private Power Concepts

1.8 The three most common approaches for achieving private sector participation in the electric power sector are (a) privatization of existing assets through the sale or transfer of ownership (commonly involving the sale of stock shares through local stock exchanges); (b) long-term lease of public electric power facilities for operation and maintenance by the private sector; and (c) development, ownership, and operation of new electric power facilities by the private sector. To date, most private sector participation has been in the third category. Accordingly, these guidelines address principally the third approach—private power generation projects.

1.9 Private power plants developed by independent power producers are normally *project financed*. This type of financing differs from the corporate financing used by existing utilities, through which projects are financed on the basis of the asset backing and creditworthiness of the utilities (i.e., on the strength of their balance sheets).

1.10 The development of private power generation projects necessarily involves the allocation of risks among the power purchaser, the project developer, and the project lenders. In selecting among power projects, power purchasers have a number of concerns. Although the price of the power being offered may be a primary concern, it is by no means the only one. The power purchaser also has a keen interest in ensuring that the power project will provide the type of generation required (e.g., base load, intermediate, or peaking capacity); that the project will enter commercial operation when needed; that the generating facility will be dependable and dispatchable; and that the project will be viable in the long term. The specific concerns of the power purchaser should be reflected in the evaluation criteria adopted for project selection based on an invitation to bid.

1.11 In its simplest form, the most important consideration for a developer of a private power project is that the project is “bankable”—that is, capable of being financed. This requires a balance between project risks and returns such that financing can be obtained on a *limited* or *nonrecourse* basis. Under this type of financing, the revenues from the operation of the project are looked to by lenders and must be sufficient to cover the interest and principal payments to lenders as well as to provide a reasonable return to the equity investors. Because “bankability” is the most basic element of the private power development process, many of the documents and agreements discussed in these guidelines are aimed directly or indirectly at facilitating the provision of necessary financing. Without such financing, the prospects for developing private power are diminished significantly.

1.12 A variety of schemes are used to formulate private power projects. These vary in structure and format depending on the conditions and requirements under which the project is executed. The most commonly found are the following:

- Build-Own-Operate (BOO)
- Build-Own-Operate-Transfer (BOOT)

- **Build-Lease-Transfer (BLT).**

1.13 These arrangements involve the formation of a private company or joint venture being set up to plan, finance on a limited-recourse basis, design, construct (or lease), and operate power developments. Many utilities have preferred to adopt a BOOT approach so that the plant will eventually be transferred to them. However, the World Bank generally prefers to see the private developers and investors retain responsibility for operation of the plant so that the benefits of private management can be maintained for the life of the plant.

### **Use of the Report**

1.14 The implementation of private power projects is not a simple process, and experience so far in many developing countries has been that agreeing on the internal framework and contractual arrangements can be a lengthy process. Each country and project has unique circumstances that will affect the final structure, agreement, terms, and conditions of the project. This report, although general, provides information to demonstrate the complexity of the process and to identify and discuss areas in which governments may need additional information, support, or both. It may also help determine whether the host-country environment, including the clarity and definition of the project selection and implementation process, is attractive to private power developers and investors. However, the report does not obviate the need to appoint experienced financial and legal advisors to assist the host country. This document is likely to be most useful to countries about to invite private power investment participants for the first time. Once independent power projects have become established, their role, and the scope for competition, should be enhanced. Furthermore, approaches to private power developments are continuing to evolve, and the details of these arrangements are likely to change as the private sector's role increases.

1.15 Chapter 2 discusses the host-country business environment and its political, economic, legislative, regulatory, and institutional/organizational aspects. Chapter 3 treats the financial and commercial issues; project financing structure; taxes, duties, and levies; tariff structures; fuel supply, transmission, and distribution; and returns on equity. Chapter 4 assesses the degree of risk that each party (public or private) assumes—commercial, political, and nonpolitical. Chapter 5 explains the different agreements that compose the security package and that need to be executed to enable financial closure and approval of loans for financing the project. Key provisions covered in the main agreements can be found in the annexes: Implementation Agreement (Annex 4); Power Purchase Agreement (Annex 5); Fuel Supply Agreement (Annex 6); and Construction Contract (Annex 7). Chapter 6 sets out the methods of bidding, bid preparation, and bid evaluation and explains the requirements for project closing.

# ASIAN POWER MARKET SUMMARIES

*Summaries of the power  
markets in China, India,  
Indonesia, Pakistan, and the  
Philippines, excerpted from  
Independent Power Quar-  
terly, First Quarter, 1994.  
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***CHINA***

# CHINA'S POWER MARKET

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## CHINA

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### PRIVATE POWER NEEDS

Roughly half of the 137,000 MW of new capacity that government officials say the country will need by 2000 will be developed by the private sector.

In total, the government and various utilities have issued—or are preparing to issue—solicitations for as much as 166,873 MW. Additionally, there are outstanding proposals for 51,569 MW of private power in China.

### MARKET STATUS

The most active developer in China, Hopewell Holdings Ltd., reorganized and went public with a roughly \$800-million share offering for Consolidated Electric Power Asia Ltd., a holding company that now owns substantially all of HHL's private power assets and business interests.

CEPA is in negotiations for about 20 projects totaling about 13,200 MW in China (see Project Proposals, below).

Similarly, AES Corp. of Arlington, Va., plans to raise about \$150-million through an offering for a new subsidiary, AES China Generating Co., that will pursue private power projects in China. AES Chigen has already identified six projects totaling 5,250 MW it is developing in China (see Project Proposals, below).

Another indication of the increasing interest in the market for private power in China was the announcement by the investment banking firm Goldman Sachs & Co. that it would take a 30% stake in a 1,200-MW expansion of an existing coal plant in Shandong province (see Project Proposals below).

Separately, the International Finance Corp. announced it will invest up to \$7.5-million in China Walden Investments Ltd., a venture capital fund that will invest in power projects in China (see Business Climate below).

Additionally, there were new proposals from Sembawang Resources for a 2,400-MW, coal-fired plant in Zhejiang Province, Time Engineering Bhd. of Kuala Lumpur for a 250-MW coal plant in Hunan province, and from a consortium that includes Maeda, Kumagai Gumi (Hong Kong) and Ringo Trading Co. for a 173-MW plant at the Yangpu Economic Development Zone on Hainan Island (see Project Proposals below).

In all, there are outstanding proposals for 51,569 MW of private power in China. And Chinese officials have issued, or



will soon issue, solicitations for as much as 166,873 MW.

#### Solicitations:

##### *Southern China—*

The four southern Chinese provinces making up the south China electric power grid want to roughly double capacity, to 40,000 MW from 24,000 MW, by 2000.

By 2010, the four provinces want to raise capacity to 119,348 MW, and by 2015, they want to increase capacity to 154,745 MW.

The south China grid is controlled by the South China Electric Power Joint Venture Corp., a consortium of the governments of Guangdong, Guangxi, Guizhou and Yunnan provinces, the Chinese Ministry of Electric Power and the State Energy Investment Corp.

The plans of the four southern provinces are detailed below by province.

##### *Guangdong Province*

• The Guangdong Electric Power Holding Co. wants private sector help to increase installed capacity from the current 11,000 MW to about 34,000 MW by 2000 and to between 60,000 MW and 80,000 MW by 2010. GEPH is encouraging foreign investment on a build-operate-transfer basis.

Dozens of projects will be built and most will be handled by a local development agency. Bids are now being prepared for international tender.

Guangdong Power Bureau will seek bids for the 2,640-MW, coal-fired Taishan Power Station, the 2,640-MW, coal-fired Shanwei Power Station and the 2,640-MW, coal-fired Zhuhai Power Station early this year. The units will be built in three stages. The first will be four units of 660 MW each and has been approved by the Ministry of Energy. Eventually, the Zhuhai station will be 3,960 MW, and the Taishan station will be 5,280 MW.

Several planned projects in Guangdong province have already been selected by the Ministry of Energy as candidates for solicitations to the international private sector.

Guangdong Power Bureau officials will ask U.S. bidders to arrange U.S. Export-Import Bank financing. Foreign suppliers must provide government export credits. The Bank of China will not offer a sovereign guarantee on most projects, but will on some. U.S. bidders will need to arrange limited recourse financing.

Guangdong's plans for new capacity also include the following coal-fired plants listed by site name, size, and scheduled completion date:

- Zhanjiang, 1,200 MW, in two stages, 1994-95 and 1997-98;
- Meixian, 250 MW, 1995-96;
- Shaoguan, 300 MW, 1995;
- Shantou, 1,200 MW, in four stages, 1995-98;
- Zhujiang, 1,200 MW, in two stages, 1992-93 and 1996-97;
- Panyu, 2,400 MW, 1997-2000;
- Shanwei, 4,800 MW, 2001;
- Huidong, 4,800 MW, 2001;
- Zhanjiang Dong Hai, 4,800 MW, 2001;
- Zhujiang East A, 4,800 MW, 2001;
- Zhujiang East B, 4,800 MW, 2001;
- Zhujiang West A, 4,800 MW, 2001.

Separately, Guangdong's 25 municipalities represent an important secondary category of independent power opportu-

nities. Each municipality is an independent supplier of power to its area, accounting for as much as 50% of Guangdong's installed capacity.

The building plans of the municipalities are not well known and are not included in the plans of Guangdong Provincial Power Bureau.

The province is encouraging municipalities to become energy-independent by easing the approval process and allowing full tax exemption and profit retention.

Foreign capital is welcomed by the municipalities and many of the area's new units will be owned by foreign joint ventures.

Because of Guangdong's strong access to foreign exchange, the central government has a limited role in building power plants, except for planned nuclear power units.

Most municipalities are driven by a desire to get the new plants on-line as soon as possible and will frequently favor the fuel that enables the plant to be built most rapidly.

• The city of Shenzhen, located on the Guangdong-Hong Kong border, is seeking private sector participation to increase current installed capacity of 1,860 MW to 6,000 MW by 2000 and to 13,000 MW by 2010.

Officials of the Shenzhen Energy Corp. (SEC) will issue in early-1994 tenders for foreign investors to bid for a build-operate-transfer contract for the 6,600-MW, coal-fired Shenzhen East Power Station. The unit will be built as ten 660-MW units. Phase-1 will be four 660-MW units. The second, larger phase will share a coal yard and terminal with the first phase.

Although the project is in the planning stage, SEC officials have begun to hold talks with prospective bidders.

SEC would like to begin construction on the complex later this year, with commercial operation of the first units sometime in 1997.

Specific projects include the 1,800-MW, coal-fired Shenzhen Mawan project; the 2,640-MW, coal-fired Shenzhen East plant and the 1,000-MW Shenzhen pumped-storage plant.

SEC will be a major participant and wants proposals from individual companies or international consortiums able to finance their equity share of the project. SEC officials are suggesting an equity split of 50-50 or 60-40.

All projects can be built on a build-operate-transfer or a build-own-operate basis. If BOT, the project will be transferred to SEC after 15 or 20 years. SEC will buy the power under a long-term power-purchase agreement to be negotiated and approved by municipal government officials.

Foreign participants will receive a number of incentives. For example, for the first two years of commercial operation, all income tax will be exempted and then the profits will be taxed at a reduced rate for the following three years. The current full income tax rate is 15%.

General contractors will be both foreign and Chinese, with a "bonus" paid to the turnkey contractor able to bring in the project ahead of schedule. SEC officials said they are "inclined" to make a Chinese company responsible for operation and management of the plant with participation of the foreign partner.

SEC recently set up a development agency, Shenzhen Energy Investment Co. Ltd., now listed on Shenzhen's stock exchange. SEIC will be used to raise the funds needed to enter into joint ventures with foreign investors to build the needed

plants.

- A 1,200-MW pumped-storage expansion to be used as a peaking unit. The project, estimated to cost about \$470-million, is slated for Guangdong Province and is known as the Guangzhou Pumped-Storage project. A similar 1,200-MW pumped-storage facility is under construction at the site.

- Until 2000, Guangdong will primarily build coal-fired plants, but after that could turn to nuclear power. Currently there are plans for about 6,000 MW of nuclear power, in addition to the 1,800-MW Daya Bay nuclear power plant that is expected to come on-line this year.

Unlike Daya Bay, which the central government of China is building, further nuclear capacity in the province will be built with the participation of the private sector. Vendors and developers for these projects are likely to be selected through an open bid, but U.S. companies will be at a disadvantage because current U.S. law limits nuclear power plant sales to China.

- Guangdong Province is looking for private companies to develop wind energy projects in Shantou Special Economic Zone on Nanao Island. The economic zone installed two windmills on its own as a pilot project, but wants to work with a U.S. company for the installation of more than 20 wind projects on the island over the next five years.

#### ***Guangxi Province***

The 3,965-MW Guangxi Power Bureau wants private sector help to increase installed capacity by 9,581 MW by 2000 to a total of about 13,546 MW.

The province is located in the Hongshui River Basin and is considered rich in hydro power potential. However, several coal-fired projects are planned and foreign investors are being sought.

The planned hydro projects include the 560-MW E Tan plant; the 621-MW Ghangzhou plant; the 480-MW Baise project, and the 5,400-MW Longtan plant.

The coal-fired projects include the 600-MW Laibin plant, Phase-2; the 600-MW Beihai unit, and the 1,320-MW Qinzhou station. International solicitations for the projects will be issued shortly.

#### ***Guizhou Province***

Guizhou Power Bureau of Guizhou province in southwest China wants private sector help to increase installed capacity to 6,270 MW from 3,035 MW by 2000. By 2010, the province wants capacity to hit 17,665 MW.

The hydro plants planned by the Guizhou Power Bureau total 10,730 MW and include the 1,640-MW Tiansheng Qiao, units 1 and 2 on the Guangxi-Guizhou border; the 540-MW, Hong Quan Du project; the 2,000-MW Gou Pi Tan plant; the 4,200-MW Long Tan plant; the 1,000-MW San Ban Si; the 840-MW Si Lin plant, and the 510-MW Dong Feng plant.

The coal-fired plants total 3,900 MW and include the 400-MW Guiyang Electric plant; 400-MW Shui Cheng; 600-MW Du Yun; 800-MW Pan Xian; 1,200-MW An Shun; 250-MW Kaili, and the 250-MW Jin Sha plant.

Foreign investors are expected to be involved in most of the projects.

#### ***Yunnan Province***

Yunnan Power Bureau plans to increase installed capacity to 8,003 MW from 4,103 MW by 2000. By 2005, the prov-

ince wants capacity to hit 14,400 MW, and by 2010 Yunnan officials are targeting capacity of 29,100 MW. By 2015, they are will need 39,500 MW.

There will be foreign investment in virtually all projects, which include some 25,550 MW of hydro and 9,850 MW of coal-fired units.

The hydro units include the 1,500-MW Qinwan plant scheduled for completion by 2003; 1,350-MW Da Chao Shan, 2002; 4,200-MW Xiao Wan, 2012; 5,000-MW Cao Zha Du, 2012; 1,500-MW Jing Hong station, 2006; and the 12,000-MW Xi Luo Du plant, with 6,000 MW scheduled for completion by 2010 and another 6,000 MW by 2015.

The fossil units include the 250-MW Kai Yun station scheduled for completion by 2000; 600-MW Yang Jia Hai, 1996; 600-MW Xuan Wei, 1998; 1,200-MW Qu Qing, 1998; 3,600-MW Shao Bian, scheduled for completion in equal phases in the years 2004, 2008 and 2014, and the 3,600-MW Fushen station, 2015.

#### ***Jiangxi Province***

The Chinese government has issued a call for a joint venture partner to install 1,000 MW of new coal-fired capacity at the existing Nanchang thermal power plant in Jiangxi province. The project currently has installed operating capacity of 300 MW in the form of two, 25-MW units and two, 125-MW units.

#### ***Northern China—***

- Within the Hebei grid, which covers the provinces of Beijing, Tianjin, Shanxi, Inner Mongolia and Hebei, installed capacity is about 23,000 MW, a level about 20% short of daily demand. The capital city of Beijing, for example, has an installed capacity of 2,700 MW, but demand is an estimated 3,200 MW.

The entire province is under the control of the North China Electric Power Administration (NCEPA), headquartered in Beijing City.

The projects planned include Sanhe, a dual-unit, 600-MW project in Hebei Province, with financing from Japan's Overseas Economic Cooperation Fund; Qinbei, a four-unit, 2,640-MW, coal-fired station in Henan Province, with some financing likely from the World Bank; Toketo, a four-unit, 2,640-MW, coal-fired project in Inner Mongolia, with some financing likely from the World Bank; Qitaihe, a dual-unit, 600-MW plant in Helongjiang Province with a financial commitment from the Asian Development Bank; Ertan Phase-1, a six-unit, 3,900-MW hydro project in Sichuan Province.

NCEPA officials said current building plans offer no hopes of reducing the shortfall of electric power within the coming years, and the agency is being forced to move new plants away from the high demand areas of Beijing, Tianjin and Hebei and closer to fuel sources.

About 90% of all Hebei electric power is generated by coal. Some coal mine-mouth plants exist and others are planned in coal-rich Shanxi Province and Inner Mongolia. Hebei has little hydro resources and the resource is used mainly for peak-load supplies. Only a small percentage of oil is used for electric generation and no new oil-fired plants are planned.

To meet demand, NCEPA plans to increase capacity by 11% annually for the years ahead, following a 9% increase in 1992 that proved to be insufficient. Consequently, NCEPA

was forced to ration electricity.

- The port city of Tianjin needs foreign capital to develop 2,000 MW of new capacity to offset supply shortfalls.

- Four northeast cities—Fengcheng, Yantai, Yicheng and Jingle City—are seeking foreign partners to build power and cogeneration plants.

- Fengcheng wants to purchase at least 50 MW of electricity and 150 tons/hour of steam;

- Yantai wants to purchase 300 MW of electricity and 150 tons/hour;

- Yicheng City wants to purchase 1,200 MW;

- Jingle City wants to purchase 24 MW.

The municipalities have awarded Genesis Energy Systems of Los Angeles, Calif., the exclusive right to develop power-purchase agreements for those power stations. Genesis' partner in the project is Choate Co. Ltd. of Hong Kong. Choate specializes in the coordination of energy planning and energy project development at cities on China's eastern seaboard.

Genesis is seeking partners to develop plants pursuant to its agreement with the cities and is also seeking U.S. utilities to partner with the cities in technology exchanges. Together, Genesis and Choate will serve as intermediaries with local Chinese officials, identify host sites, serve as the exclusive energy advisor to the four cities, negotiate power-purchase agreements, coordinate with engineering and construction companies and make financing arrangements. They will also provide the municipalities with an energy analysis, a feasibility study and a 10-year plan on sustainable energy systems.

#### *Shaanxi Province*

- The Northwest Electric Power Administration of Shaanxi Province is soliciting joint-venture partners for a \$543.3-million, 1,200-MW, coal-fired plant in Xian City to be known as Hancheng No. 2.

The solicitation is for an international company to design, engineer, construct and possibly operate the unit when complete. Terms are negotiable.

#### *Hebei Province*

- The Xuan-Hau Iron and Steel Co., based in Zhangjiakou City, Hebei Province, is seeking a partner to develop a 12-MW, coal-fired electric generator, a 6-MW, coal-fired generator and two 75-ton boilers. The company estimates total cost of the project at \$442-million.

#### *Anhui Province*

- Anhui Province, about 300 miles west of Shanghai, along the Yangtze River, is seeking foreign investors for build-operate-transfer projects. Installed capacity is currently 2,040 MW, all of it fired by coal.

About 850 MW of additional capacity will be added in 1994, but the province needs a 600-MW unit in Luoh He; a 600-MW unit in Huai He; a 600-MW unit in He Fei, and a 300-MW unit in Tian Jia An. All projects are open to the private sector.

Plants under study and expected to be built include a 600-MW unit in Fu Yang; a 600-MW plant in Chi Zhou; a 600-MW unit in Ping Wei, and a 300-MW plant in Tong Ling.

#### *Inner Mongolia*

In Huhhot city, a 7,200-MW, coal-fired unit is planned with one or more investors from the international private power market, but no deals are yet signed. Talks are under-

way with three Korean companies, including the Hyundai Group, the Samsung Group and the Daewoo Group, plus at least one unnamed Japanese company.

The central government in Beijing approved the proposed unit. Negotiations with the private sector are expected to take six or more months.

Fuel is expected to come from a new coal field about 80 miles south of Huhhot. Overall, the Inner Mongolian region is said to have well over 220 billion tons of coal reserves to fuel power projects and for other uses. The field near Huhhot, which is known as the Zhungeer field, is expected to produce over 15-million tons annually, beginning in 1993. Construction will be undertaken in three phases, with the first stage being 1,200 MW.

#### *Eastern China—*

The central government said it is seeking private sector participation in the following projects:

#### *Shanghai Province*

- Waigaoqiao Phases-2 and 3, a four-unit, 3,200-MW or 4,000-MW project;

- Shidongkou Phase-2, a dual unit, 1,200-MW project.

#### *Jiangsu Province*

- Yangzhou, a dual-unit, 1,200-MW plant, with some financing committed from the World Bank;

- Ligang Phase-2, a twin-unit, 700-MW project managed by Xiuli, a unit of China International Trust and Investment Corp., but open to the private sector;

- Nantong, a dual-unit, 700-MW plant;

- Xiaguan, a twin-unit, 250-MW project.

#### *Zhejiang Province*

- Tianhongping, a six-unit, 1,980-MW total pumped-storage plant, with some financing committed from the World Bank;

- Beilungang, a dual-unit, 1,200-MW project, with some financing committed from the World Bank;

- Qinshan, a dual-unit, 1,200-MW project;

- Pinghu, a four-unit, 2,400-MW plant;

- Hangzhou Bay, a four-unit, 3,200-MW or 4,000-MW, coal-fired plant;

- Nangiing, a twin-unit, 1,200-MW plant;

- Jiaying, Phases-2 and 3, a four-unit, 2,400-MW project.

#### *Central China—*

#### *Hubei Province*

Central China's Hubei Province is seeking foreign investment in three generating projects totaling 4,110 MW.

The province is also planning the \$1.39-billion, 1,200-MW, coal-fired Jinsha power plant in Shashi City as four 300-MW units. The site is in central Hubei Province and on the Hubei transmission grid, which runs west to east. A nearby ash yard can take waste products from the plant for an estimated 20 years.

The province estimates each unit will cost about \$346-million, and wants construction to begin in 1995 with commercial operation to start in 1998. The level of foreign investment is unspecified and open to negotiation.

The province also wants foreign investment for the 510-MW Pankou hydro station on the upper Duhe River in the Pankou Valley of Zushan County. The next closest hydro station on the Duhe River, the 150-MW Huanglongtan hydro

project, is about 70 miles away. The Huanglongtan project will be soon expanded by 300 MW and may also be open to foreign investment. The initial Pankou project will take an estimated 5.5 years to build.

- The central government has announced it is seeking private sector participation in Ezhou City, about 18-miles outside the capital city of Wuhan, Hubei Province. Current plans call for a 2,400-MW, coal-fired power plant, built as eight 300-MW units in several phases. Previously, the Ezhou plant was a 1,200-MW coal-fired project.

One 300-MW unit is under construction and is being financed by the Japanese Overseas Economic Cooperation Fund, but the province wants unspecified private sector investment for the additional units.

The project site is located within the Gedian Special Economic Zone, an area very close to the Yangtze River and transportation facilities.

#### **Hunan Province**

- In Hunan Province the government is offering Lingjunan, a 10-unit, 240-MW hydro project, with a financial commitment from the Asian Development Bank.

#### **Project Proposals:**

##### **New—**

- **AES China Generating Co. Ltd. (AES Chigen)**, a subsidiary of AES Corp., has identified six projects totaling 1,250 MW it is developing in China. If definitive agreements for all the projects are signed, AES will have an equity stake of between 25% and 60% in the projects, for a net equity of \$937.5 MW.

AES Chigen's activities in China are being partially funded through the proceeds of a recent public stock offering for about \$150-million. Parent company, AES Corp. of Arlington, Va., will invest another \$50-million in the China ventures.

The plants, listed by location, size and fuel are as follows:

- Yangcheng, Shanxi Province, 2,100 MW, coal;
- Fengcheng, Jiangxi Province, 1,200 MW, coal;
- Wuhan, Hubei Province, 1,200 MW, coal;
- Harbin, Heilongjiang Province, 400 MW, coal;
- Jiaozuo, Henan Province, 250 MW; coal;
- Weihai, Shandong Province; an investment in a joint venture that would hold a 40% interest in a partially-complete 150-MW, coal-fired station.

The 2,100-MW Yangcheng plant in Shanxi Province will be built as six 350-MW units, in a total of three phases, each consisting of two 350-MW units. The project also includes a 140-mile transmission line from the city of Yangcheng in Shanxi Province across two provinces to the city of Husiyin in Jiangsu Province where the Jiangsu Power Bureau will distribute the power. It is not yet clear whether AES Chigen will hold equity in the transmission line. Likely partners include Shanxi Energy Enterprise Co., the State Energy Investment Corp. (SEIC) and Jiangsu Province Investment Corp.

The 1,200-MW Fengcheng in Jiangxi Province will be built as four 300-MW units, with power to be sold to the Jiangxi Provincial Electric Power Bureau. Partners include Jiangxi Provincial Investment Corp., SEIC, the Jiangxi Provincial Electric Power Bureau and an anticipated additional Chinese participant.

The 1,200-MW plant near Wuhan, Hubei Province, will

be built as two 600-MW units. AES Chigen has signed a preliminary agreement with the main joint-venture partner, Hubei Provincial People's Government. Power will be sold to Hubei Power Industry Bureau under a preliminary agreement with the joint venture.

The 400-MW project in Harbin, Heilongjiang Province will be built as two 200-MW units. AES Chigen has signed a development agreement with Harbin Thermal Power Construction & Development Co. However, several other parties—Heilongjiang Provincial Electric Power Bureau, the Harbin Electric Power Bureau and a local coal mining company—are expected to participate.

