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Energy Sector Reform: The Path Toward Liberalization in India, Indonesia and Thailand

Preliminary Draft

6 December 1996

Prepared by

Energy Technology Innovation Project

Contract No DHR-5741-Q-00-1062-00

Prime Contractor Bechtel Corporation

Subcontractor Price Waterhouse LLP

Price Waterhouse LLP



Price Waterhouse LLP



December 6, 1996

World Energy Council
34 St James Street
London, SW1A 1HD
United Kingdom

Subject WEC Study *The Benefits and Deficiencies of Energy Sector Liberalization*
Case Studies for India, Indonesia and Thailand

Ladies and Gentlemen,

Price Waterhouse LLP, at the request of USAID and the Office of Energy, Technology and Innovation, was asked to prepare Preliminary Drafts Studies for the three subject countries, which we delivered on November 15, 1996. The revised version being submitted today incorporate a limited number of comments submitted to us by Mr John Hammond of the United States Energy Association, and some additional data on Thailand gained from a study, "Electric Sector's Privatization in Thailand", prepared by the Technical Division of the Bureau of Energy Regulation and Conservation, Department of Energy Development and Promotion in Bangkok, Thailand

In performing these studies, we were mindful of your objectives and attempted to answer your questions for country specific case studies as outlined in the Minutes of the Study Committee Meeting of 21 May, 1996

Background

At the World Energy Council (WEC) meeting of May 21, 1996 it was decided to conduct a study researching The Benefits and Deficiencies of Energy Sector Liberalization. The objective is to learn more about the following subjects

- Motives and main drivers for privatization/liberalization,
- Objective assessment of the process from an international perspective,
- Mistakes made and lessons learned,
- Suggestions on how to approach liberalization under different economic, socioeconomic, market and energy conditions,



- New ways of energy sector financing in Developing Countries,
- Assessment of the role to be played by regulation and government,
- Barriers to be expected and ways around them,
- “Handbook” on liberalization,
- Environmental implications,
- Impacts on producers and consumers,
- Recommendations for the future, and
- Facts about liberalization programs

Within the framework of the overall study, the WEC members decided to examine a number of specific countries and their experiences to date. Price Waterhouse LLP was engaged to contribute country case studies for Indonesia, India and Thailand in an effort to detail these countries’ liberalization experiences in the energy sector.

Objectives

In preparing these case studies, the WEC intends to obtain specific information on the background, status and current successes of these countries’ individual energy sector liberalization programs.

Scope of Work

Within the framework of this study, Price Waterhouse LLP prepared three preliminary draft country case studies for the World Energy Council. Each case study is approximately 20 pages in length and will address the following:

1 Background

Short review of the general economic situation in the country when energy sector liberalization started (including energy sector business environment, regulations, institutions, industrial relations, cultural and human aspects)

2 Motives for liberalization

To create competition (for what purpose?) to raise efficiency and productivity to bring down prices, to enable financing of development to dispose of assets/liabilities etc



3 Liberalization Process

Timing, planning, procedure (how sold and to whom), cost/price, transparency, restructuring, institutional reform, new regulations, taxation

4 Main Problems

Short-term, long-term and transitional problems

5 Results

Change in productivity, reliability, cost, prices, profitability, transparency, security of supply for end-users and national security of supply, energy efficiency, environmental impacts, R & D, ability to attract financing, regulation and taxation

Sincerely,

A handwritten signature in black ink, which appears to read 'Horst U. Meinecke'. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Horst U Meinecke

Energy Sector Liberalization in India, Indonesia and Thailand

An Introductory Overview

Several common threads link energy sector reforms in India, Indonesia and Thailand. Most evident among these is the time frame during which liberalization occurred – all three countries enacted reforms around 1991-92. In addition, sector liberalization has been driven by macroeconomic conditions such as shortages of public funds for vital infrastructure projects, which in turn have affected economic growth and development.

As part of their liberalization efforts, vertically-integrated, state-owned utilities have chosen to unbundle their generation, transmission and distribution assets to improve competition and efficiency of operations. Lack of independence and autonomy in decision making has been replaced with new policies and regulations that have diminished the role of Government in the countries' energy sectors. Additionally, price liberalization efforts have aided financial viability. New financing initiatives that encourage private sector participation have reduced the burden on Government to fund new capacities.

Differences in energy sector liberalization across the three countries originate from country-specific characteristics and sociopolitical concerns that have left an imprint on the pace and extent of coverage of sector reforms. The widening imbalance between energy supply and demand in India cannot be directly related to dependence on imported fuel in Thailand or security of supply and transmission reliability in Indonesia. Objectives of liberalization, however, are similar in each country, only the reform paths taken and results achieved are different.

To gauge the benefits of energy sector liberalization, some common liberalization concepts must be defined. These definitions will also help the reader understand the reasons for differences in the liberalization processes.

Unbundling - The breakdown or separation of an integrated operation by functional responsibilities to permit competition.

Corporatization - The conversion of a state-owned enterprise to a publicly-held company that functions independently of the Government. The company has a subscribed share value and is overseen by a Board of Directors. Its day-to-day operations are supervised by a Managing Director who reports to the Board.

Commercialization - Any entity, public or private, that operates in a market-based system, i.e., when an entity bases its costs and prices on a commercial value and operations are carried out according to commercial principles.

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Privatization - The transfer of assets, in part or in full, of a state-owned enterprise to private ownership and control. The sale of assets yields money to the Government

Private sector participation - Access that permits private parties to finance, own, manage and operate facilities that were previously in the public domain

Independent Power Producer (IPP) - An independent private party engaged in the production of private power to be sold to the state-owned utility or its remains thereof, and/or having the option to sell directly to distribution companies or large customers (bulk supply)

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The following sections contain the three Draft reports:

Section I: India

Section II: Indonesia

Section III: Thailand

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Glossary of Terms

AEP	Accelerated Exploration Program (Oil Refining)
APSEB	Andhra Pradesh State Electricity Board
BHP	Break Horsepower
Bn	Billion
BSES	Bombay Suburban Electricity Supply
CEA	Central Electricity Authority
CESC	Calcutta Electricity Supply Corporation
CIL	Coal India Ltd
DSM	Demand Side Management
GAIL	Gas Authority of India Ltd
GDP	Gross Domestic Product
GWH	Gigawatt hour
Hydel	Hydroelectric
HP	Horsepower
HT	High tension
LNG	Liquefied Natural Gas
LRMC	Long-run marginal cost
LT	Low tension
m t	Metric tons
MOP	Ministry of Power
MOU	Memorandum of Understanding
MNES	Ministry of Non-Conventional Energy Sources
NEEPCO	North-Eastern Electric Power Corporation
NHPC	National Hydroelectric Power Corporation
NLC	Neyveli Lignite Corporation
NPC	Nuclear Power Corporation
NTPC	National Thermal Power Corporation
OCB	Open Competitive Bid
OFAP	Operations and Finance Plan
OIL	Oil India Limited
ONGC	Oil and Natural Gas Corporation
PLF	Plant Load Factor
Rs	Rupees
REB	Regional Electricity Board
REC	Rural Electrification Corporation
SEB	State Electricity Board
T&D	Transmission and distribution

Executive Summary

In 1991, India began a program of energy sector reform. At the time, the country was experiencing economic decline. Gross Domestic Product (GDP) and levels of foreign exchange were falling and the budget deficit was ballooning. Burdened with operational inefficiencies and facing financing constraints for developmental activities, the energy sector witnessed a growing gap between supply and demand. In the electricity sector, the gap was estimated at about nine percent and peak demand shortage neared 18 percent. As the main driver of economic growth, the industrial sector was hampered by power shortages. Despite creating specialized financial mechanisms and introducing efficiency improvement schemes, the Government of India was unable to narrow the imbalance between energy supply and demand.

Operational inefficiencies of the State Electricity Boards (SEBs) became pronounced in 1992. By then, deteriorating coal quality and its resultant impact on electricity production had also become a strategic issue. Lack of investments in oil exploration and development had created a weak infrastructure and decline in supply. Although dependence on natural gas was increasing, many areas of gas reserves remained largely untapped. During this time, the Government identified tremendous potential in renewable energy resources.

In 1992, Government policymakers identified macro-economics stabilization and structural reform as the keys to halting India's economic crisis. Liberalization became a driving force throughout the economy, and the energy sector benefited from a newfound, market-oriented approach. Growth in the private sector was expected to have a major influence on the future of the country.

Having decided at the end of 1992 to liberalize the economy, the Government next introduced several initiatives to facilitate restructuring and reform of the energy sector. It instituted regulations designed to reduce taxes and also sanctioned import duties. Additionally, it decided to unbundle the electricity sector and encourage the private sector to own and operate generation, transmission and distribution facilities. These reforms heralded a new era in the electricity supply industry. Similarly, deregulation in the coal industry, the Accelerated Exploration Program in the oil subsector and privatization efforts of gas pipeline projects eased supply constraints and promoted private sector financing.

Despite these reform efforts, liberalization of the energy sector has had its share of setbacks. Overcoming a lengthy approval process and eliminating the Government's "counter guarantees" are short-term problems facing the sector. Transitional problems include subsidies and cross-subsidies in the electricity tariff system and concerns about quality and long-term dependability of coal. Longer-term problems include budgetary constraints that limit financing of energy projects and institutional and financial weaknesses that appear in energy sector institutions.

In the past two years, the Indian Government has increased private sector involvement to meet growing energy demand although actual progress and achievements are comparatively small. Several private power developers are actively seeking projects in India. The Government has

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issued a proposal in the coal subsector that invites private power developers to own and operate coal mines. Several joint venture partnerships in the oil and gas subsectors have also been formed, which have improved output levels and strengthened infrastructure facilities. At the same time, private investment has been targeted to meet financing deficiencies. The electricity sector has witnessed a majority of these changes. By the end of July 1995, the Government had received over 200 private sector projects which have exceeded 78,000 MW in additional installed capacity. However, this statistic should be viewed in reference to the number of projects that have reached financial closure, resumed construction and/or are under operation. Amongst the large scale projects, India can boast of only one project (CMS/GVK/Siemens in Andhra Pradesh) which has started operation, the others including Enron's Dhabol, AES's Ib Valley, Cogentrix/China Light & Power, are all embroiled in delays and investigations.

Today, even though liberalization of the energy sector has resulted in potential increases in installed capacity, electricity supply still remains well below consumer demand. It has been estimated by the World Bank in a recent study (in mid-1996) that India's current shortfall between supply and demand which is about 30,000 MW costs the industrials about US\$2 billion annually. Thus, the outlook for energy sector liberalization is conditionally optimistic, provided India stays on its committed path of reform.

I Background

1.1 Chapter Summary

In 1991, India began a reform program despite an economy characterized by a sharply declining GDP, an increasing budget deficit and diminishing levels of foreign exchange. The energy sector was burdened with operational inefficiencies and faced financing constraints to adding new capacity, which created an imbalance between energy supply and demand. As the main driver of economic growth, the industrial sector was hampered by power shortages. Despite creating specialized institutions and introducing efficiency improvement schemes, the Government of India was unable to narrow the gap between energy supply and demand. It viewed macro-economics stabilization and structural reform as solutions to the economic crisis. Liberalization became a driving force throughout the economy, and the energy sector has benefited from this market-oriented approach. Economic growth, led by the private sector, is expected to have a major influence on the future of the country.

1.2 Country Economic Overview

During the 1980s, India's average annual Gross Domestic Product (GDP) growth rate averaged 5.4 percent per annum, a significant increase over the 3.5 percent growth of the 60s and 70s. The GDP growth rate in 1990 neared 5.6 percent, but then declined to two percent in 1991. During the same period, India's fiscal deficit improved to nine percent of GDP, while foreign exchange reserves declined to roughly US \$1 billion.

Economic growth was stifled primarily by power shortages that led to production constraints in the industrial sector. The situation was further exacerbated by diminishing public resources available for investments in the energy sector. The energy sector served as an indicator for the overall economic situation which highlighted the need for urgent reform. The drop in real growth, the severity of the budget deficit, and diminishing foreign exchange reserves induced a policy reform package in 1991 that was aimed at regaining macro-economics stabilization and fueling economic growth.

1.3 Energy Sector Business Environment

Since the post-independence era of the 1950s, energy-intensive industries and technological advancements have caused energy demand to increase. In the early 1980s, energy demand had grown at an average annual rate of about 1.5 percent. In later years, agricultural output stagnated and changes in the industrial infrastructure prompted the number of energy-intensive industries to increase. Despite slow economic growth in 1989-90, therefore, energy demand remained high.

Table 1 reflects the growth rates in installed generating capacity of the various production resources between 1950 and 1993. Growth in thermal power (coal, lignite, oil and natural gas) led the way, even though overall growth across the three categories (hydro, thermal and nuclear) averaged more than nine percent. During the 1980s and early 1990s, growth rates for both

thermal and nuclear power doubled that of hydro

Table 1
Growth of Installed Generating Capacity

Year	Hydro (%)	Thermal (%)	Nuclear (%)	Total
1950-60	11.85	8.20	---	9.50
1960-70	13.8	11.90	---	13.10
1970-80	6.65	8.50	4.80	6.85
1980-93	4.20	8.90	8.60	7.25
Avg	8.80	9.30	6.65	9.20

Source: Central Electricity Authority, Government of India

India's primary energy resources are fossil fuels, hydro power, nuclear power and biomass. Its 186 billion metric tons of reserves make coal the most abundant of India's fossil fuels. At 5.06 billion metric tons, lignite reserves are also substantial. In addition, India possesses 730 billion cubic meters (Bcm) of recoverable natural gas reserves. It has a hydro potential of roughly 100,000 MW, of which only about 18,000 MW is installed. Renewable energy resources include 20,000 MW of wind power, 6,000 MW of biomass and smaller capacities of solar, tidal and small hydro.

In 1990, primary commercial energy supply came from coal (60 percent), followed by oil (26 percent), hydropower (eight percent) and natural gas (five percent). During the period 1980 - 1990, percentage shares of natural gas in primary energy supply increased from 1.5 percent to five percent, while oil and coal shares remained roughly the same. Natural gas has emerged as an important supplementary source of energy with estimates of recoverable reserves increasing from 410 billion cubic meters in 1981 to 730 billion in 1990. Almost 70 percent of the natural gas reserves are concentrated in just two areas of the country, Gujarat and Bombay High. Over 20 percent of India's offshore gas production is flared, attributable to lack of distribution infrastructure.

While coal forms the mainstay of the energy sector accounting for 60 percent of demand, a significant portion of recoverable reserves are low-quality, making long-term dependability on coal unlikely. Domestic oil is also facing supply constraints. Oil production fell from 689,000 barrels per day in 1989 to 543,000 in 1993. This decline was the result of a lack of investment in exploration and development, poor reservoir management, and reliance on old, outdated equipment.

1.4 *Energy Sector Institutions*

The overall policy framework in the energy sector is directed by the Ministry of Power (MOP) for electricity and hydro, Ministry of Petroleum for oil and gas, Ministry of Industry for coal, Ministry of Non-Conventional Energy Sources for renewable energy, and the Department of Atomic Energy for nuclear power

The Central Electricity Authority (CEA) is responsible for oversight and regulatory affairs of the power sector while the Oil and Natural Gas Commission (ONGC) provides the same services in the petroleum sector. The ONGC spearheads the exploration and development activities in the oil and gas sector along with the state-owned Oil India Limited. The Gas Authority of India Limited (GAIL) is responsible for the management and operations of the gas sector and Coal India Limited (CIL) is responsible for the mining and production of coal. There are several state-owned marketing and distribution companies in the petroleum products sector, Indian Oil and Bharat Petroleum being most prominent.

The main players in the power sector fall into three broad categories: the central sector, the state sector and private utilities. The central and state sectors share responsibility for managing and developing India's power sector. Central sector organizations include the National Thermal Power Corporation (NTPC), which accounts for about 30 percent of the country's thermal capacity, the National Hydroelectric Power Corporation (NHPC), which is responsible for centrally managed hydro projects, the Nuclear Power Corporation (NPC), which is responsible for all nuclear power in the country, and two centrally-managed organizations — the Neyveli Lignite Corporation (NLC) and the Northeastern Electric Power Corporation (NEEPCO).

The role of these central sector institutions is to augment power supply and sell it at predetermined ratios to the state electricity boards (SEBs). Besides the main operating entities, there are four power sector intermediaries: the Power Finance Corporation (PFC), the Rural Electrification Corporation (REC), the Central Power Research Institute (CPRI) and the Power Engineers Training Society (PETS). All four are under the administrative control of the Ministry of Power, and fall under the central sector category. PFC and REC are financial intermediaries while the PFC was set up to assist the SEBs to undertake system improvement projects, the REC plans and finances most investments in rural electrification.

The state-owned and -controlled SEBs generate about 70 percent of the country's electricity and provide most of the distribution to end users. The SEBs have the statutory responsibility to meet the supply needs of consumers under its jurisdiction. Although the SEBs were envisioned as autonomous entities, in practice they must obtain state government approval for decisions on investments, tariffs, borrowings, salary and personnel policies. At present there are 18 SEBs, 13 state/union territory Electricity Departments (EDs) and one municipal corporation in the 25 states and seven union territories in India. There are 57 distribution licensees operating in the country and five of these are also engaged in power generation. Some of the state governments have established power corporations responsible for power generation. These corporations construct and commission power plants, which upon completion are handed over to the SEBs. Some of these corporations include Orissa Power Generation Corporation, Uttar Pradesh Rajya Vidyut

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Utpandan Nigam Ltd , Karnataka Power Corporation and West Bengal Power Development Corporation

To account for the uneven distribution of energy resources, a regional approach to power development was promoted through the Regional Electricity Boards (REBs), which fall under administrative control of the CEA. The REBs are constituted by three or more SEBs and are grouped into North, South, East, West and Northeast regions. Activities that are coordinated regionally through the REBs include generation schedules, system operations, overhaul and maintenance programs and interstate power exchange. The Powergrid Corporation of India, Ltd (PGCIL), established in 1989, has developed a national grid by integrating five regional grids. Its main objective includes power transfer within and across regions with reliability, security and economy.

There are five private utilities: Ahmedabad Electricity Company, Bombay Suburban Electric Supply, Tata Electric Companies, Calcutta Electric Supply Corporation and Surat Electric Company. All have been operating since India's independence in 1947 and work closely with the SEBs. Together, these entities account for about five percent of India's public power supply. In addition, industries operate generating facilities that produce approximately 6000 MW of "captive power."

The Ministry of Non Conventional Energy Sources, a relatively new ministry, administers the renewable energy program which includes mini-hydro, biomass, wind and solar-power systems. The Government provides budgetary resources for demonstration projects and promotes private investment through various fiscal incentives, while the Indian Renewable Energy Development Agency (IREDA) provides institutional financing.

