Center for Environment
Office of Energy, Environment, and Technology

REVIEW OF INDONESIAN POWER SECTOR DEVELOPMENT ISSUES

March 1995

U.S. Agency for International Development
Bureau for Global Programs, Field Support, and Research
Center for Environment
Office of Energy, Environment & Technology
Washington, D.C. 20523-1810

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Energy Technology Innovation Project
Contract No. DHR-5741-Q-00-1062-00
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EXECUTIVE SUMMARY

I. INTRODUCTION

Indonesia's power sector is currently undergoing a process of substantial reorganization and evolution. Rapid increases in electricity demand have strained the resources of PLN, the state-owned utility, leading many users to construct their own power stations. At the same time, the GOI wants to reduce its financial support of PLN, limiting future contributions to those that subsidize explicitly social objectives.

The GOI's responses to these developments have been to encourage increased efficiency within PLN and increased private sector participation in the sector. The primary form of private involvement to date in Indonesia has been through build-own-operate (BOO) contracts for the construction and operation of private power plants. Several concerns have been raised about these contracts, however, in particular about apparently expensive contract terms and the need for all the capacity currently agreed to or under negotiation. Private sector participation in the ownership of existing assets is also being planned. However, the roles of PLN and other sector participants have not been defined, nor has the allocation of business risk among them been determined. In addition, the GOI is currently exploring an initial public offering (IPO) to access private funds for sector expansion.

After identifying these options, the Ministry of Finance (MOF) of Indonesia requested technical assistance to aid in analyzing them. USAID retained Price Waterhouse LLP ("Price Waterhouse") to provide such assistance, with a focus on the role the MOF should play in establishing sector policy. The specific objectives of this project were the following:

- To assist the MOF in causing the development of policies that promote greater efficiency within the power sector, with a particular emphasis on alternative approaches to privatization
- To advise the MOF on the role it should play in the proposed corporatization and selected privatization of PLN

The Price Waterhouse team was asked to review current and proposed policies relating to the following specific issues, within the context of the objectives described above: electricity tariffs and subsidies; design and status of the IPP program; an appropriate structure for the electricity sector; and the role of privatization in achieving sectoral goals.

II. CURRENT SITUATION

The PLN system can be divided into the Java-Bali grid and the Outer Islands. The former represents 80 percent of PLN's total demand, and is consistently profitable. The Outer Islands consists of hundreds of small, isolated systems with few interconnections, organized into 11 geographic regions, or Wilayahs, almost all of which are uneconomic. Other entities in the sector include captive power stations and scattered cooperatives and small-scale stations providing power to rural customers. Consistent with its prior status as a *perum*, PLN has

been expected to meet both social and commercial objectives. This ambiguity has led to a lack of accountability for commercially oriented operations, since inefficiency can always be attributed to the exigencies of fulfilling PLN's "social mission".

Indonesia currently has both substantial excess generation capacity and significant unmet demand; the system reserve margin is approximately 62 percent for Java-Bali and 104 percent off-Java. This excess capacity is expensive: in a worst-case scenario average tariffs could rise as much as seven cents per KWH in the medium-to-long term to pay for it. The extent of unmet demand is illustrated by the 2.1 million applications for new connections that were received during the 1993/94 fiscal year, representing 6,700 MVA of potential connected load, or 48 percent of PLN's installed capacity. Another problem is the large amount of captive power, which in 1990 accounted for 29 percent of total generation and 40.3 percent of total installed capacity. Heavy reliance on captive power has high costs for its owners, PLN and the Indonesian economy and environment. Most small users rely on inefficient diesel gensets that are expensive and detrimental to the environment. Captive power also has large costs for PLN, because it is commercial and industrial load that is being lost, customers that have several desirable characteristics for power companies.

III. ANALYSIS OF POLICY ISSUES

Electricity Tariffs and Subsidies -- Three principal tariff and subsidy issues must be resolved if efforts to increase efficiency and private participation in the sector are to be successful: the inability to measure and track the level of financial support actually provided by the GOI; extensive cross-subsidies embedded in the tariff structure; and PLN's lack of control over its costs and revenues.

The inability to accurately measure GOI direct and indirect subsidies must be addressed before the actual profitability of any PLN business unit can be determined. GOI support is also not linked to specific business units, reinforcing the lack of accountability produced by a mixing of commerical and social objectives. The GOI has historically maintained two types of cross-subsidies through its tariff policy: from Java-Bali to the Outer Islands; and from large users to small. The first is implemented through a geographically uniform tariff, which results in prices that frequently diverge dramatically from the cost of service, particularly in the Outer Islands, where the average cost of service is Rp. 214 and average revenue only Rp. 157. The second flows from large to small users. The largest beneficiaries by far are small residential consumers, who will receive up to Rp. 851 billion in subsidies from other customers in 1994/95.

Finally, PLN does not have control over the prices and sources of its inputs and revenues. The base tariff levels that determine its financial viability are set on an administrative, *ad hoc* basis, and are often not reflective of major changes in PLN's revenue requirements. Fuel prices are also determined administratively, and currently include an implicit tax paid by PLN to PERTAMINA. In addition, the latter's monopoly control over hydrocarbon resources allows it to impose punitive, non-market contract terms on PLN, effectively shifting to PLN risks typically borne by fuel suppliers.