The 250-MW Wan Fang plant near Jiaozuo, Henan Province, will be built as two 125-MW units. Included will be the needed transmission facilities to move the power to the Jiaozuo Aluminum Mill. The partners, including Jiaozuo Aluminum Mill and the law firm of Chadbourne & Parke, signed for the project in October 1993. The aluminum mill will use about 90 MW, while the rest will be sold to the Henan Provincial Electric Power Bureau under terms to be negotiated.

One 125-MW unit of the 250-MW plant that AES Chigen intends to take an equity stake in is already operating. The second is under construction and expected to go commercial in summer 1994. Two other phases are proposed, a second 600-MW expansion and a 1,200-MW expansion. AES Chigen might only participate in the first phase.

- **Time Engineering Bhd. of Kuala Lumpur, Malaysia**, has entered into a joint venture known as Lianyuan International Power Co. Ltd. that will develop a 250-MW, coal-fired power plant in Hunan province. Time, part of the Renong Group of Malaysia, and joint venture partner Lianyungang City Light Industrial will build the project on a build-operate-transfer basis.

Time, which will hold about 70% of the venture, will provide the development and construction expertise. Lianyungang City Light will provide much of the material needed to develop the plant, most of the operating personnel and some of the funds.

- **Consolidated Electric Power Asia**, formerly the interests of Hopewell Holdings Ltd., holds agreements for about 20 electric power projects in several Chinese provinces. Each agreement is for a minimum 660-MW, coal-fired project, for a total of about 13,200 MW.

CEPA will develop the units, each standardized for faster and cheaper development, on a build-own-transfer basis.

CEPA's partner in each project will be a provincial or municipal government. Deals are now signed in Fujian, Guangxi, Henan, Jiangsu, Shandong and in the Shenzhen Special Economic Zone of Guangdong province. Talks between CEPA officials and officials in other Chinese provinces are underway. CEPA's projects follow listed by location, size, fuel, power buyer and cost.

- Shouyangshan, Yanshi, Henan Province; 1,320 MW; coal; Henan Power Bureau; \$1.26-billion.

- Qidong District, Jiangsu Province; 2,640 MW; coal; Jiangsu Power Bureau; \$2.5-billion.

- Liaocheng, Shandong Province; 2,640 MW; coal; Shandong Power Bureau; \$2.5-billion.

- Tanfang, Shandong Province; 1,320 MW; coal; Shan-

dong Power Bureau; \$1.26-billion.

— Shenzhen Special Economic Zone; Guangdong Province; 2,640 MW; coal; Guangdong Power Bureau; \$2.5-billion.

— Fujian Province; 1,320 MW; coal; Fujian Power Bureau; \$1.26-billion.

— Guangxi Zhuang Autonomous Region; Guangxi Province, China; 1,320 MW; coal; Guangxi Power Bureau; \$1.26-billion.

While CEPA said it had no intention of allowing investors outside the relevant Chinese authorities as joint venture partners in future Chinese projects, the company said in certain unspecified circumstances outside investors may be allowed to purchase equity or invest directly or indirectly.

The company has one 700-MW project in Shajiano, Guangdong Province, in operation and a 1,980-MW project in the same location under construction.

• Sembawang Resources of Singapore is developing a \$2.4-billion, 2,400-MW, coal-fired power plant at Ying Long Shan, southeast of Ningbo City in Zhejiang Province. Phase-1 will involve two 600-MW units.

Sembawang Resources and Zhejiang Electric Power Bureau are forming a 50-50 joint-venture named Ning Long Power Generating Co. to build-own-operate the plant.

Consultants to the project and possible equity participants are Development Resources, a subsidiary of Singapore's Public Utilities Board, and China International Engineering Consulting Corp. CIECC is the development arm of China's State Planning Commission in Beijing.

It is the first power development project for the Sembawang Group of companies. The principal holding of the Sembawang Group is Sembawang Shipyard in Singapore.

Construction of the power plant will begin in 1994, assuming regulatory approvals.

Sembawang Group is forming a separate joint venture with CIECC to undertake plant processing, construction of power plants and offshore platforms in China and engineering and project development work in other parts of Asia.

The Sembawang Group said it shortlisted four financial institutions and will soon select one to package a loan for the power project.

The company said it will use international capital, both in the form of equity and debt, to finance the project.

• Goldman, Sachs & Co. of New York plans to take a 30% stake in a 1,200-MW expansion of an existing coal-fired plant in Shandong province, China. To raise money for development of the plant, Goldman, Sachs and its joint-venture partners are forming a joint stock company to issue shares on foreign securities markets.

The investment firm's Chinese partners are China Venturetech Investment Corp., the Shandong Power Corp. and the Shandong International Trust & Investment Corp.

The existing unit, the Zouxian power plant, already has 1,200 MW of installed capacity. Shandong province has installed capacity of about 10,000 MW, but needs another 10,000 MW by 2000.

The province will use joint stock companies to raise money for future power needs if the Goldman, Sachs joint venture is successful, Chinese officials said.

• Maeda of Japan, Kumagai Gumi (Hong Kong) and

Ringo Trading Co. are developing a 173-MW private power project at the Yangpu Economic Development Zone on the northwest tip of Hainan Island.

About 36 MW of the project is fired by diesel and will be in operation some time in 1994, another 137 MW is gas-fired and will be ready for commercial operation several years later. The project will provide electric power to the newly-formed Yangpu Development Zone.

• Singapore-based Amcol Holdings Ltd. will buy an 80% stake in a \$39.5-million, 80-MW, coal-fired power plant Kennington Development Ltd. is developing in the city of Qingyuan.

The city government of Qingyuan is expected to also hold a stake in Qingyuan Qiaoyuan Power Plant Co. Ltd. Construction will begin when contract details are set.

• PowerGen of the U.K. is selling three out-dated coal-fired electric generating power plants totaling 1,214 MW to an unnamed Chinese bidder. The plants will be dismantled, shipped to China and reassembled.

Included in the deal is the 300-MW, three-unit Ferrybridge B near Knottingley, the 564-MW, six-unit Castle Donnington near Derby and the 350-MW, three-unit Drakelow B near Burton-on-Trent.

• Cheung Kong (Holdings) Ltd. of Hong Kong and Hutchison Whampoa Ltd. of Hong Kong are developing a \$26-million, 50-MW, coal-fired power project in Shantou, in Guangdong Province.

• Three Kuala Lumpur, Malaysia-based companies, Kanzen Bhd. unit, Kanzen Energy Ventures Sdn Bhd. (KEV), Tan Chong Holdings Bhd. and Shanghai Chong Kee Bhd. have joined together to develop a 24-MW, coal-fired power plant in Jiangyin City. The project, Jiangyin Bingjiang Power Supply Co. Ltd., will also include as an equity partner the Jiangyin City General Economic & Technology Development Corp.

Shanghai Chong Kee will hold 20% of JCGETDC, Tan Chong Holdings 25% and Kanzen will hold 55%. The project will begin commercial operations in 1994 and supply power and heat to local industries.

*Ongoing—*

• China Light & Power and Electricite de France are negotiating details of a joint venture to build, own and operate a 3,600-MW power project in Shandong province. EdF is expected to take a 60% equity stake while CLP takes a 40% stake.

CLP is conducting a feasibility study for the Shandong Power Co. for the proposed project. CLP and EdF previously signed a technical cooperation agreement covering an exchange of information, ideas and operating experiences.

• Atlas Developments of Australia, Guangdong's Jilida Corp., a private company, and Shanxi Electric Power Co. (SEPC) struck a deal to build, own and operate a 2,640-MW project in Shanxi province. The project, known as Shentou No. 2 power station, is an expansion of an existing 1,000-MW unit owned by SEPC.

SEPC will procure Chinese government guarantees needed for project funding, while Atlas and Jilida would act as developers, arrange international finance and participate in project equity. SEPC has reportedly agreed to provide land needed for the project.

About one-third of the expanded project's power will be

sold into the Beijing-Tianjin-Tangshan power grid. Central government planning approval is held by the project developers and a final agreement between all parties is expected within several months.

- Officials report a 1,500-MW project on the Mekong River in Jinghong province will be built, owned and operated by international investors. No other details are available.

- An international consortium led by First Washington Asia of the U.S. signed agreements with the Ministry of Energy Resources to build five power plants representing about 1,000 MW at a total cost of about \$1.17-billion. Two of the five plants will be built in Guangdong. Construction of the first units is scheduled to begin at year-end 1994.

- A private investor is negotiating for the development of the 600-MW Beiwang power plant in Qinhuangdao in Hebei province. The same investor is planning a 600-MW project in Tangshan, also in Hebei province. Both units would be fired by coal.

- Hong Kong Macau International Investment signed a deal to invest \$58-million for a 25% stake in the 600-MW Hengshui plant in Hebei province, which is offering 2,189 MW of power projects for foreign participation.

- Australian engineering company Kaiser Engineers Pty Ltd. signed a letter of intent with China's Beijing Mining Administration to eventually build, own and operate a 200-MW, coal-fired plant on a joint-venture basis.

Kaiser officials said prior to advanced development, the partners will complete feasibility and financing studies. If the studies are positive as expected, construction will begin next year and project completion should be about two years later.

- Simms International Group Ltd. of the U.S. plans to take an equity stake in a 12-MW private power plant in Xinchang county, located in Zhejiang Province, a largely rural, mountainous area. The project will be jointly operated by Simms International and Xinchang Thermal Power Plant.

The project capacity is expected to increase to 24 MW in a future expansion. Simms is expected to provide about \$6.6-million of the \$11-million cost of the project, known as the Xinchang Simms Thermal Power Company Ltd. The company holds a 15-year power-purchase agreement from the province.

- Merrill International and the Wing Group Ltd., formerly Wing-Merrill International, have plans to build, own and operate a \$2.4-billion, 2,400-MW, liquefied natural gas-fired plant at a site to be selected along the Yangtze River in eastern China's Jiangsu province.

Other partners are Bechtel Corp., Westinghouse Electric, Riley Stoker, TransAlta Energy and the Jiangsu Provincial Electric Power Bureau, which will buy the power under a long-term power-purchase agreement not yet signed.

Jiangsu has a population of 69-million and is immediately north of Shanghai, China's largest city.

The Jiangsu project will include a number of consortium partners, and the foreign developers will likely hold a majority stake while the local Chinese partners will hold about 30%.

Construction of the unit, which will be financed on the open market, could begin within 18 months and actual construction will likely take about three years, with commercial operation as early as 1997.

Current installed capacity of Jiangsu is about 10,500 MW.

The annual economic growth rate of the area is about 12%, and JPEPB plans to add between 1,500 MW and 2,000 MW annually, a total of 13,500 MW by 2000.

But even with the 13,500 MW added to the existing 10,500 MW, the total of 24,000 MW of power capacity will be short of demand, perhaps by as much as 5,000 MW. Jiangsu is inviting other private project developers to participate in its electricity sector expansion.

- Merrill International and the Wing Group Ltd. also have a memorandum of understanding with officials of Henan Province to develop two, 1,400-MW, coal-fired independent power plants on a BOO basis. One is planned for Mixian and one for Dengfeng, near the provincial capital of Zhengzhou.

A third unit, also 1,400 MW, is planned for Henan's northern border city of Qin Bei, but is not part of the MOU. Capacity of the unit may be expanded in the future. Development costs of all three plants could top \$2-billion.

Coal to fire the projects will come from Henan's existing coal reserves and from the neighboring province of Shanxi.

Partners of Merrill International and the Wing Group include Bechtel Corp., Westinghouse Electric Corp., Riley Stoker, all of the U.S., and a unit of TransAlta Utilities of Canada.

- Hong Kong's China Light & Power and the Shandong Provincial Power Industry Bureau plan to joint venture development of a \$350-million, 600-MW, coal plant in Shiheng City, Shandong Province.

CLP will hold a 40% stake in the project, which could be expanded by 600 MW, if an additional foreign joint-venture partner is found. CLP's partner is Shandong Electric Power Co.

In addition, CLP signed a pact with Shandong Electric Power Co to study joint development of 3,000 MW of additional power in the form of three other power stations in Shandong Province in the counties of Shiheng, Heze and Jinling. CLP's power plant partner in Hong Kong, Exxon Energy, a unit of Exxon USA, could be involved.

- Exxon Energy plans to build a \$2.5-billion, 2,400-MW, gas-fired, combined-cycle plant in Hong Kong in a 60-40 partnership with CLP.

Though it is outside mainland China, Hong Kong is included here because the city state will be incorporated into China in 1997.

If the 2,400-MW plant is built as expected, it will bring Exxon Energy's equity involvement in electric power projects in Hong Kong to about 8,328 MW, with a power-purchase agreement for another 600 MW from a project being developed by the Chinese government. Exxon Energy holds about 60% of the 8,328 MW, a total of 4,943 MW.

An application for the 2,400-MW plant, to be built at Black Point, west of Tuen Mun, has been filed with the government of Hong Kong and is also under review by the committee set up to ease the transfer of governmental control of Hong Kong to Beijing.

Plans call for the plant to be built in stages, with the first 600-MW unit operational in 1996. Other 600-MW units will follow in 1997, 1998 and 1999.

CLP will buy the power under contract terms not revealed. The utility also awarded a contract to build a trans-

mission link to the planned plant to Fujikura Ltd. of Japan. Construction of the \$32.5-million transmission line will begin later this year. The plant is expected to be on-line in either 1996 or 1997.

Chase Manhattan Bank N.A. is the financial advisor. Also involved is a unit of London-based Schroders PLC, J. Henry Schroder Wagg & Co. Ltd., as the project's overall financial adviser.

Wardley Capital Ltd., a unit of HSBC Holdings PLC of Hong Kong put together a consortium of six banks to secure financing for the project: Wardley Ltd., Societe Generale, Banque Nationale de Paris, the Industrial Bank of Japan Ltd., Credit Lyonnais and the Long Term Credit Bank of Japan.

Schroder's officials said a four-part financing package is being arranged, which includes export credits and a commercial loan. The largest, but undefined portion of the financing, is expected to be a U.K. export credit. A French export credit is also being arranged by Societe Generale of France, as is a direct loan from the Export-Import Bank of the U.S.

In addition, the Exxon Energy/CLP joint venture is building a 300-MW, gas-fired power plant at Penny's Bay on Lantau Island to meet peaking power needs in the area and the two firms have formed the Hong Kong Pumped Storage Development Co., owned 51% by Exxon Energy and 49% by China Light, to utilize 600 MW of a 1,200-MW, pumped storage plant under construction by the government in China's Guangdong Province.

- **Henderson (China) Investment Co Ltd.**, a subsidiary of Hong Kong's Henderson Land, has agreed to jointly develop a total of 4,800 MW of coal-fired power in Shandong Province. Development costs are put at \$2.3-billion. A 1,600-MW plant will be built in the Shandong Province cities of Laicheng, Liaocheng and Weifang. Henderson will hold 30% of the joint venture and Shandong International Trust & Investment Co. will hold 70%.

- **Temasek Holdings** of Singapore and the Singapore Public Utilities Board are studying development of coal-fired plants in China's northern Shanxi Province as wholly owned units or on a build-operate-transfer basis.

Shanxi Province is expected to take an equity stake in the projects, if built. Current negotiations are considered preliminary.

The Singapore PUB is also studying possible power projects in the provinces of Ningbo, Wuxi and Suzhou. And a consortium headed by Temasek Holdings is studying port and real estate developments in Zhejiang Province.

Ningbo is in Zhejiang Province, and Wuxi and Suzhou are both in Jiangsu Province where Singapore companies are reportedly considering development of industrial parks.

- **Cathay International Group** of Hong Kong inked a joint-venture development agreement with Shengli Petroleum Administration Bureau to build-own-operate a \$500-million, 600-MW, coal-fired power facility. The joint venture firm will be known as Cathay International Shengli (Dongying) Power Generation Co. and it will build the facility as two 300-MW units. Construction will begin in 1994 and should be completed by mid-1997.

Cathay International Shengli (Dongying) Power Generation also agreed to rehabilitate, own and operate two existing

200-MW, coal-fired units now owned by the Dongying government.

- **New World Development and Henderson Land Development**, both of Hong Kong, agreed to joint-venture development of a \$346-million, 600-MW, coal-fired power project in Beihai, also located in the Guangxi Zhuang Autonomous Region.

New World and Henderson will jointly own a total of 50% of the project, while the State Energy Investment Co. will hold 30% of the equity and the government of Guangxi Zhuang ng Autonomous Region will hold 20%.

New World Development Co. Ltd.'s subsidiary, Guangzhou Pearl River Power Co. Ltd. plans a \$360-million, 600-MW, coal-fired plant in China's Guangdong province, as the first phase of a 1,200-MW development.

New World Development's joint-venture partner is Guangzhou Economic Construction Development Co. Ltd.

Guangzhou Pearl will borrow \$140-million to partly finance the project. The loan was arranged by China Development Finance Co. (HK) Ltd. The Bank of China, Hang Seng Bank, Credit Lyonnais, Dresdner Bank, Industrial Bank of Japan and Sumitomo Bank were underwriters and lead managers.

The five-year loan, which could be extended to eight years, carries interest at 1 percentage point over London Interbank Offered Rates and will be fully guaranteed by New World.

The Asian Development Bank has also agreed to lend Guangzhou Pearl \$50-million for 14 years at a concessional rate. The remaining \$170-million will come from shareholder loans and equity.

The project will buy the coal it needs, about 1.2-million tons annually, from two coal fields in northern China at market prices. The coal will be transported by rail and water under long-term transportation arrangements.

- **Deutsche Babcock AG's** power unit, Babcock Energie- und Umwelttechnik AG of Oberhausen, Germany plans to build a 250-MW, coal-fired electric power plant near Beijing. Development of the project is scheduled to begin in 1994 and is expected to be complete in four to five years. The plant will provide parts of Beijing with power and heat.

- An unidentified investor has signed to develop a 3,300-MW, coal-fired power plant in the Sichuan Province city of Pubujiang.

- **Westcoast Power** signed an agreement with the Changqing Petroleum Exploration Bureau (CPEB) to form a 50-50 joint venture—Sino-Canadian Cooperative Changhai Gas Electric Generation Co.—to build, own and operate a \$20-million, 15-MW, gas-fired cogeneration plant in Jingbian County, Shaanxi Province, China.

The project, set for 1995 completion, will likely be expanded to 40 MW to meet CPEB's needs for other facilities.

The current project will be located at the Jingbian gas field and Ansai oil field, both located in the Shaan Gan Ning (Ordos) basin.

The project may provide an introduction into the electric needs of the much larger China National Petroleum Corp. (CNPC), said Westcoast officials. The oil company uses power in various ways, including energy-intensive petroleum product refining.

- **Mission Energy** of California, an affiliate of Southern

California Edison, is "exploring" for private power projects in China, but declines to discuss specifics until a contract is signed. The company did say more than one project is under evaluation. In each case, at least one equity partner will be sought.

- **Westinghouse Electric Corp.** of the U.S. is planning a joint venture with **Longyuan Power Technology Exploitation Corp.**, a Chinese power company, to renovate China's existing, but outdated electric power generators. China has about 150 generators currently installed. Most details of the agreement are not yet worked out.

- **Plainfield, Ind.-based PSI Energy** signed a three-year information exchange agreement with **Huaneng International Power Development Corp.** The pact involves exchange of management and training personnel, the sharing of technical information and other factors.

- Twelve unidentified Japanese companies from various sectors have agreed to combine with the Tokyo-based **Institute of Energy Economics** to build joint ventured, coal-fired independent power plants in Guangdong Province.

IEE will act as the negotiator between the Japanese companies and Chinese officials. The firms have set their sights on building at least two of the power plants Guangdong Province needs, if feasibility studies now underway are favorable. The plants are likely to be built on a build-operate-transfer basis.

**Flotations:** The government of China has not announced nor indicated it intends to float any portion of its existing electric generating system.

**Retail Sales:** A growing number of large industrial plants in China either have their own cogeneration or "captive" power plants or are looking for a private company to build one for them.

With the opening of the Chinese power market, cogeneration developments are becoming more likely, according to officials.

In some cases, various ministries set up their own generation equipment. For example, the Chinese Ministry of Petroleum and the Ministry of Communications are known to have purchased gas turbine generators and diesel generating sets. Much of the equipment is for use in isolated locations, such as the Daqing oil field in China's extreme Northeast and the Karamay oilfield in the Northwest.

Also, the recent economic growth of the coastal provinces has led to purchases of foreign diesel generating sets that offer quick-fix solutions to China's electricity shortages.

An estimated 15,000 MW or about 15% of total installed capacity are produced by industrial concerns.

**Power Export Opportunities:** Because of China's need for power and its relative isolation, the opportunity for export of power generated by a private sector plant is considered small.

## PRINCIPAL ELECTRICITY SUPPLIERS

About 85% of China's electricity is generated by what are called "electric power administrations."

The administrations are actually large electric utility companies with territories generally corresponding to one or more of China's political and administrative subdivisions, provinces or municipalities, such as Beijing and Shanghai.

The administrations build power stations, generate power,

and sell electricity to industrial, agricultural, and residential end-users.

The four largest administrations account for almost 66% of the generating capacity of the electric utility networks. Two other regional electric power administrations and eight smaller provincial power administrations—each with grids confined to single provinces—account for most of the rest of the generating capacity of the electric utilities.

Although the administrations are considered independent accounting units, they are essentially bureaucratic organizations, and important investment, output, and pricing decisions are made in Beijing by the Ministry of Energy.

The government has launched reforms intended to gradually reduce central control over the regional administrations. The six large regional power administrations are to be replaced by companies independent of the Ministry of Energy except for general technical assistance and policy questions.

Also, a new Energy Investment Company was formed. Central state planners intend to reduce the use of direct budget grants. In the future, new energy projects will increasingly be financed by channeling government funds through the Energy Investment Company, which is to function like a bank and assess the economic and financial viability of new projects.

The Energy Investment Company is expected to eventually become independent of state planners, but right now its actions are strongly influenced by state planners.

The Ministry of Energy and the State Planning Commission appear to share responsibility for guiding the decisions of the investment company.

The administrations, generating capacities, locations and service territories are as follows:

- **North China Electric Power Administration**, 16,000 MW, Baiguang Road, Beijing, responsible for Shanxi and Hebei provinces and for Beijing and Tianjin municipalities.
- **Northeast China Electric Power Administration**, 19,000 MW, Nanhu Road, Shenyang, Liaoning Province, responsible for Henan, Hubei, Hunan, and Jilin, and Liaoning provinces.
- **East China Electric Power Administration**, 25,000 MW, East Nanjing Road, Shanghai, responsible for Shanghai Municipality and Zhejiang, Jiangsu, and Anhui provinces.
- **Central China Electric Power Administration**, 22,000 MW, Liyuan, Donghu, Wuhan, Hubei Province, responsible for Shaanxi, Ningxia, Qinghai, and Gansu provinces.
- **Northwest China Electric Power Administration**, 9,200 MW, Shangde Road, Xian, Shaanxi Province, responsible for Shaanxi, Ningxia, Qinghai, and Gansu provinces.
- **Southwest China Electric Power Administration**, 6,800 MW, Dongfen Road, Chengdu, Sichuan Province, responsible for Sichuan and Guizhou provinces.
- **Shandong Province Electric Power Administration**, 8,000 MW, Jinan, Shandong Province.
- **Guangdong Province Electric Power Administration**, 7,000 MW, Guangzhou, Guangdong Province.
- **Fujian Province Electric Power Administration**, 4,000 MW, Fuzhou, Fujian Province.
- **Yunn Province Electric Power Administration**, 3,100 MW, Guiyang, Yunnan Province.
- **Guangxi Province Electric Power Administration**, 3,200



MW, Guilin, Guangxi Province.

- Xinjiang Province Electric Power Administration, 2,000 MW, Urumchi, Xinjiang Province.

- Xizang (Tibet) Electric Power Administration, 200 MW, Lhasa, Tibet. Tibet is one of China's least-developed areas but it is the site of some of China's experiments in the use of geothermal and wind energy.

- Inner Mongolia Electric Power Administration (Hu-bao Grid), 3,500 MW, Hohhot. Although Mongolia is another less-developed province, it has large coal deposits that may be developed during the next decade. In addition, it is China's leader in wind-powered generation.

Foreign interest currently centers on the three administrations located in the coastal areas: the Northeast China Power Administration, the East China Power Administration, and the North China Power Administration.

## GENERATION PROFILE

**Installed Capacity:** 173,000 MW.

**Annual Load Growth:** At least 10% annually.

**New Generation Needs:** The Ministry of Power and the various provinces have released plans for about 192,000 MW of new capacity needed by 2015. The government's target for 2000 is to reach an installed capacity of 310,000 MW.

A total of 15,000 MW was added in 1993, but the Ministry wants to pick up the pace, adding 15,000 MW to 17,000 MW in each of the next five years, and adding 20,000 MW annually between 1998 and 2000.

Of the 100,000 MW, about thirty projects between 1,000 and 3,000 MW are included, seven are over 3,000 MW, plus the Three Gorges project, the world's largest at over 18,000 MW. The hydro projects will be built as fast as domestic and foreign funding will permit.

Current installed hydro capacity is 37,883 MW, but the government wants to expand that total to 80,000 MW by 2000 and has placed hydro construction on its list of "priority industries."

China is now in the midst of building the 18,200-MW Chang Jiang Three Gorges hydro project on the Yellow River, one of the largest in the world.

**Amount from Private Power:** At least half of the 137,000 MW that Chinese officials are calling for will be built and owned by the private sector.

## POLICY STATUS

China's new electric industry control regulations were implemented Nov. 1, 1993. The new regulations established five levels of authority: the state level; those across provincial, autonomous regional or municipal boundaries; the provincial, autonomous regional or municipal level; the city level; and the county level.

The new regulations are designed to also allow the central Chinese government to gradually decontrol prices of electric power and give a greater sense of security to foreign independent power producers.

The regulations provide an avenue for independent power producers and consumers to fight interference from state and local governments

The regulations will also help the government link the re-

gional power grids to become a national network.

Currently, China has five major grids, covering 22 provinces, autonomous regions and municipalities, and eight independent grids.

A national power grid to cover 26 provinces and Hong Kong is expected to take shape by 2000.