1.5 *Regulatory Environment*

The Electricity Act of 1910 provided the initial legal framework which continues to govern the operations of licensees, including that of the existing five private utilities. At independence in 1947, private utilities and licensed local authorities together provided about 80 percent of the country's supply. However, when these licenses expired, the SEBs took over their responsibilities as mandated by the 1956 Industrial Policy Resolution.

The Electricity (Supply) Act of 1948 provides the overall regulatory framework for the sector, authorizing the CEA with developing a national power policy and giving it responsibility for planning, coordinating and regulating sector development. Further responsibilities of the CEA include the development and operation of the Regional Load Dispatch Centers to assist the regional electricity boards in coordinating the various utilities. The same Act created SEBs to generate and distribute the public power supply and serve as state-level regulators. The SEBs were envisioned as largely self-governing entities empowered to set tariffs and monitor licenses. The 1948 Act also empowers the central government to make rules for carrying out CEA's objectives.

In 1956, the Industrial Policy Resolution was passed which redefined generation and distribution of power as the exclusive responsibility of the states, through the SEBs. This led to the gradual diminishing of the number of private utilities to the current five.

In 1976, the Electricity (Supply) Act was amended to provide for the establishment of central and state generating companies to supplement the role of the SEBs. The central and state generating companies were expected to achieve a more efficient utilization of national resources cutting across state boundaries.

1.6 *Industrial (Labor) Relations*

There is a delicate balance between labor and industry. While labor unions represent about 25 percent of industry and service workers in the organized economy, this reflects only 2 percent of the overall workforce. The power sector employs nearly 1 million workers. Indian law recognizes worker's rights to organize and bargain collectively. Although government recognizes labor's legal right to strike, local and state governments have many times used their authority to declare a strike illegal and force arbitration.

1.7 *Cultural/Human Aspects (public reaction to liberalization)*

The Indian economy is the sixth largest economy in the world in terms of purchasing power and supports nearly 15 percent of the world's population. About 80 percent of India's population live in more than 500,000 villages and the rest in more than 200 towns and cities. Backed by several thousands of years of history, the Indian people and culture offer a remarkable racial and cultural synthesis. For over 40 years, India had adopted a public sector dominated economy. But with the new liberalization drive backed by private sector led growth, India has been identified as an emerging market by the western world. The middle class work force of about 250 million is

skeptical of the liberalization benefits and fears the impact of rising costs and prices on the family economy

The industrial sector and the agricultural sector form the backbone of India's mixed economy accounting for nearly 75 percent of electricity consumption. The industrial sector is not only constrained in terms of controlled inputs (like raw material and fuel) but is also burdened by the cross subsidization of agricultural and residential customers. Labor unions in the industrial sector see a major threat looming because of job loss and rising energy prices resulting from the liberalization and privatization processes. The segment of agricultural and residential consumers who benefit from state support also fear that liberalization efforts will lead to removal of subsidies and higher energy bills.

II Motives and Main Drivers of Liberalization

2.1 Chapter Summary

As energy demand continued to outpace supply, investment needs for new capacity were rising. Allocation of public sector funding for the energy sector had become increasingly difficult due to the macro-economics situation in the country. The operational and financial performance of the SEBs in the electricity sector resulted in the energy sector unable to generate funds from internal resources for new capacity and system improvements. Weak operational and efficiency indicators in the sector have been influenced by minimal to no competition between the various utilities. Declining oil production, decreasing coal quality and reserves, and the limited infrastructure to distribute petroleum products are other motives to attract domestic and foreign investment into the energy sector.

2.2 Motives and Main Drivers for Liberalization (Privatization)

Supply/Demand gap Energy supply shortages have occurred because of inefficiencies in supply and demand. Even though reserve margins appeared healthy at about 30 percent of installed capacity, India's energy sector has traditionally been characterized by an insufficient availability to meet peak demand. Electricity demand had increased at a higher rate than supply, leading to supply shortages of over 18-20 percent in (peak) power demand and between eight and ten percent in energy demand. Table 2 shows India's power supply/demand gap prior to the start of liberalization.

Table 2
India's Power Demand and Supply (Bn kWh)

Year	Demand	Supply	Deficit
1988	211	188	23
1989	223	206	17
1990	248	228	20
1991	268	247	21
1992	289	266	23

Source: Economic Intelligence Service, *India's Energy Sector*, July 1995

Diminishing public resources The energy sector required urgent investments for capacity expansion and operational improvements, but the central government could not provide the necessary resources which highlighted the worsening macro-economics situation of the country. The increasing burden of energy development was transferred to government budgets (both central and state). For three consecutive plan periods (sixth, seventh and eighth plan) from 1980 to 1997, the outlays for the energy/power sector consumed a progressively larger percentage of total public sector expenditures—29 percent in the sixth plan and 28.6 percent in the seventh plan. This trend caused allocations to the power sector to fall short of requirements. The estimated requirement for the eighth plan (1993-97) was Rs 128,000 crore (equivalent to about US\$36 billion) against a plan allocation of Rs 79,589 crore (about US\$22 billion).

Commercial viability of the SEBs The weak financial position of the SEBs exacerbated the shortage of public funds. Inefficiencies within the SEBs were largely due to their lack of managerial and commercial autonomy. Their weak position stemmed directly from their inability to collect receipts owed them, particularly by governmental consumers. State government requirements—which obligated SEBs to provide heavy tariff subsidies to a large cross-section of the population, particularly, agricultural and residential customers in the rural areas—have added to their deteriorating financial condition. The 1948 Electricity Supply Act explicitly requires SEBs to operate in the most efficient and economical manner and mandates that they adjust tariffs to achieve a minimum return, after interest, of three percent on net fixed assets in operation. With continued poor operating performance, low tariffs and growing subsidies, SEBs have been unable to attain statutory minimum requirements. Aggregate operating losses ranged from Rs 3.2 billion in FY 86 to about Rs 15 billion in FY92. The SEBs had to borrow from the state budgetary resources to finance their operating deficits and capital expenditures, which became an additional burden on state government finances. In the seventh plan (ending 1992), the SEBs depended on state government loans, which amounted to about 57 percent of total investment. Internal resources of the SEBs fell to nearly negative 20 percent by the end of 1992.

System Operational Losses The excessive system losses were characterized by the growing transmission and distribution losses in the country. Transmission and distribution losses due to both technical and non-technical reasons had reached a critical stage. The SEBs had provided data that indicated an official transmission and distribution losses of 22.9 percent in FY 91. Some analysts maintain, however, that the actual figure exceeds 30 percent. Estimates of the associated revenue losses in FY91 were Rs 50 billion (about US\$ 2.2 billion) for the country. The increase in losses was caused mainly by low quality construction, inadequate maintenance and poor load management. It is estimated that transmission losses were between five and seven percent of the 22.9% total, the remaining 15-17 percent occurred in distribution losses. Non-technical losses which included theft, pilferage, unmetered supplies and defective meters comprised the majority of distribution losses.

2.3 *Form of Competition and Purpose Served*

In 1990, India's power sector was vertically integrated. The SEBs controlled generation, transmission and distribution of electricity for their respective state. Central sector institutions such as the National Thermal Power Corporation (NTPC) and the National Hydro Power Corporation (NHPC) were introduced to augment state power supply on a predetermined ratio. In addition, the SEBs obtained limited assistance in generation from the five private utilities mentioned earlier. Measures that allowed for industrial participation (in the form of captive power stations) were taken prior to the liberalization efforts of 1991.

There has been minimal to no competition in the power sector. SEBs are responsible for all three primary functions of the electricity supply industry: generation, transmission and distribution. The SEBs also shared regulatory responsibilities with the Central Electricity Authority (CEA). Specifically, SEBs took care of state level regulation whereas the CEA played the role of a federal regulator. The private utilities provided supply to limited target markets and in no way posed a competitive threat to the state controlled SEBs.

2.4 *Status of Efficiency and Productivity*

Since liberalization reforms were introduced, the installed capacity of the country's power supply has steadily increased. Availability and operational efficiency of generation plants have improved, increasing overall annual output and/or power plant load factors (PLF). From the late 1980s to the early 1990s, power generation by public utilities increased nearly nine percent per annum and the overall plant load factor hovered around the 50 percent mark. The majority of the SEBs, however, had a plant load factor less than 50 percent during this time, which indicates a poor utilization of SEB power plants. These improvements in power generation and plant load factor are noteworthy because the quality of coal used was low grade and deteriorating. Most system improvements resulted from the efficiencies of central sector institutions such as the National Thermal Power Corporation and the five private utilities in the power system.

Employee productivity improved significantly between 1981 and 1991. While the absolute number of employees in the sector increased, the number of employees per million kWh sold has decreased drastically from 106.6 in 1981 to 5.3 in 1991. The number of employees per customer also decreased.

2.5 *Level and Structure of Prices*

Average retail tariff had increased marginally between 1982-92 in real terms and was about 50 percent of long-run marginal cost (LRMC) of generation. Increases in real costs for fuel and wages offset the increases in efficiency and real tariffs, but tariff differentials among consumer groups widened. Industrial consumer tariffs became closer to LRMC whereas agricultural tariffs covered less than 10 percent.

Industrial consumers represent the largest share of energy demand (47 percent) in the country, followed by agricultural (27 percent), residential (16 percent), commercial sector (5 percent) and

the remainder by others including public services. The major increases in energy consumption in the industry sector occurred in 1989 because of the economy's structural changes towards energy-intensive industries. The trend of agricultural shares in energy consumption, particularly in electricity, reflects a gradual modernization and technological changes in India's agriculture sector. Energy consumption in the agriculture sector nearly tripled in the period 1980-90, partly because of the imperfect level and structure of the electricity tariff system, which provided heavy subsidies to this sector. In general, power supplied to agricultural and residential customers, particularly in the rural areas, are at prices far below what it costs to generate which has had a major impact on the financial situation of the SEBs.

2.6 *Investment Needs for Financing Projects*

India's power system had an installed capacity (excluding nuclear power) of 69,257 MW in 1993, which generated 301,066 GWh. In 1994, installed capacity increased to 72,553 MW, which generated 318,000 GWh. In 1995, installed capacity rose to 78,000 MW, which generated 345,400 GWh. Government planners estimate by 2005 India will require 142,000 MW of new capacity at a cost of US\$ 150 billion.

For India's eighth plan (1993-97), the Ministry of Power is expected to add 30,858 MW of new generating capacity. However, only about 13,250 MW (less than 50 percent) had been added by the end of 1996, because of difficulty in raising financing.

The Petroleum Ministry estimates that India needs about US\$12.5 billion in new oil investments between 1996-2002. But then the government can only provide about US\$8 billion, leaving a projected shortfall of nearly US\$4.5 billion.

2.7 *Other Motives for Liberalization/Privatization*

Declining oil production, decreasing coal quality and reserves, and the limited infrastructure to distribute petroleum products are additional motives to attract domestic and foreign investment.

III Liberalization Process

3.1 Chapter Summary

Upon making the decision to liberalize the economy, the Indian Government introduced several initiatives to facilitate restructuring and reform. New policies were introduced, new regulations instituted and several benefits including tax relief were developed—all to facilitate growth. The country has since adopted a competitive bidding process for electricity supply after moving away from the initial unsolicited bid approach. The Accelerated Exploration Program in the oil sector, privatization of gas pipeline projects and deregulation in the coal industry are other key initiatives that have had a major impact on the liberalization process. However, the division of responsibility between the Center and the States has brought about a decentralized pattern of reform and restructuring initiatives. For example, Orissa and a few other states are moving forward whereas the rest of the states continue in status quo.

3.2 Timing of the Liberalization Drive

In 1991, the Government of India set out to reform its vital energy industries in response to a growing power gap, decreasing domestic oil reserves, natural gas and coal production, and deteriorating macro-economics conditions. The Government amended India's Electricity Acts and opened the sector to privatization and foreign investment. Following the amendments, a high-powered Board chaired by a Cabinet Secretary was established in October 1991 to promote private investment and to accelerate the clearance of proposed projects.

Liberalization efforts included implementing an Accelerated Exploration Program (AEP) in 1993. The program proposed investing US\$23 billion in the oil sector between 1994 and 1996 and called for further exploration of oil shale reserves, deepwater drilling in fields up to 3,900 feet deep, development of coal bed methane, horizontal drilling to improve natural gas recovery, and implementation of enhanced oil recovery projects. The Government is seeking to improve oil production from its 1994 level of 710,000 barrels per day to 890,000 barrels per day by 1998.

The state-owned company responsible for the operation and development of the natural gas sector, the Gas Authority of India Ltd (GAIL), planned to spend a minimum of US\$2 billion by the year 2000. The intent was to expand India's gas production and develop its distribution infrastructure. Privatization efforts have focused mainly on gas pipeline projects, including the formation of joint ventures with foreigners for distribution projects. The Government is also considering projects that would expedite liquefied natural gas (LNG) imports into India.

The Government has begun deregulation of the coal industry and has altered legislation to allow for the increase of coal imports. In early 1995, it cut import tariffs from 85 percent to 15 percent. In addition, state-owned Coal India Limited (CIL) plans to export coal to new markets where high-ash Indian coal could be blended with higher grade coal. It expects revenues earned from exports to offset those lost from lowering duties on imports.

3.3 *Planning Techniques Used in the Liberalization Agenda*

The Government of India has opened the power sector to privatization in generation, transmission and distribution. It has devised various methods to encourage financial and operational accountability on the parts of the states and their respective SEBs. The increasing role of the private sector is expected to contribute to financial discipline among SEBs, since private investment will flow only to those states with an attractive policy environment. Also, by comparing the efficiency measures adopted by organizations such as the centrally-owned National Thermal Power Corporation, the Government has forced SEBs to become more prudent in their financial operations. In addition, the states' need for economic development has served as a catalyst to move SEBs along the path of sector reform.

The Government is promoting the following policies:

- Corporatization of the generation and transmission systems under the Companies Act and allowing private sector participation in power generation
- Electricity tariff reform that both raises tariff revenues to cover long-run marginal costs and reduces cross-subsidies
- Establishment of Regulatory Commissions separate from the government to set and monitor performance standards
- Privatization of power distribution either by sale or long-term lease management contracts

3.4 *Methodology/Procedure Adopted in the Liberalization Process*

The Government initially used an unsolicited bid process to evaluate proposed private electricity generating projects. However, due to growing pressure from the political opposition, it amended the policy to indicate that all future power generation projects must be made through an open competitive bidding process. This new approach eliminates the guaranteed 16 percent return on investment previously offered, since accepted bids will be based on the lowest tariff. While it is up to the states to adhere to and enforce such policies, the Government has leverage because the Ministry of Power has to approve all proposed tariff plans. To avoid delays associated with the open competitive bidding process, many SEBs are setting minimum project (size or value) thresholds before requiring private power projects to adhere to the bidding procedure. The Andhra Pradesh SEB (APSEB) for example, has decided to award contracts for setting up mini power plants - with up to 30 MW capacity and costing less than Rs 1 million - on a first-come

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first-serve basis APSEB retains wheeling rights over power generated by these projects Similar small power plant initiatives are being undertaken in the Southern states of Tamil Nadu, Karnataka and Kerala

Projects of capacity of 1000 MW or more catering to more than one state require Central Electricity Authority (CEA) approval rather than individual state approval The CEA identifies sites for such projects, the National Thermal Power Corporation prepares feasibility reports and the Powergrid Corporation solicits competitive bids from domestic and international developers

The Government has raised the limit of capital expenditure for generation projects in which CEA clearance is necessary from Rs 1 billion to Rs 4 billion This limit is applicable to projects being established by an Independent Power Producer (IPP) selected through a competitive bidding process

3 5 *Effect of Liberalization on Energy Costs/Prices*

India's industrial and commercial sectors consume about half of its generated electric power Agriculture uses over a quarter and residential consumption, various public services, and other miscellaneous groups account for the balance In FY 1995, average retail tariff revenue was approximately Rs 1 33 per kWh, up significantly from approximately Rs 1 05 per kWh in 1993 Unfortunately, increases in real costs, particularly for fuel and wages, have largely offset the increases in real tariffs and plant efficiency Average tariff revenue therefore still remains below actual costs, estimated at about Rs 1 60 per kWh for FY 1995, and at about half of the revenue that would result from pricing based on the long-run marginal costs (LRMC)

Tariff differentials among consumer groups have widened Rates to industrial consumers have been raised and are well above actual cost of supply, in effect, they are close to or above LRMC in most states Average industrial tariff revenue in FY 1995 approached Rs 2 12 per kWh Agricultural tariffs have fallen in real terms and, at an estimated average of Rs 0 22 per kWh for fiscal 1995, cover less than 20 percent of actual costs and less than ten percent of LRMC Compounding the problem are utilities' poor collection rates, particularly from farmers, and high transmission and distribution losses for rural supply A similar situation exists with the residential sector, where tariffs are typically heavily subsidized and where, particularly in urban areas, meter tampering and other forms of electricity theft are widespread

3 6 *Restructuring Initiatives and Institutional Reform Measures*

The macro-economics reform package sought stabilization with a goal to increase GDP growth to about five percent by the mid 1990s Some of the initiatives introduced since 1991 include a provision allowing private sector companies to build coal- or gas-based thermal power projects, as well as hydro, wind and solar power generating projects of any size The same companies that could participate in generation, could also participate in distribution activities Projects with 100 percent foreign equity are now allowed and duration of operating licenses have now been increased to 30 years, with 20-year renewals Additionally, generating companies operating coal-based, gas-based and hydro projects can now sell power on the basis of a structured, two-part

tariff

Amongst the state level restructuring efforts, Orissa spearheads the power sector reform initiative. Following closely behind are the states of Bihar, Gujarat, Haryana, Punjab, Rajasthan and Uttar Pradesh. The Orissa State Electricity Board (OSEB) through a loan from the World Bank, is currently implementing a restructuring program aimed at creating a commercially viable utility that can attract private investment. The OSEB has been succeeded by two independent companies, the Grid Corp. of Orissa (Gridco), which handles transmission and distribution and the Orissa Hydro Power Corp. (OHPC) which is responsible for generation. Towards end-1995, the Orissa legislature passed the Orissa Electricity Reform Act which provided for the rationalization of the generation, transmission, distribution and supply of electricity. This Act helped in the establishing of a commission in April 1996 to regulate Orissa's power sector and ensure operational, managerial and financial autonomy of the state's power utilities and companies. More recently, during the third quarter of 1996, the state has broken down its distribution areas into six independent jurisdictions, of which two have been tendered for lease.

3.7 *Instituting New Regulations*

In 1991, a modification of the Industrial Policy Resolution of 1956 resulted in power being removed from the list of activities reserved for the public sector. The Act was amended to remove many of the regulatory disincentives to private investment (described above) in the power sector and for private generating companies and captive plants to sell power to the SEBs.

In 1994, the Government of India authorized Powergrid to serve as its national transmission and grid operator. Its mission is to improve the efficiency of transmission of electric energy, to encourage private power generation and to stimulate competition among generators. Powergrid has quickly established itself within the sector as an agent of reform. Together with NTPC, Powergrid has been given authority by the Government to serve as an agent of reform by restricting power supply to SEBs severely delinquent in payment and/or grossly negligent in operations.

Similarly, the Power Finance Corporation (PFC) became a vehicle by which the Ministry of Power stimulates fiscal accountability among the states and the SEBs. It wields its power by refusing to provide financing to development projects for states and/or SEBs with severe operational and financial deficiencies. PFC requires an SEB to enter into an agreement called an Operations & Finance Action Plan (OFAP) that must also be endorsed by the respective state government. The OFAP seeks to improve utilities' resource mobilization, operational efficiency and commercialization. It also provides measures to be taken by the SEB according to an agreed schedule, and it is regularly monitored by the PFC.

The National Thermal Power Corporation (NTPC) is suffering internal resource problems as a direct result of the SEBs' outstanding payments. Consequently, it is considering other means it might take to resolve this matter. Some steps under consideration are (a) the mandatory signing of bulk power supply agreements/power-purchase agreements with SEBs and the opening of letters of credit, (b) the recovery of payments through Central Appropriation from the defaulting

states' Central Plan Assistance (its annual central government budget allocation), and,
(c) the establishment of a repayment plan with the SEB that requires it to make payments on its current bill while paying off previous obligations

3 8 *Changes in Taxation Policy*

The availability of a five-year tax holiday for new generation and distribution companies has been approved as one of several measures to attract private investment. In addition, the Government has relaxed the tax on the repatriation of dividends and interest on foreign equity and loans. The custom duties on imports of generating equipment have been reduced to 20 percent and import duties on coal have been reduced from 85 percent to 15 percent. Conversely, in efforts to stem the demand for imported oil that resulted from supply problems and refinery fires, the GOI imposed a ten percent tax on all oil products in November of 1995.

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IV Main Problems

4.1 *Chapter Summary*

India's liberalization process to date has had its share of problems. The lengthy approval process and the elimination of Government "counter guarantees" for the energy sector are short-term problems. Transitional problems include subsidization, cross-subsidization and cost recovery in the electricity sector and issues of quality and long-term dependability of coal in the coal subsector. Long-term problems include budgetary constraints to financing new energy projects as well as pervasive institutional and financial shortcomings within the SEBs.

4.2 *Short-term Problem(s)*

Approval process One of the main short-term problems involves the time it takes to send a private project proposal through the clearing process. Until very recently, there were 17 approvals required for a power generation project. On average, the procedure takes four to five years to complete. This duration was unacceptable to some of the states badly in need of additional capacity. Several states recommended, therefore, that the Government implement an open competitive bidding process. The states specifically requested the removal of the requirement of statutory clearance of cost estimates, techno-economic approvals and the prior consent requirement from the CEA. It was also suggested that clearance from the Central Water Commission under the Irrigation Act be abolished along with fuel linkages and transportation clearances from fuel suppliers. Instead, it was proposed that these clearances be replaced with commercial contracts negotiated between project promoters and fuel companies. This process allows for these agreements to be conducted alongside negotiations with relevant government agencies/SEBs. Additionally, Ministry of Power officials have suggested removing the confidentiality clause from power-purchase agreements to make the bidding process more transparent. Although it is still being perfected, this streamlined process in theory will allow for project approval clearance and techno-economic approval phases in three months.

4.3 *Transitional Problems*

Electricity Tariff System In accordance with Government policy, electricity tariffs to agricultural, irrigation and low income domestic consumers are heavily subsidized. Many analysts suggest that heavy subsidization causes increased demand and encourages inefficient usage. If this assumption holds, then the subsidy practices of most SEBs can only exacerbate the existing problem of revenue shortfall. Some of the SEBs give free power to agricultural consumers with installed capacities of motor pumps not exceeding five horsepower. Other utilities give agricultural consumers unmetered supply and then charge them on the basis of installed pump motor size. From 1982-1995, this process has been reflected in substantial increases of electricity consumption by the agriculture sector -- from 17 percent to 28 percent during this period. Some of the increase is a result of the increased productivity that resulted from the increased energization of pumpsets. While the installation of pumpsets are slowing down, however, the rate of growth for agricultural consumption of electricity is increasing.

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Industrial and commercial consumers pay higher tariffs that often exceed twice the rate of other consumers Table 3 shows the wide differences in average tariff by consumer category

Table 3
Average Tariff by Consumer Category

Consumer Category	Average Tariff - 1995 (Rs /kWh)
Industrial (High Tension)	2 113 (US\$0 07)
Industrial (Low Tension)	1 554 (US\$0 05)
Agricultural	0 328 (US\$0 01)
Commercial	2 146 (US\$0 068)
Domestic	0 857 (US\$0 027)

Source Export Hotline - India Electric Power Generation (Exchange rate @ 1/95 Rs31 374)

Other tariff issues pose transitional problems Tariffs do not differentiate between fixed and variable costs of production, which creates a disincentive for SEBs to back down production during non-peak hours Attempts to change these practices invariably lead to resistance from the affected groups Consumer advocate groups are very much a part of the setting of tariffs within SEBs Government planners, however, are making special efforts to rationalize tariff structures of individual consumer classes Regional tariff commissions have been constituted by the Government to assist SEBs in developing more realistic pricing concepts

Coal quality and future availability India's power generation is heavily dependent on coal Despite India's coal resources and its mining economics justify its dependence on coal, environmental considerations could dampen coal-based power development The coal sector's ability to produce the required amount of coal for India's future generation needs is jeopardized by the following issues profitability, pricing, profitability of indigenous mining, environmental management, rehabilitation and resettlement, private sector involvement and India's import policies If these concerns are adequately addressed, then improving coal quality and maintaining supply to the public and private generators for the future can be reasonably assured

4 4 Long-term Problems

Attracting private investment The CEA had computed the additional generation capacity target at 56,800 MW between 1998-2002 (during its Ninth Plan) This target was based on the assumption that about 20,000 MW (original targets were 48,000 MW) of new capacity would be added during 1992-97 (the Eighth Plan) Government officials believe that the public sector will not be able to deliver financing for the projected need Therefore, the private sector will be targeted for additional financing Assuming an average cost of Rs 40 million per MW of generating capacity developed suggests a total investment requirement in excess of Rs 2,272

billion (US\$66 billion) Raising these funds could pose a major problem for the state government as the Central Government is no longer providing counter guarantees to private developers Discussions are underway to force the state governments to obtain private financing based on their own credit rating This measure is designed to force the states to improve their financial position

Inefficient SEB operations The managerial weaknesses and lack of autonomy of the SEBs continue to be a problem This deficiency has resulted in low technical achievements and significant energy losses in the country's power sector Plant availabilities, load factors, heat rates and levels of auxiliary consumption at many plants leave room for improvement Normal maintenance functions are not being carried out properly and repairs and renovations of old plants are not being made in a timely and cost-effective manner Compatibility problems among grid participants have also contributed to losses within the system In addition, considerable cost is incurred in transporting high-ash content coal that is used heavily in electricity production

Curbing operating losses Transmission and distribution losses incurred throughout the country are costly and make meeting the increasing power demand difficult Losses are due to several factors, including underreporting of unmetered supply (usually to avoid acknowledging non-technical losses such as theft and meter tampering) and technical losses due to incompatible and outdated equipment The loss of revenues that results from insufficient bill collecting adds to difficulty of curbing non-technical losses

V Results

5.1 Chapter Summary

Since India's reform program began in 1991, reform and restructuring activities have been initiated throughout the energy sector. Private sector involvement has been introduced to meet growing demand while private investment has been targeted to meet financing shortfalls. The electricity sector has witnessed the majority of these changes. As of the end of July 1995, over 200 private sector projects that totaling over 78,000 MW of additional installed capacity, were under review by the Government. However, only a handful of large scale projects have reached financial closure with several projects being embroiled in delays and investigations. Despite reforms in the energy sector that have resulted in potential increases in installed capacity, electricity supply still falls far short of consumer demand. The Government is still contemplating ways to improve the operational and financial efficiency of the SEBs, including the possibility of enhancing the effectiveness of other main energy sector institutions. Additionally, the coal subsector has issued a new proposal for inviting private power developers to own and operate coal mines. Several joint venture partnerships in the oil and gas sector have been formed, bringing in new investments to improve output levels and strengthen infrastructure facilities. The road ahead is conditionally optimistic, provided India stays on its committed path of reform.

5.2 Level of Impact of Liberalization on Security of Supply (National and End Users)

Liberalization efforts have netted promising results in terms of the expressed interest for energy sector investment from the private sector. The response from both Indian and foreign firms has been favorable. About 234 power project proposals have been received, representing a total capacity addition of 78,000 MW at a cost of approximately US\$ 90 billion. This statistic should be viewed in reference to the number of projects actually approved and/or under construction and/or in operation. Only a one large scale project is in operation, while about half a dozen are in various stages of nearing financial closure burdened with delays and investigations.

The coal subsector has extended three options to private power developers for securing coal supplies: (i) to buy the high priced coal directly from Coal India Ltd (CIL), (ii) to purchase development rights to a mine for US\$ 100 million that would be operated by CIL with output dedicated to the developer's power plant, and, (iii) to purchase a mine and develop its coal potential. The third method is being employed by the Calcutta Electric Supply Co. It is also expected that the protective tariff of 85 percent on imports of coal into India may be eliminated.

India's Accelerated Exploration Program has gone through eight rounds of licensing solicitations. In 1994, Enron Corporation entered into a profit-sharing agreement with India's Reliance Petroleum to undertake the development of India's largest upstream oil and gas project. In addition state-owned Oil and Natural Gas Corporation (ONGC) - India's largest upstream oil company - and state-owned Oil India Limited (OIL) are planning to invest US\$ 2.2 billion before 1997 in domestic oil and gas exploration and production. The companies will seek another

US\$2 billion from foreign investors by offering large equity shares in new ventures. The Government is developing proposals to improve the distribution infrastructure because currently about 20 percent of gas is being flared. A gas distribution joint-venture project, Manhanagar Gas, is to supply residential and consumer markets in the Bombay area. The joint venture is being formed by state-owned Gas Authority of India Limited (GAIL) and British Gas. These projects are expected to improve the security of national supply as they contribute to increased domestic production and thereby decrease the need for imports.

At the end-user level, electric supply continues to be constrained by fiscal, commercial and technical mismanagement at the SEB level. Cross-subsidization of agricultural and domestic consumers continue to hamper the country's ability to meet its growing demand for power. Adequate resources must be invested in corrective actions to improve transmission line efficiencies, increase plant load factors, improve metering, decrease transmission losses and improve availability and compatibility of equipment. Until then, the country will continue to suffer from brownouts, blackouts and voltage fluctuations in its supply.

5.3 *Level of Impact of Liberalization on Productivity, Research and Development, and Reliability of Service*

Reform measures have begun to improve overall productivity within the electric power sector. In addition to increases in installed capacity, availability and operational efficiency of India's generation plants have also improved. Most of this improvement is due to the efforts of the National Thermal Power Corporation (NTPC), India's main generating utility that supplies 30 percent of the country's thermal power. Since NTPC operates mainly on commercial principles, its operational efficiency and plant load factors far exceed those of most other state utilities. It has even begun to use a two-tiered tariff for some of its power stations, thus ensuring coverage of its cost of production.

Born of a need to restructure India's transmission and distribution system operations, the Powergrid Corporation was created in 1994 and has replaced the Central Electricity Authority in performing vital load dispatch operations. Powergrid is responsible for efficient operation of the transmission sector, encouraging private generation and promoting competition in power generation. In cooperation with the SEBs, Powergrid is implementing projects to develop modern coordination and control systems for the various regions. All projects are scheduled for implementation in 1996. Powergrid is also charged with improving the structure of bulk power and transmission tariffs.

The National Thermal Power Corporation and Powergrid are working together as reform agents of the Government by leveraging their control over bulk supply to the SEBs. Each entity is implementing and enforcing new investment and commercial policies. Additional power is being supplied to states that correct tariff structures and operating efficiencies, power supply is restricted to those states not making tangible improvements. This approach has proven successful at promoting financial discipline at the state level.

Reforms have encouraged some research and development in new technologies, but fiscal

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constraints have limited progress in these areas. India's renewable energy program, however, remains one of the most active in the world, new developments are occurring in the wind, solar, bagasse and biogas and mini-hydroelectric energy subsectors. Another significant research initiative is the Accelerated Exploration Program, which is taking place in the oil refining sector.

5.4 *Level of Impact of Liberalization on Transparency in Cost, Price and Profitability*

The liberalization program has targeted cost and price reforms as one of its most important goals. Subsidies in FY 96 cost SEBs about US\$ 4 billion after only US\$ 600 million of the US\$ 4.6 billion state-imposed subsidy to agricultural and residential consumers was repaid. Cross-subsidization defrayed an additional US\$ 1.8 billion, a 1996 loss of US\$ 2.2 billion (about 0.8 percent of GDP) still resulted.

India's industrial and commercial sectors consume about half the country's generated electric power. Agriculture consumes over 25 percent and residential consumption, various public services and other miscellaneous groups account for the remainder. In fiscal 1995, the average retail tariff revenue was Rs 1.33 per kWh, up significantly from Rs 1.05 per kWh in 1993. Increases in real costs, particularly for fuel and wages, have largely offset increases in plant efficiency and real price increases. Average tariff revenue, therefore, still remains below actual costs (estimated at about Rs 1.60 per kWh for fiscal 1995), and is close to one-half of LMRC.

5.5 *Level of Impact of Liberalization on Energy Efficiency and Environment*

One of the mechanisms the Government has proposed to address India's projected future power supply deficit is Demand Side Management (DSM). The Government has concluded DSM will enable it to save an estimated 30 percent of maximum demand and 20 percent of electricity energy. Promoting energy-efficient equipment, refurbishing existing plants, decreasing transmission and distribution losses, raising tariffs to cover cost of supply and establishing captive/cogeneration power plants are key features of DSM the Government is seeking to employ.

5.6 *Level of Impact of Liberalization on Financing of Investment Needs*

Since liberalization began, the Government has amended several existing laws to make its power sector financially attractive to private investors. Following are some of the important amendments:

- Foreign equity participation of 100 percent is allowed.
- All private companies entering the power sector will be allowed a 4:1 debt/equity ratio, providing promoter's contribution is at least 11 percent of the total cost of the project.
- Private parties must attract at least 60 percent of total outlays from entities other than Indian public financial institutions.

- A post tax return on equity of 16 percent at a plant load factor (PLF) of 68.5 percent was guaranteed. The guarantee has been replaced by competitive bidding for all private power projects and decision is based on purchase price.
- There are no restrictions on repatriation of dividends or interest on equity and loans by foreign investors.
- A five-year tax holiday is available for new generation and distribution companies.
- Depreciation allowance on plants and machinery have increased.
- Custom duty on imports of equipment have been reduced to 20 percent.
- The tariff norms for hydro-electric power have been liberalized to include a capacity charge and an incentive fee for availability over 90 percent.

5.7 *Level of Impact of Liberalization on Regulation and Taxation*

To attract private investment, the Government has approved a five-year tax holiday for new generation and distribution companies. It has also relaxed the tax on repatriation of dividends and interest on foreign equity and loans. Import duties on equipment have been reduced to 20 percent and duties on coal have been reduced from 85 percent to 15 percent. Conversely, efforts to reduce the demand for imported oil (that resulted from supply problems and refinery fires) led the Government to impose a ten percent tax on all oil products in November of 1995.

5.8 *The Road Ahead*

The Government's policies to reduce India's high fiscal deficit, which helped trigger the 1991 economic crisis, have achieved mixed results. In 1992-93, the fiscal budget deficit fell to 5.7 percent before rebounding to 7.3 percent the following year. India's GDP in 1991 was US\$ 222 billion and grew to an estimated US\$ 365 billion in 1995. GDP growth rates averaged four to five percent annually between 1992 and 1994 and GDP was estimated at 6.5 percent in 1995. Standard and Poor's rates India's long-term foreign currency "BB+," and its short-term foreign currency debt "B." These ratings are based primarily on the success of governmental reforms designed to improve productivity and the balance of payments. The effect of these ratings, however, is offset by a debt-to-GDP ratio of 70 percent.

Increased Government borrowing in 1995 has led to growth in the money supply. Consequently, the 8.3 percent inflation rate remained higher than the government's target of seven percent. In February 96, the Indian rupee hit a two-year low against the dollar (Rs 37.3 per US\$1 as compared to Rs 31.4/US\$ in 1993). Also, as a result of reforms which have opened up the economy to foreign investment, foreign exchange has grown from US \$1 billion in June 1991 to over US\$ 20 billion by the end of 1995. Exchange rates for the rupee are still partially controlled.

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by the Government, and are expected to be lifted over the next 12 to 18 months following further liberalization of exchange controls. The current five-year tax moratorium for power sector investors is expected to be increased to ten years.

India has begun looking ahead. Political corruption scandals that plagued the country caused internal and external apprehension. The Government of India pushed back reforms and project development efforts until after the April 1996 general elections, and liberalization programs appear to have gained momentum. Moreover, the Government is gradually backing away from direct guarantees and has begun to look at ways it can use its leverage to stimulate faster reforms.

There is a passing of power from the Government to the States. Fiscal transfers to the states declined from six percent of GDP in 1991 to 4.5 percent in 1995. The states are being forced to become fiscally sound. The Reserve Bank of India has begun promoting the idea that states should borrow on their own credit rating, which is a better measure of their fiscal competence.

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Glossary of Terms

BAPEDAL	Environmental Impact Management Agency
BAKOREN	Inter-Ministerial National Energy Board
BKPM	Capital Investment Coordinating Board
BOO	Build-Own-Operate
DGEED	Directorate General of Electricity and Energy Development
ICSID	International Center for the Settlement of Investment Disputes
IPP	Independent Power Producer
kWh	kilowatt hour
MOC	Ministry of Cooperatives and Small Enterprises Development
MPW	Ministry of Public Works
MOF	Ministry of Finance
MME	Ministry of Mines and Energy
MW	Megawatt
Pancasila	State philosophy
Pertamina	<i>Perusahaan Pertambangan Minyak dan Gas Bumi Negara</i>
Persero	Government corporation with a profit motive
Perum	State-owned agency with a social purpose
PGN	<i>Perum Gas Negara</i>
PLN	<i>PT Perusahaan Listrik Negara</i>
PPA	Power Purchase Agreement
PSC	Production Sharing Contract
PTBA	<i>PT Tambang Batubara Bukit Asam</i>
PTE	Technical Committee
Repelita	Five-year economic plan
SPSI	All Indonesia Labor Federation
Wilayah	Geographical region

Executive Summary

Indonesia has one of the world's fastest growing economies, with annual growth averaging seven percent a year since the early 1970s. The growing economy, population and urban middle class have expanded the industrial and residential need for energy. Recognizing that Indonesia will become a net oil importer sometime early next century, the Government is seeking to intensify oil research and development, utilize Indonesia's vast hydro and geothermal natural resources and expand the country's coal and natural gas subsectors.