The new regulations are a signal that the Chinese government's long-standing opposition to higher electricity prices is being relaxed by central planning authorities in order to encourage private sector development.

Chinese power prices have been virtually unchanged since 1976 and only recently were allowed to rise slightly. However, the modest increase is far below actual cost of production, which was long ago outpaced by inflation, the Ministry of Power said.

The current electricity shortfall is about 20% and threatens to grow worse if China does not accelerate development of power plants, the Ministry said.

Although it will not yet offer specifics on the new pricing schedules, serious analysis is underway by the Ministry staff, which is expected to be ready with a broad set of new regulations sometime later this year.

Initial implementation of the new prices will be within the East China Power Group, which includes the provinces of Shanghai, Zhejiang, Jiangsu and Anhui. A rational electricity tariff could be fully-established across the country within 24 to 36 months following initial implementation in east China, officials said.

Other major changes are planned. The power sector will also be restructured to run more like a private company.

The ministry will write and introduce new power sector rules and regulations for the electricity sector, plus establish a management system for the power industry over the next few years, officials said.

Historically, China is divided into 12 electrical grids, each one administered by a local power authority. All power authorities were owned by the government, so wholesale and retail prices were established by the government. Only operating costs and outstanding debt were calculated into the price structure.

Most power plants lost money and were consequently subsidized by the central government. Also, grids sold power to end users at a price reflecting the end user's importance in the central government's economic plan. Rates did not reflect whether a plan was efficient or old or new.

The government allows 100% foreign ownership of power plants. Previously, developers set up joint ventures with local Chinese partners to build-own-operate or build-operate-transfer new power plants.

The Energy Ministry has been empowered to allow developers to make sufficient profits to make projects economic.

## RATE STRUCTURES

Electricity prices average about 2.3 cents/kWh, but the Chinese are studying means of moving toward rational electricity tariffs (see Policy Status above). In general, China's electric utilities supply power to industries at uneconomically low rates.

However, many private power units being developed by

"localities" using funding from Hong Kong for example, and foreign-owned private power projects are usually lucrative for the developer. Because consumers pay for power directly to the power plant owners, rates can be higher and entities financing the units, such as banks in Hong Kong, are interested in investing in the units. Consumers are apparently willing to pay higher tariffs to get reliable power supplies.

## FUEL PROFILE

China has abundant reserves of oil, natural gas and coal. But the country relies most heavily on coal for electricity production.

**Coal:** China has enough coal to last several hundred years. Coal currently accounts for about 76% of primary energy consumption, with 99% of domestic production supplying the local market.

According to the World Energy Council, China has estimated recoverable anthracite and bituminous coal reserves of 68.5-billion tons and estimated recoverable subbituminous and lignite reserves of 57.6-billion tons.

Most of China's easily accessible, high-quality coal is in the north. Coal in southern China is generally higher in sulfur and ash. Consequently, large amounts of coal are shipped from the north to the south.

The Chinese government is currently in the process of moving the country's coal mining industry toward a market economy. Government officials plans to lift most coal price restrictions this year and lay off some 400,000 miners in an effort to modernize the industry and reduce debt. The government plans to sell 77% of coal produced at market by the first quarter of 1994. So far, the government has lifted price controls on 20% of the nation's coal production.

SGI International Inc. of La Jolla, Calif., signed a memorandum of understanding with China's main coal-producing area, Shanxi Province, to determine if Shanxi coals are suitable for upgrading using SGI's clean-coal refining process. The coal would be used in electric generating plants in China and other countries.

SGI refineries are said to convert low-quality, sub-bituminous and lignite coal into more efficient, high-grade clean coal by removing oil, sulfur and other material. The product of the refining plants is known as PDF, or process derived fuel. It is a much higher grade fuel than the parent coal and is clean enough to meet stringent U.S. sulfur dioxide (SO<sub>2</sub>) emission standards, the company asserts.

Shanxi province is China's main coal producing region, and a newly discovered coal field in northern Shaanxi has estimated reserves of 24.8-billion tons. Full-scale development is scheduled to begin by the end of 1995.

**Oil:** China is the world's fifth largest oil producer. The country has estimated proven reserves of 24-billion barrels. But without greater production, China could become a net oil importer by 1996. In an effort to encourage foreign oil companies to fund exploration and production ventures in China, the government opened the Shanghai Petroleum Exchange in May 1993. In March 1993, the government opened the Nanjing Petroleum Exchange as part of its market reform experiments.

Several foreign firms are venturing into China, including Amoco Corp. and British Petroleum Co. BP intends to im-

prove access to the vast Tarim Basin in southern Xinjiang, one of the last large prospective areas in the world still unexplored by Western oil companies. Xinjiang only has a single track railway.

Preliminary exploration of the remote Tarim Basin in western China has resulted in estimates of reserves of 10-billion tons of light oil and 8.3-trillion cubic meters of natural gas. Last year Xinjiang produced 12.6-million tons of oil out of a total of 142-million tons for all of China.

Oil has also been discovered in Bohai Bay, offshore of Tianjin. Reserves are estimated at 190-million tons, making it China's largest offshore oilfield.

Chinese officials have also restructured the country's oil sector, breaking up state monopolies for importing and exporting crude and refined products and creating more integrated companies, each able to import and export crude oil and refined petroleum products. The new companies include the China National United Oil Corp., China International United Petroleum, and Chemicals Co. Ltd.

**Natural Gas:** China's estimated proved reserves are 49.4-trillion cubic feet.

The country has begun to develop several new, promising fields including the Qingdonan Basin, which has estimated reserves of 220-million cubic meters; the Pinghu oil field in the East China Sea; and fields in Sichuan Province, which account for over 40% of China's total gas production.

The Pinghu field is being developed by Texaco Shanghai Inc., a joint venture of Texaco Inc. and China's Shanghai Petroleum Corp. The field is expected to produce 500-million cubic meters of natural gas annually for about 18 years.

The Qingdonan Basin is being explored by a joint venture of Atlantic Richfield Co. and China National Offshore Oil Corp.

**Hydro:** The Ministry of Electric Power estimates the country's hydro potential to be 676,000 MW, including at least 379,000 MW that are commercially exploitable.

About 66% of the large hydro sites are in the southwest, far from the large electric load centers along the coast. Long-distance transmission lines will have to cross rugged terrain before the potential can be realized.

Nevertheless, a huge 17,680-MW hydro project, known as Three Gorges, is being planned by the government on the Yangtze River.

By areas, China's hydro potential is 6,900 MW in the north; 12,000 MW in the northeast; 17,900 MW in the east; 67,400 MW in the south-central area; and 41,900 MW in the northwest.

**Renewables:** China's renewable energy resources have not been well characterized. Some exploitation of each is underway, but only on a small-scale. However, the capital-intensive demand of most renewable technologies will likely block widespread reliance on these alternatives in the near future.

**Delivery Systems, Imports:** The state-owned China National Petroleum Corp. and Japan's Mitsubishi Corp. are conducting a joint feasibility study for development of a 4,200-mile natural gas pipeline from the Central Asian republic of Turkmenistan to China. If built, the pipeline would be the longest in the world.

Fuel transportation infrastructure in China is largely unde-

veloped. The railway system, for example, the primary method of moving coal, is overburdened with current shipments and there is virtually no gas pipeline system.

The port system of China is well developed, as is the river system, making the importation and movement of oil relatively easy for some parts of the country. However, many interior regions remain remote and are not well connected with other regions.

## **BUSINESS CLIMATE**

Chinese leaders are trying to decide how to best manage economic modernization. The political leaders must decide between rapid growth, and the attendant risk of high inflation, or slower expansion and lower inflation. Beijing seems to be choosing growth and to have abandoned a brief austerity campaign.

In June 1993, vice premier Zhu Rongji raised interest rates, imposed restrictions on lending and took other measures aimed at cooling economic overheating. But Zhu was forced to ease the austerity measures in September because of complaints from state-owned enterprises and other businesses of cash shortages.

The World Bank projects a growth rate of up to 13% this year, a level the bank noted is not sustainable on longer periods.

The International Finance Corp. will invest up to \$7.5-million in China Walden Investments Ltd., a venture capital fund that will invest in power projects in China, as well as projects in the telecommunications, health care, building materials and software. It is the IFC's first venture capital fund in China. IFC has investments in about 20 other venture capital funds.

The fund has a minimum size of \$25-million and a target size of \$50-million. IFC will invest 15% of the amount committed, up to \$50-million. IFC will limit its investment to \$7.5-million in the case that the fund attracts more than \$50-million. About \$30-million has already been committed to the fund, according to Jun Zhang, project manager of the investment fund at the IFC.

The IFC is also investing \$100,000 in China Walden Management Ltd., the fund manager. The management company is being established by Walden Group, a San Francisco-based international venture capital management company that has \$200-million under management, including about \$150-million invested in Asia. Both the fund and the management company will be incorporated in the Cayman Islands.

While the fund will invest in private power projects, the size of the projects it invests in will be limited by the investment criteria of the fund. Specifically, no one investment can be larger than 15% of the total fund and no sector can constitute more than 25% of the fund. Those criteria will limit the fund managers to investments in small power projects. A single 10-MW project would preclude further investment in any other electric power project.

The Export-Import Bank of the U.S. is accepting applications for limited recourse project financing for power plant and other developments in China.

Actual financing will not be extended until the U.S. and China conclude negotiation of a bilateral agreement. Exim bank officials could not give a timetable for conclusion of

those negotiations.

By filing applications now, Exim bank will be able to start what is a detailed process leading to actual limited recourse financing.

The bank's preliminary analysis can be extensive because limited recourse financing generally lacks sovereign guarantees. The key concern of the bank is whether the proposed project generates enough cash flow to pay down the loan. However, they noted in some cases solicitations by certain public agencies can amount to sovereign guarantees. If financing is granted, Exim bank will provide 85% of the contract value of U.S. equipment and services exported to a foreign project site.

**Political Climate:** Market reforms underway in China have received the blessing of the country's Communist Party Central Committee. Although there are some concerns about the smooth transition of power and continuity of policy in the inevitable shift from the current aging leadership to a younger generation of leaders, China's ability to absorb the political and economic shocks of reforms has so far proved good.

**Tax Policies:** The National People's Congress recently enacted an individual income tax law for domestic and foreign workers with nine brackets from 5% to 45%. The tax is effective Jan. 1, 1994. The 45% bracket applies to anyone making over \$94,728 annually.

For foreign workers, taxable income includes base salary, foreign service premiums, bonuses, per diem, tax reimbursement, housing allowance over actual costs, property and windfall gains.

Non-Chinese residents doing business in China are taxed on China source income only, if they are in China for more than 90 days and less than one year. Foreign residents in China for more than one year are taxed on world-wide income.

The U.S. and China have a double tax treaty.

**Currency Convertibility:** Chinese banking officials laid the foundation for convertibility of the Chinese currency, the yuan, in December 1993 with the announcement that they would unify the previous two-tier exchange rate systems and allow the yuan to float at market rates. Under the new system, the yuan will be able to be traded for foreign currency, but the exchange will still be controlled by the central state bank, not by private banks.

**Local Work Force:** China's urban workers earned an average \$316 a month during the first nine months of 1992, up 4% from the comparable 1991 period.

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***INDIA***

# INDIA'S POWER MARKET

## INDIA

### PRIVATE POWER NEEDS

An estimated 56,800 MW of the 142,000 MW of new generation needed by the year 2005 could come from the private sector. There are currently 71 private power proposals totaling more than 28,000 MW under negotiation and 43,382 MW of solicitations.

### MARKET STATUS

One of the largest and most visible private power projects in India, the 2,015-MW Dabhol project being developed by a consortium of Enron, Bechtel and General Electric, obtained a power-purchase agreement with the Maharashtra State Electricity Board in fourth-quarter 1993, sending a signal to other developers that private power will move forward in India (see Project Proposals below).

Also in the fourth quarter, Enserch Development signed agreements with the central government of India and with National Thermal Power Corp. for the exclusive rights to develop a private power plant in Kerala state that could be as large as 2,400 MW (see Project Proposals below).

In addition, the U.K.'s Rolls-Royce Industrial Power Group teamed up with the Calcutta Electric Supply Co. to develop a 500-MW project in Bihar (see Project Proposals below).

Also in the fourth quarter, the Maharashtra State Electricity Board increased the amount of private capacity it is seeking by putting out a call for another 4,500 MW (see Solicitations below).

Solicitations were also issued by Tamil Nadu state, which is seeking 51.5 MW of wind power, and the Ministry of Non-Conventional Energy Sources, which is seeking another 1,340 MW of wind energy (see Solicitations below). The government is also seeking private participation for up to 1,450 MW in the Sardar Sarovar Dam Project.

On policy, the Ministry of Energy has advised the State Electricity Boards to adopt competitive bidding as a means of implementing private power projects (see Policy Status below). The announcement is not binding and does not affect existing projects under negotiation.

#### Solicitations:

##### New—

• The Maharashtra State Electricity Board of Bombay is soliciting private sector participation for 4,500 MW of coal- and gas-fired projects. The projects are in addition to the power-purchase agreements and solicitations already under negotiation by MSEB.

The new projects are listed below by site name, size and fuel.

- Bhusal-B, 2,200 MW, coal;
- Parli-C, 420 MW, coal;
- Umered, 420 MW, coal;
- Khaparkheda, 420 MW, coal;
- Rawas-Mandwa, 1,040 MW, gas;

• The Tamil Nadu Energy Development Agency (TEDA) is soliciting international developers to build, own and operate up to 51.5 MW of wind projects.

TEDA is offering an extensive incentive package, including 100% depreciation of equipment during the first year of operation, access to the transmission grid for a 2% wheeling charge, equity holding of up to 100%, a 16% return on investment, an operating license of 30 years, renewable for another

20 years, full repatriation of profits and dividends, equity holdings as low as 11%, a long-term power-purchase agreement with the Tamil Nadu Electricity Board (TNEB), plus the developer can borrow up to 40% of the project's cost from Indian lending institutions.

The planned projects follow, listed by site name, size and fuel.

- North Madras, Stage-2, 630 MW;
- Basin Bridge GT, 120 MW, thermal;
- lower Bhavani, 8 MW, hydro
- Sathanur Dam, 7.5 MW, hydro.

In addition, the Tamil Nadu Energy Development Agency (TEDA) is soliciting international developers to immediately build, own and operate up to 750 MW of thermal units and 15.5 MW of hydro units.

• India's Ministry of Non-Conventional Energy Sources (MNES) is considering establishment of 1,340 MW of wind projects, on a BOO basis. The wind projects by location and size are Kethanur in the Coimbatore district, 2 MW; Poolavady, also in the Coimbatore district, 30 MW; Devarkulam in Kattabomman district, 15.5 MW; and at an unspecified location in the Kattabomman district, 6 MW.

• Indian government planners have decided to split off the power-generation component of the Sardar Sarovar Dam Project of up to 1,450 MW into a separate joint-venture company with a private-sector partner, according to senior officials with Sardar Sarovar Nigam Ltd. (SSNL), which is administering the project's implementation.

Shortlisting of potential partners for the \$870-million power component has already begun, officials said, while refusing to divulge any further details.

The project would set up two hydro power houses totaling up to 1,450 MW. One would consist of six reversible 200-MW turbines at the river bed, while the other, using five 50-MW turbines, would be at the canal head.

The Detailed Project Report prepared by SSNL apportions the government's share of the power project costs among the three participating Indian states: Madhya Pradesh, 57%; Maharashtra, 27%; and Gujarat, 16%. The cost of the power component accounts for nearly a fourth of the total project cost of \$3.54-billion.

The project would be built over Narmada River which traverses central and western India and is scheduled to be completed by 2000.

##### Ongoing—

The Indian Ministry of Energy has identified 84 projects totaling 21,315 MW that will be available to the private sector. The projects are part of the government's previously announced plans to obtain at least 30,538 MW of private power by 1997.

The following 21 thermal stations totaling 11,495 MW, are offered to the private sector listed by size, name, location and fuel, where available.

- 1,000 MW, Nabinagar Thermal Power Station Stage I, units 1 and 2, Bihar;
- 1,000 MW, Faridabad Thermal Power Station, Haryana;
- 1,000 MW, Cuddalore Thermal Power Station, Tamil Nadu;
- 1,000 MW, North Madras Thermal Power Station Stage-3, Tamil Nadu;
- 630 MW, Tenughat Thermal Power Station Extension Stage-2, Bihar;
- 630 MW, Jawaharpur Thermal Power Station units 1,

2 and 3, Uttar Pradesh;

- 600 MW, Aonla, combined-cycle, Uttar Pradesh;
- 600 MW, Babrala, combined-cycle, Uttar Pradesh;
- 600 MW, Shahjahanpur combined-cycle, Uttar Pradesh;

Pradesh;

- 500 MW, Durgapur Thermal Power Station, Orissa;
- 500 MW, Gopalpur Thermal Power Station, Orissa;
- 500 MW, Hirma Thermal Power Station, Orissa;
- 500 MW, Naraj Thermal Power Station, Orissa;
- 500 MW, Tuticorin Stage IV Expansion, Tamil Nadu;
- 500 MW, Vembar Thermal Power Station, Tamil Nadu;
- 420 MW, Muzaffarpur Thermal Power Station Stage-

2, Bihar;

- 420 MW, Birsinghpur Thermal Power Station Extension Stage-2, Madhya Pradesh;
- 420 MW, GNDP Thermal Power Station, Punjab;
- 420 MW, Goindwal Sahib Thermal Power Station, Punjab;

Punjab;

- 420 MW, Rosa Thermal Power Station, units 1 and 2, Uttar Pradesh;

Uttar Pradesh;

- 250 MW, Bhavnagar Thermal Power Station, Gujarat, lignite;

lignite;

- 250 MW, Kutch Thermal Power Station, Gujarat, lignite;

The following gas-fired units, totaling 3,383 MW, are listed by size, name, technology and location.

- 615 MW, Pipavav combined-cycle, Gujarat;
- 360 MW, Amguri combined-cycle, Assam;
- 300 MW, Pillaiperumalnallur combined-cycle, Tamil Nadu;

Nadu;

- 210 MW, Jagdishpur combined-cycle, Uttar Pradesh;
- 60 MW, Namrup Thermal Power Station Extension, Assam;

Assam;

- 22.5 MW, Bashkandi open cycle, Assam;
- 15 MW, Admtilla, open cycle, Assam;
- undesignated, Palwal Thermal Power Station, Haryana;

The following 41 hydro stations, totaling 6,073 MW, are listed by size, name and location.

- 1,200 MW, Teesta-3, Sikkim;
- 900 MW, Karchamwangtoo, Himachal Pradesh;
- 800 MW, Thumankal, Karnataka;
- 345 MW, Mahadayi unit, Karnataka;
- 680 MW, Rampur, Himachal Pradesh;
- 660 MW, Teesta Stage-5, Sikkim;
- 240 MW, Hibra, Himachal Pradesh;
- 225 MW, Shongtong Karcham, Himachal Pradesh;
- 192 MW, Allainduhagan, Himachal Pradesh;
- 135 MW, Patna Thermal Power Station, Bihar;
- 126 MW, Larji Hydel, Himachal Pradesh;
- 90 MW, Sarapadi, Karnataka;
- 86 MW, Malana Hydel, Himachal Pradesh;
- 86 MW, Swara Kuddu, Himachal Pradesh;
- 81 MW, Budhili, Himachal Pradesh;
- 70 MW, Dhamwari-Sunda, Himachal Pradesh;
- 60 MW, Bansagar-3, Madhya Pradesh;
- 30 MW, Bansagar-2, Madhya Pradesh;
- 21 MW, Keerti-hole, Karnataka;
- 20 MW, and 1.95 MW Kabini, Karnataka;
- 20 MW, Patikari, Himachal Pradesh;
- 20 MW, Bansagar-4, Madhya Pradesh;

- 15 MW, and 2 MW Hemavathi, Karnataka;

- 15 MW, Elanceru, Karnataka;
- 15 MW, Varahi, Karnataka;
- 12 MW, Brindawan, Karnataka;
- 10.5 MW, Khauli, Himachal Pradesh;
- 9 MW, Anandaka, Karnataka;
- 6.5 MW, CEEVY, Karnataka;
- 4.5 MW, Neogal, Himachal Pradesh;
- 4.5 MW Harangi, Karnataka;
- 4.5 MW, Vanivilas Sagar, Karnataka;
- 4 MW, and 4.5 MW Guntur units, Andhra Pradesh;
- 3.5 MW, Madhavmantri, Karnataka;
- 3 MW, KC Canal Hydel Electricity, Andhra Pradesh;
- 3 MW, Shiva, Karnataka;
- 2 MW, Nugu High Level Canal, Karnataka;
- 1.95 MW, Thirumurthi, Tamil Nadu;
- 1.3 MW, Pachiparai Dam, Tamil Nadu;
- 0.7 MW, Mukurathi Dam, Tamil Nadu;
- 0.35 MW, Thuklapatti Canal Drop, Tamil Nadu.
- 0.25 MW, Drop Down Stream, Karnataka.

The following eight wind power stations, totaling 62 MW, are listed by size, name and location.

- 50 MW, Ramgiri, Andhra Pradesh;
- 4.5 MW, Jogimatti;
- 4.5 MW, Kapatagudda Hills;
- 3 MW, Gokak Hills;
- four projects in Karnataka of undetermined size: Malagatti, Hanumansagar, Pommamahalli and Hanumana Hatti.

The following diesel-fired units totaling 278 MW, are listed by size, name and location.

- 100 MW, Cuddalore, Tamil Nadu;
- 100 MW, Samayanallur, Tamil Nadu;
- 78 MW, Kolar-Bidar Indi Jamkhandi, Karnataka;
- A solar project is the 30-MW Kothagudam station in Andhra Pradesh.

• Tamil Nadu Electricity Board is seeking private sector participation in a 500-MW, coal-fired generating station in the town of Tuticorin, located about 400-miles south of Madras. Prequalification is open until mid-October. TNEB said it will agree to purchase the output of the unit under a contract to be negotiated.

Approval for the project's feasibility study is expected shortly from the Central Electricity Authority. Approval will allow the project to proceed rapidly. Approval is also expected from the Tamil Nadu pollution control board, the ministry of environment and the central government of India.

Tuticorin is the site of an existing 1,050-MW coal-fired unit owned and operated by TNEB, which has identified a site for the proposed project.

A foreign bidder would be allowed to own and operate 100% of the plant's equity. Equity levels as low as 11% will be allowed. Additionally the developer can borrow up to 40% of the project's cost from Indian lending institutions. TNEB will also provide a 16% return on investment and an operating license of 30 years, renewable for another 20 years.

TNEB said interested companies should submit the following details within the prequalification documents: financial and managerial standing of the private company, technical competency and access to appropriate technology, details



and performance of past projects and source of project implementation funding.

The release of the Tuticorin project will soon be followed by similar international requests for the planned 1,000-MW North Madras thermal power station, stage-3, TNEB said. However, no date for release of the North Madras solicitation is set, officials said.

- Southern India's Andhra Pradesh State Electricity Board is soliciting the international private power sector for proposals for a total of 3,910 MW, including 3,410 MW of thermal units, 340 MW of hydro units at several locations and 160 MW of wind projects.

In the district of Karimnagar, APSEB is asking for proposals for two 250-MW units referred to as the Ramagundam Extension. Estimated development costs are \$412-million.

In the district of Nellore, the board is seeking proposals for two additional 250-MW units. Development costs are estimated at \$992-million, which includes significant expansion of the nearby Krishnapatnam port.

Other thermal projects include the 500-MW Kothagudem Stage-5 thermal unit, the 410-MW Rayalaseema Stage-2 thermal unit and the 1,000-MW Visakhapatnam Stage-1 thermal unit.

APSEB officials said it has a number of local firms interested in collaborating with U.S. firms in implementation of the projects, but a joint venture with an Indian firm is not necessary.

APSEB said it will agree to long-term purchase of power produced by the projects once they are declared commercial. Officials declined to specify a purchase tariff, but said the rate "will be determined using guidelines offered" by the state and federal government. Details of requirements are available from APSEB (see Contacts below).

- Seven states are planning 29 private coal-based projects totaling 10,380 MW. Three of the seven, Gujarat, Maharashtra and Andhra Pradesh, are offering gas-based projects totaling 2,450 MW.

Himachal Pradesh, Andhra Pradesh, Madhya Pradesh and Tamil Nadu have offered 19 hydro projects: Himachal Pradesh, 10 projects; Madhya Pradesh, three projects; Andhra Pradesh, four projects; and Tamil Nadu two projects with an aggregate capacity of 2,073 MW.

In Maharashtra, the SEB is offering 4,890 MW to the international development community, while the public sector in Maharashtra would like the private sector to build-own-operate a 500-MW, coal-fired power plant in the city of Chandrapur. The World Bank has approved a \$350-million loan to MSEB to partially finance not only the plant but a wider energy-efficiency plan.

In Gujarat, the state electricity board is looking for the private sector to develop or has proposals for 1,900 MW. Gujarat State Electricity Board (GSEB) has 2,365 MW under development and most of that is available to the private sector via joint ventures.

A 220-MW unit of the Kakrapar nuclear power station in Gujarat recently came on-line, bringing total capacity to 1,720 MW. The second unit of the Kakrapar project is expected to commence power generation early in 1994.

#### **Project Proposals:**

##### **New—**

- **Enserch Development of Florham Park, N.J.**, has

signed agreements with the central government of India and the federally owned National Thermal Power Corp. for the exclusive rights to develop a private power plant in India's Kerala state that could be as large as 2,400 MW.

The Kayamkulam Super Thermal Power Project will be developed in three phases. The first phase, scheduled for completion by about 1998, is for 420 MW. The second and third phases for 1,000 MW each, would follow in a year or two after the first phase. The plant will be located about 20 miles south of Cochin, the major city in Kerala.

Power will be sold to the Kerala State Electricity Board under a power-purchase agreement that has yet to be finalized. Coal to fuel the plant will be supplied by central government-owned Coal India Ltd.

Enserch's partner in the development consortium, known as ICMC Power Consortium, is **Tata Projects Co.**, a private company. Equity splits among the partners have not yet been determined, but Enserch will likely take the majority stake. Total development cost for the first phase of the project is about \$750-million.

The Kayamkulam project is Enserch's first announced project in India. The company is working on two other projects in India.

The Kayamkulam project, which is about 10-years old, was originally being developed by National Thermal Power, but NTPC ran out of money. Because it is a transferred and not a greenfield project, progress on Kayamkulam could move quickly since siting and environmental permits have already been secured for the full 2,400 MW.

- **Rolls-Royce Industrial Power Group of the U.K.** will take power plant equity for the first time through an undisclosed stake in a 500-MW, coal-fired project in India with joint-venture partner **Calcutta Electric Supply Corp. (CESC)**.

The venture, Chandil Power, will build, own and operate the \$412.5-million plant at Chandil in the Indian state of Bihar. Commercial operation is scheduled for 1996.

Rolls-Royce will supply two 250-MW steam turbine generators and may contribute cash as its portion of Chandil Power's equity.

CESC will manage its part of Chandil Power through CESC CON, the project management arm of CESC. The utility will also buy the power output from the plant under undisclosed terms.

Rolls-Royce Industrial Power Group, based in Newcastle-Upon-Tyne, is a unit of Parsons Turbine Generators Ltd. of the U.K.

Rolls-Royce officials said additional equity stakes may be taken in future power plants in India and other countries, if it finds attractive opportunities. Currently, the company's interest in India is high because of the enormous power needs of the country, officials said.

Separately Rolls-Royce struck deals to build the 200-MW, gas-fired, combined-cycle Godavari Project for Spectrum Power Generation Ltd. of Hyderabad and signed a turn-key contract for a 500-MW, coal-fired project under development by CESC near Balagarh, on an island in the Hoogly River in West Bengal, India.

In addition, Rolls-Royce and RPG Industries Ltd. of India formed a joint venture—RPG RR Power Engineering Ltd.—

to provide comprehensive plant-life improvement services and operational support for power plants installed in India.

- A consortium of **Enron Corp.**, **Bechtel** and **General Electric** have signed a 20-year power-purchase agreement with the Maharashtra State Electricity Board for the proposed 2,015-MW plant to be built in Dabhol.

The project is not the first to sign a PPA in India, but it is the largest and one of the most closely watched. Negotiations for the project began in July 1992 when the consortium signed a memorandum of understanding with the Maharashtra SEB.

Negotiations were complicated by the consortium's choice of liquefied natural gas as a fuel. The consortium will have to build an LNG trans-shipment facility to serve the plant.

The tariff for the plant has two parts, a fixed capacity charge and a variable energy fee. The capacity charge is fixed in 1997 terms at 7.47 cents/kWh with an escalation clause stipulating a 4% per year increase.

The first 695-MW portion phase of the project, to be fired by distillate fuel oil, is expected to come on-line early in 1997. The second phase will add another 1,320 MW and be fueled by LNG. Construction on the second phase is expected to begin in 1995, with completion set for 1998.

After the second phase is complete, the charge is expected to be 7.62 cents/kWh.

The significance of the Dabhol PPA is enhanced because Enron was pushing for deviations from standard PPAs, said observers. The deviations include a set escalation clause and guarantees against currency fluctuations for the rupee portion of the debt. In return, Enron and its partners have promised to deliver 90% availability for the plant.

The debt-to-equity ratio for the \$2.5-billion project is 70:30. About 70% of the debt will be funded by the Export-Import Bank of the U.S., other multilateral institutions and Indian financial institutions. The World Bank is not participating.

Enron is contributing \$230-million in equity or 80% of the total, while Bechtel and GE will each contribute 10%. In the first phase, Enron will probably sell down its equity stake to about 50%. In the second phase, it will likely sell its share down to 30%, said an Enron spokesperson.

Bechtel will provide design and construction, General Electric will supply equipment and Enron will develop and operate the plant.

- **Ispat Group of Calcutta** and **Mitsui Corp.** of Japan have teamed up to develop a 1,000-MW, coal-fired project at Umered, located about 63-miles outside Nagpur. MSEB was invited as an equity participant in the project and is considering the offer.

The project has been approved by the central government and negotiations are under way with Coal India Ltd. for fuel supplies. Ispat suggested the company lease four coal mines. The mines have a total reserve of 380-million tons.

- **Tractebel** of Belgium and a local company, **Jindal Group**, proposed a 250-MW, coal-fired power plant in Nagpur. If built, the project will be developed as two 125-MW units. Funding is being sought from the World Bank and the International Finance Corp.

- **Bombay Electric Supply and Transport Co.**, an electric distributor now buying power from the Tata Electric Co.,

is studying development of a 1,000-MW, coal-fired power plant in the Bombay area. Project partners would be needed, MSEB said.

Separately, TEC is building a 150-MW pump-storage unit at Bhira, set for service in 1995, and is planning a 180-MW, gas-fired unit near Bombay.

#### **Ongoing—**

- **Gujarat Power Corp. Ltd.** and **Gaz de France** signed a memorandum of understanding calling for construction of a 2,500-MW plant in Gujarat fueled by imported liquefied natural gas. Further details were not available.

- **National Power** of the U.K. has signed a joint-venture agreement with **Ashok Leyland**, a unit of Indian vehicle maker Hinduja Group, to develop a 1,000-MW, coal-fired plant at Vishakhapatnam in Andhra Pradesh, replacing Southern California Edison affiliate **Mission Energy**.

Mission withdrew from the project over management control issues with Ashok Leyland. Although the project looked very promising, the issue was "who was going to drive the bus," said Michael Noel, senior vice president and chief financial officer for Mission.

The station, proposed as two 500-MW units, will be sell power to the Andhra Pradesh State Electricity Board (APSEB). The partners will undertake the plant after feasibility studies and review by both parties are completed. National Power is expected to take a 25% equity stake in the project. A sizable part of the equity is expected to be held by local Indian groups, and the project is also open to additional international joint-venture partners.

- The government of Andhra Pradesh has approved seven private companies to develop 178.5 MW of wind farms. The developers will build the plants on a turnkey basis and the entire power output of the units will be purchased by the Andhra Pradesh State Electricity Board.

The largest single project award was for a 105.75-MW site and went to **Intervolt Cannon Power Corp.** of New York. It will be the largest wind farm project in India to date. Other awards were given to the following companies by name, corporate headquarters, and size of the wind farm: **Klen & Marshall Manufacturers & Exporters Ltd.**, Madras, India, 49.75 MW; **Sree Rayalaseema Alkalies**, Hyderabad, India, 5 MW; **Madras Cements Ltd.**, Madras, India, 5 MW; **Avanti Kopp & Kera Sintors**, Hyderabad, India, 5 MW; **Shakti Concrete Industries**, Hyderabad, India, 5 MW; **NEPC-MECON Ltd.**, Madras, India, 3 MW.

- **Southern Company's Southern Electric International** unit, is developing a \$1.63-billion, 2,340-MW, coal-fired power project in the eastern state of Orissa.

- **Jayamkondam Lignite Corp. Ltd.** of India is developing a 1,500-MW, lignite-fired TIDCO power project units 1, 2 and 3 in Tamil Nadu.

- **Asea Brown Boveri AG** and **National Thermal Power Corp.** are developing an 800-MW, gas-fired power plant at Bawana power station in Delhi.

- **RPG Enterprises of India** is developing a 500-MW, coal-fired Chandil power station in Bihar.

- **Calcutta Electric Supply Co.** is developing a 500-MW, coal-fired Budge-Budge power project.

- **North East Services Inc.** of the U.S. is developing a

500-MW, coal-fired Dubri power project in Orissa.

- **Coleman & Associates** of Sydney, Australia, is leading a consortium to build a 440-MW, lignite-fired independent power plant in Barsingsar, Rajasthan, India.

The consortium, operating as Barsingsar Power Corp. (BPC), consists of **Ansaldo GIE** of Italy, **Transfield Holdings** of Australia, local consultants **PL Dhanuka Group** and others.

BPC is currently negotiating a power-purchase agreement with the Rajasthan State Electricity Board of Jaipur.

The project will be built as two, 220-MW units and includes a concession under new incentives offered by the government of India to own and operate the mine required to produce the lignite.

The State Electricity Commission of Victoria (Australia) will provide project management and engineering, but will not hold equity. BPC is talking with AES Corp. of Arlington, Va., about participation in the project, but no agreement has been reached. AES may operate the development once it is built. AES confirmed BPC is talking with the company. Coleman & Associates is also talking with potential joint-venture partners for other electric power projects in India.

- **Century Textiles and Industries Ltd.** of India is developing a 420-MW, coal-fired power station at Pench in Madhya Pradesh;

- **GVK Industries** of the U.S. is developing the 400-MW, coal-fired Godavari power project in Jegarupadu, Andhra Pradesh.

- **Jaiprakash Industries Ltd.** of India is developing the 300-MW Baspa hydro project in Himachal Pradesh.

- **ST Power Systems Inc.** of the U.S. is developing a 210-MW, lignite-fired, power project with Neyveli Lignite Corp. in Tamil Nadu.

- **Ballarpur Industries Ltd.** of India is developing the 70-MW Uhl-3 hydro project in Himachal Pradesh.

- **Punjab Power Generation Ltd.** of India is developing a 22.5-MW Ghanvi hydro project in Himachal Pradesh.

- **India's McNally Bharat Engineering Co.** of New Delhi is the lead in a consortium of **Siemens AG**, **Deutsche Babcock AG**, and **MAN AG** formed to build, own and operate a \$2.7-billion, 1,500-MW, lignite-fired independent power project in Tamil Nadu. The plant will be one of India's largest when complete. An electric utility with strong plant operating experience will likely be involved.

The consortium plans to form a joint venture with the government-owned Tamil Nadu Industrial Development Corp., but the equity distribution among the partners is not established.

It is expected the unit will be built at or near the site of an existing lignite mine and that the state electricity board of Tamil Nadu will sign a long-term contract to buy the power output.

Construction is scheduled to begin in January 1995, with the first phase of the plant operational by 1998. The second phase is targeted for 2000 and the third phase should be operational by 2002.

- A consortium of **Westinghouse Electric Corp.**, **Foster Wheeler Corp.**, **Blount Inc.**, **International Contracting and Marketing Corp.** of New York City and **Tata Projects Ltd.** of Bombay have signed a memorandum of understanding

with the Tamil Nadu State Electricity Board to build, own and operate a 1,000-MW, coal-fired power plant near Madras in Tamil Nadu state.

The consortium is now preparing a project report and is seeking additional consortium equity partners.

- The **Nathpa-Jhakri Power Corp.** is developing a \$1.48-billion, 1,500-MW hydro project in northern Himachal Pradesh state.

The World Bank approved a loan of \$442-million for the project after it was satisfied with the financial arrangements and the technical capabilities made by Nathpa-Jhakri.

- **North Eastern Energy Services** of Fairfield, Conn., is developing a \$1-billion, 1,000-MW, coal-fired project in Mysore, Karnataka.

- The **Power Grid Corp.** of India and the Maharashtra State Electricity Board received a U.K. government grant of about \$41-million, credits from the Swedish government and financing by the World Bank to implement and manage a project to link the transmission grids in southern and western India and craft programs to promote energy efficiency. The project will be developed in the Maharashtra state province of Chandrapur and will allow the two areas to swap electric capacity as needed.

The high-voltage DC transmission project will have a capacity of 1,500 MW and transmit electricity over 460-miles from Chandrapur to Padghe, near Bombay. Transmission is scheduled to begin commercial operation in 1997.

- **Cogentrix Inc.** of Charlotte, N.C., has signed a memorandum of understanding with the Indian state of Karnataka for a feasibility study for two 500-MW cogeneration plants, one in Mangalore and one in Bangalore.

- **GEC-Alsthom NV** of Paris was recently awarded a \$220-million contract to link the electricity systems of west and south India.

The company will supply and install a 1,000-MW station linking Chandrapur and Ramagundam for the state-owned Power Grid Corp. of India. The project is a step towards creating a national power grid in India.

- **Essar Energy**, a unit of Bombay-based Essar Group has proposed to GSEB a 800-MW, gas-fired private power project near Surat. Essar is also seeking government approval to explore for and produce oil and gas in the Tapti River near the town of Hazira. Gas production would be used to fuel the plant.

The industrial development department of Gujarat also has under study a 600-MW, lignite-fired project in the village of Kutch. GSEB plans to use recently discovered lignite deposits in Bhavnagar and Surat to increase lignite-based power generation. For the lignite-fired plants to operate at the lowest possible cost, they must be operated near lignite production sites.

- **British Gas** is studying a plan for building an 800-MW, gas-fired project near Delhi, and an 800-MW, gas-fired plant in Maharashtra.

- **AES Corp.** of Arlington, Va., has signed a memorandum of understanding with the Orissa State Electricity Board (OSEB) of Bhubaneswar calling for development of two 210-MW, coal-fired projects and acquisition of two other 210-MW, coal-fired power projects now operated by OSEB.

The timetable under which AES will move forward is not

set and depends on how quickly the company can finance the project.

Cost of the plants is estimated at about \$600-million. Estimates on the acquisition costs were not available.

AES has a local partner acting as a consultant, that will eventually receive a small equity stake in the projects, but AES is looking for a substantive partner with the financial strength to help carry-off the project.

AES, which characterized the projects as "solid," said all units will be operated on a build-own-operate basis with power generation sold to OSEB under a power-purchase agreement to be negotiated.

- **Sumitomo Corp.** of Japan has formed a joint venture with the **Gujarat Power Corp. Ltd.** for a 600-MW, gas-fired, combined-cycle plant in the region. The Gujarat State Electricity Board (GSEB) will buy the power production.

- An Indian firm, **Raunaq Group**, has proposed to GSEB a 500-MW, lignite-fired plant in the Panandaro district of the city of Kutch.

Also, the GSEB has its own plans, which are also opportunities for private power developers. GSEB and the Gujarat Mineral Development Corp. are proposing a 500-MW, lignite-fired plant, also in the Panandaro district of the city of Kutch.

GSEB also plans two gas-fired projects for operation in the latter part of the decade. One unit will be a 615-MW plant and the other will be a 650-MW project, both at the city of Gandhar.

- **Bombay Suburban Electric Supply Ltd.**, a power distributor, is developing a 500-MW, thermal power plant at Dahanu in North Bombay, also under a contract with MSEB.

- **Siemens AG** of Germany formed a joint venture agreement with **Tata Electric Power Co.** of Bombay, India, to build-own-operate a \$485-million, 400-MW, gas-fired, independent power plant in western India.

Additional international partners are being sought. Both Siemens and Tata are expected to take a minority equity stake. The project partners will not be required to have plant operating experience because Tata Electric has extensive power project operating experience. The joint venture is anxious to begin building the unit as quickly as possible.

- **Thermax Ltd.**, in Pune, is seeking partners for 15 proposed coal projects located throughout India, ranging from 120 MW to 1,500 MW.

The projects reportedly have been "cleared for final linkages" and have the requisite environmental permits, or have been fully cleared and are ready for construction. Another eight projects are still under review.

- Six undisclosed power project developers have submitted bids to MSEB for a 410-MW, gas-fired power project at Nagothane, also near Bombay. MSEB is also looking for bids from the private sector for acquisition of two existing 225-MW, gas-fired plants at the city of Khaparkheda. MSEB will auction the two plants in the near future.

- Britain's **National Power** has struck an agreement with an Indian industrial firm and an unnamed third partner to begin a six-month feasibility study for a 300-MW, coal-fired independent power station in Mangalore, Karnataka, a state in southern India.

National Power said if the plant is built as expected it

would supply power to local industrial companies.

The feasibility agreement is with **Jaiprakash Industries Ltd.**, an engineering and manufacturing group planning to build a one-million tons/year steel mill at the Mangalore site.

National Power regards the project as the lead project in a series of opportunities currently under review. National Power's engineering and power project building subsidiary, **National Power International**, has been active in India for the last 15 years consulting and working with various state-owned electricity boards.

- An Indian-Italian consortium is planning a \$105-million, 268-MW hydro station in Almati.

- U.S.-based **Spectrum Technologies**, in a joint venture with the **National Thermal Power Corp.** operating as **Spectrum Power Generating Co.**, is planning a 200-MW power project in Godavari.

- India's largest aluminum manufacturer, **Bombay-based Hindalco Industries Ltd.**, plans to install two cogeneration units totaling 150 MW at its plant in Renusagar, in the northern state of Uttar Pradesh.

Hindalco needs the power to provide electricity to the power-intense process of making alumina. The company plans to increase production capacity.

- **Tata Electric Companies** of Bombay has received MSEB approval to build a 150-MW, pumped storage unit in Bhira. TEC plans similar projects in 1995 for the cities of Bhipuri and Khopoli.

TEC has also launched early development work for a 180-MW, gas-fired, combined-cycle plant at an undetermined location in Maharashtra.

- **Belgundi Cements Pvt. Ltd.** is looking for investors to expand a 5-MW biomass plant to a 30-MW facility to be ready for operation by March 1995.

It is being built at a small cement plant and surplus power will be sold "to other users through the grid." Government approvals have been obtained. Contact Harry Dhau, managing director, at (91-22) 202-2206 or 0827.

- **Supersystems** of Irvine, Calif., is working on three projects in India, in the range of 10 to 25 MW. Financing has been arranged for one project and additional financing is sought for the other two.

- Other companies expressing interest in the Indian private sector include Toronto-based **Northland Power**, **Panda Energy** of Dallas and **Texaco Syngas**.

**Flotations:** The Delhi government plans to privatize the distribution of electricity in Delhi, and the Delhi administration will invite tenders from private companies, but has not set a date for doing so. Terms and conditions have also not yet been announced.

**Retail Sales:** Sales to distribution companies within the various states are possible, as are sales directly to industrials within areas set aside for manufacturing and similar activities.

**Power Export Opportunities:** A \$10-billion electricity transmission project is under consideration to link India, Malaysia, Thailand, Indonesia, Singapore, Brunei and the Philippines.

## PRINCIPAL ELECTRICITY SUPPLIERS

**National Thermal Power Corp. (NTPC)** was established in

1975 by the government to plan, promote, and integrate the development of thermal power projects in the country. NTPC executes and operates large pit-head thermal power stations and associated transmission networks. Currently, NTPC's power generation constitutes 37% of the total thermal power generation in India.

The following is a list of the State Electricity Boards (SEBs) according to their geographic location, state and headquarters city:

**Northern Region:**

Haryana, Haryana State Electricity Board, Chandigarh;  
Himachal Pradesh, Himachal Pradesh State Electricity Board, Simla;  
Jammu and Kashmir, Jammu & Kashmir State Electricity Board, Jammu/Srinagar;  
Punjab, Punjab State Electricity Board, Chandigarh;  
Rajasthan, Rajasthan State Electricity Board, Jaipur;  
Uttar Pradesh, Uttar Pradesh State Electricity Board, Lucknow.

**Southern Region:**

Andhra Pradesh, Andhra Pradesh State Electricity Board, Hyderabad;  
Karnataka, Karnataka State Electricity Board and Karnataka Power Generation Corp., Bangalore;  
Kerala, Kerala State Electricity Board, Trivandrum;  
Tamil Nadu, Tamil Nadu Electricity Board and Tamil Nadu Power Generation Corp., Madras.

**Western Region:**

Gujarat, Gujarat Electricity Board, Baroda;  
Madhya Pradesh, Madhya Pradesh State Electricity Board, Jabalpur;  
Maharashtra, Maharashtra State Electricity Board, Bombay.

**Eastern Region:**

Bihar, Bihar State Electricity Board, Patna;  
Orissa, Orissa State Electricity Board, Bhubaneswar;  
West Bengal, West Bengal State Electricity Board, Calcutta.

**Northeastern Region:**

Assam, Assam State Electricity Board, Gwahati;  
Meghalaya, Meghalaya State Electricity Board, Shillong.

Neyveli Lignite Corp. (NLC) was established in 1956 under the Indian Ministry of Steel. It was set up to exploit the lignite reserves at Neyveli in Tamil Nadu. NLC's complex consists of a lignite mine, with production of 6.5 million tons annually, a briquetting and carbonization plant to produce coke, a fertilizer plant and three thermal power stations totaling 1,470 MW. NLC plans to add five units of 210 MW each—a total of 1,050 MW—before 1997.

There are several other public and private agencies that generate and distribute electricity, including five regional electricity boards where investments and benefits are shared by more than one state; 13 municipal corporations generating power under license from the state governments; and 10 private firms and 30 cooperatives.

The largest private firms are Tata Electricity Companies, owned and operated by the Tata Group; the Ahmedabad Electric Supply Co.; and the Calcutta Electricity Supply Corp.—owned and operated by the R.P. Goenka group.

The private utilities are often referred to as private power producers, causing some confusion when compared to non-

utility generating firms.

## GENERATION PROFILE

**Installed Capacity:** 78,981 MW. Of the 63,000 MW in the public sector, about 69.3% or 43,659 MW, are thermal-fired; 28.4% or 17,892 MW are hydroelectric and 2.3% or 1,449 MW are nuclear. The vast majority of the thermal capacity is fired by coal.

**Annual Load Growth:** About 10% to 13% annually. India's industrial growth depends substantially on availability of electric power. Although generation has grown between 5% to 10% annually, demand continues to outstrip supply.

India is experiencing an acute power shortage, adversely affecting industrial performance. The National Council of Applied Economic Research (NCAER) attributed a loss of 3.1% in India's industrial production due to power shortages.

**New Generation Needs:** 80,000 MW by 2000. By 2005, total additional capacity of about 142,000 MW are needed, including 82,000 MW of thermal-fired power, 51,600 MW of hydro and 8,150 MW of nuclear plants. By the year 2010, India will need a total of 172,000 MW of new capacity.

The following gas-fired plants, locations and generating capacity—totaling 3,170 MW—are proposed by NTPC: Kawas, Gujarat, 640 MW; Anta, Rajasthan, 413 MW; Auraiya, Uttar Pradesh, 650 MW; Gandhar, Gujarat, 650 MW; Dadri, Uttar Pradesh, 817 MW. NTPC plans similar projects at Faridabad in Uttar Pradesh, Krishna Godavari district in Andhra Pradesh and the state of Tripura.

The following coal-fired projects—totaling 3,900 MW—are being planned by National Thermal Power Corp. (NTPC): Farakka Project (Phase II), 1,000 MW; Vindhyaal (Phase I), 220 MW; Kahalgaon (Phase I), 840 MW; Dadri Project, 840 MW; Talcher Project, 1,000 MW.

The National Hydroelectric Power Corp. was established in 1975 by the Indian government to promote and coordinate the development of hydro power. NHPC has under construction several projects and recently finalized a plan to build six plants totaling 3,720 MW.

These projects—including project name, location and capacity—are: Dhauli-Ganga (Phase I), Uttar Pradesh, 280 MW; Beglihar, Jammu and Kashmir, 450 MW; Sawalkot, Jammu and Kashmir, 600 MW; Teesta, (Phase III), Sikkim, 1,200 MW; Koel Karo Project, Bihar, 710 MW; Uri Hydroelectric, Jammu and Kashmir, 480 MW.

**Amount from Private Power:** As much as 56,800 MW of the 142,000 MW of new generation needed by the year 2005 will come from the private sector. There are currently 71 private power proposals totaling more than 28,000 MW under negotiation and 43,382 MW of solicitations before the Indian government.

## POLICY STATUS

India's Ministry of Energy has officially advised the country's State Electricity Boards to employ a competitive bidding format for private power projects, as opposed to the Memorandum of Understanding process that has been used to date.

Existing proposals with MOUs will continue unchanged and the new directive will not preclude the future use of MOUs, said A.K. Upadhyay, director of the Investment Pro-

motion Cell of the Ministry of Energy. There are currently about 71 projects with MOUs in various stages of development in India.

The policy decision is a "just a suggestion to the State Electricity Boards" that they consider another means of inviting private power projects, said Upadhyay, adding that a competitive bidding process might yield more transparent proposals and better prices for consumers.

Under the existing MOU process, an individual company negotiates subdeals to implement a project, such as arrangements for tariff rates and power-purchase agreements.

Under the new format, companies bidding for a power project will have to compete with other bidders on costs per kWh, *force majeure* clauses, cost-escalation formulas, and financial structures, including the foreign-exchange component and debt-to-equity ratios.

The announcement of the policy shift was timed to defray any possible adverse public reaction to the signing of a power purchase agreement for the 2,015-MW Dabhol project being developed by a team of Enron, Bechtel and General Electric, said sources close to the Indian government (see Project Proposals, above).

The policy was also adopted in response to efforts by Indian developers who favor competitive bidding over negotiated projects, said one source.

However, the policy shift was not the result of pressure from the World Bank, as some developers had speculated. The World Bank has never set competitive bidding as a precondition for a loan, said Joelle Chassard, a senior financial analyst with the World Bank. Nevertheless, the change is welcomed by the World Bank. In the long-run, the competitive bidding process is better because it is very difficult for an SEB dealing with a single developer to know if he has a good deal," said Chassard.

**India's central government offers two forms of guarantees to private power projects.**

The first guarantee is for a minimum return on equity of 16% on investments in the power sector. There is no cap on earnings for private power projects. The guarantee is part of a two-tier tariff system designed by central government authorities to attract private investors to India's electricity sector.

One part of the tariff covers the fixed capacity costs, the other, covers the variable energy costs. The guarantee, which is denominated in U.S. dollars, covers the capacity payments for both gas-fired and coal-fired power projects. The guarantees will be offered on a case-by-case basis only.

In addition, companies will be offered legally enforceable contracts to ensure payment of damages for failure to execute contracts such as supply of coal and other inputs.

The second guarantee is a counter-guarantee to those offered by individual state electricity boards and state governments.

SEBs have been directed to set up escrow accounts to cover three months of payments to private power projects. If those funds are exhausted, the developer can seek payment through a guarantee by the state government, which is backed up by a letter of credit and is good for about one year's worth of payments. If that payment method fails, the central government has agreed to step in and guarantee payments to

approved projects. The exact form of the central government's agreement to "backstop" the state governments have not yet been worked out in detail.