Indonesia's economic prosperity has triggered a growing need for electricity, a large part of which remains unmet. Indonesia is attempting to meet this demand at least cost by developing coal, hydro and geothermal sources of energy. Despite the best efforts of the state-owned electrical utility (PLN), inefficiencies in transmission and distribution persist, as numerous power outages and transmission bottlenecks attest. The Government is seeking to solve these problems by unbundling PLN, converting it into a group of competing limited liability corporations and by reexamining the electricity tariff structure. Decentralization through competition is expected to enhance PLN's operational performance and improve customer service.

Converging political and economic forces spurred Indonesia's energy sector reforms in the 1990s. A stable government and rapid economic growth form the backbone of the country's five-year economic plans, which stress diversification of the economic and energy sectors. Energy sector reform has been geared towards increasing the role of private participation in the sector, which the Government has encouraged by reducing its share of ownership in power projects. Another reform, the issue of bonds/shares of PLN in the capital market, appears to have had little effect on energy prices. By adding incentives to Indonesia's tax policies, other reforms have made the investment climate more attractive to foreign investors.

Several problems have accompanied liberalization of the energy sector. The first is a short-term problem, and involves securing a bankable gas supply. A transitional problem, lining up a source of coal, has traditionally been worked out by the contractors involved. Two long-term problems have not been resolved by energy sector liberalization: cross-subsidies in the tariff structure and land acquisition for private power producers and PLN. Moreover, even with the sector's continued liberalization, security of supply and reliability of energy transmission still concern Indonesia's residential and industrial end users. Power outages and long connection times have caused many industrial users to self-generate power. This increase in "captive power" has severely eroded PLN profit margins.

Indonesia has also benefited from the positive effects of energy sector liberalization. The increase of private-sector contracts in the energy sector has sparked new discoveries and increased research in the oil and gas subsectors. The effect of

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reforms on electricity prices has been negligible for small residential and commercial users because PLN has been effective in keeping prices below economic costs for these groups. Impressed with liberalization efforts and PLN's improving financial health, the World Bank and other multilateral institutions continue to provide the country with multibillion dollar loans to meet its growing energy requirements.

The future of energy sector liberalization in Indonesia is marked by a cautious optimism. Economic growth that helped drive the reforms seems likely to continue, but the liberalization climate is tempered by many factors, some of which include an uncertainty over future political stability and a mounting foreign debt.

I Background

1.1 *Chapter Summary*

Indonesia is home to one of the world's fastest growing economies, with annual growth averaging seven percent a year since the early 1970s. It has had a balance of trade surplus since 1990, but has also struggled with a nine percent inflation rate and a current account balance deficit that is expected to climb between US\$ 7 and US\$ 8 billion in 1996. The economy remains robust, however, as evidenced by a 74-million person workforce that is potentially expanding by 2.4 million annually. The emergence of an urban consumer class, many of whom are well educated and cost-conscious, is another sign of Indonesia's newfound prosperity. A growing economy, population and urban middle class have expanded the industrial and residential need for energy in industry. As part of its policy of economic diversification, Indonesia has recently been shifting away from its reliance on crude oil by expanding its coal and gas subsectors and by seeking to tap its vast hydro and geothermal natural resources.

1.2 *Country Economic Overview*

Manufacturing and agriculture form Indonesia's economic pillars, with each contributing 24.3 percent and 17.2 percent, respectively to its 1995 GNP. The economy grew very fast in the last five years: exports increased 76 percent, the balance of trade averaged US \$5.85 billion annually and direct foreign investment skyrocketed, increasing more than 392 percent in 1994 and 1995. Other signs of Indonesia's economic growth appear in its emerging urban consumer class -- between 14 and 15 million people (7-7.5 percent of the population) who tend to be well educated, business-oriented and secure in their jobs. This middle class has emerged partly because of the Government's emphasis on education. By 1994, 93 percent of all Indonesians of primary school age had attended school and the illiteracy rate had fallen to 13.7 percent -- down from 39 percent in 1971.

High rates of domestic demand for consumer goods have contributed to a nine percent annual inflation rate since 1991. Moreover, in 1995, an increasing reliance on manufacturing and consumer imports resulted in a current account balance deficit of US\$ 7.9 billion and prompted the balance of trade surplus to drop by 40 percent. Key goals of Indonesia's current five-year plan involve curbing inflation and reducing the country's US\$ 100-billion external debt by the year 2000. Concerns about the country's debt outlook and its uncertain political future led economic analysts to assign Indonesia a country risk rating of "C" for the third quarter of 1996.

1.3 *Energy Sector Business Environment*

Meeting the needs of an urban consumer class - both the industries they work in and the homes they live in - has contributed to the burgeoning demand for power in Indonesia.

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Residential energy sales are increasing as household electrification ratios and incomes rise. Electricity sales grew at an average annual rate of 14.3 percent between 1981-1994, the number of electrified villages increased eight-fold (3,400 to 29,000), and the number of customers grew approximately five-fold (from 3.2 million to 15.2 million).

Indonesia possesses the raw materials and natural resources to meet the growing demand for electricity, although presently much of this demand remains unmet. Currently, the country has an estimated hydro-power potential of 75,000 MW, less than four percent of which (2,150 MW) has been tapped by the state-owned electric utility, PLN. Additionally, less than one percent of potential geothermal power - 140 MW out of an estimated 16,000 MW capacity - has been realized by PLN.

Because Indonesia is composed of more than 3000 islands, PLN's transmission and distribution network is divided into multiple systems. One interconnected power system services Java-Bali, and other isolated systems have developed around major load centers, where electricity is delivered through minigrids, most of which serve only one particular island. For the Java-Bali system, operational responsibility rests with two generation subsidiaries and four distribution units. Outside Java-Bali, PLN's operations are divided into eleven *Wilayahs*, or geographical regions. Residing at PLN Headquarters are the Directorates of Administration, Construction, Finance, Operations and Planning.

To reduce unmet demand for electricity, Indonesia plans to add 9,500 MW of generated electricity to its installed capacity of 15,100 MW between 1994 and 1999. Private electricity generation, or "captive power," now accounts for an additional 8,400 MW of total capacity (23,500 MW). Industry analysts predict future electricity demand will increase by 14 percent a year and that PLN will account for roughly half the country's electrical generation by 2005. Total investment into the electric sector from 1994 to 1999 is estimated at US\$ 6 billion.

The coal and gas subsectors are also booming. Already, the coal industry is expanding rapidly in order to meet demand from new power plants. Although Indonesia presently relies on oil for an estimated 45 percent of its generating capacity, the Government projects that coal will fuel over 60 percent of the country's power plants by 2009. Indonesia is developing higher grade quality coals for export and is seeking to increase output of lower grade coal for domestic power generation. Indonesia has 5.2 billion short tons of coal reserves, two-thirds of which are found in Sumatra. It exports over 80 percent of its coal production, and energy experts predict that Indonesia's coal terminals can handle a doubling of current exports. Contractors accounted for 73 percent of Indonesia's total coal production in 1995. Indonesia has 5.8 billion barrels of proven oil reserves.

Indonesia has proven natural gas reserves of 109 trillion cubic feet, which according to Pertamina, the state-owned oil and gas utility, represent 73 percent of Indonesia's hydrocarbon reserves. In 1995, Indonesia produced 2,999 billion standard cubic feet of natural gas, the energy equivalent of 1.42 million barrels per day of oil. Pertamina

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predicts a four-fold increase in gas consumption between 1994 and 2000 as natural gas becomes a major source of domestic energy. As of late 1995, domestic consumption of natural gas was 2.2 billion cubic feet per day.

Gas production grew 7.5 percent annually between 1981 and 1992. More than 70 percent of the gas produced was sold under long-term contracts, of that amount 56 percent was liquefied for export. About 60 percent of Indonesia's 1995 output was used for production of liquefied natural gas (LNG). With a capacity of 29.7 million short tons per year and a 40 percent market share in world LNG trade, Indonesia remains the world's largest exporter of LNG.

The Government plans to expand gas production well into the next decade. Future applications will include city gas distribution systems and large combined-cycle power plants. Highlighting this new philosophy is the 1995 decree by the Minister of Transportation, which requires all public buses in Jakarta to use compressed natural gas rather than diesel fuel.

1.4 *Regulatory Environment*

Key regulatory reforms affecting Indonesia's energy sector are outlined below:

- The Electricity Act of 1985 - Defines the legal framework for the electricity sector. It gives the Government the right and obligation to supply power in Indonesia and permits establishment of private power producers, distributors and licensees.
- Presidential Decree No. 37 of 1992 - Authorizes private sector participation under Build-Own-Operate (B O O) schemes. It permits cooperatives and other legal entities to generate, transmit and distribute power for public use.
- Coal Cooperation Contracts (CCCs) of March 1993 - Government offers contracts to foreign coal investors that include ownership of concessions for up to ten years, repatriation of profits and special tax arrangements.
- Deregulation Package of June 1994 - Eliminated restrictions on minimum investment and location. It allowed for joint ventures in which the foreign partner could have up to a 95 percent stake in sectors previously excluded from investment: generation, transmission, distribution of electric power, telecommunications, shipping and aviation.
- Deregulation Package of May 1995 - Created an eight-year import tariff reduction on foreign goods, opened nine new areas to private investment -- including palm oil refining and certain automotive parts. It lifted import restrictions on 81 items such as construction and boiler steel.

- National Development Planning Board Proclamation on Monopolies of September 1995 - Calls for elimination of all state-owned monopolies and protectionist policies by 2003, in an effort to boost free trade and economic efficiency The Government presently has majority ownership of almost 200 companies in all major sectors of the economy

1.5 *Energy Sector Institutions*

Table 1 illustrates the principle players in Indonesia's energy sector

Table 1
Indonesia's Energy Sector Institutions

Agency	Acronym	Description
P.T. Perusahaan Listrik Negara	PLN	State-owned electric utility Responsible for generating and high voltage distribution
Perusahaan Pertambangan Minyak dan Gas Bumi Negara	Pertamina	State-owned oil, gas and geothermal utility, controls rights to oil and other minerals Oversees exploration and production
P.T. Batubara Bukit Asam	PTBA	State-owned coal utility
Perum Gas Negara	PGN	State-owned gas distribution utility
Capital Investment Coordinating Board	BKPM	One-stop investor service, promotes foreign investments in all sectors except oil, gas, mining, banking and insurance
Ministry of Mines and Energy	MME	Implements government policies in the energy sector Oversees Pertamina and Pertamina's production sharing contractors Sets electricity tariffs with country President "Shareholder Designate" of PLN
Ministry of Finance	MOF	Oversees financial operations of PLN With MME, "Shareholder Designate" of PLN
Ministry of Public Works	MPW	Responsible for hydropower resource surveys and operation of multipurpose hydro plants
National Energy Board	BAKOREN	Inter-ministerial Board that coordinates energy policies and development with other sectors
Technical Committee	PTE	Supports BAKOREN Comprised of senior officials of different departments
Independent Power Producers	IPPs	Gaining strength in Indonesian power market
Ministry of Cooperatives and Small Enterprises Development	MOC	Enhances the role of cooperatives in rural electrification
Environmental Impact Management Agency	BAPEDAL	Develops, implements national policies and programs for industrial pollution and hazardous waste management

Source The World Bank, *Second Power Transmission and Distribution Project*, January 1996

1 6 *Industrial Relations*

Indonesia's labor force is growing approximately 2.8 percent per year. Seventy-five percent of the workforce is between 15 and 34, and 40 percent is comprised of women. About ten percent have graduated from junior high school, and seven percent from high school. The number of persons with secondary or higher education is rising, and the government plans to make education through junior high school compulsory. Despite more job seekers than positions available, Indonesia is experiencing shortages of managerial and professional personnel.

The All Indonesia Labor Federation (SPSI) has established labor unions that represent 21 different industrial sectors. Labor strikes are not prohibited, but all disputes are generally handled by a tripartite commission, consisting of labor representatives from SPSI or the company involved, company management and local Government authorities. Strikes have been common since 1992, and usually result from failure of employers to pay minimum wage, denial of benefits and termination of employees. Wage rates are set by the Government and vary by region. Typically, oil workers receive higher wages than agricultural workers.

The Government has agreed to submit any foreign investment disputes to the International Center for the Settlement of Investment Disputes (ICSID) in Washington, D.C. An investment arbitration board is available to parties of a dispute that agree to submit to its arbitration.

Other relevant points about the Indonesian industrial relations investment climate are listed below:

- There have been very few major investment disputes between the Government and foreign investors in recent years.¹
- Foreign firms benefit from more rigorous enforcement of labor regulations than do local firms.
- There are no formal restrictions regarding mergers and acquisitions, but Indonesian companies are closely held and owners rarely put up more than 20 percent of their stock for public offering. There have been no instances of hostile takeovers in Indonesia.
- There are no documented cases of foreign-owned projects or installations being the object of politically-motivated violence.
- According to the Capital Investment Coordinating Board (BKPM), the 1967 Foreign Capital Investment Law states that the Government "shall not initiate

¹ A long-standing investment dispute involving a U.S. investor was resolved through the ICSID in 1993.

nationalization of foreign investments except by law and when such action is necessary in the interest of the state ” To date, no foreign investment has been expropriated since the passage of the 1967 Law

1.7 *Cultural and Human Aspects*

In theory, Indonesians are governed by *Pancasila*, or the state national philosophy that emphasizes harmony and consultation leading to consensus *Pancasila* appears to permeate PLN's relationship with Indonesian property owners in its right of way conflicts. Rather than exercise its right to land and risk confrontation with landowners, PLN has often canceled or postponed private power contracts.

II Motives and Main Drivers of Liberalization

2.1 Chapter Summary

Reducing the country's reliance on oil, easing its financial burdens and increasing the efficiency in energy supply have been the main drivers behind Indonesia's liberalization of the energy sector. Rapid economic growth has also triggered large unmet electrical demand, which the country is attempting to meet at least cost by developing domestic hydro and geothermal energy sources. Despite PLN's best efforts, however, inefficiencies in transmission and distribution still exist, power outages and distribution bottlenecks are too often the order of the day. The Government is attempting to remedy these problems by unbundling PLN, converting it into a limited liability corporation and by reexamining the current tariff structure.

2.2 Motives and Main Drivers

Indonesia has known since the inception of its First Stage Long-Term (25 Years) Development Strategy in 1969 that its oil reserves were limited. In 1979, the Government decided to reduce oil exports in favor of internal use. Where oil exports accounted for 24 percent of GNP in 1981, for example, they accounted for only 10.8 percent of GNP in 1993.

Oil was heavily subsidized by the Government until the mid 1980s. Energy subsidies financed from the budget or from the Government's special credit programs during 1981-82 amounted to US\$ 2.3 billion, an increase of 40 percent from the previous year. Moreover, the economic cost, or difference between domestic and border prices of these subsidies, was almost double the budgetary cost and nearly 5.4 percent of GDP in that same year. To reduce the fiscal burden, the Government sought to encourage efficient use of energy through pricing that reflected the scarcity of its energy resources.

In 1994, the Government projected its mature oil fields were declining by five percent annually, yet domestic oil consumption was expected to increase by 7.4 percent in 1995. Indonesia's current proven oil reserves stand at five billion barrels, and Pertamina anticipates the country will become a net oil importer sometime between 2003 and 2015. Indonesia has been readying itself for the change, focusing on more efficient utilization of electricity, introduction of electricity into rural areas and on demand-side management practices. Also, the Government is placing more emphasis on power generated from coal and natural gas fired plants, and methods of tapping the archipelago's underutilized hydro and geothermal resources are being explored.

2.3 *Form of Competition and Purpose Served*

PLN is vertically integrated. Restructuring of PLN is driven in large part by a need to improve customer service and calls for decentralization and unbundling and corporatization and privatization. Unbundling will take place along functional lines in Java-Bali (generation, transmission and distribution) and decentralization along geographical lines elsewhere. A mix of profit centers and investment units and their subsidiaries will result from the restructuring process, with each profit center reflecting a different degree of private participation. In preparation for their creation as subsidiaries, various units will be given increased autonomy over time. Performance contracts that hold unit managers accountable will foster competition among the units.

The Government took an initial step towards corporatization when it converted PLN in August 1994 from a state-owned agency with a social purpose (*Perum*) to a government corporation with a profit motive (*Perseero*). In effect, restructuring will create a group of limited liability corporations that will compete in a market-oriented environment and will be subject to oversight by a regulatory regime that is currently being modified. Through performance contracts that specify clear targets, the Government only exercises strategic, arms-length control over PLN.

Decentralization is occurring outside the Java-Bali system as well. Geographical vertical unbundling is taking place in the systems that service the outer islands. Given the less-developed nature of these systems, the Government's objective is to transfer power to the existing *Wilayahs*, eventually corporatizing them. PLN plans to replace the diesel generating units that supply electricity to the islands with more efficient generating plants. Where possible, they will be also be replaced with decentralized, cost-effective renewable energy sources. PLN intends to remain the dominant supplier of electricity to the *Wilayahs* well into the 21st century.

The Government recognizes that major policy, institutional and sector structure changes are necessary to ensure that the entry of the private sector into Indonesia's energy is (a) based on competition, (b) that resulting power-purchase prices are the lowest possible, and (c) that private sector entry into generation is market driven. The Government is taking steps to adopt a competitive bidding approach for private participation in the power sector and power-purchase prices have fallen.

Three recently-signed power-purchase agreements (PPAs) for coal-fired power plants (in Table 2) illustrate this trend

Table 2
Declining Power-Purchase Prices

Name of Project	PPA signed	Purchase Power Price (cents/kwh)
Patton 1	February 1994	8 5
Tanjung Jati B*	August 1994	7 4
Patton 2	April 1995	6 5

* Bids for Tanjung Jati A set a new competitive benchmark for purchase of private power at 5 89 cents per kwh

Source The World Bank

As testament to the increased presence of independent power producers (IPPs) in the Indonesian energy sector, the Indonesian Government in December 1994 signed US\$ 2 12 billion worth of PPAs with companies planning to build four new geothermal plants in Java

2 4 *Status of Efficiency and Productivity*

The country's rapid power growth since the mid-1980s and its archipelagic geography pose challenges that have exceeded PLN's ability to meet demand for electricity. Despite liberalization, these factors have made it difficult for PLN to enhance efficiency, reduce costs and improve service. Extensive power grids service Java and Bali, for example, but quality of electricity supply to the outer islands remains low while costs remain high. In addition, in 1994 five out of ten urban and seven out of ten rural households were without electricity. A recent survey also documented that the average PLN industrial consumer endured about 15-50 outages per customer per year, depending on location. As a result, industry has taken to self-generating nearly 50 percent of its electricity requirements.

The Government has concluded that private sector participation is a prerequisite to reducing its financial burdens and increasing the efficiency of electricity production. It is committed to implementing the necessary regulatory reforms to improve efficiency and customer service.