Many of the State Electricity Boards are in the red and collectively owe the federally owned National Thermal Power Corp. over \$875-million. The guarantees will cover power purchase rates, consumer tariffs and the distribution networks.

The issue of sovereign guarantees has proved vexatious in the past and has kept nearly 40 proposed projects in limbo, despite government agreements to allow 100% foreign equity ownership, a guaranteed return of 16% and ownership of captive mines.

**Industrial Cogeneration:** India has industrial cogeneration potential of about 10,000 MW, according to a government analysis. The government is strongly encouraging Indian industry to install units to help offset the need for additional generating capacity on the national grid.

The sugar industry alone accounts for more than 2,000 MW of untapped cogeneration potential, followed by pulp and paper, fertilizers, petrochemicals, textiles, chemicals, steel, and food processing. The private sector claims the major obstacle to cogeneration projects development is the low price offered in power purchase agreements with local utilities.

**Environment:** The Indian government estimates industry will need environmental control systems valued at over \$3-billion by 2000. Rapid population growth, urbanization, and industrialization contribute to serious pollution problems in India. Over 4-million tons of particulates, 1-million tons of carbon monoxide, 500,000 lbs. of nitrogen, and 200,000 lbs. of hydrocarbons, along with a host of other solid and liquid toxic substances, are generated every year.

To enable industries to implement pollution control measures, the Industrial Credit & Investment Corp. Ltd. obtained a \$50-million line of credit from the World Bank.

There is mounting pressure by the Ministry of Environment and Forest and the Central and State Pollution Control Boards against polluting industries and the incidences of pollution are expected to increase.

**Renewables:** The state-run Renewable Energy Development Agency Ltd. (IREDA) estimates India could produce up to 2,000 MW of power from wind, solar and hydro projects within three years.

Public and private companies are expected to get involved with the renewable energy sector. For example, an industrial firm, Tamil Nadu Newsprint Ltd. is developing a 15-MW wind farm near a major plant site. The company launched development after experiencing difficulties locking-in adequate and reliable supplies of fossil fuel for a planned cogeneration unit. In Kerala, an industrial company, Carborundum Universal Ltd., is developing a 12-MW hydro unit.

IREDA will provide some of the funds needed for the renewable projects. The World Bank loaned the agency \$145-million to begin development.

## RATE STRUCTURES

Efforts are underway by federal officials to rationalize pricing policies, especially since international agencies such as the World Bank and the Asian Development Bank now link their loans to transparent, cost-of-service pricing of pow-

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## RATE STRUCTURES

Efforts are underway by federal officials to rationalize pricing policies, especially since international agencies such as the World Bank and the Asian Development Bank now link their loans to transparent, cost-of-service pricing of pow-

er. But electricity pricing remains a sensitive subject in India, especially in agricultural areas that have historically received the greatest subsidies. Recent attempts to hike electricity prices in the state of Haryana resulted in riots and several fatalities.

The government is setting up national and regional boards to draft transparent statewide rates for each state.

The government is also developing a two-part tariff system based on private power project capital costs and operational expenses.

Rates for power on a kWh basis differ dramatically from state to state, but in each case the rates for the agricultural sector are heavily subsidized by the domestic and industrial sectors.

For example, in Uttar Pradesh, industry pays about 4.682 cents/kWh, while the residential sector pays 2.299 cents/kWh and the agricultural sector pays 0.75 cents.

In Tamil Nadu, industry pays 3.52 cents/kWh, residential 2 cents and agriculture 0.313 cents.

In Andhra Pradesh, agriculture pays just 0.158 cents/kWh, while residential customers pay 2.26 cents and industry 4.178 cents.

The same relationship between the three sectors exists in all other states, although each state offers different rates.

## FUEL PROFILE

India has plentiful supplies of oil and coal and, to a lesser extent, of natural gas. India also has a huge and largely untapped hydro potential, as well as significant biomass and other alternative sources of energy. Some estimates put the country's biomass potential at 6,000 MW and its potential for wind generated power at 20,000 MW.

**Oil:** The shortfall between annual domestic Indian oil production and demand is expected to reach 35-million tons by 1997, according to a government study. Demand, now about 60-million tons, is projected to reach 79-million tons by fiscal 1996-1997. Domestic output is expected to only reach 44-million tons by fiscal 1996-1997, up from the current level of 27-million tons.

The Petroleum Ministry estimates India needs \$12.5-billion in new oil investments over the next five years, but the government can only provide about \$8-billion of the total. Accordingly the Indian cabinet has approved a Petroleum Ministry proposal to convert the Oil and Natural Gas Commission into a public limited company with the approval of the issuance of 20% of its stock to the public.

The partial privatization will enable ONGC to tap the open market for new funds, instead of the Indian Planning Commission, which sets ONGC's annual budget.

India has estimated oil reserves of 6.1-billion barrels.

**Natural Gas:** India's has estimated proven natural gas reserves of 26-trillion cubic feet. But there are large undeveloped gas deposits in the western, eastern, and southern parts of India.

Enron Power has signed a letter of intent to buy 2.5-million tons of liquefied natural gas a year for 25 years to fuel its proposed 1,980-MW, power plant in Dabhol (see Project Proposals above). Enron signed the gas-purchase agreement with the Ras Laffan Liquefied Natural Gas Co., a 70-30 joint venture between major shareholder Qatar General Petroleum Corp.—a unit of the Qatar government held by the Qatar

General Petroleum Corporation—and Mobil Corp. of the U.S.

**Coal:** The World Energy Council estimates India's recoverable anthracite and bituminous reserves at 66.8-billion tons, and its ignite and subbituminous reserves at 2.1-billion tons.

The state-owned coal company, Coal India Ltd., has introduced policies aimed at enabling it to ease its burdensome debt load. Coal India is extending to private power developers three options for securing coal supplies: (1) they can buy coal directly from the company, but prices are usually high, (2) for \$100-million a developer can purchase the development rights to a mine that will be operated by Coal India with output dedicated solely to the developer's power plant, or (3) a developer can purchase a mine and develop the coal potential. The third method is being employed by Calcutta Electric Supply Co. for its 500-MW Budge-Budge project.

The protective tariff of 85% on imports of coal into India may be scrapped following pressure from the Union Ministries for Commerce, Power and Steel.

The Geological Survey of India located huge lignite reserves along the coastal tracts of north Kerala.

**Hydro:** India has about 100,000 MW of potential hydro capacity, yet has installed only 18,000 MW.

**Wind:** About 5,000 MW of wind power are scheduled to be on-line by the year 2000.

**Delivery Systems:** The government plans to build new ports to handle liquefied petroleum gas at Mangalore and Kandla and plans an 810-mile oil product pipeline from Kandla to Bhatinda.

Mangalore and Kandla are on India's west coast, while Bhatinda is in the northwestern state of Punjab. The Indian Oil Corp. (IOC) is responsible for the project.

British Gas completed what the company said are phase-one negotiations with the Gas Authority of India Ltd. for a joint venture to supply natural gas to Bombay.

The government and British Gas will form a joint venture company to use offshore gas and set up a gas distribution network to serve the more than 600,000 commercial, domestic and industrial customers in the Bombay area.

The government is planning development of pipelines from offshore gas fields in the following areas: Krishna, Godavari, Bombay, Arunachal Pradesh, Assam and Rajasthan.

Smaller developments are planned offshore Cauvery and Andaman as well as onshore developments in Gujarat and Assam. There will be pipelines from South Bassein to Hariza and a pipeline from Herra to ICP, then to Hariza.

## BUSINESS CLIMATE

The budget announced by Finance Minister Dr. Manmohan Singh in March 1993 contained several incentives designed to attract private sector power investments. Power projects that go on-line on or after April 1, 1993, are entitled to a five-year tax holiday. Assessment commences in the year production begins. For subsequent assessment years, tax deduction from profits will be allowed at the normal 30% rate.

The budget also promises a cut to 20% from 30% in customs duties on capital goods and project imports, as well as concessions on excise duties for plant equipment. The excise duty for all capital goods has also been reduced to 10%, from a previous range of 11.5% to 23%. And power units will now



pay only a 5% excise duty for plant and machinery purchased from domestic producers.

Additionally, the budget has reduced the import duty on ferrous and non-ferrous metals, used in making indigenous power-generation machinery, to 20% from 30%.

The budget incentives will lower the cost of future power plants by at least 10%. Depending on fuel, the overall savings could average between \$15.63-million and \$18.75-million for a 500-MW plant.

The new budget also increases the outlay for power projects by 22%, to \$1.95-billion, from \$1.62-billion last fiscal year. Nevertheless, this allocation is inadequate for the medium- and long-term energy scenario, said analysts.

Economic reformation in India, begun in earnest in 1991, hangs in the balance of actions not yet taken. To keep pace with the booming economies of other Asian countries, India must undertake a series of radical moves, including elimination of farm subsidies, privatization of most state-run companies, and imposition of income tax on tens of millions citizens not now paying tax or even filing returns.

In its latest annual report, the International Monetary Fund concluded Prime Minister P.V. Narasimha Rao's reforms have been helpful, but far from complete.

The European Investment Bank has sanctioned a loan of \$65-million to India's state-owned Power Grid Corp. for an electricity development project in South India. It is the first EIB loan for an Asian country. The loan will finance a modern load-dispatch, control and communication system of the high-voltage electricity transmission grid that services the four southern Indian states of Tamil Nadu, Andhra Pradesh, Kerala and Karnataka. The project is partly financed by the World Bank.

The loan comes in the wake of an accord between India and the European Community that granted India Most-Favored-Nation status, opening avenues for cooperation in various economic sectors.

**Political Climate:** In November 1993, elections the right-wing Bharatiya Janata party that had previously gained substantial power with its unwavering support of Hindu extremism lost much of its popularity.

Bharatiya Janata became India's main opposition party by promoting Hindu resentment against India's Muslim minority. Bharatiya Janata was blamed for backing Hindu zealots who tore down an ancient mosque in December 1992, setting off riots that killed 2,000 people, mostly Muslims.

The results have no direct effect on Prime Minister P.V. Narasimha Rao and his minority Congress Party government.

**Currency Convertibility:** Exchange rates for the rupee are still partially controlled by the Indian government, but exchange controls could be lifted over the next 12 to 18 months as a result of plans announced by Finance Minister Singh to further liberalize exchange controls.

**Repatriation of Profits:** Newly-instituted reforms allow 100% repatriation of profits.

**Tax Policies:** There is a 55% *ad valorem* tax on project imports, such as equipment. Because power projects require massive investments, the government seeks soft-term loans or bilateral credit from supplier countries.

**Availability of Local Partners:** There are numerous potential partners including the private generating companies

and industrial cogenerators.

**Local Work Force:** Most of India's people live in more than 500,000 villages where the major economic activity is agriculture. As a result of a British policy that encouraged migration from urban to rural areas, India is more rural today—26% urban, 74% rural—than it was 100 years ago.

Labor distribution is as follows: commerce and services, 14%; manufacturing, 20%; agriculture, 52%; construction, 7%; government and public authorities, 7%.

India's literacy rate, as of 1991, was 52%, up from 44% a decade ago. The education system is free and open to all through the university level.

India's state boundaries are drawn largely along linguistic lines, and the constitution recognizes 14 regional languages in addition to Hindi and English.

English, although spoken by only about 3% of the population, remains important in government, education, and science.

## CONTACTS

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**National Thermal Power Corp.**, Rajinder Singh, chairman, NTPC House, SCOPE Complex, Core III, 7 Institutional Area, Lodi Road, New Delhi 110 003; phone, (91-11) 436-0044; fax, (91-11) 436-3050; P.K. Varma, executive director, phone, (91-11) 436-0251; fax, (91-11) 436-1018; NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodi Road, New Delhi, 110 003; phone, (91-11) 360044; P.K. Agarwal, deputy manager; phone, (91-11) 643-3156; fax, (91-11) 646-6623; A. Baijal, general manager; phone, (91-11) 645-1960, 642-6984; fax, (91-11) 642-6983; 201, Skipper House, 62, Nehru Place, New Delhi 110019.

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**Color-Chem Ltd.**, S.G. Advani, director, 194 Ravindra Annex, Churchgate Reclamation, Bombay, 400 020; phone, 91-22-2022161; fax, 91-22-2029781; telex: 11-83365.

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***INDONESIA***

# INDONESIA'S POWER MARKET

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## INDONESIA

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### PRIVATE POWER NEEDS

Up to 13,000 MW by 2000 will be available to the private sector. Currently there are 6,925 MW of proposals in various stages of negotiation and 2,990 MW have been solicited.

### MARKET STATUS

This past quarter, a consortium of Sikap Power, World-wide Holdings—both of Malaysia—and Indonesian firm PT Bukaka Teknik Utama firmed up plans for a 5,000-MW, coal-fired plant that would be built in three stages (see Project Proposals below).

In addition, Duke Energy, Powerlink Corp. and P.T. Freeport Indonesia Co. have formed a venture to acquire and complete 160 MW of capacity at Freeport's gold and copper mining operations on the Indonesian island of Irian Jaya (see Project Proposals below).

Also, California Energy Co. is reportedly in talks with PT Himpurna Enersindo Abadi, a local company, for a joint venture (see Project Proposals below).

Indonesia's next five-year development program begins March 1994 and government officials say private sector participation in the power sector is imperative if supply is to catch demand, which is growing slightly over 12% annually.

According to the government's latest available information, just 33% of Indonesia's 185-million residents have access to electricity. The figure is the lowest among the six-member Assn. of Southeast Asian Nations (ASEAN).

#### Solicitations:

- The government has released international tender documents for supply and construction of Indonesia's first nuclear power plant, a 1,200-MW unit near Muria Mountain on the crowded coast of central Java. Proposals can be for build-own-operate or other schemes. Details will be open to negotiation.

The National Atomic Agency estimates construction of the plant will take up to six years with commercial operation scheduled for 2003.

The government asked for responses by November of this year. The government will decide by early next year on the most attractive proposals. Suppliers and contractors from the U.S., Germany and France are expected to respond, but the tender is available to all contractors.

The government is in the process of buying uranium fuel for the project from Australia, Canada and other areas.

The key factor in the tender received will be the price of power produced by the station, according to the National Atomic Agency. NAA will meet early next year to evaluate the proposals before handing them over to the office of the president.

The government will agree to any number of incentive plans for the project, such as build-own-operate or other negotiable arrangements.

The government has further plans to build up to 12 nuclear power plants on Java (see New Generation below).

- T.J. Jati: Two 600-MW, coal-fired plants in central Java. The site was selected by PLN for a total capacity of eight 600-MW units. The prequalifying teams are: (1) ABB Energy Ventures; (2) PT Bakrie Brothers with Nordic Power Invest AB and Transfield; (3) PT Catur Reksa Daya with PT Astra International and PT United Tractors and Bechtel International and National Power International; (4) Electric Power Development Co. Ltd. with Mitsubishi Heavy Industries and Mitsubishi Corp.; (5) Sumitomo Corp. with Mission Energy and PT Prima Nusa Indonesia.

- Cilegon, West Java: one 400-MW; coal-fired plant. The prequalifying teams are: (1) Ansaldo of Italy; (2) Mitsubishi Corp. with Mitsubishi Heavy Industries; (3) Samsung Co. with Samsung Heavy Industries and Samsung Engineering & Construction Co. and Korea Power Engineering Co.; (4) Siemens with Elcom Services, PT Guna Nusa Utama Fabricators, Clough Engineering and PT Petrosea; (5) Mitsui & Co.

- Wayang Windu, West Java: 40-MW, geothermal



project. The prequalifying teams are: (1) Amoseas with Texaco Cogeneration & Power Co.; (2) PT Enerindo Supra Abadi with U.S. Geothermal Industries Corp.; (3) PT Mahasara Buana with Geothermal Energy of New Zealand Ltd.; (4) Mitsubishi Corp. with Mitsubishi Heavy Industries; (5) Power Design Build Group with PT Ikha Hutama Satrya and PT Tripatra Engineering & Construction.

• Pathua, West Java: 40-MW, geothermal. The prequalifying teams are: (1) Amoseas with Texaco Cogeneration & Power Corp.; (2) Ansaldo; (3) PT Catur Reksa Daya with PT Astra International, PT United Tractors, Bechtel International and National Power International; (4) PT Enerindo Supra Abadi with U.S. Geothermal Industries Corp.; (5) Power Design Build Group with PT Okha Hutama Satrya and PT Tripatra Engineering & Construction.

• Pontianak, West Kalimantan: 110-MW, coal-fired project. This project was originally peat-fired but was converted to coal because of environmental considerations. The prequalifying teams are: (1) PT Bukaka Teknik Utama with EBS International Ltd., STEAG AG and Ferrostaal AG; (2) PT Ciputra Insan Prima with PT Udinda Aneka Sarana, PT Jaakko Povry and Ahlstrom Development Corp.; (3) PT Bakrie Brothers with Nordic Power Invest AB and Transfield; (4) Tractebel Pacific Ltd. with PT Daya Sakti Timber Co., PT Barito Pacific Lumber Co. and PT Alltrak; (5) Thermo Energy System Corp.

#### Project Proposals:

##### New—

• Sikap Power unit Sikap Project Management Services (SPMS) of Malaysia, Malaysian property developer Worldwide Holdings and engineering firm PT Bukaka Teknik Utama of Indonesia plan a 5,000-MW, multi-phase, coal-fired independent power station in Bukit Asam, Sumatra, Indonesia.

SPMS and Worldwide will each hold 35% of total project equity, with the remaining 30% held by BTU. Approval of the build-own-operate project by Indonesian authorities is pending.

The project was first proposed in October 1993, when the consortium partners signed a memorandum of understanding.

The first phase will consist of two, 150-MW, mine-mouth, coal-fired units scheduled to be completed by 1996. The second phase will consist of two, 500-MW units. Construction would start in 1995 with completion about three years later.

In the final, but undefined phase, additional 500-MW, coal-fired units would be built in the southern, northern and eastern areas of Indonesia, a total of some 3,500 MW or more.

Power from the first phase will be fed into an existing 150-kV transmission grid for local use. Power generated by the second phase will be fed into a 500-kV grid to be built either by state-owned power company Perusahaan Umum Listrik Negara or members of the private sector. How the power from the third-phase units will be handled is not set, but the consortium is studying distribution to Java, peninsular Malaysia, Singapore and Batam island by submarine cable.

The consortium reports several companies have expressed interest in participating in the project, including Mitsubishi of

Japan and Pacific Power International of Australia.

Also, Fieldstone Asia and Kleinwort Benson have reportedly expressed an interest in advising the consortium on financing.

• Omaha-based California Energy Co. is reportedly in talks to build, own, and operate a geothermal power plant in Indonesia, mostly likely in a joint venture with PT Himpurna Enersindo Abadi, a local company.

Although California Energy declined to discuss the report, the project is expected to be in central Java's Dieng area, about 250-miles east of Jakarta and will be designed to tap into Indonesia geothermal reserves, which, at 16,000 MW, are considered among the world's largest.

California Energy recently set up an international subsidiary office in Singapore to launch geothermal project development activities in any country with suitable resources.

Project development will be helped by California Energy's August 1993 acquisition of The Ben Holt Co., a Pasadena, Calif.-based engineering firm specializing in design of flash and binary geothermal power plants. The Ben Holt Co. has extensive experience in the Pacific Rim, especially Indonesia. Before being acquired, Ben Holt Co. was functioning as a consultant to CE's development efforts in Indonesia.

• Powerlink Corp., a unit of Northstar Energy Corp. of Calgary, has signed a letter of intent with Duke Power unit Duke Energy and Freeport Indonesia to purchase a majority portion of Freeport's power facilities, valued at \$200-million, on the Indonesian Island Irian Jaya.

Freeport, a subsidiary of Freeport McMoRan Copper & Gold of New Orleans, Duke Energy and Powerlink will each have a 30% share of the venture, while the remaining 10% will be owned by an unidentified Indonesian investment company.

The deal centers on a 100-MW diesel-fired cogeneration plant that supplies power to the company's gold and copper mining operations. The mining facilities are being expanded and a 60-MW power plant addition is under construction. Powerlink said there also is potential for further electrical facility expansions on the island.

The first phase of the sale, expected to exceed \$100-million, will be completed in mid-1994 and cover existing assets. The final sale will include the power plant expansion and is slated for the first half of 1995 when the new capacity comes on-line.

The transaction is subject to the execution of definitive agreements between the partners, financing and certain Indonesian government approvals.

The venture will be responsible for providing power services required by the mining company, including the expansion of ore output to 115,000 metric tons per day.

The acquisition is Duke Energy's first venture in Indonesia. Duke recently opened a Hong Kong office to pursue power projects in the Pacific Rim, China and Indonesia.

• IpcO International Ltd. of Singapore began commercial operations in early-December of a 66-MW power plant, said to be Indonesia's first independent power unit. IpcO and local partners built the Cikarang Listrindo power plant about 28-miles east of Jakarta. Additions to the plant are expected in the years ahead.

##### Ongoing—

• Unocal Geothermal of Indonesia Ltd., a unit of Unocal

Corp. said its two 55-MW, geothermal units under construction at Gunung Salak, West Java, will be operational by mid-1994, at the latest.

Recently, in a separate agreement, Unocal Corp. subsidiary Unocal North Sumatra Geothermal Ltd. signed a contract to develop up to 1,000 MW of geothermal power for PLN and Pertamina. The power will be sold into PLN's transmission system.

Under the agreement, Unocal would supply steam for 30 years to power plants that will be built as reserves are proven. At the end of the finance period for each power plant, ownership will be transferred to PLN.

Unocal will be responsible for all aspects of project development under a 42-year contract and paid by PLN on a kWh basis, but the company did not release how much it will be paid. Construction costs will be paid by Pertamina, but Unocal must first finance and construct the plants. Project equity will be retained by Pertamina.

The project location contains some of the best geothermal prospects in the world, according to Unocal. The company will also conduct an appraisal of the geothermal resources in the 240,000-acre Sarulla area in northern Sumatra.

- **Intercontinental Energy Corp.**'s 1,200-MW proposal for the second stage of the Paiton power project has been rejected by the government of Indonesia. Intercontinental no longer pursues projects in Indonesia.

Minister Habibie, who sponsored Intercontinental, requested Siemens to team up with Intercontinental's local partner, PT Bimantara Bayu Nusa. Recently, several other companies have been asked to join the project, but have yet to submit proposals.

Industry observers point out it is unlikely this effort will result in a financable project due to technical and operational complexities resulting from the sharing of the site by PLN and two private sector groups. Most likely the first stage of the project will close first and construction will begin before a decision is reached on the second two units.

Least-cost implementation would suggest installing identical units for the second pair of 600-MW units, preferably under the same ownership and operation with the first two units, assuming successful financial closure occurs for the first stage.

IEC's partners included **MK-Ferguson Co.** of Cleveland and Japan's **Mitsubishi Corp.** The local minority partner is **P.T. Bimantara Bayu Nusa**, part of the Bimantara Citra Group. MK-Ferguson is a unit of Boise, Ida.-based **Morrison-Knudsen Co. Inc.** Intercontinental Energy is based in Hingham, Mass.

- **Enron Development Corp.** and **Mobil Oil Corp.** submitted a proposal for a 500-MW gas-fired combined cycle power plant in East Java in April 1993. The proposal is currently under review by PLN and the directorate of private power. The proposed commercial operation date for the project is early 1996.

- London-based **British Gas** signed an agreement with the Indonesian government to conduct a feasibility study for a 400-MW, gas-fired combined-cycle private power plant in Bumi Serpong Damai City in West Java. Plans call for a build-operate-transfer arrangement under terms of about 30 years.

British Gas said it is launching the study without partners,

but will need one or more partners to develop the project.

The study is expected to be complete by mid-June 1994. Construction would begin shortly thereafter, and the plant could be completed by 1996 selling power to PLN.

- A proposal for the coal-fired Asam Asam project in south Kalimantan was originally submitted by **Tractebel SA** of Belgium with several Indonesian partners in 1991. The proposal was rejected by PLN in 1992, but the government now appears to be reconsidering the project and Tractebel could be asked to submit a new proposal.

- The first stage of the 1,200-MW Paiton power project proposed by **PT Paiton Energy Co.** has been under negotiation for about nine months. **PT Paiton Energy Co.** is a consortium of **Mission Energy BV**, a Dutch subsidiary of **Mission Energy of Irvine, Calif.**, which will take a 32.5% equity stake; **GE Power Funding Corp.**, with a 32.5% share; **Mitsui Corp.**, with 20%, and **PT Batu Hitam Perkasa** of Indonesia with 15%.

In March 1993, the government issued a presidential approval for the project and the investment coordination board issued an investment license to the consortium. However, no power-purchase agreement or tariffs have yet been agreed upon.

Based on the counter-proposals made by the government's negotiating team, the talks continue with the consortium intent on reaching an agreement early in the third quarter. Financing will then be sought. The project is scheduled to go on-line early in 1998.

- **Power Design Build Group** of New Zealand and Indonesia's **PT Okha Hutomo Satrya** are in discussions for a 40-MW, geothermal power project on Mt. Sibayak in North Sumatra. OHS is a subsidiary of **Hutomo Mandala Putra's Humpuss Group**.

- **Japan's Electric Power Development Co. Ltd.**, and **Tokyo Electric Power Services Co. Ltd.**, a subsidiary of **Tokyo Electric Power Co. Inc.**, are conducting a feasibility study for an 1,800-MW, coal-fired thermal power plant project in Sumatra.

The study, which is being funded as part of Japan's overseas development aid program of the Japan International Cooperation Agency, was to be complete in July 1993.

The project covers coal development as well as construction of the power plant and a 312-mile transmission line to Java.

The study also involves analysis of coal reserves and production volumes, as well as a technical investigation into coal mine development techniques.

- **Dale Power Systems** of Filey, England, is building a 15-MW, oil-fired generating unit for **PT Yasonta** of Bandung, Java. Yasonta will use the electricity to operate its textile machinery.

**Flotations:** None planned.

**Retail Sales:** Private companies can participate in the production and distribution of electricity in Indonesia in three ways—owning the electric plant, and the state electricity board can supply electricity to households; generating electricity for sale to companies within a particular industrial estate; and self-generation.