2 5 *Level and Structure of Prices*

Large cross-subsidies exist across consumer groups, which have resulted in electricity prices to industrial consumers in Java being higher than the industrial cost of supply. Currently, the Government is looking for ways to tailor the current tariff structure to meet the requirements of regulatory reform, one possibility under review involves replacing the uniform national tariff by 1999 with two or more regional tariffs.

2.6 *Investment Requirements*

To keep pace with an electricity demand expected to increase seven percent a year, PLN must increase its power generation by 2000 MW, its transmission line construction by 2000 kilometers and its power distribution network by 50,000 kilometers in the near term. PLN will require between US\$ 2.5 billion and US\$ 3.4 billion new investment per year for construction of its power generation and transmission lines. Expansion goals for development of coal reserves will require US\$ 1.5 billion in investment from 1994-1999. The first link of an Indonesian Gas Transmission System, scheduled for completion in ten years, will require US\$ 590 million and will have a capacity of 250 million cubic feet per day.

2.7 *Other Motives*

PLN envisions itself a major player in a world-class power sector, and wishes to meet Indonesia's growing energy demand at world-class levels of performance. Traditionally, PLN has built very large reserve margins (compared to peak load) into its generating capacity. In Bali, for example, the 1994-95 reserve margin topped 50 percent, more than double the internationally accepted best-practice standard of 25 percent or less. PLN is also striving for world-class levels of customer service, operation and investment.

Table 3 lists some of PLN's global performance targets in customer service, operation and investment.

Table 3

PLN Performance Targets					
PLN Performance Category	Actual 1994	Target 1996	Target 1997	Target 1999	International Best Practice
Customer Service					
No of outages (customer/year)	20	17	16	(*)	5
Duration (hours/customer/year)	21	19	18	(*)	0.5-2
Operational					
T&D Losses (%)	12.1	12.0	12.0	(*)	6
Investment					
Reserve margin (%)	56	-	-	30	25
Financial					
Rate of Return (%)	4.5	8	8	8	8
Debt-Service ratio	2.07	1.5	1.5	1.5	1.5
Current ratio	0.76	1	1	1	1

(*) Targets will be set on the basis of an annual review.

Source: The World Bank, *Second Power Transmission and Distribution Project*, January 1996.

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III Liberalization Process

3 1 *Chapter Summary*

Converging political and economic forces have led to liberalization of Indonesia's energy sector. Political stability and rapid economic growth have helped define strategies for the sector and form the backbone of the country's five-year economic plans. A key component of recent privatization efforts in the energy sector includes reduction of government equity in energy sector power projects. Reforms such as floating bonds/shares in PLN and restructuring initiatives thus far have had little effect on electricity prices. They have, however, effected changes in taxation policy to attract foreign investment.

3 2 *Timing of the Liberalization Drive*

Several circumstances have combined to bring about liberalization of Indonesia's energy sector. The first is the current climate of political stability. Thirty of Indonesia's 51 years of independence have been headed by President Suharto, who has been in power since 1966, and is currently considering running for a seventh consecutive term in 1998. The President is the head of state and Government, and has direct legislative authority to appoint the Cabinet in this Unitary Republic. Liberalization reforms generally filter down from the upper levels of Government.

Inflation control has remained a primary economic goal of the Government since the First Stage Long-Term (25 years) Development Strategy was initiated in 1969. Successful monetary policies reduced inflation from 18 percent in the early 1970s to around nine percent over the past five years. Reducing inflation below nine percent in the 1990s has been difficult for the Government. Its tightening of monetary controls in the late 1980s and in the early 1990s (by setting a limit on its foreign borrowing) has been a mixed blessing. Inflation temporarily receded, but so too did foreign investment as many large infrastructure and energy-related projects were either canceled or postponed by the Government.

3 3 *Planning Techniques Used in the Liberalization Agenda*

Indonesia's liberalization reforms have been couched in an economic policy expressed in its five-year economic plans, which are open to annual review. Objectives of the current five-year plan ending in 1999 are described in the Outlines of State Policy which also guide the formulation of the Second Stage Long-Term (25 years) Development Strategy. The first three five-year plans sought to achieve stability, growth and equity. These plans feature a transition from food production and infrastructure (Repelita I), to improvement in living standards and equitable distribution (Repelita II), to a gradual shift away from reliance on oil (Repelita's III, IV and V). Repelita VI and the Second Stage Long-Term (25 years) Development Strategy emphasize a continued transition away from oil exports.

and an ongoing move towards a sustained economic and social development of Indonesia's ability to meet its rapidly growing energy needs efficiently. These objectives will be achieved through conservation and diversification of primary energy resources and their more efficient use, with a view towards minimizing environmental impacts of such use.

3.4 *Methodology/Procedure Adopted in the Liberalization Process*

Liberalization of the energy sector has occurred through a series of recent regulatory reforms. The Investment Deregulation Law of 1994 allows for entry by private investors into Indonesian infrastructure projects and relaxes restrictions on foreign ownership. The new rules permit foreign parties to own 100 percent of the issued capital of an Indonesian company, apart from areas deemed particularly important to the people of Indonesia, where foreign investment is limited to 95 percent. The production, transmission and distribution of electricity was one of the areas - along with telecommunications, ports, railways and others - that was previously off limits to private investment.

Another deregulation package in 1995 outlined an eight-year import tariff reduction schedule and opened up nine more sectors to direct foreign investment. One of these sectors included the manufacture of utility boilers. At the same time, however, restrictions on the electricity, telecommunications and port investment sectors were reimposed. This reform affects roughly two-thirds of the 9,400 goods on which Indonesia imposes duties and surcharges. Specifically, the law

- maintains that items with import duties and surcharges with rates of 20 percent or less will be reduced to 5 percent by 2000. Goods with import tariffs of 20 percent or more will have rates reduced to 10 percent by 2003.
- holds that domestic companies need only 51 percent Indonesian ownership, or 45 percent Indonesian ownership and 20 percent held through the Indonesian stock exchange.
- lifts import restrictions on items such as construction and boiler steel.

Several investment standards have accompanied these laws. Foreign investors can distribute but not retail. Second, as mentioned earlier, the Capital Investment Coordinating Board controls all foreign investment -- with the exception of banking and insurance agencies and oil, gas and mining. Pertamina owns all Indonesian oil and mineral rights. Foreign firms participate in oil, coal and mineral extraction through production sharing contracts (PSCs) and contracts of work. Other contract types include joint operation agreements and technical assistance contracts.

Another incentive package that targeted the oil subsector was introduced by the Indonesian Government in January 1994. It was designed to encourage oil exploration in

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remote and frontier sites by reducing the Government's equity split from 85 to 65 percent in frontier and deep water acreage. Contractors in Indonesia finance exploration and production and development, the costs of which are recovered through sales of oil and gas produced.

Indonesia conducted its first international coal concession tender in 1978. At that time, it offered contract of work agreements covering all aspects of production, marketing and fiscal matters. In 1986, foreign investment was restricted to minority stakes in state-owned concessions. Then, in 1993, the Government offered Coal Cooperation Contracts (CCCs) with incentives that included full-ownership of concessions for up to ten years, repatriation of profits and special tax arrangements. In 1995, the Government indicated it was revising CCCs to make them conform more closely to contracts in other mining sectors. One possible change is that royalties would be paid in cash not in kind.

3.5 *Effect of Liberalization on Energy Costs/Prices*

Despite the new reforms, PLN appears to have thus far held the price of electricity constant in real terms. The average price of electricity fell from 7.6 cents per kwh in 1987/88 to 7.3 cents per kwh in 1994. Major tariff increases since 1987 - 25 percent in April 1989, 20 percent in August 1991, 13 percent in February 1993 and 8 percent in November 1994 -- have more or less kept pace with inflation.

This scenario will probably change by early next century, however, when electricity prices are expected to increase because of the price and volume of power purchased from private generators. Privately-produced power purchases are expected to rise from 0.5 percent of total power produced for PLN sales in 1994 to 43.9 percent of total sales in 2003. The expensive nature of initial independent power producer (IPP) contracts will likely push electricity prices from 7.3 cents per kwh to 8.8 cents per kwh in 2003.

To facilitate private power production through its tariff structure, the Government is requiring that PLN

- quickly establish and publish rates for the purchase of power from small generators
- establish tariffs for the bulk supply of power to distribution enterprises

In addition, the Government is currently examining possibilities to promote third-party access to PLN's transmission grid and is considering having PLN institute a power-wheeling tariff.

3 6 *Restructuring Initiatives and Institutional Reform Measures*

Many of the restructuring initiatives in Indonesia's power sector involve the state-owned electric utility, PLN. One such initiative calls for PLN's transmission and distribution network to be reexamined, for its current physical layout leaves the system vulnerable to power outages and transmission bottlenecks. As mentioned earlier, the islands of Java and Bali are served by an interconnected power system, while a secondary system of minigrids serves Indonesia's outer islands.

The entire Java-Bali framework, however, is dependent on a single circuit link which connects West and East Java. Disturbance along several of its lines could jeopardize the stability and security of the whole system, which would aggravate PLN's power supply inadequacies and power shortages with excess generating capacities. A flexible 500 kV network is planned to be in place by the year 2000, which will ensure economic operation of the transmission system, optimum use of installed generating capacity and system security.

Another reform taking place in Indonesia's power sector involves the issue of PLN bonds in the capital market to partly finance new power projects. According to the President of PLN, US\$ 3.7 billion will be needed for investment in power projects by 1999. Proceeds from the fourth bond issue will be used to finance the construction of transmission lines and power plants in Java. The other 20 percent will be used to finance the conversion of a fuel oil power plant. Bonds worth US\$ 432.5 million were issued in February 1994. Other bond issues took place in 1993 (US\$ 259.5 million) and 1992 (US\$ 129.7 million). If bonds are undersubscribed, then liquidity problems arise for PLN, which in the past has resorted to short-term borrowing and deferral of its liabilities to the Government to alleviate this problem.

Other restructuring moves in the 1990s are listed below:

- PLN announced in 1996 that it will float shares internationally in two subsidiaries that overlap on the Java-Bali grid. Some observers view this as a partial step towards full privatization of PLN, which they think might occur in 1998.
- Pertamina declared in September 1995 that it would be reducing its 46,000-person workforce by 13,000 over the next five years.
- The Government recently confirmed it is drafting legislation to allow private companies to enter the transmission and distribution sectors.

3 7 *Instituting New Regulations*

In this era of increasing liberalization, the Government of Indonesia has recognized that a new approach to regulating electricity is required.

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Many of the reforms in the most recent regulatory framework reflect this sentiment and have encouraged

- unsolicited proposals for Build-Own-Operate (B O O) power generation projects, some of which were in preparation under Letters of Approval
- arrangements for permitting small independent power generators to sell electricity to PLN at published tariffs (and standard forms of contract)
- consideration of expanding the role of private investors in distribution and supply with a view towards increasing their participation in PLN when it becomes fully corporatized

The Government is seeking to encourage even more private participation in the power sector. The Ministry of Mines and Energy (MME) recently undertook a major review of the power sector's current regulatory framework, with the aim of formulating and implementing a new regulatory regime. At the same time, the Directorate of Private Power under the Directorate General of Electricity and Energy Development (DGEED) completed a study on the regulation of private power development in the energy sector. MME and DGEED presented their findings to the World Bank for its review in June 1996.

3.8 *Changes in Taxation Policy*

In addition to the changes in import duties listed above, the deregulation package of 1995 authorizes several changes in tax policy. Of potential taxes, 50 percent are exempted, especially on capital inputs. The average import tariff surcharge is 7.25 percent, but 184 surcharges will be eliminated in the next ten years. A ten percent value-added tax is added on all domestic and imported goods. Sales tax is collected at the point of import, based on total sales value. The Government plans to remove non-tariff barriers on 179 of the current 269 restricted tariff lines by 2005. This is in addition to the existing policy of double taxation avoidance. Under this arrangement, 30 select countries have entered into agreements with Indonesia to avoid double taxation on income such as profits, dividends, interests, fees and royalties.

IV Main Problems

4.1 *Chapter Summary*

The problems mentioned in this chapter highlight a few of the challenges faced by Indonesia as it liberalizes its energy sector. The first short-term problem - that of securing a bankable gas supply - was resolved because the gas supplier and producer were one and the same. Another problem, lining up a source of coal, will probably be worked out by the contractors involved, so there is as yet no need for Government intervention. Two long-term problems have also accompanied energy liberalization: cross-subsidies in the tariff structure and land acquisition for private power producers and PLN.

4.2 *Short-Term Problem*

A short-term problem that has arisen in the energy sector is that very few gas-fired electric generation projects have reached the power purchase agreement (PPA) stage. One of the problems involves securing a bankable gas supply. Because it came up with a unique solution to this problem, the Sengkang integrated oil and gas project stands to become the first independent power producer (IPP) of coal-fired plants to become operational -- in August 1997. Its gas supplier and power producer - Energy Equity Tennaco - are one and the same, which may have facilitated talks with Pertamina and heartened banks which were considering taking fuel-supply risks. Further, the law requires Sengkang to sell output to Pertamina exclusively. In the Sengkang case, however, the project contract has a back-to-back agreement where Pertamina sells fuel back to Sengkang to guarantee sufficient gas to the project.

4.3 *Transitional Problem*

A transitional problem has developed around coal. A consortium for two coal-fired Build-Own-Operate (B O O) power plants, for example, has had difficulty this year lining up a source of coal. The law regulating private power allows PLN to set the price of coal if the power producer and fuel supplier cannot reach agreement, which makes most coal companies unwilling to enter into supply agreements. In addition, most power-purchase agreements have no "Take or Pay" clauses for electricity production, and power producers are unwilling to include "minimum take" stipulations in their contracts with coal companies. Coal companies generally will not supply large amounts of coal without such a clause, particularly when the export market for coal is booming. Since the projects will utilize lower grade coals, which are not export quality, the promoters of the project feel confident about ensuring coal supply.

4.4 *Long-Term Problems*

Liberalization has yet to solve a longer term problem embedded in the current tariff structure – the effect of cross-subsidies across consumer groups. In the present system, there are two types of cross-subsidies, one from Java-Bali to the Outer Islands and another from large users to small. The first subsidy is implemented through a geographically-uniform tariff. Because the PLN service area consists of over 600 separate systems throughout the archipelago and a plant mix which includes all sizes of hydro and thermal units, this policy results in prices that frequently diverge dramatically from the cost of service.

This is particularly true in the outer islands, where the average cost of service was nine cents per kwh and average revenue only seven cents per kwh. Residential customers are connected based on quantitative targets the Government sets for PLN, however, so it is only the commercial and industrial customers who are denied service. As a consequence, potentially profitable commercial and industrial customers are not connected in areas where PLN has excess capacity, while the residential customers that PLN is forced to connect drain the resources of the company.

A second problem resulting from cross-subsidies occurs between large and small consumers. The largest beneficiaries of cross-subsidies are small residential consumers. Small industrial users also benefit, while large users of all types are taxed. Cross-subsidies therefore provide a strong incentive for large commercial and industrial customers to leave the system and become self-generators of power, reducing PLN's profit margins.

Recognizing the need to improve the pricing of electricity so that there is efficiency in consumption, the World Bank is financing the two studies mentioned earlier (by MME and the DGEED) that are examining the cross-subsidies problem. One governmental objective is clear – cross-subsidies between businesses and between consumer categories will be progressively phased out and replaced by a transparent system of Government subsidies for social programs/services for low income groups. Any approach, however, to changing the electricity tariff structure is likely to be gradual and at the Government's choosing.

The second long-term problem deals with the inability of private power producers to acquire land, better known as the “right of way” dispute. Land is often not registered in Indonesia. Once it is determined who owns the property, owners can demand unrealistic compensation from private investors in the power, oil and mining sectors who are seeking to purchase their property. The Government can, as a last resort, compel owners to sell their land at a given price, but it often prefers to extend the project deadline or even cancel the project's contract rather than take this unpopular step. Health-related concerns have exacerbated the problem. Several people from a town in East Java are suing the Ministry of Mines and Energy and the Governor of East Java, claiming that high tension lines over their houses are damaging their health.

V Results

5.1 *Chapter Summary*

Even as liberalization continues, security of supply and reliability of energy transmission continue to worry residential and industrial end users. The increase in captive power generation has eroded PLN profits and underscores this trend. The reforms do appear, however, to have intensified growth in oil and gas research and development, and more discoveries and contracts are frequently occurring in these subsectors. The effect of reforms on electricity prices has been negligible for small residential and commercial users, however, as PLN has effectively kept prices below economic costs for these groups. Reforms have prompted lenient taxation policies that are conducive to the continued entry of private foreign investors into the power sector. Moreover, the World Bank and other multilateral institutions are impressed by Indonesia's liberalization policies, and continue to provide the country with multibillion dollar loans to meet its growing energy needs. The road ahead is tempered by a cautious optimism: economic growth seems likely to continue but uncertainty over Indonesia's political stability and a mounting foreign debt are cause for concern.

5.2 *Level of Impact of Liberalization on Security of Supply*

Security of supply is still of major concern in the Indonesian power sector, particularly in electricity transmission and distribution. The backbone of the Java-Bali system is the 1750 km long 500 kV voltage network, which extends from Suralaya at the Western extremity of Java to Paton in East Java. A 150 kV network is comprised of about 8,600 km of overhead line and underground cable throughout Java, Bali and Madura. Two submarine cables connect Bali to the Java grid. As of April 1996, one of these two submarine cables was disabled and workers were having difficulty repairing it. Should the remaining cable fail, Bali would suffer a severe power shortage. PLN is considering installing more capacity on the island to reduce its dependence on Java, but the specter of an unstable security of supply continues to haunt many of the islands in the Indonesian archipelago.

5.3 *Level of Impact of Liberalization on Productivity, Research and Development, and Reliability of Service*

Industry is still hesitant to rely on PLN, which has given rise to an unanticipated increase in captive power. Citing PLN's long connection waits and power outages as disruptive of production, many industries are turning to their own generators for power. Connection times for industrial consumers ranged from 167 days to 3 years from 1990-93. The increase in capacity also has cut into PLN's sales, as private-owned generation plants now account for 30 percent of Indonesia's installed capacity. Moreover, by keeping the price of diesel fuel low and by allowing the duty free import of generator sets, Government reforms have encouraged the growth of captive power.

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Industrial users are becoming increasingly frustrated with capacity shortages due to power outages. A steel factory in South Sulawesi, for example threatened to move this year unless PLN guaranteed additional electricity for an expansion project. The factory was only producing 15,000 tons of steel per year, but power shortages reduced the amount to 8,000 per year. The factory is on the waiting list for additional power, but PLN does not have the installed capacity in Sulawesi to meet demand. The Government is now building a hydro power plant that officials hope will solve the problem.

Energy reforms, however, do appear to have intensified research and development in the oil, coal and gas subsectors. As a result of Pertamina's fourth incentive package mentioned earlier (Government equity in the projects fell from 85 percent to 65 percent), the Government had signed 14 of 18 new production sharing contracts (PSCs) for frontier and deep water acreage oil exploration.

Privatization reforms also seem to be taking root in the coal subsector. Independent coal producer P T Kaltim Prima Coal (KPC), is a joint venture between British Petroleum and Australia-based Coninz Rio Tinto and is Indonesia's largest independent coal producer. The company began mining in 1992, under a 30-year contract with the state-owned coal utility *PT Tambang Batubara Bukit Asam* (PTBA), which collects 13.5 percent of the revenues. In March 1995, KPC announced it would list some of its shares on the Jakarta Stock Exchange, under its PTBA contract, KPC is required to divest 51 percent of its equity between 1996 and 2000.

Consistent with national policies, Pertamina is continuing to step up natural gas research and development as well, exploring the possibility of transporting gas from the Natuna Sea gas fields through Malaysia's offshore Duyong field. In 1994 and 1995, Indonesia signed two key contract extensions allowing for expansion of existing capacity and construction of the Natuna Liquefied Natural Gas Plant in the South China Sea. In addition, Pertamina extended all of its Japanese LNG contracts except one -- from 2000 until 2010.

5.4 *Level of Impact of Liberalization on Transparency in Cost, Price and Profitability*

On the oil demand side, the Government has tried to maintain petroleum prices at or above international parity (efficiency pricing) while cross-subsidizing as necessary the price of kerosene, with an implicit tax on gasoline. Similarly with electricity, while periodic adjustments have generally left retail supply close to the long-run marginal cost of supply, electricity prices remain below economic cost for small residential and industrial users who account for about 40 percent of sales. The Government's pricing policy has also maintained a uniform price structure for electricity and petroleum products in all parts of the country, thereby providing a subsidy to the rural population and areas outside Java-Bali.

The international shares of its subsidiaries that PLN floats will probably not generate much revenue, due to the nature of PLN and its subsidiaries. As a *persero* (government

corporation with a profit motive), PLN is required to make a profit and operate without a Government subsidy. At the same time it is considered an agent of development. As such it must carry out certain duties such as rural electrification, which are commercially not viable. It has no control over tariffs, MME sets the rates with approval of the President, which makes it politically difficult to raise rates rapidly. Finally, PLN's record as a money making organization is poor.

Bond issues have, however, improved PLN's bottom line. PLN has floated four sets of bonds, and plans on offering US\$ 450 million annually starting in 1996. It is currently working successfully to attract interest from Asian investors in domestic bonds. The increase in private equity will not only enable PLN to finance more power projects, but it will enable the agency to improve its liquidity by reducing its debt dependence on the Government.

PLN's managing and operating capabilities have also increased over the years, along with its energy sales. It now connects over one million customers annually and its financial health continues to improve. Since the late 1980s, PLN has moved from losses of approximately US\$ 59 million in 1988 to profits of US\$ 170 million in 1994, without increases in tariffs above the rate of inflation. Increased reliance on gas plants has also contributed to PLN's financial turnaround, helping to counter the 100% increase in the domestic cost of diesel oil between 1989 and 1994.

5.5 Level of Impact of Liberalization on Energy Efficiency and Environment

Industry's continued reliance on captive power suggests that despite recent inroads by PLN (e.g., an increase in annual number of consumers connected), it is still disenchanted with the utility's ability to deliver energy reliably and efficiently. In short, as discussed earlier, power shortages and distribution bottlenecks such as long connection times are still hampering PLN's ability to supply energy effectively to its end users. Devising and implementing a strategy for more efficient use of electricity continue to be a high priority for the Government during Repelita VI.

In 1990, the Government established the Environmental Impact Management Agency (BAPEDAL), which is responsible for the development and implementation of national policies and programs as they relate to urban and industrial pollution and hazardous waste management. The Government has established uniform guidelines for environmental clearances and provides for periodic reporting requirements for environmental management and monitoring during project implementation.

Conservation of energy resources is vital to the Government's policy of limiting the environmental costs of energy consumption. Safeguarding the environment for sustainable development is a key component of the sector's current regulatory framework. Within the electric power subsector, for example, close attention will be devoted to the design of generation, transmission and distribution facilities as well as to environmental monitoring and compliance during Repelita VI (1994-99) and beyond.

5 6 *Level of Impact of Liberalization on Financing of Investment Needs*

Foreign direct investment has surged as a result of the deregulation packages of 1994 and 1995. In 1994, foreign investment rose by 200 percent to US\$ 24 billion. In September 1995, the Ministry of Investment estimated it had approved US\$ 30.1 billion in new investment during the first nine months of 1995 -- up more than 60 percent for the same period in 1994. Foreign investment projects already approved in the first half of 1996 indicate Indonesia may surpass the US\$ 40 billion mark by the end of this year.

According to Indonesia's National Development Planning Board estimates, the country will require US\$ 50 billion of direct foreign investment in the next five years (1994-1999) to sustain its current economic growth. The World Bank estimates that Indonesia will require US\$ 82 billion for power generation and related infrastructure projects by 2004.

PLN will require between US\$ 2.5 billion and US\$ 3.4 billion per year for construction of its power generators and transmission lines to meet rising electricity consumption. Prior to sweeping regulatory reforms, funding for these projects was usually obtained by the Government, PLN's income, loans from the World Bank, export credits and other financial sources.

In the oil subsector, Pertamina conducted a bidding round which offered concessions in the Natuna Sea oil and gas field in early 1995. As a result, Pertamina estimated it had approved US\$ 3.7 billion of new oil sector investment by the end of that year. In addition, the Government has secured financing for the first link of the proposed Trans-Indonesian Gas Transmission System. Lenders include the Asian Development Bank (US \$218 million), Japan's Export-Import Bank (US\$ 195 million), the European Investment Bank (\$58 million) and the state-owned gas utility *Perum Gas Negara* (US\$ 119-million equity contribution). In March 1995, the World Bank agreed to loan Indonesia US\$ 398 million to build five mini-hydro power plants with a combined capacity of 7.45 MW.

As evidenced above, funding for many of Indonesia's infrastructure projects originates from the World Bank, which awarded Indonesia over US\$ 5 billion for its investment and infrastructure and energy-related projects in 1993 and 1994. In 1995, 19 countries and 13 multilateral institutions (including the World Bank) provided Indonesia with a \$5.36 billion loan. Despite the magnitude of these loans, the World Bank issued a report in June 1995 that commended the country's reform policies but stated it must seek more efficient public investment and allow for greater private sector participation in the economy.

The flurry of regulatory and taxation reforms of the late 1980s and early 1990s seem to suggest the reform process is gaining momentum. The tight monetary policies of 1988 scared investors away, but Presidential Decree No. 37 in 1992 - which specifically authorized private power under B O O schemes - brought them back. Monetary controls

were then retightened, imposing a limit on foreign borrowing (which again scared investors away) and then tax-friendly deregulation and reform packages were implemented in 1994 and 1995 (which caused them to return)

5.7 *Level of Impact of Liberalization on Regulation and Taxation*

Since it was converted to a government corporation with a profit motive (*persero*) in 1994, PLN is now able to pay dividends (though none had been distributed in 1995) and is subject to a corporate tax (though payments are not expected until 2001 since the double-declining method of depreciation is used for tax purposes). Moreover, because of its commercial status, PLN will no longer have to set aside 55 percent of its annual net profit after corporate taxes to the Indonesian Treasury's Overall Development Fund -- provided it meets its current obligations and pays off its remaining installments presently due the Fund.

5.8 *The Road Ahead*

It will be interesting to see in the years ahead if the Indonesian Government will continue to allow liberalization of the energy sector to proceed at its current pace. Of equal interest to sector analysts will be the results of the Government's private power and regulatory reform reviews, particularly as they affect cross-subsidies in a new tariff structure.

Other factors that will continue to affect liberalization of Indonesia's energy sector include the

- pace of economic growth and how it affects PLN's ability to meet demand for power reliably and efficiently at least cost to the consumer
- stability of the political situation, i.e., the length of time President Suharto and his ruling party remain in power
- ability of the country to improve its country risk rating
- effectiveness of the Government at harnessing its underutilized hydro and geothermal reserves
- PLN's ability to remain profitable in its newfound role as a government corporation as well as its ability to pass muster with performance targets, land acquisition issues and lining up sources of coal
- degree to which environmental regulations are strengthened and adhered to

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- policy Indonesia adopts for dealing with its increasing foreign debt, i.e., its rapidly growing current account balance deficit and high debt service ratios
- effect of the Government's willingness to eliminate all state-owned monopolies and protectionist policies by 2003

All of these factors will continue to impact the private sector's entry into the Indonesian energy sector. To date, energy sector reform in Indonesia has been fast-paced and fruitful, the interplay of the factors above will dictate to what degree it remains that way

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**Energy Sector Reform: The Path Toward
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Glossary of Terms

BOI	Board of Investment
BOO	Build-Own-Operate
BOT	Build-Own-Transfer
DEA	Department of Energy Affairs
ECCT	Energy Conservation Center of Thailand
EDL	Electricite du Laos
EGAT	Electricity Generating Authority of Thailand
EGCO	Electricity Generating Public Co , Ltd
FPO	Fiscal Policy Office
IPP	Independent Power Producer
KW	Kilowatt
MEA	Metropolitan Electricity Authority
MOF	Ministry of Finance
MW	Megawatt
NEPC	National Energy Policy Council
NEPO	National Energy Policy Office
NESDB	National Economic and Social Development Board
NIDA	National Institute of Development Administration
PDP	Power Development Plan
PEA	Provincial Electric Authority
PES	Performance Evaluation System
PPA	Power Purchase Agreement
PTT	Petroleum Authority of Thailand
PTTEP	PTT Exploration
REGCO	Rayong Electricity Generating Company
RFP	Request for Proposals
SET	Securities Exchange of Thailand
SOE	State Owned Enterprise
SPP	Small Power Producer
TNB	Tenaga Nasional
TOE	Tons of Oil Equivalent

Executive Summary

Thailand's economic liberalization process began with the election of Prime Minister Chuan Leekpai in September 1992. The country's strong economic growth, coupled with the desire to maintain international competitiveness, prompted the Government to embark on a comprehensive economic liberalization program. Infrastructure, the energy sector in particular, has been a main target of these reforms. The energy industry is dominated by three state-owned enterprises: the Electric Generating Authority of Thailand (EGAT), the Metropolitan Electricity Authority (MEA), and the Provincial Electric Authority (PEA).

Thailand's energy sector liberalization program has been driven by the Government's objectives to increase the efficiency of the sector's utilities, reduce government involvement in their operation, and increase competition. Unlike many other developing countries, Thailand is highly creditworthy. Its "A2" sovereign risk rating from Moody's provides the level of comfort necessary to attract both foreign direct investment and funds from international capital markets. As a result, foreign credit is available at terms similar to those for developed countries. Moreover, the energy sector's state-owned enterprises provide a substantial net contribution to the Treasury. Even prior to liberalization, efficiency, profitability and productivity of these state-owned utilities were high compared to those in other developing countries.

However, Thailand's lack of indigenous fuel supplies has resulted in a high dependence on imported fuel. Although production of domestic primary energy sources is increasing, imports are also rising. Between 1990 and 1994, domestic production of crude oil, lignite, and natural gas increased from 1,196 to 1,325, from 3,570 to 5,165, and from 5,657 to 9,307 kilo tons of oil equivalent (ktoe), respectively. During the same period, imports of coke, crude oil, and petroleum products rose from 60 to 72, from 10,860 to 18,609, and from 7,660 to 8,603 ktoe, respectively. While the liberalization of primary fuels will be discussed in this paper, the Government's reforms in the energy sector have focused primarily on electric power. The Government will rely on increased independent power production to help meet future demands for new power capacity.

The energy sector liberalization program entails commercialization, corporatization and privatization of state-owned enterprises, as well as increased private sector participation through build-own-operate (BOO) and build-own-transfer (BOT) schemes. EGAT has already corporatized and partially divested a subsidiary generating company, Electricity Generating Public Co., Ltd. (EGCO), and is in the process of selling off additional enterprises. The distribution companies, PEA and MEA, as well as the Petroleum Authority of Thailand (PTT), are also undergoing restructuring and commercialization. In 1996, EGAT announced the selection of two consortia to develop a combined electric generating capacity of 1,400 MW on a BOO basis.

Thailand's energy sector liberalization process has proceeded without significant problems. After outlining its program and setting target dates, the Government has proceeded to achieve each of its objectives with little delay. The liberalization policy has been widely accepted by the public,

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the government, and the private sector Two outstanding problems accompanying liberalization have been 1) whether to allow EGAT's subsidiary, EGCO, to openly compete against IPPs to provide power to EGAT, and 2) Thailand's continued dependence on imported fuel and power

Given the relatively efficient and reliable state of Thailand's energy sector prior to liberalization, measurable short-term results of the ongoing liberalization program have been minimal While the end user may not perceive improvements in price and reliability, corporatization has led to greater profitability and privatization has increased the security of supply These results have been accomplished through increased competition and an influx of private, domestic and foreign capital into the electric energy sector

I Background

1.1 *Chapter Summary*

Liberalization of the energy sector in Thailand began in 1992. The country's strong economic growth, which led to a sharp rise in energy consumption, precipitated the Government's reform program. The energy industry is dominated by three state-owned enterprises: the Electric Generating Authority of Thailand (EGAT), the Metropolitan (Bangkok) Electricity Authority (MEA), and the Provincial Electric Authority (PEA). These utilities are regulated by the National Energy Policy Council (NEPC), under the office of the Prime Minister.

1.2 *Economic Overview*

Thailand's economic liberalization process began with the election of Prime Minister Chuan Leekpai in September 1992. Leekpai came into office promising to reform Thailand's economy and reduce the military's influence in politics. Despite the Government's history of frequent coups and strong involvement of the military, the Government has not faced significant opposition to its reform program and Thailand's capable core of civil servants has managed the economy smoothly.

During the period 1990-1992, GDP grew at an average annual rate of eight percent. This expansion was fueled by exports, which jumped from US\$22.8 to \$32.1 billion during this period. The trade deficit (an average of US\$-5.6 billion between 1990 and 1992) can be attributed to high rates of capital investment, rather than rising consumption. Although the Bank of Thailand effectively pegs the Thai baht to the U.S. dollar, large amounts of capital inflows during this period neither seriously threatened the Bank's ability to maintain a stable exchange rate nor created excessive inflationary pressure. Accordingly, foreign exchange reserves rose from US\$ 13.31 billion in 1990 to US\$ 20.36 billion in 1992.

The Government's fiscal surplus also attests to its sound economic policies. The surplus rose from 4.84 percent of GDP in 1990 to 5.39 percent in 1991, decreasing to 2.64 percent in 1992. As a result of its impressive performance, Thailand earned an "A2" sovereign risk rating from Moody's and an "A-" rating from BankWatch.

1.3 *Energy Sector Business Environment*

Strong economic growth has led to a sharp rise in overall energy consumption in Thailand. This increase has been driven by the growth of the transportation sector, which represents the largest portion of total final energy consumption, at 54 percent, and consumes 60 percent of oil products. The industrial sector consumes 25 percent and the household/commercial sector consumes 12 percent of total final energy. The remaining nine percent is consumed by other users. The transportation sector depends mainly on gasoline and diesel oil, which Thailand does not produce in sufficient quantities. As a result, the country is highly dependent on imported oil, which accounted for over 70 percent of total primary energy supply in 1990. In that year, Thailand

imported 18.7 million metric tons of oil, of which refined products accounted for 7.7 million metric tons. Thailand's domestic reserves of fossil energy in 1991 were 4.8 million tons of crude oil, 240 billion cubic meters of natural gas, and 891 million tons of lignite.

Total primary energy supply in the country increased at a rate of nine percent per annum to 29.6 million metric tons of oil equivalent (TOE) in 1990. Domestic energy production has grown rapidly through the development of natural gas, oil, and lignite. Domestic sources provided 37 percent of total primary energy supply in 1990. The shares of natural gas and coal, mainly lignite, were 12 percent and 16 percent in 1990, respectively.

To reduce oil dependency, the Government has encouraged energy diversification through the development of indigenous natural gas and lignite supplies. The growth in gasoline and diesel consumption in road transport is the main factor in increasing oil demand. In the industrial sector, however, electricity and coal are commonly substituted for oil. The increasing number of coal and gas-fired industries and power plants has been the main factor of rising coal and gas consumption. Several major discoveries of off-shore natural gas and the continued expansion of gas production have boosted investor confidence in gas-driven plants. Gas production, at 605 million cubic feet (mcf) in 1990, was projected to double by the end of 1996.

In addition, the Government is attempting to reduce its high dependence on imported oil by improving energy efficiency and increasing the use of alternate fuels. In 1992, the National Assembly passed the Energy Conservation and Promotion Act, which required the National Energy Policy Office (NEPO) to implement a demand side management program with the participation of EGAT, MEA, PEA, the Department of Energy Affairs (DEA), and the Energy Conservation Center of Thailand (ECCT).

Thailand's total installed electricity generating capacity was 8,720 MW in 1990, increasing to 13,651 MW by the first quarter of 1996. Thermal power generation represented 74 percent of total capacity in 1990, with hydropower producing the remaining 26 percent. Total electricity generated was 44.1 billion kWh. Eighty-nine percent was supplied from thermal power and 11 percent from hydro power. Thermal power plants consumed 50 percent natural gas, 30 percent oil, and 20 percent coal.

Electricity consumption in the household sector has experienced the fastest rate of growth in energy consumption. This trend is expected to continue with the increasing use of household appliances such as rice cookers and refrigerators. Nevertheless, household energy use in Thailand accounts for a relatively small share of total energy demand compared to other Asian countries. Electricity represents over 60 percent of the energy used in Thailand's household sector.