**Power Exports:** A \$10-billion electricity transmission grid project is under consideration to link Malaysia, Thailand, Indonesia, the Philippines, Singapore and Brunei.

The government is studying a high voltage submarine ca-

ble link between Sumatra and Java.

## PRINCIPAL ELECTRICITY SUPPLIERS

Prior to the advent of private power, Perusahaan Listrik Negara (PLN), the state-owned utility, was the sole supplier of electricity to the national grid.

The government has invited the private sector to build generating projects but the state-owned utility will retain the sole authority to transmit and distribute the power to the public. Some private capacity is sold to PLN, but no private operators currently sell their entire electric output to PLN.

The Dept. of Mines and Energy has basic responsibility for energy matters, with PLN the primary agent in the electricity sector. PLN is a public corporation managed by a board of directors responsible to the Minister of Mines and Energy.

## GENERATION PROFILE

**Installed Capacity:** At the end of 1992, PLN's installed capacity was about 10,302 MW, including 2,142 MW from hydro, 5,889 MW oil, 1,730 MW coal, 400 MW gas and 140 MW geothermal. There are also 7,500 MW of self generation.

There is a considerable disparity in power supply in Indonesia with around 68% of total installed capacity in Java, while Sumatra has only about 18% and Kalimantan, Sulawesi and other islands have about 5% each. Java also accounts for about 80% of demand but has limited energy resources, while the other islands have much greater energy resources and relatively low population density.

**Annual Load Growth:** Load has grown at a 17% annual rate for the past two years and is expected to continue at 12% annually. In addition, rapid industrial expansion has created a backlog of unconnected industries with a total load of about 4,000 MVA.

**New Generation Needs:** By 1999, PLN's total installed capacity is expected to rise by as much as 40,000 MW.

PLN's specific plans call for the addition up to 13,000 MW, including 3,650 MW by 1994.

Because they are concerned conventional fuel supplies will not be adequate, PLN and government officials are turning to other options including nuclear power. The government has plans to build 12 nuclear power plants of between 600 MW and 1,000 MW each in Java over the next 25 years.

The Indonesia Power-23, a \$612-million capacity expansion program was approved by the board of the Asian Development Bank. A \$280-million development loan will soon follow.

The program will consist of a \$48-million, 19-MW hydro project in North Sulawesi, a \$262-million, 210-MW hydro project in South Sumatra, a \$40-million rehabilitation of transmission lines in South Sumatra, a \$27-million diesel plant, \$14-million for a demand-side management pilot program, and a \$5.5-million engineering design for the Merangin hydro station in Sumatra.

Another \$148-million is set aside for contingencies, \$71-million for equipment price changes and \$106-million is set aside for interest during construction of the projects. The ADB board will shortly send to shortlisted consultants a request for proposals.

**Amount from Private Power:** Between 7,000 MW and

13,000 MW of the new capacity needed in Indonesia by 1999 is expected to be built by the private sector.

## POLICY STATUS

The Regulation of the Minister of Mines & Energy concerning private power, a follow-up document to KEPPRES 37/1992, defines how solicited and unsolicited private power projects will be processed. According to the decree, privately produced electricity can be sold to the state-owned electricity company, Perusahaan Umum Listrik Negara (PLN), or another party. The sales price must reflect actual private generation costs and be approved by the energy minister.

To further encourage private investment in electric power plants, the government has waived import taxes on capital goods and eased certain income tax rules. However, the government will not guarantee any capital investment or debt repayments made by the private sector.

The government is urging developers to use fuels other than oil, because Indonesia, a member of the Organization of Petroleum Exporting Countries, is concerned that rising local demand will turn it into a net oil importer shortly after 2000.

To meet long-term electric demand, the government is turning to nuclear power and recently issued tenders for the construction of a 1,200-MW nuclear plant at Mount Muria (see Solicitations above).

The main objectives of Indonesia's electric energy policy are to secure continuity of supply at affordable rates for households, to secure adequate supplies of oil and gas for export, which will require a shift to coal-fired power plants and the use of other energy sources such as geothermal.

Rural electrification is an important component of Indonesia's energy policy. PLN, which is responsible for implementing this policy, has a target of electrifying 11,600 villages.

## RATE STRUCTURES

There are 24 retail tariff categories but the rates in each category are identical throughout the country. This leads to significant cross subsidization between the Java-Bali interconnected system and off-Java areas where it is more expensive to generate and deliver electricity.

In addition, PLN is required to facilitate subsidies of certain tariff categories set low for social or other reasons. Retail tariffs are set by the president of the republic after considering a proposal submitted by the Ministry of Mines and Energy. Tariffs have most recently been raised in January 1993 by about 13%

## FUEL PROFILE

Indonesia has native reserves of oil, natural gas and coal, as well as a very large geothermal potential.

**Coal:** Indonesia's state-owned utility, Perusahaan Listrik Negara (PLN), expects consumption at coal-fired power plants to increase more than six-fold between 1994 and 2004. State-owned and private power plants will burn 34-million tons by 2004. Power plants now burn about 5.27-million tons of coal and 62-billion cubic feet (Bcf) of gas.

Coal will increasingly replace diesel as a fuel for Indonesian power plants. By the end of 1999, diesel consumption at power plants will drop to 2.71-billion liters and fuel oil to

1.24-billion liters, PLN estimates. Indonesian power plants now burn about 3.59-billion liters of diesel and 3.1-billion liters of fuel oil. Power plants currently burn some 5.27-million tons of coal and 62-billion cubic feet (Bcf) of gas.

To meet that and other sources of demand, production by Indonesia's coal companies will have to grow by 75%, reaching 45.5-million tons by 2000. Output for 1993 should come in at about 26-million tons, up 16% from 1992.

According to the World Energy Council, Indonesia has estimated recoverable coal reserves of 35.3-billion tons. About 75% of that total is located on the island of Sumatra and 25% is located on Kalimantan. However, many of the eastern Indonesian islands have yet to be explored, particularly the vast areas of Irian Java and the larger islands of Moluccas.

**Oil:** Pertamina, Indonesia's state oil company, is considering new incentives to entice foreign oil companies to explore remote and expensive parts of the archipelago to avoid becoming a net oil importer.

A series of incentives introduced in 1988 and 1989 resulted in 10 oil contracts in 1992 and could yield as many as 13 this year.

Tracer Petroleum Corporation of Vancouver, B.C., through its wholly owned subsidiary PerminTracer Petroleum Ltd., signed a production sharing contract for petroleum exploration and production rights to the North Tanjung Block in Indonesia with Pertamina and the Energy Ministry. The potential size of the North Tanjung block is projected at 100-million to 500-million barrels.

Tokyo's Kanematsu Corp will develop crude oil projects on the Indonesian island of Celebes with Atlantic Richfield Co. Kanematsu acquired a 30% concession in the 6,900-mile Kalosi block in the southern part of the island from ARCO.

Studies by ARCO show potential for coal-derived oil beds in the block and 600-billion cubic feet of gas have been confirmed.

Estimated proved oil reserves are 6.58-billion barrels.

**Natural Gas:** The government has granted Exxon Corp. a concession on a \$40-billion natural gas project in the South China Sea that could be one of the world's largest. Pertamina has agreed to give Exxon a bigger share of the gas estimated at 150-trillion cubic feet.

The Paris-based oil firm, Total SA, sees tripled Indonesia gas output by 2000 to 15-billion cubic meters a year, up from 6-billion cubic meters.

Muriah Shell BV, a unit of Royal Dutch/Shell Group, discovered natural gas in the Java sea, according to Pertamina. The discovery, Keladi-1, flowed 19-million cubic feet of gas per day in tests. The well is located 100 miles northeast of Semarang, capital of central Java. Indonesia's total reserves are estimated at 150-trillion cubic feet.

**Geothermal:** Geothermal steam potential is estimated at 16,000 MW and is centered in the Java and Sumatra areas. Less than 150 MW of geothermal plants are in service and under Pertamina ownership at sites in Kamojang and Dieng. A number of private companies have expressed strong interest in developing geothermal fields and PLN is considering the proposals.

The government is also studying how to best allow the private sector into geothermal development, particularly since

it would like to see geothermal generation jump by several hundred percent over the next few years. The high cost of geothermal development is the major hurdle in Indonesia. Historically, geothermal project developers faced a 48% income tax rate, but that was repealed last year in an effort to stimulate project development.

**Delivery Systems, Imports:** Indonesia is part of the proposed trans-ASEAN gas grid, a \$10-billion, 3,750-mile pipeline linking it with Brunei, Malaysia, the Philippines, Singapore and Thailand.

In January 1993, Singapore received the first flow of Malaysian gas from the first phase of the project.

Malaysia plans to extend the pipeline another 200 miles by 1995, which would link it with Thailand and possibly Indonesia.

Much of Indonesia is isolated from other areas because of the country's rough terrain, but there are thousands of harbors that could receive water-borne shipments.

## **BUSINESS CLIMATE**

Indonesia is the largest single borrower of Asian Development Bank funds. The bank has crafted a development for Indonesia through 1996, all of which is focused on keeping the state economy open and increasing the role of the private sector in all phases of Indonesian activities.

The higher levels of income posted by most Indonesians has resulted in higher rates of inflation, expected to be about 8% over the next 12 months.

There are six ADB objectives, including, promotion of non-oil and gas exports, mobilization of domestic resources, job creation, human resource development, wider private sector participation, and improved efficiency of existing foreign and private investment.

Indonesian infrastructure development is termed key by ADB. Consequently, ADB investment over the next few years will concentrate on diversification of energy resources, increased efficiency in generation and distribution systems, construction of urban infrastructure projects, the upgrade of rural roads, improvement of air and sea transportation, and increased availability of efficient telecommunications.

The bank plans to finance private sector investment in power generation and development of industrial estates.

Energy development is the government's highest priority and over the next 10 years investment is expected to be about \$3-billion, while another \$1.6-billion will be devoted to non-power projects. The ADB 1994 loan pipeline contains about \$1.6-billion of projects and about \$3.15-billion of technical assistance programs.

**The private sector is pushing for full foreign ownership** in power and other infrastructure projects. The government requires developers to set up joint ventures with local partners and the financial weakness of the local partners usually slows development.

Indonesian President Suharto issued a pledge to maintain national economic growth of over 6% annually, although it might require higher taxes. Suharto claims only with a high level of economic growth can Indonesia overcome its vast socio-economic problems.

When re-elected for another five-year term, Suharto said

the government would both increase taxes and cut spending. His pledge comes two years into a tight money policy, imposed to fight inflation, a growing external debt and debt payment deficit.

Foreign investment into Indonesia rose between 1990 and 1992 to \$10.3-billion, up from \$8.7-billion, although domestic investment fell sharply.

The government has issued two "deregulation packages," one in June 1991, the other in July 1992, that lowered duties on hundreds of categories of imports and eased or eliminated trade barriers on a number of other goods.

In May 1992, the government eased initial equity and divestiture requirements for certain types of foreign investment. If paid-in capital is at least \$50-million or if a project is located in certain provinces, the project may be 100% foreign-owned initially, with divestiture to a maximum of 80% foreign ownership within 20 years.

To get closer to end-users, foreign companies coming into Indonesia for the first time normally appoint local agents. A local agent is important, because they can be alert to upcoming invitations to bid, which may be released any time. Local agents can also investigate the procurement plans of buyers and inform their principals abroad about upcoming opportunities.

Under Presidential Instruction Number 8 (Inpres 8) all government-to-government loans for development projects must carry an interest rate of 3.5%, have a 7-year grace period and an 18-year payback. Many large infrastructure projects are financed on this basis. Companies pursuing major government projects are frequently informed by Indonesian government officials that they must have "soft loans" or Inpres 8 financing to win the bid. However, many projects are undertaken using foreign financing which does not meet the Inpres 8 requirements.

There is some recognition by the government that not all projects will attract foreign support on terms dictated by Inpres 8, and so the government administers Inpres 8 "flexibly." A project can go forward without Inpres 8 financing, if it is determined by the National Planning Agency (BAPPENAS) to be a high priority for the government.

Firms are advised to work closely with the officials in the implementing agencies and to encourage them to champion their case in asking for an exception from BAPPENAS. The only exception is in industrial estates, where private power developers will be free to sell directly to companies within the estates.

**Political Climate:** A reshuffling of the cabinet is expected with the re-election of President Suharto to a fifth term. The new cabinet would be an unknown quantity and therefore many analysts expect delays on pending power projects.

**Currency convertibility:** Indonesia maintains an open capital account and foreign exchange flows are free of controls. The government's policy is to allow a slow depreciation of the rupiah in a managed float with a projected 5% annual write down against the U.S. dollar.

In February 1991, the government promulgated new banking regulations, including requirements to meet Bank for International Settlements capital adequacy standards by December 1993.

In November 1991, the government's foreign commercial

borrowing team announced ceilings on foreign commercial borrowing by private and state-owned banks and introduced reporting requirements for private sector borrowing.

Bank Indonesia, the central bank, also sharply reduced access to its swap facility to encourage long term capital inflows and discourage short-term foreign borrowing.

In 1992, the government eased monetary policy and urged banks to reduce interest rates. Banks gradually responded, but lending rates remain high. Tight, and expensive, credit is expected to prevail for the near-term.

Other banking developments included passage of a new Banking Law that placed state-owned banks on the same legal footing as private commercial banks, gave them the option of selling shares on the local stock exchange, and permitted foreigners to purchase shares in listed private and state-owned banks.

**Tax Policies:** There are no non-tariff barriers affecting the importation of electric power distribution equipment. Import tariffs on this type of equipment range from 5% to 30% with a 10% import sales tax added on.

**Local Work Force:** The Indonesian government has agreed to review policies toward workers' rights, but has not yet set a schedule to do so. U.S. government officials had threatened to suspend trading privileges without an improved Indonesian labor rights record. Indonesian officials deny rights violations.

The only labor union in Indonesia, the All Indonesia Workers' Assn., or SPSI, is struggling to gain bargaining power.

Historically, the Indonesian labor market is characterized by shortages in some segments, while the overall number of job seekers far exceeds the number of positions available. Only about 1% of the population is estimated to have a university education, while 9.7% only finished junior high school and 10.5% earned a high school education. There is a shortage of managers, engineers and scientists, and Indonesia depends on foreign nationals to fill those jobs.

## CONTACTS

### Government

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***PAKISTAN***

# PAKISTAN'S POWER MARKET

hitting the southern industrial port of Karachi. Previously, Karachi was protected from the inadequacies of the power supply of the north. The government estimates Pakistan has a current shortfall of 2,000 MW.

Several industrialists are planning to install private power plants to bypass unreliable power supplies and several feasibility studies are underway.

## Solicitations:

- The Water & Power Development Authority asked the private sector at year-end 1992 to submit proposals for a 150-MW, gas-fired project to be built on a build-operate-transfer or build-own-operate (BOO) basis in the district of Sahiwal. WAPDA indicated private ownership of transmission facilities to service the unit was acceptable.

- WAPDA is seeking BOO bids for at least one 350-MW to 450-MW, gas-fired project at West Wharf, Karachi. Proposals for it and similar projects for the area should include a complete project, including needed substations. Up to 30% of total project costs could come from the National Development Finance Corp.

- The Sarhad Hydel Development Organization of Peshawar is expected in 1994 to issue an international tender for a 1,000-MW hydro project. The agency is currently negotiating a management consultant contract.

Other major projects planned for implementation by either WAPDA or the private sector before 2000 include:

- A \$3.5-billion, 3,600-MW hydro project at the multi-purpose Kalabagh Dam.

- An estimated \$2.7-billion, 3,360-MW hydro station at Basha, 200-miles upstream of Tarbela. Implementation is possible in 1996-97, with completion by 2006.

- The 1,500-MW, Neelum-Jhelum hydro project on River Jhelum.

- The 270-MW Chashma hydro project and barge-mounted turbine plant on the right bank of the Chashma River.

- The \$98-million, Ghazi Ghariala hydro project, six miles downstream of Tarbela Dam. Feasibility studies were completed in June 1992. Generation capacity is not known, but is expected to be modest.

**Plant Selloffs:** The privatization of WAPDA will likely begin with a selloff of a number of existing plants.

- The first WAPDA plant to be sold will be the 892-MW, oil-fired power plant in Jamshoro, Sind Province, about 82 miles north of Karachi. A feasibility study of the privatization process to be used was completed near year-end 1992 and is now under review at the Pakistani cabinet level.

- Less advanced are plans to sell off four plants totaling 1,150 MW in the province of Punjab.

## Project Proposals:

- Sponsors of the \$1.882-billion, 1,300-MW Hub River power project in late-1993 signed a revised agreement with the government of Pakistan, the final version of arrangements covering fuel supply, power purchase, implementation and government guarantees. The **Hub Power Group** (Hubco) expects to complete the project's financial package following the release of a formal commercial loan information memorandum.

The memorandum is scheduled for release in early January and financing could be complete about six weeks later.

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## PAKISTAN

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### PRIVATE POWER NEEDS

About 14,500 MW of new capacity will be needed by the end of the decade, and most of this is expected to come from the private sector. Also, most if not all, of the 9,209 MW of state-owned generating assets will be sold. There are solicitations outstanding for 10,570 MW and project proposals totaling 9,344 MW known to be under consideration.

### MARKET STATUS

Continuing progress on Pakistan's most visible private power project, the 1,300-MW Hub River project, and the newly elected government of Benazir Bhutto are expected to create a favorable environment for private power developments in 1994 (see Solicitations and Policy Status below).

An agreement between Pakistan's central government and the country's provincial government has cleared the way for the privatization of the state-owned Water & Power Development Authority (WAPDA). In addition, the Ministry of Water & Power will privatize the state-run Karachi Electricity Corp., the supplier of electric power to the country's capital (see Flotations below).

In addition, 1994 could see progress in the proposed privatization of the Karachi Electricity Supply Corp. (see Flotations below). The Asian Development Bank is providing technical assistance to KESC.

At year-end 1993 power cuts for the first time were



An initial briefing memorandum sent to over 67 banks drew interest amounting to over \$1-billion. Pakistani prime minister Benazir Bhutto set a Feb. 15 deadline to complete financing for the project.

Hubco signed a few smaller loans. In early December 1993 it drew a \$37-million loan from the Commonwealth Development Corp. (CDC), its first direct loan from an international development institution and the first tranche of long-term debt for the project.

The public sector financing company of Pakistan, the National Development Finance Corp., agreed to provide a \$29-million mobilization loan to the project.

The development consortium consists of the **Xenel Group of Saudi Arabia**, **National Power International**, a unit of **National Power PLC** of the United Kingdom, **K&M Engineering & Consulting Corp.** of Washington, D.C., **Mitsui** of Japan and **Ishikawajima-Harima Heavy Industries Co.** of Japan. The construction consortium for the project is comprised of **Mitsui**, **Ishikawajima-Harima Heavy Industries**, **Ansaldo** of Italy and **Campenon Bernard** of France. The unit is now under construction and expected to begin commercial generation of power by mid-1996.

- A \$1.2-billion, 1,200-MW, coal-fired project known as the **Gadani power plant** is under study by **Shawinigan Integ** of Canada.

- A 1,000-MW solar project, the world's largest, is proposed by a consortium led by Dallas-based **Entech Inc.** The project would cover over eight square miles when complete. The first stage calls for between 10 MW to 30 MW, growing to 300 MW during the following five to six years and up to 1,000 MW in the years following.

Initially, the project will be funded by a combination of grants, debt and equity. The Global Environmental Facility of the World Bank indicated grant funding may be available shortly, based on the project's ability to reduce CO<sub>2</sub> production in Pakistan.

- Two projects recently collapsed. Specifically, the government pulled agreements for the **Darwaza Power Group's** planned 110-MW, gas-fired, combined-cycle project at **Kala Shah Kaku** near Lahore and a joint venture of **Abtech Group** of Karachi and Russia's export agency, **Technpromexport** was scaled down to about 420 MW, from 840-MW, because of rising costs.

The gas-fired project sited for **Jamshoro** may be picked up by another developer in the near future.

- The **Fateh Group** of Pakistan is studying a \$883-million, 840-MW, oil-fired project in **Jamshoro**.

- A \$453-million, 700-MW, oil-fired power project is planned at **Port Qasim** by a joint-venture of the **Fauji Foundation** of Pakistan, **Babcock & Wilcox** of the U.K. and **Can-American Holdings** of the U.A.E. A feasibility study is underway.

- **Citibank International** is preparing financing of about \$600-million for the proposed 525-MW, gas- and oil-fired, combined-cycle **Uch-2** plant under development by **Power Development Co.**, **Energy Resources International Inc.** and **Gibbs & Hill Inc.**

- A joint venture of **Tenaska Inc.** and **California Energy Co.**, both of Omaha, Neb., and **Hawkins Oil & Gas Inc.** of

**Tulsa**—known as the **Uch Project Group**—proposed a 400-MW, gas-fired project at the **Uch gas field** in **Baluchistan** near the border of Iran. A detailed feasibility study required by the government is underway.

The project would sit atop the **Uch gas field** in western Pakistan. The field would provide the project's fuel and be developed by Pakistan's state-owned oil and gas development arm. Construction will begin immediately after financial closing, which is expected to come from the World Bank and other sources.

- A 300-MW, oil-fired plant at **Bin Qasim** near Karachi is proposed by the **Fauji Foundation** in collaboration with the **Canam Group of Oman**, Dubai.

- **Karachi Electric Supply Corp.** plans a \$300-million, 270-MW, hydro project at **Chashma** in central Punjab. Future plans call for three 210-MW, gas-fired plants and substantial improvements to the transmission and distribution network.

Power needs in Karachi, a port and industrial city with a population of 10 million, are increasing by about 9% annually.

- A 160-MW, lignite project is proposed by **Deutsch Babcock** of Germany.

- A 140-MW, hydro unit is proposed by the **Army Welfare Trust** with technical assistance and credit from **Industrial Metalurgical Pescarmona** of Argentina.

- **O'Brien Environmental Energy** of Philadelphia, **ARS Group** unit **Intrag Inc.**, of Wellesley, Mass., and the **Fauji Foundation** of Pakistan have signed a memorandum of understanding to form a joint venture to build, own and operate a \$180-million, 134-MW, gas-fired independent power project in **Kabirwala**.

O'Brien and Intrag were awarded the project contract after winning an international competitive bid. The project will supply power to WAPDA under a 15-year power-purchase agreement.

The Oil & Gas Development Corp. of Pakistan recently completed two low-Btu natural gas fields at a cost of about \$10-million to provide fuel to the project.

Project financing is expected to be supplied by the U.S. Agency for International Development and the U.S. Export-Import Bank, as well as other commercial and multinational lenders.

- A 132-MW, lignite project is planned by a company called **Pakland**, believed to be a local concern.

- A 120-MW, diesel plant is planned by the **Kohinoor Group** at **Raiwind**, near Lahore, for the fast growing industrial estate at **Chunian**.

- A 120-MW, diesel plant is proposed by **Fecto Pakistan**, an industrial company.

- The Karachi-based **Tawakkal Industrial Group** plans a 110-MW independent power plant at **Gharo**, in south Pakistan. **S.E.M.T. Pielstick** of France is expected to be a joint venture partner and supply the unit's turbines. The plant would supply power under a long-term power-purchase agreement to WAPDA. It is scheduled to begin operation in 1995.

Financing for the plant will come from a combination of the Asian Development Bank supplying 15%, Pielstick 65% and the sale of shares to the public 10%. The remaining 10% would come from the Tawakkal Group.

- A 100-MW, gas-fired, combined-cycle plant is proposed

by Intrag of the U.S. in partnership with Mandpur Gas.

- An 80-MW, coal-fired plant at Chakwal in northern Punjab is also proposed by Intrag with a local partner, the Redec Group.

- The Nishat Group of Industries set up a power generating company called Nishat Tek Ltd. to build a 17-MW project for an industrial site in Faisalabad, financed by Citibank AG.

- ICI Pakistan Power-Gen Ltd., a unit of ICI Pakistan is building a 10-MW plant at one of its industrial sites. Financing will be by the ANZ Grindlays Bank and equipment will be imported from Japan.

- A consortium of Skanska AB of Stockholm and two French companies, Cegelec and ISL/Sogreah, won clearance to build and operate a 30-MW, gas-fired power plant on the banks of the Neelum river in Azad Jammu and Kashmir. Commercial date of the project is expected by year-end 1994 or early-1995.

- A Karachi company, Tri-Star Power, offered on the local stock exchange \$2.5-million of its shares to fund the development of a 10-MW independent power plant in Karachi. The power generated from the project will be used by local industrials.

- A 6-MW, hydro project is planned on the Balloki Sulemanki Link canal in the Okara district by Altern Inc. of Englewood, Colo.

- A project of unspecified capacity known as the Allai Khawar Hydroelectric station, is proposed in the northwest frontier province areas of Kohistan by the Fecto Group.

**Flotations:** Pakistan's federal and provincial governments have agreed to the partial privatization of the Water & Power Development Authority (WAPDA). Specific dates and many of the details are not yet set. However, there will be no restrictions on foreign company participation and international investment will be allowed for as much as 100% of a project's equity.

First to be privatized will be WAPDA's 4,200 MW of thermal power stations and the electric distribution system. WAPDA's 3,000 MW of hydro units and the national transmission grid will remain in the hands of the government. Additional details are being developed.

The Asian Development Bank of Manila agreed to provide technical assistance to privatize and reorganize the Karachi Electricity Supply Corporation (KESC), by splitting KESC into separate business units covering generation, primary transmission, secondary transmission and distribution.

The plan calls for reducing the government's equity holding to less than 50% in the short-term and for the government to completely sell-out eventually. The bank has not yet worked out a schedule for privatization.

**Retail Sales:** Pakistani laws say the private sector may establish "industrial estates"—industrial parks—anywhere in the country. On those estates, the private sector is allowed to freely generate power for captive use and WAPDA has the option of buying surplus supplies.

According to government figures, there are 56 industrial estates in the country, including 16 with power production facilities. Of the remaining 40, 29 are connected to natural gas supplies and are available to international developers.

Companies building industrial parks in Pakistan usually

include their own generation in development plans.

## PRINCIPAL ELECTRICITY SUPPLIERS

Electric generation is largely a government function. The two state-owned public utilities are the Water & Power Development Authority (WAPDA), based in Lahore, and the Karachi Electric Supply Corp. (KESC), based in Karachi.

## GENERATION PROFILE

**Installed Capacity:** About 11,449 MW. WAPDA's installed capacity is 9,387 MW and KESC's installed capacity is 1,905 MW. Karachi Nuclear Utility Plant has capacity of 157 MW.

Pakistan's capacity includes about 2,947 MW of hydro, 3,683 MW oil- or gas-fired steam plants, 2,026 MW of combustion turbines, 415 MW of combined-cycle plants, 125 MW from a nuclear plant and a small amount from several small renewable projects.

Another 1,500 MW is installed by various industrial facilities as either cogeneration or self-generation units.

The transmission grid of Pakistan is the largest contiguous system in Asia, a total of 14,400 miles of lines ranging from 60/kV to 500/kV. However, only 7.5-million customers are connected to the system and load losses are high, estimated between 20% and 26%.

**Annual Load Growth:** Between 5% and 6.5% in response to aggressive industrialization and soaring population growth.

**New Generation Needs:** About 14,500 MW by 2000, or roughly 2,000 MW a year, just to stay even with sharply growing demand. Power shortfalls at peak demand are between 1,800 MW and 2,000 MW.

The government wants private interests to build a minimum of eight hydro plants and a similar number of coal- and oil-fired stations by the end of the century at an estimated cost of \$16-billion.

Ideally, WAPDA wants to bring 1,000 MW of hydro and 1,000 MW of coal- and oil-fired stations on stream each year, or a total installed capacity of 12,900 MW by the end of 1998.

KESC wants to expand its installed capacity to about 2,550 MW by the end of 1998.

The Pakistan government is also placing a high priority on expanded rural electrification. Of a total 125,083 villages in Pakistan only 40,784 are electrified. The eighth 5-year plan, which ends in 1998, forecasts an expenditure of \$778.2-million for village electrification.

A \$162-million project funded by OECF calls for electrification of 6,300, but so far, only 2,100 villages have been electrified under the project. WAPDA plans during the eighth 5-year plan to install over 5,100-miles of 11-KV lines, 5,500-miles of transmission lines and 78,418 distribution transformers at a cost of some \$713-million.

The Islamabad-based government of Pakistan is negotiating with the government of France about acquisition of a nuclear power plant of unspecified power generating capacity. The on-again-off-again negotiations have been underway since 1990 and will only continue if Pakistan agrees to open its facilities to full inspection by the International Atomic Energy Agency.

**Amount from Private Power:** Most of the new genera-

tion needed in Pakistan will be built by the private sector. There are currently solicitations for 10,570 MW and known proposals for 9,344 MW.

Eventually, most, if not all, of the 9,209 MW of state-owned generating assets are expected to be sold to the private sector.

## **POLICY STATUS**

In late November 1993, the government of Pakistan established a special commission to propose new energy policies. The commission is to recommend in early 1994 a process the government will use to increase power generation, promote foreign and local private investment in new generating facilities, and enhance oil and gas production.

Nonetheless, more than 20 industrial units and several major banks have been sold to the private sector and there are plans to privatize the Water & Power Development Authority.

**Environment:** The environmental aspect of any power project in Pakistan is becoming more important. Most public and private projects require compliance with World Bank environmental standards, which in turn requires full control of all emissions, including the installation—if needed—of modern desulphurization units.

Developers of all power projects must complete for the government an "Environmental and Social Soundness Assessment." The assessment requires a full description of the project and the affected environment, the collection of at least one year of base-line data covering meteorological information, water quality data, socio-economic impact, resettlement of local population, hazardous waste and material handling.

The assessment must also include a mitigation and resettlement plan, if needed, showing costs, duration and other factors.

Finally, an ongoing monitoring plan must be drafted for continued environmental compliance.

## **RATE STRUCTURES**

The government, eager to attract private investment, offers power-purchase agreements for up to 30 years at initial rates of between 5.6 cents and 7 cents/kWh, depending on technology, project location and negotiations. Guarantees can also be negotiated, such as coverage for political risks and repatriation of profits.

In late-August the government of Pakistan increased electric, oil and gas prices as part of a sweeping package of economic reforms. Electricity and gas price went up 15%, while domestic oil prices rose 10%.

## **FUEL PROFILE**

Pakistan has native reserves of oil, gas and coal, but they are not sufficiently developed to meet the country's energy needs.

**Oil:** Proven oil reserves are about 162-million barrels. Pakistan's 26 domestic oil fields produce about 72,000 barrels per day, about 42% of the country's daily requirement.

The government hopes its new petroleum policy will attract enough foreign investors to boost production by 65,000/bpd within the next three years.

Crude oil consumption is about 160,000/bpd. About

80,000/bpd is imported from Saudi Arabia, Iran and the United Arab Emirates.

Oil is used for 40% of Pakistan's total energy needs and about 66% of it is imported. The government is planning more than \$2-billion of investment in the oil sector to reduce dependence on imports and develop indigenous resources.

The Pakistani government has hopes of becoming the oil refining center of southwest Asia, as well as the export terminal for oil from the Central Asian republics of the former Soviet Union and a major market for cheap electricity from that region. The government also hopes to become a transit and end-user hub for gas pipelines from Qatar, Iran and the Central Asian republics.

Negotiations with Kirghizia for oil and gas pipelines and electricity supplies are underway.

**Coal:** A recently discovered field in Sind Province could hold as much as 80-billion tons. The government will reportedly authorize the use of the field for electricity production. Last year, Pakistani authorities found a 10-billion-ton reserve. Previously, total reserves were estimated at about 580-million tons.

Pakistani officials are considering the further privatization of its mining sector through the sale of individual mines. Reportedly, the first to be put on the block could be the Makerwal mine, currently controlled by Pakistan Mineral Development Corp.

**Natural Gas:** Proven reserves are about 22.6-trillion cubic feet, while annual production is about 519-billion cubic feet. Most of the gas is found onshore, although promising new discoveries are reported offshore.

Pakistan is pushing to boost gas-fired generation, as well as wider gas use in industry, transportation and other areas. The main constraint of increased gas use is the absence of a distribution infrastructure capable of transporting the volumes of available gas. Development of trunklines is underway.

Foreign investment is beginning to play a greater role in the Pakistani gas sector. Recently, the London-based oil company LASMO PLC signed contracts with the government of Pakistan and the Sui Southern Gas Company for the sale of gas from the Kadanwari field in Sind province under a 15-year contract to SSGC, which is building a 250-mile pipeline to carry it from Kadanwari to Karachi. The field contains estimated reserves of over 700 bcf and is due on stream in early 1995. It is expected to meet about 10% of Pakistan's total current gas consumption.

In September 1993, Pakistan, Turkmenistan and Afghanistan agreed to a 20-year cooperation agreement calling for Turkmenistan to export electricity and natural gas to Afghanistan and Pakistan, plus assist in exploration and development of oil and gas fields. In return, Turkmenistan will be allowed to develop natural resources in Pakistan and Afghanistan and all three companies will cooperate in development and construction of new highways and railroads.

The three countries will ask the World Bank's International Bank for Reconstruction and Development, the Asian Development Bank and the Islamic Development Bank for loans to finance the proposed projects.

Three newly commercial natural gas fields in southern Pakistan will provide up to 38-million cubic feet/day from early

1995. The fields hold estimated reserves of 700-billion cubic feet, according to the state-run Oil & Gas Development Corp. (OGDC).

The production may be able to supply 10% of Pakistan's total gas consumption, OGDC said.

Gas will be sold to the state-run Sui Southern Gas Company Ltd., which is laying a 160-mile pipeline from Kadanwari to Karachi.

A memorandum of understanding has been signed with Turkmenia for supplies of natural gas to the northern part of the country and Deniz, Azerbaijan's state-owned oil company, has set up a joint venture with Pakistan's Huffaz Group to explore for oil and gas in Sind, Balochistan and Punjab.

Also, the government gave approval for a gas pipeline from Qatar, along with a number of other energy-related projects.

**Hydro:** Melting snow from the vast Himalayas creates substantial hydro potential in Pakistan, estimated between 30,000 MW and 40,000 MW. Only some 2,900 MW are developed. The pace of hydro development in Pakistan is slow and expected to remain so.

**Alternative Fuels:** Wind, solar and micro-hydro resources appear to be abundant in several areas of Pakistan, but the government does not now have a program for development.

**Delivery Systems:** Private-sector access to Pakistan's strained fuel transportation infrastructure is limited but growing.

There are facilities to take imported oil to major urban and industrial centers, where most power plants are located.

Natural gas transmission is also limited, but Sui Southern Gas Transmission and Sui Northern Gas Pipelines are expanding the transmission system.

## **BUSINESS CLIMATE**

The government continues efforts to privatize several public sector enterprises and has announced plans to sell off virtually all public sector banks and manufacturing units to private investors.

Pakistan has ambitious development plans to revamp its infrastructure, but the government admits it lacks sufficient funds. In addition, Pakistan is very dependent on foreign aid.

The government offers a number of investment incentives, including tax holidays, duty exemptions, lower or waived import duties, removal or simplification of investment sanctioning and import licensing procedures, and fewer banned and restricted items. There are other incentives, particularly in less developed regions of the country.

Pakistan Privatization Fund Ltd. was created by the government in 1992 to support the government's privatization effort by raising capital from public offerings and other techniques.

The fund was partly crafted to fill a gap left by the banking sector, which is not able to respond adequately to the emerging private sector financial needs. Pakistan's current financial system is dominated by large, state-owned banks, with less than 20% of all banking assets privately owned.

However, the fund is small, about \$24-million, compared to the more than \$2-billion needed to fund the government's

privatization program through 1994.

The National Development Finance Corp., the Pakistan Industrial Credit & Investment Corp., and Bankers Equity Ltd., are the leading local development finance institutions, providing medium- and long-term loans in both rupees and foreign currency to the private sector. Services include equity participation, underwriting public issues of shares and securities, and technical and managerial assistance.

Pakistan has established a broad industrial base, particularly in the textile, cement, vegetable oil, fertilizer, sugar, steel, machinery, and food processing industries, but corporate taxes are high and bureaucratic delays can be daunting.

**Political Climate:** The political climate is uncertain. Benazir Bhutto is working to reform economic policy, but she faces stiff opposition from a parliament, some of whom oppose having a woman as prime minister.

**Currency Convertibility:** Exchange control reforms beginning in February 1991 allow foreign firms to invest in the shares of Pakistani companies with full repatriation allowed.

Government restrictions on foreign currency accounts by firms and individuals, both resident and non-resident, have been abolished, and limits on royalty and technical fee payments to non-residents, removed.

Non-resident firms and individuals now may trade freely on the stock exchanges by establishing "Special Convertible Rupee Accounts" in Pakistan from foreign currency remittances.

**Repatriation of Profits:** The central bank is no longer required to issue prior approval for the repatriation of profits or capital. Foreign-owned firms may issue equity shares.

**Tax Policies:** In 1992, the government introduced a package of tax reforms. An export processing zone, offering tax incentives to investors, has been set up in Karachi to attract foreign investment.

Investment incentives—including tax holidays, duty exemptions, and other measures—are being offered for private investment in less developed regions of the country.

However, the high rates of corporate taxation are compounded by various surcharges and other tariffs. Also, a major barrier to U.S. electrical equipment exports to Pakistan is the relatively high rate of duty levied.

Average tariff rates have come down, but further significant reductions are unlikely because of growing government budget deficits. The issue is being addressed through negotiations between the U.S. and Pakistani governments. U.S. companies often use licensing and joint ventures to overcome the high tariffs.

**Local Work Force:** About 3.5% of the 34-million work force is unemployed. Urdu and English are the official national languages. English is widely used in higher education, commerce, the courts and most official business.

Primary education is free, but only 44% of all children attend primary school, and only 18% attend secondary schools. Adult literacy is low.

By national law, Pakistan's industrial workers have the right to form trade unions, but those same labor laws place significant constraints on their ability to function. Strikes are rare, usually illegal and short.

Under the Essential Services Act of 1952, union activities are restricted in sectors associated with "the administration of

the state" like education, electric utilities and nationalized banks.

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# ***THE PHILIPPINES***

# THE PHILIPPINES' POWER MARKET

Lumpur took over Sabah Shipyard's 100-MW power barge venture (see Project Proposals below).

## Solicitations:

- The Philippine Board of Investments is preparing to solicit the private sector for proposals to convert the idle 620-Bataan nuclear power plant to a coal-or gas-fired unit.

The government is conducting a conversion study, scheduled for completion in early-1994 and is expected to recommend conversion of Bataan into a 1,500-MW, liquefied natural gas-fired unit. The private sector will almost certainly be involved because of the high estimated cost, over \$1-billion. The timetable of the conversion will depend on details of the private sector proposals offered.

A number of companies have expressed interest in converting Bataan, including U.S.-based **Enron Power Corp.**, **Uniphoenix Corp. Bhd.** of Malaysia, **Hyundai Group** and **Samsung Group**. The Philippine government has shelved the unsolicited proposal by **Uniphoenix Corp. Bhd.** of Malaysia to take over and convert the Bataan plant. Uniphoenix' partners included **Damansara Realty Corp. Bhd.** of Malaysia and **George Zaferos International Ltd.** of Milwaukee.

Uniphoenix proposed to have an initial 300 MW of capacity available within six-months of project authorization, a total of 600 MW in the 12 months following project implementation and all 1,000 MW in a total of 24 months.

Westinghouse Electric Corp. completed the Bataan plan in 1985, but it was never put into operation because the Philippine government claimed the unit was not safe and that bribes were paid to former Philippine president Ferdinand Marcos to win the contract.

In early October, the government accepted an out-of-court offer from Westinghouse in exchange for the government dropping fraud charges. Under the settlement, Westinghouse will provide combustion turbine generators to the Philippine worth an estimated \$49.5-million. In exchange, the Philippines said it will drop its fraud case before the International Chamber of Commerce in Geneva and not pursue an appeal of a May ruling in U.S. District Court in Newark which acquitted Westinghouse. Westinghouse did not confirm the settlement.

- The Philippine National Oil Co.'s Energy Development Corp. has begun accepting proposals from the private sector for three geothermal projects totaling more than 200 MW. Deadline for submissions has not yet been established.

The units will be available as build-own-transfer, build-own-operate or build-transfer-operate projects.

The first project is the 40-MW North Negros Geothermal Project in Bago and Murcia that has an on-line date of 1997. Estimated development cost is \$43.5-million with a foreign revenue requirement of at least \$20.8-million, perhaps more. Twelve geothermal wells will be needed to support the facility. None have yet been drilled.

The second project is the 120-MW Mt. Labo Geothermal Project in Camarines Sur, also designed for commercial operation in 1997. At least \$61.7-million of the estimated \$109.4-million in development costs will be foreign funds, the government said. Of the 24 geothermal wells needed for the project, only two have been drilled.

The third project is the 40-MW Mt. Parker Geothermal

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## PHILIPPINES

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### PRIVATE POWER NEEDS

Most of the 20,700 MW of additional capacity needed in the Philippines by 2005 are expected to be provided by private power developers. Already, more than 12,000 MW have been solicited and 7,652 MW of project proposals have been put forward.

### MARKET STATUS

The Philippines is struggling with a power supply crisis because of the government's inability to perform appropriate plant maintenance and its lack of financial resources to build new power plants and rehabilitate existing units. Daily brownouts generally last from four to 10 hours in most areas, especially rural areas. State-owned National Power Corp. said the problem could be solved by mid-1994 once new independent power plants are brought on-line.

There were several new private power projects proposed in the fourth quarter, including proposals by **Industrias Metalurgicas Pescarmona** of Argentina for two hydro stations totaling 330 MW. Also, an international consortium proposed taking over NPC's 199-MW Naga Power complex and **Tomen Power** of Japan will build about 98 MW of oil-fired capacity (see Project Proposals below).

In addition, two projects changed hands in fourth-quarter 1993. **Magma Power** bought **Mission Energy's** interest in a 231-MW geothermal plant, and **Ganda Holdings** of Kuala

Prospect in South Cotabato. The exact size of the project and its costs will be determined after the field is delineated. Surface investigation of the site was completed in 1992 and this year the geochemical and geophysical exploration effort will be finished.

But a number of other factors must be completed, including environmental impact of the project followed by needed permits. Drilling of resource wells will take place between 1994 and 1997. The government would like the power plant developed for commercial operation in the year 2000.

• The Philippine government introduced a preliminary list of 118 power projects available immediately to the private sector under the government's effort to sharply increase foreign investment.

The projects total 11,145 MW and are available under build-own-transfer or similar arrangements.

The National Economic and Development Authority (NEDA) said its list of 118 power projects is available not only under BOT agreements, but "similar arrangements" if a deal can be struck.

The list contains 37 hydro projects ranging in size from 6 MW to 112 MW, 45 "mini" hydro plants of between 320/kVa and 6 MW and 15 large thermal-fired projects. The thermal projects have not been identified by the government by type or selected site.

• NPC has put out to bid 1,860 MW of existing projects under a rehabilitate-operate-lease (ROL) scheme. NPC accepted bids from foreign firms on July 15, 1993.

The first project under this latest round of ROL projects is the 207-MW, multi fuel-fired Naga power complex in Cebu. The project consists of six diesel-, two gas- and two coal-fired units. The ROL process is estimated by NPC to cost about \$45-million.

NPC is free to enter into a negotiated contract for Naga and the other projects by virtue of the Energy Crisis Act of 1992, thereby avoiding the often lengthy public bidding process.

Ontario Hydro of Toronto, Ontario, held until May 15, 1993, a management contract for the Naga complex and is expected to be one of the bidders for Naga.

Naga complex efficiency is very low, reportedly between 22% and 28%, and it is now only contributing between 120 MW and 150 MW to the Cebu grid.

The other ROL projects NPC will soon bid-out include the:

- 100-MW Binga hydro plant in Benguet, Mt. Province;
- 57-MW, diesel-fired Talavera unit in Talavera, Cebu;
- 95-MW, diesel-fired Apaya plant in Misamis Oriental;
- 300-MW, coal-fired Calaca plant, unit 1 in Calaca, Batangas;
- 300-MW, unit-1 and the 350-MW unit 2 of the Malaya oil-fired plant in Piliilia, Rizal;
- 200-MW, oil-fired Manila power project in Manila;
- 150-MW, unit-1 and 150-MW unit-2 Kalayaan pumped-storage unit in Laguna.

Although the projects generally operate poorly, the problems have more to do with administrative and management problems rather than technical difficulties, sources report.

Most details of the ROL schemes are negotiable between

NPC and the private companies selected to execute the contracts.

• NPC requested proposals from the private-sector for rehabilitation-operation-leaseback (ROL) of the 100-MW hydro plant at Itogon, Benguet.

The contract period is for 15 years. The private company will be required to pay NPC a negotiable monthly lease rate for the contract period.

The successful bidder must agree to perform certain work including dredging of a needed reservoir involving the removal of 3.5-million cubic feet, construction of dams, a tunnel and reforestation and soil conservation.

• A request by NPC for private sector bids to build-own-operate up to 500 MW of barge-mounted electric generating projects drew few responses.

Although over 50 companies expressed interest to NPC, only six actually turned in a formal bid and only one—a proposed project by Hong Kong-based Hopewell Holdings Ltd.—strictly conformed to NPC requirements.

The Philippines needs new power sources so badly NPC said it will put the bids through its evaluation process while waiting for the six firms to fully comply with bidding requirements.

• The Philippines is preparing an international solicitation for build-operate-transfer bids for a total of 29 hydro projects totaling 950 MW.

The projects will be offered in two blocks—14 projects totaling 530 MW and 15 projects representing 420 MW.

Solicitations for the first block will be issued shortly, while tenders for the second block will take place in 1994.

Project feasibility studies for the units are complete and available from NPC. The World Bank-financed studies were completed by either NPC or competent consultants.

NPC anticipates the private sector will form special project companies incorporated in the Philippines to undertake development of the units.

All project finance is expected to be limited recourse without any direct sovereign guarantees of repayments. NPC is willing to sign 25-year power-purchase agreements for the output of the BOT units.

Contract signings are expected by mid-1994 and effective September 1994. Commercial operation of the first block is expected in 1997 and 1998.

As the solicitation process is unfolding, NPC will be working to obtain all needed permits from the various government agencies, including water permits from the National Water Resources Board (NWRB), land use permits from the Forest Management Bureau; environmental compliance clearance from the Philippine Dept. of Environment and Natural Resources; and needed endorsements from relevant regional, provincial and local councils.

Any project of 10 MW or less has access to special small hydro incentives, including lower gross receipts taxes; tax and duty-free importation of machinery, equipment and materials; tax credits on domestic capital equipment; lower taxes on realty and other similar taxes; a value-added tax exemption and a seven-year income tax holiday. Ownership of the units can be 100% foreign.

The first priority solicitation includes projects on the Lu-



zon-A and -B, Visayas and Mindanao grids.

Luzon-A grid:

- Bakun C, 19.8 MW, Ilicos;
- Kanan B1, 112.6 MW, Quezon Province.

Luzon-B grid:

- Ilaguen B, 146 MW, Isabela;
- Addalam A, 73 MW, Quirino;
- Tanudan D, 49 MW, Kalinga-Apayao.

Visayas grid:

- Langogan, 7 MW, Palawan;
- Okoy, 13 MW, Negros;
- Alag, 39.5 MW, Mindoro.

Mindanao grid:

- Pugu D, 11.4 MW;
- Pugu E, undetermined capacity;
- Pugu B, 18 MW;
- Asiga, 11 MW, all in Agusan Norte;
- Siguil, 15 MW, Sarangani.

The second solicitation will include units on the Luzon, Visayas and Mindanao grids.

Luzon-A grid:

- Amburayan A, 4 MW;
- Amburayan C, 30 MW;
- Nalatang A, 30 MW;
- Nalatang B, 45 MW;
- Bakun AB, 45 MW, all located in Benguet.

Luzon-B grid:

- Pasil B, 20 MW;
- Pasil C, 22 MW;
- Pasil D, 20 MW;
- Saltan B, 24 MW;
- Tinlayan B, 21 MW, all located in Kilinga-Apayao.

Visayas grid:

- Caturan, 18 MW;
- Dulangan, 28 MW;
- Bongabong, 28 MW;
- Aglubang, 14 MW, all located on in Mindoro;
- Babuyan, 6 MW, Palawan.

Mindanao grid:

- Cateel E, 17.5 MW, Davao Del Norte;
- Lanon, 21 MW, South Catabato;
- Tran AB, 31 MW, Maguindanao.

• Manila-based **Atlas Consolidated Mining & Development Corp.** wants foreign private sector investors to assume the company's \$104-million foreign debt in exchange for its 140-MW power plant.

Atlas owns and operates the plant at its mine site in central Cebu province. Excess power from the plants is sold to NPC.

The company turned to the debt-swap concept after a proposed power project development joint venture with **MG Carbon GmbH** a subsidiary of Germany's **Metallgesellschaft AG**, collapsed.

• The government-owned **Development Bank of the Philippines (DBP)** agreed to offer a \$300-million private sector infrastructure development fund (PSIDF) for local firms willing to build infrastructure projects.

The fund will be available to companies interested in building power plants and other infrastructure projects for the

1994 to 1998 time frame.

PSIDF will be partially financed by DBP's planned \$150-million Eurobond offering in July.

• The Philippine Dept. of Energy is offering to the private sector about 2,160 MW of new geothermal energy units on a BOT or BOO basis with international solicitations issued by National Power Corp. DOE wants geothermal to be the country's largest domestic energy source by 2000.

A total of 22 geothermal plants are included in the country's revised power development plan for 1993-2005, pending before the administration. Quick approval is expected.

DOE plans the following units, listed by name, size, and targeted commercial operation date.

On the Luzon grid:

- Bacman 1, 110 MW, August 1993;
- Bacman 2, 40 MW, December 1993;
- Mak-Ban binary unit, 16 MW, March 1994;
- Bacman, 16 MW, June 1994;
- Maibarara binary, 11 MW, October 1994;
- Mak-Ban, 60 MW, December 1994;
- Mak-Ban, 20 MW, January 1995;
- Del Gallego/Mt. Labo, 120 MW, December 1997.

Visayas grid:

- Palinpinon 2, Unit 1, 20 MW, October 1993;
- Unit 2, 20 MW, December 1993;
- Unit 3, 20 MW, February 1994;
- Unit 4, 20 MW, April 1994;
- Mambucal A, 40 MW, January 1996;
- Leyte A/Cebu, 200 MW, December 1996;
- Mambucal B, 40 MW, January 1997;
- Leyte A/Luzon, 440 MW, December 1997;
- Leyte B, 275 MW, January 1998.

Mindanao grid:

- Mt. Apo A-1, 20 MW, March 1994;
- Mt. Apo A-2, 40 MW, December 1994;
- Mt. Apo B, 60 MW, December 1995;
- Mt. Apo C, 120 MW, January 1998.

• DOE is also preparing a solicitation for a 450-MW block of geothermal power, its second, as part of its revised energy sector action plan (ESAP).

The ESAP delays by up to six months previously established targets for various power and rehabilitate-operate-transfer (ROT) projects and establishes deadlines for dramatic energy sector liberalization favoring the private sector.

The change immediately effects the 900-MW, coal-fired power program on Luzon and the 200-MW, coal-fired power program on Mindanao.

• Future private power solicitations are being prepared by National Power Co. for BOT and/or BOO hydro projects on all Philippine grids and for rehabilitate-operate-maintain (ROM) projects for a total of 1,790 MW of existing facilities. The projects include the 850-MW Sucat gas-fired plant, the 740-MW Malaya oil-fired plant and the 200-MW Manila gas-fired plant. No date for release of the solicitations has been set.

• NPC will offer this year a contract for rehabilitation of the 55-MW, gas-fired Cebu Thermal power project. The project is designed to return the project to normal and effi-

cient operation.