1.4 *Energy Sector Institutions*

Thailand's electric power supply industry is comprised of three electric utilities: EGAT, MEA, and PEA. EGAT, a state-owned enterprise (SOE) under the supervision of the Office of the Prime Minister, is responsible for the generation and high voltage transmission of electricity. MEA and PEA, both SOEs under the Ministry of Interior, are responsible for electricity

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distribution MEA distributes to the Bangkok Metropolis, Nonthaburi and Samut Prakarn provinces PEA distributes to the remainder of the country in addition to producing its own electric power from small diesel and mini hydro power plants

Two other utilities in neighboring countries are additional sources of electricity generation Tenaga Nasional Berhad (TNB) in Malaysia and Electricite du Laos (EDL) in Lao PDR both supply EGAT

The Petroleum Authority of Thailand (PTT), the dominant entity in the petroleum sector, is involved in downstream oil and gas activities Upstream activities are carried out by the private sector PTT is responsible for the purchase, transport, processing, and sale of natural gas PTT has a third of the market share in the distribution and marketing of oil

1.5 *Regulatory Environment*

The energy sector in Thailand is operated by a number of mature public institutions Several energy-related agencies spread across many ministries and include cabinet-level committees At the highest level is the National Energy Policy Council (NEPC), which is chaired by the Prime Minister NEPC, the secretariat to NEPC, acts as its operating arm, and functions primarily as a link between NEPC and the country's energy state enterprises and conducts all energy policy work

NEPC may be regarded as the regulator of the electric power supply industry as it is the major government body charged with the supervision of all governmental agencies and state enterprises involved in energy matters Other departments involved in energy affairs are a) The Department of Mineral Resources, responsible for assessing and preliminary exploration of the country's coal and petroleum reserves, b) the Department of Energy Development and Promotion, which conducts research and development and monitors energy sector activities, and c) the Department of Industrial Works, responsible for controlling industrial air and water pollution

Currently, Thailand does not have an independent regulatory body for the energy sector However, the regulatory structure works satisfactorily, as evidenced by operating efficiency and the lack of power shortages Nevertheless, the Government has recognized the need to orient the regulatory framework to a more commercial structure

EGAT, MEA and PEA have been controlled through a variation of cost-of-service regulation, which in the case of EGAT includes an automatic adjustment for fuel costs Thailand has supplemented this regulation with a limited form of performance contract regulation The Government has also controlled the overall investment program by regulating operational efficiency

The electric power supply industry is regulated by the following laws

- The National Energy Policy Council Act, B E 2535 (1992) covering energy policy and tariff structure and rates,
- The Energy Development and Promotion Act, B E 2535 (1992) covering power plant standards,
- The National Executive Council Announcement No 58 covering public safety,
- The Act on Permitting Private Sector to Participate in or Operate State Business, B E 2535 (1992) covering steps and procedures in private participation, and
- The Electricity Generating of Thailand Act, which empowers EGAT to operate the generation and high voltage transmission system of the country

1.6 *Industrial Relations*

No significant competition existed in the energy sector prior to 1992. Under the EGAT Act, EGAT's responsibilities have been to generate, acquire and transmit electric energy. EGAT plans for future capacity based on load forecasts calculated by the Load Forecast Sub-Committee, which is comprised of representatives from the National Energy Policy Office (NEPO), MEA, PEA, and EGAT. The electricity produced from EGAT's own generating units as well as that imported from Malaysia and Laos is sold in bulk to MEA and PEA, which in turn sell to end users. In addition, EGAT sells electricity to 14 direct customers, as prescribed by the 1969 Royal Decree Covering Power Users and later amendments, and to the EDL. EGAT also exchanges power with TNB under the System Interconnection Agreement.

1.7 *Cultural Factors*

The public has generally welcomed liberalization as an opportunity to increase competition and potentially lower prices. The most notable objection to the national energy policy has been in response to the National Energy Policy Office's plans to develop a nuclear power plant. Deferring to public sentiment, the Government has delayed these plans indefinitely.

II Motives and Main Drivers of Liberalization

2.1 Chapter Summary

Thailand's energy sector liberalization program has been driven by the Government's desire to increase the efficiency of the sector's utilities, reduce government involvement in their operation, and increase competition. Unlike many other developing countries, Thailand is highly creditworthy, earning an "A2" rating from Moody's. This rating assures foreign investors that their investments are relatively insulated from such risks as war, political discontinuity, or macroeconomic instability. As a result, foreign credit is easily available on terms similar to those for developed countries for investment in the energy sector. Moreover, sector state-owned enterprises are generally efficient, profitable and provide a substantial net contribution to the Treasury. The energy sector liberalization program focuses on commercialization, corporatization and privatization of state-owned enterprises, as well as increased private sector participation through build-own-operate (BOO) and build-own-transfer (BOT) schemes. The Government plans to increase independent power production to help meet future demand.

2.2 Motives and Main Drivers

Thailand's liberalization of the energy sector is part of a larger national policy to privatize state-owned enterprises. Thailand's National Economic and Social Development Plans recognize the importance of private sector participation and divestiture, leading the Cabinet to propose increased private participation in state enterprises to achieve six objectives:

- encourage private funding for critical infrastructure investment
- reduce government loans and guarantees
- decrease government involvement in these activities
- increase efficiency
- improve domestic economic welfare
- promote technology transfer

The Government's policy on privatization of state-owned enterprises is based on the following principles¹

- the Government should not engage in activities that can be better managed by the private sector, and thus, should not establish or expand enterprises that compete

¹ Government of Thailand White Paper, 1988

with the private sector, except for activities related to public interest and national security

- state enterprise management should become more market-oriented and accountable, and be given adequate autonomy
- enterprises that are not operating efficiently should be restructured and become candidates for partial or total divestiture
- private participation should be promoted and expanded -- particularly in basic infrastructure services -- through investment concessions and joint ventures to reduce the fiscal burden, expand services, ensure operational efficiency, and gradually reduce the size of the public sector

The energy sector liberalization program calls for restructuring, corporatization and divestiture of state-owned enterprises and increased private sector participation through build-own-operate (BOO) and build-operate-transfer (BOT) schemes. The Government aims to use private sector participation to help secure supply, which for Independent Power Producers (IPPs) means committing to meeting operational dates and conforming to planning needs and flexibility. The Government also hopes to derive more value from EGAT in terms of availability of capacity and other operating characteristics.

More specifically, the Government has established requirements for operating characteristics such as minimum generation targets, ramp up and ramp down ratios and voltage control. EGAT also wishes to secure back-up fuel availability and obtain market rates for fuel costs.

2.3 *Form of Competition*

Although not explicitly identified among the Government's motives for liberalization, increasing competition in the sector will help the Government achieve its stated objectives. Prior to liberalization, Thailand's power sector was controlled by vertically integrated monopolistic state-owned enterprises. EGAT was the sole domestic generator of electricity, although it purchased limited amounts from Laos and Malaysia. EGAT sold electricity to PEA and MEA, which distributed it to end users.

2.4 *Status of Efficiency and Productivity*

Despite the lack of competition in the sector, the Thai Government has held its state-owned enterprises (SOEs) to very high standards of efficiency and productivity since the inception of the National Economic and Social Development Plan in 1961. SOEs in the energy sector are relatively financially and technically efficient, and contribute to the Government's sound fiscal position. Table 1 shows selected financial indicators for EGAT, MEA, and PEA.

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Table 1
Financial Indicators for EGAT, MEA and PEA

	1991	1992	1993
EGAT			
Net profit	11,704	12,339	9,279
Debt/equity ratio	1 85	1 81	1 62
ROA	6 68%	6 39%	4 36%
MEA			
Net profit	2,535	2,295	2,867
Debt/equity ratio	2 40	2 25	1 96
ROA	8 03%	6 40%	7 17%
PEA			
Net profit	5,809	7,661	9,030
Debt/equity ratio	2 28	1 79	0 97
ROA	9 95%	10 96%	11 24%

in million baht (Approximately 25 5B/US\$)

Source The World Bank, *Thailand Sector Report*, 1994

Thailand is ranked second among developing Asian countries in technical performance of its electric distribution system. Transmission and distribution losses have been low by developing country standards. In the early 1990s, losses included transmission losses of four percent and distribution losses of five percent at MEA and eight percent at PEA. EGAT's network losses were approximately nine percent of generation. To reduce its losses, MEA converted the secondary system from 100 kilovolts to 220 kilovolts. MEA has also attempted to reduce non-technical losses, such as theft and incorrect meter-reading. Non-technical losses have been reduced to an estimated 0.1 percent. PEA has been working to improve distribution losses through system reinforcement, improvement of system power factors, upgrading distribution system voltage, phase balancing, and prevention of insulator leakage. However, PEA distribution losses of eight percent are still high.

2.5 Level and Structure of Prices

The electricity tariffs are set by EGAT, PEA, MEA, the Ministry of Finance (MOF), the National Energy Policy Office (NEPO), and the National Institute of Development Administration (NIDA). The automatic fuel adjustment factor is determined monthly and the relative rates are reviewed periodically to ensure that cross-funding among the utilities is adequate.

Bulk supply power prices are based on long-run marginal cost. As prices are sufficient to maintain financial viability and are affordable to the public, they have not been a major issue in power sector liberalization. For social equity considerations, the Government has been charging a uniform retail price for power throughout the country. However, as supply to rural areas costs more than supply to the Bangkok metropolis, the Government has been charging MEA higher rates to subsidize PEA.

Retail prices have remained relatively stable in recent years. In nominal terms, small residential customers paid 1.128 baht/kWh (US cents 4.42) from 1988 to 1992,² when prices fell to 1.0542 baht/kWh (US cents 4.13). Small commercial customers paid 1.84 baht/kWh (US cents 7.2) from 1987 to 1991, when prices were lowered to 1.82 baht/kWh (US cents 7.14). Small industry paid 2.19 baht/kWh (US cents 8.59) from 1988 to 1992, when prices were increased to 2.23 baht/kWh (US cents 8.75). Service reaches a relatively high percentage of the population. In 1992, MEA and PEA achieved 82.5 percent and 70.81 percent electrification, respectively.

Medium-sized industrial customers pay a demand charge of \$9.43/MW on-peak, \$1.257/MW off-peak, plus an energy rate of 4 cents/kWh for both periods. Larger industrials pay a demand charge of \$11.98/MW on-peak, and \$2.474/MW off-peak, plus an energy rate of 4 cents/kWh for both periods. Commercial customers pay between \$7.39/MW and \$9.34/MW for all periods, plus an energy rate of between 4.0 and 4.3 cents/kWh, respectively.

In the oil industry, the Government implemented a two-step reform program in May 1991 to deregulate prices and marketing margins, with the exception of ex-refinery prices. A "semi-floated" step also decontrolled ex-refinery prices in August 1991. Although the prices of oil products were liberalized in 1991, the price of regular gasoline was about 30 percent higher than that of diesel oil because of the differential in taxes. With the exception of liquefied petroleum gas and bitumen, oil prices are now determined by the market. However, tariff barriers still provide a degree of protection to domestic refiners.

2.6 *Investment Needs for Financing Development Projects*

The 7th Plan Period (1992-6) contains 54 energy projects that require capital expenditures. Of these, 28 are on-going projects that were approved in the 6th Plan. The remaining 26 projects will be submitted for approval in the 7th Plan. The total capital expenditure in the 8th Plan (1997-2001) requires ThB 253 billion (approximately US\$10 billion). Of this amount, the foreign currency requirement is ThB 111 billion (approximately US\$ 4.35 billion) and the local currency requirement is ThB 142.5 billion (approximately US\$5.65 billion).

The success of the investment and divestiture program depends on the depth of the capital markets. Thailand has one of the most dynamic stock exchanges in Asia. As of December 1992, market capitalization stood at \$130.5 billion compared to \$1.0 billion in 1980. The number of

² The exchange rate was approximately 25.5 baht/US\$ during this period.

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companies listed on the Securities Exchange of Thailand (SET) rose from 77 in 1980 to 347 in 1993

Despite Thailand's significant financing needs, fiscal constraints *per se* did not prompt the Government to expand private sector participation in order to meet increased capital requirements. However, a related concern, the increased demand forecast for the next 20 years, has been a major impetus. Without the help of the private sector, EGAT would face great difficulty expanding sufficiently to meet projected demand. Table 2 shows EGAT's anticipated generation requirements from the present to the year 2011.

Table 2
EGAT's Anticipated Generation Requirements

Fiscal Year	Peak MW	Increase Per Year (MW)	%
1996	13,009	1,129	9.5
1997- 2001	14,193-19,029	1,240	7.9
2002-2006	20,237-25,371	1,240	5.92
2007-2011	26,835-33,532	1,632.2	5.74

Source: Electricity Generating Authority of Thailand (EGAT)

The private sector will be instrumental in supplying Thailand's future energy needs. As of December 1995, EGAT's total installed generating capacity was 12,058 MW, including 412.5 MW (3.1 percent) oil-fired, 3,630 MW (27.29 percent) using gas, 2,359 MW (17.73 percent) burning lignite, 2,565 MW (19.28 percent) hydro, 2,868 MW (22 percent) combined-cycle generation. Targets for installed capacity require the addition of 6,940 MW by 2001, 19,940 MW by 2006, and 31,940 MW by 2011. The Thai Government has already identified 12,800 MW that will be developed by the private sector through three competitive solicitations.

III Liberalization Process

3.1 *Chapter Summary*

The Government is implementing a well-planned liberalization program that entails restructuring, commercialization and corporatization of state-owned enterprises, divestiture, and increased private sector participation through Build-Own-Operate (BOO) and Build-Own-Transfer (BOT) projects. EGAT has already corporatized and partially divested a subsidiary generating company and is in the process of selling off additional enterprises. PEA, MEA, and the Petroleum Authority of Thailand (PTT), which is responsible for production of energy and oil refining and retailing, are also undergoing restructuring and commercialization. In 1996, EGAT announced the selection of two consortia to develop a combined capacity of 1,400 MW on a BOO basis.

3.2 *Timing of the Liberalization Drive*

In March 1992, the National Assembly passed an amendment to the EGAT Act, allowing EGAT to establish a subsidiary company that would own and operate specific generating facilities. In September 1992, the Cabinet passed a resolution, the Royal Act on Private Participation in State Affairs, to liberalize all infrastructure sectors for increased private sector participation and corporatization.

Private sector participation in the energy sector began with EGAT's 1992 establishment of the Electricity Generating Company, EGCO, a subsidiary generating company with an initial capacity of 600 MW, increasing to 1,232 MW by 1996. EGCO also set up its own subsidiary, the Rayong Electricity Generating Company (REGCO). EGCO was divested by 49 percent in 1994 and was planning to compete to build new generation capacity. Also in 1994, the Petroleum Authority of Thailand (PTT) privatized a subsidiary, PTT exploration (PTTEP), to step up exploration and development of oil reserves. The initial public offering of PTTEP was highly successful.

By 1999, all sector enterprises (EGAT, PEA, MEA, and PTT) will be corporatized. Classifying EGAT, MEA and PEA as "Excellent State Enterprises" allows them the flexibility to operate as private companies in terms of financial management and establishing staffing and compensation structures. PEA may be divided into four regional companies to increase competition and avoid excessive size.

In addition to EGAT's IPPs, 50 percent of the shares of EGAT, PTT, PEA and MEA may be offered to domestic and foreign investors. Presently, 50 percent of EGCO is publicly listed. EGAT holds 48 percent of the equity and the Thai Property Crown Bureau the remaining 2 percent. EGAT plans to further reduce its equity holding below 40 percent by the end of 1996.

The plan to restructure EGAT envisions creating six business units (profit centers) and six operating units (cost centers). The business units are Thermal Generation, Transmission,

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Engineering, Construction, Mining, and Maintenance The operating units are Governor's Office and Internal Audit, Hydro Power Plants, Administration, Accounting and Finance, Policy and Planning, and New Business Ventures Asset restructuring for the creation of profit centers is in progress Business units will be corporatized in line with the Government's broad sector restructuring strategy All transactions between business units will be on the basis of transfer prices

In FY 97, after this structure is developed on a sound commercial footing, EGAT's business units will be either wholly or partially privatized Each of EGAT's fully commercialized units will be registered as an EGAT subsidiary company of which 100 percent shares will be owned by EGAT After that, each subsidiary company will be registered as a Public Company Limited selling shares on the Securities Exchange of Thailand (SET) in accordance with the financing plan for expansion EGAT will divest itself of 9,493 MW of generation assets through stock floatations The privatization process will depend on the absorptive capacity of domestic capital markets

3.3 *Planning Techniques*

In response to the Government's privatization policy, the Cabinet approved the following Four Step Plan for Thai power utilities

First Step 1992-3

- Classify EGAT as an "Excellent State Enterprise"
- Change the bulk price of MEA and PEA to correspond to long run marginal cost and eliminate the subsidy to PEA
- Introduce business principles for EGAT fuel purchases from Petroleum Authority of Thailand,
- Introduce an automatic fuel adjustment clause into EGAT's tariffs
- Establish EGAT's subsidiary company, EGCO, and list its shares on Securities Exchange of Thailand (SET)
- Abolish the policy of uniform retail tariffs for the whole country

Second Step 1993-4

- EGCO buys Rayong Power Plant from EGAT and negotiates for the purchase of Khanom from EGAT

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- EGAT invites private investors to participate in the Mea Kham Fluidized bed combustion project
- Determine the functions of and prepare for Independent Power Producers (IPPs) to be responsible for some projects in the Power Development Plan period (1995-2001)
- Restructure EGAT into commercially viable Business Units
- Classify MEA and PEA as “Excellent State Enterprises”
- Restructure PEA into Business Units with separate bulk tariffs for purchases from EGAT

Third Step 1994-5

- Amend EGAT, MEA and PEA Acts and privatize EGAT, corporatize MEA and PEA
- Privatize EGAT into public utility company and prepare for its registration with the Securities Exchange of Thailand
- Invite IPP bidding for projects to be constructed during 1995-2001

Fourth Step 1995-6

- Divide the PEA Corporation into regional electrical companies corresponding to its regional business units (see #6 of Second Step)
- Increase the share capital of EGAT and list its shares on the Securities Exchange while keeping the majority of ownership with the Government

EGAT has been implementing the Government’s privatization policy in accordance with the Four-Step Plan. However, raising funds and distributing EGAT’s shares on the SET will be shifted to the end of 1998. EGAT applied for a revision of that aspect of the Four-Step Plan. With the Government’s approval of the revised Four-Step Plan, EGAT will establish its six business and five operation units by the end of 1996. Table 3 shows the planned capacity for Private Sector Participation until the year 2011.

Table 3
Future Power Supply - Additional Capacity Required for PDP

National Plan #	Fiscal Year	Additional Installed Capacity	EGAT's Plants & SPP	IPP Plants	Laos PDR's Plants
8	1997	1,333	1,333	-	-
	1998				
	1999	7,100	4,600	1,300	1,200
	2000				
	2001	1,700	-	1,400	300
9	2002	1,700	300	1,400	-
	2003	1,500	500	1,000	-
	2004	1,700	700	1,000	-
	2005	2,000	1000	1,000	-
	2006	2,000	1000	1,000	-
10	2007	2,300	1,300	1,000	-
	2008	2,800	1,800	1,000	-
	2009	2,300	1,300	1,000	-
	2010	2,300	1,300	1,000	-
	2011	2,300	1,300	1,000	-
	total	31,033	16,433	13,100	1,500

Total installed capacity in 1996=15,731.9 MW

Source National Economic and Social Development Board

3.4 Methodology/Procedure

The Government's policy on private sector participation in the power sector entails two forms of participation: a) small power producers (SPPs) and Cogenerators, and b) larger power projects, i.e., Independent Power Producers (IPPs).

Small Power Producers and Cogeneration The National Energy Policy Council (NEPC) concluded that electricity generation from renewable energy, waste or residue fuel and generation would increase the efficiency of utilization of primary energy and by-product energy. Therefore, the Government has requested that EGAT purchase electricity from small power producers.

In April 1992, the Government announced the first offer to purchase a total of 300 MW from small power producers (SPPs). In 1994, a Cogeneration Agreement was signed with a private company to bring on line a new 60 MW facility. In 1995, the Government issued a second announcement to purchase up to 1444 MW. Eighty-four applicants have proposed to sell power to EGAT, totaling 4500 MW. Fifty applicants were prequalified. As of May 1996, 18 of them had signed contracts with EGAT for 600 MW. As of April 1996, 20 SPPs with a total installed

capacity of 669 MW had been developed, mostly using renewable fuels such as bagasse, rice husk, wood, etc

Independent Power Producers In December 1994, the Government invited bidders and issued the first Request for Proposals (RFP) to purchase 3,800 MW from IPPs. The RFP addressed all of the issues contained in the model Power Purchase Agreement (PPA) and Grid Code, in addition to seeking information about the financial strength and suitability of the bidder to operate a power plant to EGAT's satisfaction. The Grid Code specifies how the transmission system is to be operated, interconnected, and power generation scheduled and dispatched. The Grid Code will be the standard used by EGAT and will be referenced in the PPA. EGAT will also have a Connection Agreement with the IPP covering the terms under which the IPP will be connected to the EGAT transmission system. Under this agreement, EGAT will recover the costs incurred in installing connecting equipment and new lines to serve the IPP. The IPP will have construction, fuel supply (for thermal power plants), financing, and operation and maintenance contracts, as well as a PPA with EGAT.

The purchase of the first 3,800 MW from IPPs will be separated into two stages. In Stage I, 1,000 MW will be scheduled for commercial operation during the years 1998-2000. In Stage II, 2,800 MW will be scheduled for operation in 2001 and 2002.

In April 1995, the Government issued a supplemental notice to purchase additional capacity of 380 MW. By 30 June 1995, 104 registered bidders had formed into 32 consortia and submitted 50 IPP proposals. A total of 39,067 MW have been proposed. An open competitive bidding process was based on a documentation package consisting of a RFP, a model PPA, and a copy of the Grid Code. The projects will be developed on a BOO or BOT basis.

The cornerstone of the security package is the PPA. International consultants, with oversight from the National Energy Policy Office (NEPO), structured the PPA such that project risks were balanced with reward mechanisms that all parties (EGAT, developers, and financiers) would find equitable. There are unit-specific payments for availability and payments for energy at contracted fuel cost and heat rates, while there is both a provision for a security bond of 500 Baht/kw and liquidated damages. The PPA provides for reductions in payments for losses in value to the system through reduced availability and changes in ramp up and ramp down rates.

Investors' needs are recognized through such measures as

- payments to lenders if EGAT takes over the project
- *force majeure* provisions
- dispute resolution and arbitration procedures
- the targeting of availability payments towards the recovery of fixed costs by the project company

- incentive payments to encourage operational efficiency

Despite such specific provisions, the PPA is flexible enough to ensure that the type of plant to be offered is not pre-specified. Different technologies, both thermal and hydro, are dealt with using technology-specific amendments to the core PPA. In addition, independent power companies were given the liberty to be 100 percent foreign owned or joint ventures with Thai companies, although the Government said it will favor foreign-Thai joint ventures.

In accordance with both the clarity of EGAT's requirements and the strength of the security package, in 1994 the Government conducted competitive tendering in a transparent manner. The evaluation system focuses on price, not on rates of return. The lowest bidder should not have to justify its rate of return, except to the extent that it affects the competitiveness of its price. However, prices will not be accepted if they exceed EGAT's own cost of generation. The choice of generating fuel will be left to the developer. EGAT requires only that it be environmentally acceptable and offer a stable pricing structure and supply. Private power plants are allowed to increase the cost of power sold to EGAT to cover any additional costs needed to bring a plant into compliance with rapidly changing Thai environmental laws. Previously, developers were concerned that soaring environmental compliance costs in the future could adversely affect the finances of a project.

The IPP Evaluation subcommittee was composed of the Governor of EGAT and one representative each from NEPO, NESDB (National Economic and Social Development Board), and FPO (Fiscal Policy Office).

The bid evaluation criteria were based 60 percent on price factors (availability, energy, connection cost) and 40 percent on non-price factors (viability of project). The evaluations were approved by the EGAT Board of Directors.

3.5 *Effect of Liberalization Reforms on Cost/Price*

The two-part tariff comprises a capacity charge, based on performance at agreed levels of net dependable capacity and availability, covering fixed costs such as

- loan interest
- taxes
- return on investment
- depreciation
- fixed operation and maintenance costs,

and an energy charge, based upon units of energy supplied at agreed rates, covering

- fuel costs
- variable operations and maintenance costs

3.6 *Restructuring initiatives and institutional reform measures*

The state-owned enterprise (SOE) establishment law has been ratified to enable SOEs to engage in private sector joint ventures. Additionally, the laws establishing both EGAT and MEA have been amended to establish the future electricity supply industry structure.

3.7 *Instituting New Regulations*

In addition to the PPA, the Grid Code recognizes the technical needs of the system as well as the needs of the investor for stability and fairness. It defines procedures which provide clarity on operational practice and performance measurement by identifying electrical connection procedures, power plant operation and generation dispatching with which IPPs have to conform. The code provides for review procedures with reference for approval by the industry regulator. The Grid Code assures IPPs of fair treatment, but also sets out non-negotiable system requirements. The first version of the Code was drafted by EGAT and international consultants on the basis of EGAT's existing system and operational procedures. EGAT is continuing its work on fine tuning and implementation.

Based on the recommendations of a technical study completed in July 1996, NEPO, the current regulator, and the Cabinet have agreed that the power utilities will develop financial benchmarks for regulation that will ensure transparency and equity.

3.8 *Changes in Taxation Policy*

Selected Board of Investments (BOI) privileges allow for

- Reduction of import duties
- Exemption from income tax for eight years
- Possible reduction of income tax by 50 percent for an additional five years

IV Main Problems

4.1 Chapter Summary

Thailand's liberalization process has proceeded smoothly and without significant problems. After outlining its program and setting target dates, the Government has proceeded to achieve each of its objectives without significant delay. As the liberalization policy has been widely accepted by the public, the government, and the private sector, few obstacles have been encountered. Two outstanding problems have been 1) whether to allow EGAT's subsidiary, EGCO, to compete in competitive bidding, and 2) Thailand's continued dependence on imported primary fuels and electric power.

4.2 Short-Term Problems

The following short-term problems occurred in either the planning or implementation stages:

- Several shifts in political power have delayed implementation. For example, in September 1995, the government appointed a new board to EGAT, most of whom had little or no experience in the power industry. The Government withdrew some of the names and appointed new directors with stronger electric sector experience.
- There is no action plan for the liberalization process outlining a clear methodology and implementation process for concerned agencies to follow.
- The management and employees of some state enterprises may oppose the liberalization process, due to uncertainty about their career or loss of benefits if the private sector enters into management.
- Legal ambiguity stems from the country's initial legislation that prohibits operation of public utilities by the private sector, if the privatization is undertaken through the sale of ownership shares to the public, the investment fund must be transformed into ownership shares registered under the Civil and Commercial Code before sales take place. Such execution requires new legislation in the case of EGAT.

The Government has attempted to resolve these problems by taking the following actions:

- Building cooperation and support from all concerned parties by disseminating facts to educate the public about the advantages and disadvantages of privatization.
- Improving the work program for greater clarity by preparing an operational plan, with clearly defined methods and steps to ensure effective implementation of the privatization plans.

- Providing incentives for the affected and concerned parties, such as agreement for partial employee ownership of SOEs, together with the provision of skill-retraining services to facilitate switching to other jobs
- Promoting business-oriented operation by amending relevant laws which restrict private sector roles in certain activities and by changing the status of the SOE into a limited company

4.3 *Transitional Problems*

As EGAT has a substantial ownership stake in EGCO, objections were raised that EGAT may favor EGCO if it were allowed to compete in the first round of IPP bidding. The Government decided that EGCO should not be allowed to compete in the IPP bidding.

Disputes over water ownership rights led to the exclusion of EGAT's 20 hydropower plants from the privatization plan. All other plants that EGAT will divest are thermal, gas turbine or combined cycle.

The uniform tariff policy has required that retail sales of MEA and PEA be priced uniformly throughout the country. EGAT's differential tariffs to MEA and PEA have been a vehicle for subsidization from the urban to rural areas. The Government intends to eliminate that cross-subsidy scheme from EGAT's tariffs before EGAT's full privatization.

This problem is being addressed through a World Bank technical assistance project, the *Study on the Rationalization of Bulk Supply Tariffs to MEA and PEA*. The study will provide a model bulk power agreement with MEA and PEA, the first step in formalizing MEA and PEA contracts that would eliminate cross-subsidies. The revised bulk tariff structure will be introduced in 1996.

4.4 *Long-Term Problems*

Thailand's long-term energy problems revolve around the country's lack of indigenous primary fuels, a situation that has resulted in a high dependence on imported fuel. Although production of domestic primary energy sources is increasing, imports are also rising. Between 1990 and 1994, domestic production of crude oil, lignite, and natural gas increased from 1,196 to 1,325, from 3,570 to 5,165, and from 5,657 to 9,307 kilo tons of oil equivalent (ktoe), respectively. During the same period, imports of coke, crude oil, and petroleum products rose from 60 to 72, from 10,860 to 18,609, and from 7,660 to 8,603 ktoe, respectively. Despite the Government's attempts to reduce dependence by increasing domestic production of fuel and implementing demand-side management programs, the country will continue to rely on imported fuels for the foreseeable future.

Purchasing larger quantities of power from IPPs in neighboring countries will result in greater dependence on external power supply and decreased national energy security, leaving Thailand

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more vulnerable to external shocks Thailand's IPP program plans for increased power purchases from neighboring countries EGAT plans to purchase 1500 MW from projects from Laos by the year 2000 The Thailand-Malaysia High Voltage Direct Current Interconnection will boost the power exchange up to 300 MW in 1997 EGAT is now negotiating with Teknologi Perlis, the independent power producer authorized by the Malaysian government to sell electricity to Thailand on EGAT's power purchase of 300 MW Additionally, 6000 MW from the Lower Thanlwin Project in Myanmar (Burma) may be developed, if the Government of Myanmar agrees to sell to Thailand

V Results

5.1 Chapter Summary

Given the relatively efficient and reliable state of Thailand's energy sector prior to liberalization, measurable short-term results are insignificant. While the end user may not perceive improvements in price and reliability, corporatization has led to greater profitability and privatization has increased the security of supply to end users.

5.2 Level of Impact on Security of Supply

Scarcity of fuel sources has led the Thai Government to diversify its supply of energy through its liberalization program. In addition to securing electric energy from Laos (in June, 1996, the two governments agreed to double to 3,000MW by 2003 Thailand's purchase of electric power from plants in Laos), Thailand also signed a preliminary agreement in 1996 with Cambodia to develop hydroelectric capacity in Cambodia with both public and private sector involvement. There are also plans to expand the already existing transmission capacity between Malaysia and Thailand. While this step may help provide a continuous supply in the near term, it may threaten national security in times of energy shocks or war.

In terms of supplying end users, Thailand has not experienced the crippling power shortages that have plagued some of its neighbors, such as the Philippines. Therefore, a combination of demand-side management and proper planning to meet load forecasts should ensure a reliable supply to consumers. The liberalization process has been key in helping to assure a reliable supply.

5.3 Level of Impact of liberalization on Productivity, Research and Development and Reliability of Service

EGAT has been classified as an "Excellent State Enterprise." PEA is to achieve this status by the end of 1996. The "Excellent State Enterprise" status requires: 1) return on assets employed greater than 6 percent, 2) labor costs below 10 percent of total costs, and 3) annual productivity increases equal to or greater than 2 percent. Achievement of "Excellent State Enterprise" status provides management with the authority to devise and implement a suitable staffing and compensation system. This step has had a major impact on improving management incentives and is crucial to achieving a smooth transition to commercial operating status.

5.4 Level of Impact On Transparency in Cost, Price and Profitability

EGAT's fuel purchases from PTT are now made on a sound commercial basis. In the past, EGAT had been obliged to purchase all of its oil from PTT. Under the privatization program, EGAT was allowed in 1993 to purchase oil on the open market, on a trial basis. PTT won the competitive tender for the trial purchase, which was considered a success. While the agreement

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for commercial heavy oil purchases from PTT has been completed, a natural gas agreement is still being negotiated and will be completed in 1996

Although it began the liberalization process as a financially sound SOE, EGAT's profitability has increasingly improved. In 1994, EGAT remitted 4.6 billion baht to the Government, which represented 35 percent of its net profit. The Prime Minister was even prompted to question EGAT on its unusually high profits for FY 1994. EGAT's net profit increased 50 percent from the previous period to 18 billion baht. The Prime Minister went as far as to accuse EGAT of charging excessive tariffs to the public. EGAT had to explain to NEPC that the profits were a result of a 1994 readjustment of the wholesale tariff. EGAT charges to MEA and PEA to keep the earnings from the electrical operation fairly distributed among the three power companies. The retail price remained the same.

From 1986 until October 1996, the tariff structure remained virtually unchanged, except for a small reduction in 1987. Effective December 1992, the Government implemented an automatic adjustment clause, by means of which the retail tariff is adjusted monthly as EGAT's costs change for fuel, taxes, foreign exchange and demand-side management techniques.

As of April, 1996, PEA and MEA received power from EGAT at wholesale rates. The bulk supply tariff is based on long-run marginal cost pricing but takes into account equity, social and development considerations, as well as the financial needs of the three utilities. The tariff to PEA and MEA as currently applied, comprises a flat per KW charge. There is no wholesale demand charge or charge for variation depending on time of use. Consequently, the tariff does not reflect the cost of supply and does not give the correct signals to PEA and MEA to improve their load factors, load shapes, and power factors or encourage conservation. As of September 30, 1996, the bulk supply tariff for MEA and PEA was baht 1.47/kwh (US cents 5.65) and baht 0.96/kwh (US cents 3.7), respectively, although the actual cost of supply to PEA is greater than the cost of supply to MEA. The difference in the tariff to the two utilities has allowed the urban consumers to subsidize the rural consumers so that the retail tariff for all consumers in Thailand remains uniform.

In 1995, the Government Committee on Electricity Pricing began a review of EGAT's power pricing structure to ensure that it can adjust to the changes brought about by the introduction of private power supplies through the solicitation process. The Committee plans to end all power subsidies to EGAT. The revisions will match the sales price of power with its generation costs and introduce a progressive rate structure based on volume. Separately, NEPO plans to introduce time-of-day tariffs for medium scale industries and others to discourage the use of electricity during peak demand periods.

On October 1, 1996, EGAT established a new wholesale tariff structure that will remain in effect for three years. The new plan discontinues the cross-subsidies that EGAT traditionally offered to PEA at the expense of MEA. EGAT now levelizes costs to 5 cents/kwh from the 5.6 cents/kwh MEA previously paid and the 4.36 cents/kwh that PEA paid.

5 5 *Level of Impact on Energy Efficiency and Environment*

Total losses in generation and transmission were approximately 7.7 percent of total power generated in 1995, down from the 1994 level of 8.6 percent. The level has fallen in recent years as transmission problems have been resolved with power line upgrades. About 3.2 percent of electricity generated was lost in transmission and transformers in 1995, better than the 1994 level of 4.1 percent. Distribution losses as a percentage of power received were about 4.5 percent for MEA and six percent for PEA, an achievement by both organizations that ranks with the best performing power utilities in Asia.

5 6 *Level of Impact of Liberalization on Financing and Investment Needs*

Despite enjoying a large degree of autonomy in the conduct of daily operations, the energy sector's SOEs are subject to strict government control in all matters relating to investment planning and financing. Because of the strict control on public debt, all loans made by energy state enterprises requiring government guarantees must be approved by the Fiscal Policy Office of the Ministry of Finance and the Cabinet, and subsequently endorsed by the National Debt Policy Committee.

Meeting increased load demand and improving the electricity transmission and distribution system will require an estimated B 254 billion (approximately US\$10 billion) under the Eighth Plan. For a long-term profile up to the year 2011, the Power Development Plan (PDP) recommends the installation of 33,676 MW of new generating capacity, net the retirement of 2,747 MW of existing power plants. By September 2011, the sector's total capacity will be 43,918 MW comprised of 11 percent hydro, 25 percent conventional oil/gas fired, seven percent lignite-fired, 11 percent imported coal-fired, 10 percent combined cycle, eight percent gas turbine, and 28 percent from IPPs and EGAT-TNB transmission lines.

5 7 *Level of Impact on Regulation and Taxation*

With the Government's plans to restructure the sector and its entities and move them towards commercialization, corporatization and eventual privatization, the Government has reviewed the options for the regulatory structure that would be able to properly handle the increased burden and more complex nature of regulation in the future. The new regulatory structure, based on benchmark regulation, will be transparent and provide a set of legally binding and fair rules and regulations that can attract the private sector and assure them of their investment, future income, and market entry and exit.

5 8 *The Road Ahead*

The outlook is for continued rapid growth in electricity demand over the medium term. The latest official demand forecast made by the National Load Forecast Subcommittee envisions continued high load growth related to expected strong economic performance. Base case demand growth rates for EGAT, MEA, and PEA for the Seventh Plan (1992-6) are summarized below. These growth rates are considered to be reasonable and achievable. In 1994, Thailand electricity

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demand was 10,709 MW. The demand is forecast to increase to 13,673 MW by the end of 1996, to 19,899 MW by the end of 2001, to 26,392 MW by the end of 2006 and to 33,532 MW by the end of 2011.

In February 1996, the Cabinet approved the medium-term structure for the electricity supply industry. This structure envisions the formation of a central purchasing agency comprising the existing EGAT transmission system and hydro power plants. This entity will be a private corporation. The thermal plants under EGAT will be corporatized as an independent generation subsidiaries. All transactions between the central purchasing agency and power suppliers will be based on fully dispatchable PPAs in order to ensure productive efficiency in the system.

The Petroleum Authority of Thailand (PTT) will continue moving towards greater commercialization and corporatization. It will convert its oil and gas units into independent subsidiaries as envisioned in its corporate plan. Also, policy making and monitoring will be separated from PTT operations. The government may dilute and sell PTT's shares of its 13 subsidiary companies over a period of time.

The two electric distribution companies, PEA and MEA have both prepared corporatization/privatization action plans. The PEA action plan has been approved by the Cabinet. It now has to define detailed implementation plans to manage the transition from the existing organizational structure to the future commercial organizations. Distribution companies may be allowed to purchase directly from any generating company or IPP. EGAT's role as a central procurement agency may be gradually phased out.

The next step would be to allow large industrial and commercial customers to buy directly from all generators. This situation would require defining wheeling charges for transmission and distribution, and redefining distribution company obligations to supply--and industrial and commercial customer obligations to buy -- in a franchise area. If Thailand is able to implement these measures, the Government's goals for efficiency, transparency and equity of the energy sector are virtually assured of success.

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