**Project Proposals** (in descending order by MW):

*New—*

- **Industrias Metalurgicas Pescarmona SA** of Argentina proposed two hydro facilities totaling 330 MW. If built, the plants will be located in Laguna, south of Manila, and in Aklan province in central Philippines. IMPSA is Argentina's largest supplier of hydroelectric power.

- San Francisco-based **BankAmerica** agreed to advise and arrange non-recourse project financing for Omaha-based **California Energy Co.**'s build-own-operate-transfer agreements with the Philippine National Oil Co.-Energy Development Corp. (PNOC) for two geothermal projects, totaling 300 MW and costing more than \$500-million. The projects are located on the Philippines islands of Luzon and Cebu.

BankAmerica said it will handle the project out of its Hong Kong office and noted a team of BA Securities Inc. and BA Asia Ltd. will evaluate the non-recourse, project financing under consideration. Sources include the Export-Import Bank of the United States, Export-Import Bank of Japan, International Finance Corp., Asian Development Bank, Overseas Private Insurance Corp., and international and Philippine commercial banks. BA Securities Inc. is BankAmerica's registered broker-dealer subsidiary and BA Asia Ltd. is BankAmerica's Hong Kong-based merchant bank.

California Energy signed the agreements with PNOC for a 180-MW project at the Mahanagdong geothermal field and a 120-MW project at the Upper Mahiao geothermal field. Both are take-or-pay power-sales agreements. Mahanagdong is scheduled for completion in June 1997, Upper Mahiao in July 1996.

California Energy and its partners will own and operate both plants for 10 years. PNOC will buy the power production from the plants and resell it to NPC. Following the repayment of California Energy's non-recourse project debt and recovery of invested capital, the plants will be transferred at no cost to PNOC. California Energy said it will use internal funds for its equity investments.

- San Diego-based **Magma Power Co.** acquired Mission Energy's interest in a 231-MW geothermal power plant planned for the Philippine island of Leyte under an existing energy conversion agreement with PNOC. According to the agreement with PNOC, Magma will build the plant under a build-operate-transfer contract and will operate the plant utilizing steam supplied by PNOC. The first phase, consists of 77 MW and is scheduled for start-up in 1996. The second phase, an additional 154 MW, is scheduled to come on-line in 1997.

Ownership of the plant will transfer to PNOC 10 years after commercial operation of the second phase. Magma will build and operate the plant using steam supplied by PNOC. Project development is subject to a number of conditions, including the arrangement of financing.

Japan's **Sumitomo Corp.** said it was considering an equity stake of between 5% and 20% as part of a joint venture in the plant with Magma.

- A consortium of **ABB**, **Marubeni** and **Kawasaki** put on-line a 210-MW, gas-fired, single cycle, "fast-track" project and continues to build the first 90-MW of a 300-MW

oil-fired unit set to come on-line in 1994.

- A "fast-track" 200-MW, oil-fired power barge known as the Mindanao Power Plant was put on-line by developers **Mitsui** and **BWES**, a Japanese and Danish consortium.

- An international consortium proposed taking over the 199-MW, coal-fired Naga Power complex now owned and operated by NPC.

The consortium proposed a rehabilitate-operate-lease (ROL) contract.

The consortium consists of **CMS Generation**, **International Container Terminal Services**, **Chemphill Export & Import Corp.**, **Atlas Consolidated Mining & Development Corp.** and others.

- **First Private Power Corp.** will have its La Union diesel-fired power plant on-line in early-1994. The "fast-track" BOT will generate 190 MW.

- Kuala Lumpur-based **Ganda Holdings Bhd.** took over the rights and obligations of **Sabah Shipyard Sdn. Bhd.**'s 100-MW power barge venture. Sabah Shipyard in September signed a power barge contract with National Power Corp. of the Philippines for the construction, operation and maintenance of the barge. The pact runs for five years with an option to renew it for another five years.

- **Tomen** of Japan is building two separate oil-fired projects. With Philippine partner **Alsons**, Tomen will have on-line in early-1994, a 58-MW oil fired unit. With **Wartsila**, Tomen is building a 40-MW, oil-fired unit. Both units are on a BOT basis.

- Nevada-based **Ormat Inc.** began operation of its 16-MW Mak-Ban binary geothermal project and an additional 17-MW binary plant on Luzon Island is scheduled to come on-line in 1994. Ormat is currently building 125 MW unit in collaboration with California Energy.

*Ongoing—*

- **CMS Energy's CMS Generation Co.** of Dearborn, Mich., agreed to acquire half of **Luzon Power Associates**, a company that will build, own and operate a \$500-million, 400-MW, oil-fired independent power project on the island of Luzon near the city of Batangasa. Luzon Power includes **Meralco Industrial Engineering Services Corp.** of Manila (MIESCOR) and **Altresco Philippines Inc.** of Denver. Acquisition terms were not released.

MIESCOR is a Philippine construction and engineering company active in a number of locations worldwide. Altresco Philippines is part of Altresco International of Denver.

Electricity generated by the plant when complete in mid-1996 will be sold under an existing contract to Manila Electric Co., the largest private electric utility in the Philippines.

Approval from the Philippine Dept. of Energy is in hand and acquisition of all other necessary government approvals are on schedule. Construction will begin in the first half of 1994, following completion of all project financing, and be complete about two-years later.

- **MBF Asia Capital Corp. Holdings Ltd** of Hong Kong signed a memorandum of understanding with **MCA Holding & Management Corp.** of Quezon City, to develop a \$1-billion, 390-MW, hydro project in San Miguel. The project will also provide irrigation and flood control services to the sur-

ding area.

- **Orbeta Enterprises** of San Francisco signed a power-purchase agreement with NPC to provide 135 MW of diesel-barge-mounted generating capacity to the Mindanao Island and agreed to have the units anchored and operating off Mindanao by May 1.

NPC later canceled the contract, claiming Orbeta did not meet the required performance bond, but offered a new pact with Orbeta, if previous problems could be resolved. NPC and Orbeta have not signed a new deal.

- **All Marine Services International**, a U.S. firm, was awarded a lease contract for a 130-MW power barge offshore Luzon by NPC. The unit will have an installed capacity of about 155 MW, but the local transmission lines are unable to handle only 130 MW.

All Marine and NPC are negotiating a central government guarantee of the power-sales agreement, which NPC has requested and asked Philippine president Fidel Ramos to consider. He is considering issuing the guarantee, NPC officials said.

If such a guarantee is issued, it would be a first for the Philippines and similar agreements might be written into existing power barge contracts, officials said. If the guarantee is not issued, NPC officials said they fear new contracts may be difficult to finance and might be rendered void.

- **China Chang Jiang Energy Corp.** of mainland China was awarded a rehabilitate-operate-lease agreement for the 90-MW Binga hydro plant in Benguet Mt. Province. It is the first Philippine award to a mainland China entity and is a negotiated pact.

NPC said it is free to enter into a negotiated contract for the Binga and the other projects by virtue of the Energy Crisis Act of 1992, allowing it to avoid the often lengthy public bidding process.

The ROL agreement requires CCJEC to finance, design, rehabilitate, construct, supply, test, operate and maintain the Binga plant, and after 15 years, transfer the unit to NPC at no cost.

The plant will be leased to CCJEC for a fixed rate of \$10,000/month, a total of \$37.8-million over the 15-year contract. In exchange, NPC agreed to buy the output for 4.49 cents/kWh.

CCJEC is required to follow the hourly or daily dispatch order of NPC. If the company is unable to meet the NPC dispatch requirements, it will incur a penalty equal to the fuel cost of NPC's highest cost generation alternative within the grid. The penalty is not imposed during periods of either *force majeure* or allocated downtime. CCJEC is also required to draw at least 90% of its manpower needs from existing Binga personnel and the employee compensation package and other details must meet the approval of NPC. NPC is requiring CCJEC compensation to be better than NPC's existing salary ranges.

CCJEC is also required to post a \$55.5-million performance bond backed by an irrevocable letter of credit during the entire contract period.

Under the contract, CCJEC is required to dredge 3.5-million cubic meters of silt and debris in the Binga reservoir and perform annual maintenance dredging to remove an estimated

500,000 cubic meters of silt. The company must then construct a sluice tunnel or flushing device as a permanent solution to Binga's silting problem. Extensive repair and construction work is also needed on the Binga dam complex.

- **Keppel Philippines Holdings Inc.**, a unit of Singapore's Keppel Corp. Ltd, plans several power barge projects. One project involves the acquisition and operation of three 30-MW power barges and the company plans to bid for a 100-MW power barge under the government's current program.

- **Integrated Network Systems Inc.**, a domestic company, signed earlier for a 100-MW barge-mounted unit moored off the coast of Sangley Point in Cavite, Luzon. NPC said there is currently a snag in the paper work surrounding the project. NPC declined to release details about the snag or other possible projects.

- NPC said Houston-based **Polar Energy Inc.**'s 90-MW project off the coastal town of Calaca Batangas will have one 30-MW barge in place shortly, after a brief delay. The Polar project, now known as the Far East Livingstone or "FELS" project, signed a 5-year contract with the NPC, calling for Polar to finance and anchor a system of three diesel-fired turbines totaling by May 15, 1994.

The first company to sign a fast-track barge power deal, **Emmet Inc.** of Santa Rosa, Calif., which planned development of a 120-MW, diesel-fired, barge-mounted power project in Mindanao, failed to secure financing by a July deadline and fell through.

Since then, Emmet relocated the project to a land-based project and is now negotiating a land lease contract and power-purchase agreement with National Steel Corp. and Paper Industries Corp. of the Philippines (PICOP), NPC said.

- U.S. firm **Edison Global** will build a 58-MW, diesel-fired, build-own-operate project at the Bataan export processing zone while the Cavite EPZ will be the site of a 63-MW, diesel-fired project built on a BOO basis by the **Magellan Utilities Development Corp.** The power-purchase agreements are still being negotiated. Each project will supply about 8 MW to their respective EPZs and the remaining power to NPC at 4.9 cents/kWh.

- **Protec**, a local company, was given an extension by NPC to rewrite its proposal for skid-mounted generating units in Manila. Two 10-year, BOO projects for Protec were approved in early-August by NPC.

- **Tomen Corp.** of Japan, **Alcantra Group** of the Philippines and the **International Finance Corp.** have formed a joint venture to pursue power project development in the Philippines. IFC agreed to provide the group with a \$35.5-million loan and invest \$4.5-million of equity.

- The Australian company **IAAL**, has proposed an 800-MW, gas-fired project in the Subic Bay area.

- **Hopewell** has obtained financing for its 700-MW, coal-fired Pagbilao independent power project in Quezon province. Construction began in February and should be complete in 1996.

The Pagbilao project is a joint venture between Hopewell Energy International Ltd., the **Commonwealth Development Corp. (CDC)** and **International Finance Corp.**

Hopewell holds about 90% of the project's equity, while

IFC and CDC each hold about 5%. Hopewell is contributing about \$200-million of equity, while the IFC and CDC are offering \$10-million.

Lead banks in the financing include the **Export-Import Bank of Japan**, the **Export-Import Bank of the United States**, **Citibank N.A.** and the **Bank of Tokyo**.

In addition to its \$10-million in equity, IFC will lend \$60-million for its own account, with up to \$40-million more to be syndicated with commercial banks. IFC also acted as overall financial advisor for the project.

**Mitsubishi Heavy Industries Ltd.** and **Mitsubishi Corp.** of Tokyo, Japan, were awarded a turnkey construction contract from Hopewell for Pagbilao.

The plant is being developed under a 25-year BOT contract.

Hopewell is now planning a second 700-MW, coal-fired plant at Pagbilao. The project is only in the planning stage, but talks are underway with NPC and financing sources.

- A domestic company, **Econo-Pacific Luzon Inc.**, is studying a \$620-million, 600-MW private power project at a site in Cavite.

- **Magellan Utilities Development Corp.** of the Philippines has a letter of intent with Manila Electric for a 600-MW, coal-fired plant in Pinamucan, Batangas, on a BOO basis.

- **Ace Indonesia** has a letter of intent with Manila Electric for a 330-MW, multiple-fueled combined-cycle gas turbine station on a build-own-transfer basis.

- **Cavite Energy Corp.**, a unit of Manila Electric, has a letter of intent with the utility for a 330-MW, gas-fired power plant in Tanza, Cavite, on a BOT basis.

- **Pacific Manufacturing Resources** of the Philippines is seeking a power-purchase agreement and a joint venture with Manila Electric for a 300-MW unit.

- **Caltex Philippines** is planning a 300-MW, combined-cycle cogeneration plant at its refinery at San Pascual, Batangas, in partnership with affiliate **Texaco Cogeneration & Power Co.** of Universal City, Calif.

- **ABB** of Switzerland, and **Marubeni** and **Kawasaki** of Japan are developing a 300-MW, oil-fired project known as the Bataan combined-cycle project in Limay. The project is on a BOT basis and will be fully complete by late-1994.

- A joint venture of **Mitsui** of Japan and **GEC Alsthom** is negotiating a contract for a 300-MW, gas-fired project known as the Sucat land-based gas turbine project.

- **Enron Power** of Houston signed a deal to develop a 210-MW, diesel-fired project to sell power to NPC. Enron will build the plant at Subic, Olongapo, and has agreed to lease for three years an existing 28-MW power plant at the former site of the U.S. Navy's Subic Bay base.

Full completion of the plant is scheduled for June 1994. The three-year lease for the 28-MW unit is renewable.

- A unit of Manila Electric Co., **First Philippine Power Corp.**, is building a 195-MW, diesel-fired, power station in La Union on a BOT basis. The unit, being built by **Bauan Private Power Corp.**, is expected to be on-line by early 1994. Partners include several local investment groups.

- **Hopewell** is working on a 100-MW, diesel-fired Navotas Gas turbine project on a BOT basis.

- **All Asia Capital & Trust Corp.** is seeking a foreign

partner for a 60-MW, waste-to-energy plant at Smokey Mountain in Tondo.

- **Northern Mindanao Power Corp.**, a domestic company, is building a 58-MW, diesel-fired project in northern Mindanao. Project partners are said to be Japanese and Finnish firms.

- **Reynolds Philippines Corp.** is developing a 22-MW, diesel-fired plant at a site in Dasmarinas, Cavite.

- **Time Engineering** of Malaysia continues to work on a series 20-MW, diesel-fired, land-based mobile generators. Time has offered several truck-mounted generating units of between 5 MW and 10 MW each.

- **Ormat Inc.** of Sparks, Nev., signed a power-purchase agreement with NPC for the 16.2-MW Bacon-Manito binary geothermal project in the Bicol region. The unit is being partly financed by the U.S. Agency for International Development and the U.S. Export-Import Bank.

- **Kimberly Clark** is planning two projects totaling 8 MW.

- **Nestle Philippines** is planning a 3-MW unit.

- **Del Monte Philippines** is planning a 3-MW unit.

**Flotations:** A five-year privatization plan for the National Power Corp. is under consideration in the Philippine congress. The Congressional Planning and Budget Office submitted the plan in an effort to cut the government's financial deficit.

Under the budget office plan, a portion of NPC shares would be sold to the public each year for five years. The plan is sure to draw opposition and undergo much scrutiny before coming to a vote.

**Retail Sales:** The Philippine government has approved cogeneration projects as a technique to enhance energy efficiency in the Philippines.

**Power Export Opportunities:** The nation consists of over 7,000 islands with very limited interconnections between the islands.

The World Bank has approved a \$110-million loan to the Philippines to finance the expansion of electric transmission lines, rehabilitate a thermal-fired generating plant and upgrade the facilities of the state-owned National Power Corp. The additional lines will transmit power generated from new plants to Manila and nearby suburbs.

## PRINCIPAL ELECTRICITY SUPPLIERS

National Power Corp. owns and operates the vast majority of electric power facilities in the Philippines, but the situation is changing quickly.

Of NPC's total installed capacity of 6,521 MW, only 4,604 MW are operating, but the efficiency of the plants is low, only 2,644 MW are actually produced. Only 1,373 MW of oil-fired electricity is generated. Just 386 MW of hydro are produced, 510 MW of geothermal and only 375 MW of gas-fired capacity are generated.

The hydro plants are below capacity because of an extended drought and earthquake damage, the oil-fired plants are old and unreliable and the gas-fired units, designed to be peaking projects, are being used as baseload plants and consequently are breaking down more frequently. About 85% of existing plant capacity is made up of plants at least

cars old.

## GENERATION PROFILE

**Installed Capacity:** National Power Corp. has about 1 MW of installed capacity, including 3,096 MW fired by 2,132 MW of hydro, 888 MW of geothermal and 405 of coal-fired capacity.

**Annual Load Growth:** Up to 10.6% annually until 1998, jumping to 11.8% annually through 2005.

**New Generation Needs:** About 20,700 MW between 1993 and 2005. Most of the new planned capacity, about 10,000 MW, will be built on the main Luzon grid, while the Visayas Islands will receive some 1,200 MW and Mindanao about 1,000 MW.

Coal-fired capacity will make up about 12,000 MW of the capacity, followed by oil, 4,750 MW; hydro, 1,900 MW; geothermal, 1,700 MW.

Additionally, the Philippines National Oil Co. is developing a number of projects, mostly geothermal, and Manila Electric Co. (Meralco) also operates a number of small power plants and is developing several others, as well as a number of independent power stations.

**Amount from Private Power:** An undetermined amount of the new capacity will be private power. The exact level depends on the financial ability of NPC to finance its own pending projects.

The Philippines will need about 20,700 MW of new capacity between 1993 and 2005, according to government estimates, much of it likely to come from private sources.

## POLICY STATUS

- The National Economic and Development Authority (NEDA) said it is working with the Philippine House of Representatives committee on economic affairs to change 1990 legislation governing BOT schemes.

House Bill 3166 reforms the current law and provides more flexibility when attempting to win project approval or arranging financing.

In general, the amendments expand the definition of BOT projects, eases the constitutional questions that can come up under the Philippine foreign ownership law, allows the private sector to tap the proposed Private Sector Infrastructure Development Fund (PSIDF) for a higher percentage of project costs, reduces the limitations on the government's "reasonable return" criteria, permits negotiated contracts and other changes.

NEDA said the changes are needed to make the Philippines more attractive to investors as international competition heats up for increasingly scarce financing resources.

The government reforms will open up, and deregulate the economy and make it more "outward-looking," NEDA said.

Foreign exchange provisions are to be reformed and limitations on how long a foreign investor can lease land for a project is being extended to 75 years from the current 30 years.

Specific information was not available at presstime, but can be obtained directly from the government or the Coordinating Council for the Philippine Assistance Project, which is being assisted by the U.S. Agency for International

Development.

CCPAP and U.S. AID are trying to find and identify potential BOT projects, conduct pre-feasibility studies and then package them for the private sector. The agency does not just deal with power projects, although that makes up a lot of what it does.

The Development Bank of the Philippines launched a new loan program for infrastructure project development. Financing for the program Private Sector Infrastructure Development Fund came from the bank's resources and proceeds from eurobonds it issued in late-June 1993 and from contributions from multilateral agencies.

The fund is available to companies interested in building infrastructure such as power projects.

The DBP said it will use the fund to help the government bridge a gap in its budget for infrastructure projects.

- Manila Electric Co. (Meralco), the distribution arm of NPC in Manila, implemented a self-generation program encouraging industrials to generate up to 100% of their load.

Participants in the program are offered the following benefits: (1) accelerated depreciation of the unit in accordance with Regulations No. 4-92 of the Bureau of Internal Revenue; (2) reduction of kW demand charge by Meralco; (3) an NPC rebate for every kWh delivered to the Meralco grid.

- After realizing the need for additional geothermal project incentives, the Philippine government had a major geothermal energy development incentive bill introduced into both houses of the legislature. The bills were recently certified for "urgent action." Deliberations are underway and enactment was expected at year-end 1993.

The Geothermal Act (H.B. 246 in the House of Representatives and S.B. 423 in the Senate) offers to both domestic and foreign geothermal project investors the following incentives: an eight-year government royalty collection holiday; special tax treatment for up to 60% of the costs to complete geothermal development drilling, install fluid collection and disposal systems and replacement well drilling; and a Filipino participation incentive allowance of up to 5% of gross proceeds for geothermal service contracts in which Filipino citizens or companies have a minimum participating interest of 25%.

The bill received favorable treatment within the energy committees of each chamber and is expected to pass with only minimum resistance.

- The Philippine government has issued new incentives to attract developers. The new measures are designed to entice private firms to run standby generators to make the power available to the national grid and to allow the state-owned National Power Corp. to hire barge-mounted diesel generators for relatively-short lease periods. Until the government action, NPC could only buy barge mounted power plants.

Companies agreeing to generate power from their own standby generators will be allowed to fully-depreciate the cost of the generating equipment over an 18-month period, rather than the routine three years, plus receive a rebate from NPC of 1.95 cents/kWh.

The ability to quickly write off the equipment is, in addition to Philippine regulations, allowing power generators to

import generating equipment and fuel oil tax free.

Terms of projects being leased to NPC are negotiable, but are expected to open with five-year periods and an option for five more years. Tariffs are also negotiable, but are expected to average between 4 cents and 5 cents/kWh. Diesel fuel is to come from government sources at negotiated prices.

## RATE STRUCTURES

NPC has signed private power deals with buyback rates between 5.71 cents/kWh and 8 cents/kWh, depending on technology, capacity and location.

However, future loans from the World Bank will be tied to the willingness and success of Philippine government officials in deregulating power prices and bringing power plant revenues to levels that cover existing debt.

## FUEL PROFILE

The Philippines has coal, oil, gas and geothermal resources, but lack of development forces the country to rely heavily on imported fuels.

**Oil:** The Philippine government wants to cut its dependence on imports as sharply as possible, but it is not expected to drop below 50% before 2000. About 60% of the total energy requirement in the Philippines is imported, mostly from Saudi Arabia.

The Philippines' proven oil reserves are at least 500-million barrels, with millions more barrels suspected.

**Coal:** The Philippines' largely untapped coal reserves, estimated at 440-million metric tons, are becoming attractive to both government and private power developers as an alternative to higher priced oil. Coal imports from Australia, China, and Indonesia have been growing.

**Gas:** Proven reserves are an estimated 20-trillion cubic feet, but exploration efforts now underway are expected to yield much more.

**Geothermal:** Geothermal energy provides only 9% of overall Philippine energy demand and 23% of national power requirements, but Philippine geothermal reserves are estimated at 4,000 MW, with proven reserves of not less than 1,400 MW.

Only about 885 MW are now in use through the operation of four geothermal plants. There are some 40 naturally occurring surface geothermal manifestations and another 30 thermal "spots."

Over the last two to three-years, only about 20 geothermal wells were drilled annually. Between 1994-2000 175 wells are scheduled for drilling to bring the total available steam for power plants to about 2,965 MW.

Geothermal exploration activities levelled-off during the last few years because of the high costs of project development and provisions in the production-sharing scheme under Presidential Decree No. 1442, or the Geothermal Service Contract Law. More generous incentives to steamfield developers are pending a new draft geothermal law.

The draft calls for an eight-year holiday on government royalty collections, development costs uplift, and a "Filipino Participation Incentive Allowance" to make steam field development economically attractive. By 2000, the Philippines plans to reduce its dependence on oil to 33%. Currently, oil

provides 65% of all energy used in the Philippines.

**Delivery Systems:** Installed fuel transmission systems are relatively poor, but improving. The government is attempting to build oil and gas pipelines as quickly as possible.

The Philippines is part of the proposed trans-ASEAN gas grid, a \$10-billion, 3,750-mile pipeline linking it with Brunei, Indonesia, Singapore and Thailand. Singapore has received the first flow of Malaysian gas from the first phase of the project. Malaysia plans by 1995 to extend the pipeline another 200 miles and possibly link it with Thailand, perhaps Indonesia, with the Philippines to follow.

## BUSINESS CLIMATE

Domestic and foreign investment in the Philippines fell about 28% during the first 10 months of 1993, when compared to the first 10 months of 1992. Specifically, investment dropped to \$2.35-billion during the first 10 months of 1993, compared to \$3.26-billion the year earlier.

In 1993 foreign investment is expected to total about \$20 million, down from \$25.3-billion in 1992, but is projected to grow to \$37.84-billion in 1994.

Philippine officials blamed the decline on the ongoing power shortage, which turned away prospective investors and delayed expansion plans, and said investment for 1994 should rebound because of strong growth of the domestic economy, despite the lingering power shortage.

During the third quarter of 1993, the economy grew 2.8%. For the full-year 1993 the economy is expected to grow 2.5% once all the information is in, and could grow 4.5% in 1994, the government said.

A number of government high-priority economic development activities are planned for 1994 and beyond, including rehabilitation and construction of power plants, transmission lines and substations in the Luzon, Visayas and Mindanao grids. The government also wants to extend rural electrification through the construction, rehabilitation and maintenance of distribution facilities to reach over 78.2% of all towns and villages by 1998.

There are some legal limitations on foreign investment in the Philippines, but the Foreign Investments Act of 1991, which went into effect November 1991, allows foreign investment to cover 100% of the equity of companies engaged in power generation and other activities without the need for prior Board of Investments approval.

The Philippines is a member of the Assn. of Southeast Asia Nations.

**Political Climate:** Since the fall of Ferdinand Marcos in 1986, there have been several coup attempts in the Philippines, creating a worldwide perception of political instability and a lack of leadership. Officials claim there is little real risk in most parts of the Philippines, but there are occasional disturbances including a continuing—though abated—communist insurgency.

**Currency Convertibility:** In January 1992, the government abolished all foreign exchange restrictions covering capital repatriation and profit remittances.

**Tax Policies:** In 1991, the government reduced the number of tariff levels to four, with rates up to 30%, from the previous seven rates ranging up to 50%. Current laws allow a

year phase-in period and many exemptions.

**Local Work Force:** The Asian Institute of Management (AIM) rates the Philippines highest in Asia overall for labor because of cost, availability and quality, especially for management and technical skills. In addition, there is significant underemployment, particularly in scientific and technical disciplines. The population is conversant in English.

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