IPP Program -- In response to forecasted rapid demand growth, the GOI has begun contracting for power with IPPs. The first such agreement, for the 2,400 MW Paiton One project, was recently signed, and 4,000 to 6,000 MW of other IPP projects are planned.

An effective IPP program should be based on the results of a comprehensive system plan, which is currently not the case. Both solicited and unsolicited projects are under development, in addition to the PLN's own *Super Crash* program to construct new capacity. In addition to the direct cost of acquired capacity that may be un-needed, the Paiton One PPA sets a poor precedent by guaranteeing the purchase of a high minimum amount of power. Such "take- or-pay" contracts, when the minimum take is relatively high, can disrupt the economic dispatch of the system, raising overall costs. Based on the GOI's current plan for the IPP program, it is estimated that its total cost could reach $4 billion in 2000, which will be passed through directly to consumers. Our analysis estimates the additional per KWH cost of the IPP program to be US$0.07 if this capacity is not needed.

In addition to meeting the expected need for increased generating capacity, other objectives for the IPP program are to: mobilize international capital for domestic infrastructure projects; assist in moving the power sector from social service provider to commercial industry; create a competitive environment for the acquisition of generating capacity; and transfer business and financial risks from the GOI to private parties. The current program, for the reasons cited above and others discussed in the body of the report, will not lead to the achievement of these objectives, unless it is reorganized to provide a consistent, coherent framework within which to acquire new capacity.

Power Sector Structure -- The objective of restructuring the power sector is to make it efficient and self-financing. In order to do so, the GOI must separate the sector's commercial objectives from the social policies it is currently being asked to implement. Criteria for achieving the goal of economic efficiency include: (1) aligning all GOI policies, laws and regulations to support commercialization; (2) encouraging the use of competition and market mechanisms to provide maximum economic discipline; and (3) distributing risks to the party that can best bear them. This last criterion means that the risks of planning, management, control, dispatch, and service quality and reliability should reside with those directly responsible for that function.

Several tradeoffs must be considered in choosing a power sector model from the continuum between integrated and fully disaggregated. For example, disaggregated structures encourage competition and require little regulation, but integrated models are easier to implement, require less institutional change, and have the clearest lines of responsibility. Two other critical considerations must be addressed by the GOI while selecting an appropriate restructuring model. First, which type of model best supports the ability of the system to make necessary transmission and distribution investments? Second, which model has more appeal to outside investors and is more "IPO-able"? In both cases, the model which best links entities to their markets and best creates incentives for management to pursue the outstanding market potential of the Java-Bali grid will be preferred.

Privatization -- There have been numerous public announcements concerning the privatization of PLN's generation subsidiaries, including a call made by President Suharto in November 1994 for the rapid restructuring of PLN in order to prepare for privatization. The President of PLN subsequently disclosed that he was in the last stages of selecting "joint-venture partners" or "strategic allies" for generation subsidiaries to be established in 1995. Generation companies (Gencos) have not yet been established, however, nor is there any indication that formal plans for their creation have been developed. It is therefore unlikely that all relevant issues can be addressed by April 1995, the proposed deadline for the announcement of joint-venture or strategic partners for the Genco subsidiaries.

An explicit framework for the future sector structure and its regulatory framework are vital in order to derive the maximum benefit from privatization, and their absence is a significant hinderance to both private parties and the GOI in judging the financial and business merits of any proposed deal. The key financial consideration impacting privatization opportunities is the limited number of PLN units that are profitable. Almost all of these, with the possible exception of one Wilayah, are in the Java-Bali system. If the privatization strategy includes an IPO component, the hurdles to be met are even greater. Successful IPOs have in common the following features: a successful track record; a franchise or opportunity for growth; a coherent regulatory framework; established commercial relationships; and an attractive risk/reward profile. In addition, they must meet the listing requirements of the exchanges on which they are offered, including audited financial statements, which will be difficult to produce for PLN subsidiaries due to several accounting complexities.

IV. RECOMMENDATIONS

Electricity Tariffs and Subsidies --The principal objective of efforts to reform the tariff structure should be to allow tariffs for customers that are not to be subsidized to move toward the cost of serving them. Only when this occurs will they be profitable for PLN to connect and serve. In addition, those subsidies that the GOI decides should remain must be carefully targeted so as to benefit only the customers for whom they are intended. The World Bank estimates that only five percent of current subsidies to small residential consumers go to the provision of basic levels of service (15 to 25 KWH per month per household) for the poorest consumers. Moreover, the smallest residential consumers (tariff category S1) pay only a monthly demand charge, requiring poor consumers to pay a flat monthly fee that they may find difficult to bear with fluctuating income and subsidizing consumption levels far in excess of those that could reasonably be described as basic needs.

An example of how residential subsidies could be more carefully targeted is provided in the hypothetical tariff structure illustrated in the report. By eliminating demand charges for the two smallest tariff categories and implementing a "life-line" rate for the first 30 KWH of consumption for all users, the total residential subsidy would be reduced by approximately Rp. 490 billion. This reduction would mean higher total bills for many consumers in the R1 and R2 tariff categories, but only for those that are using substantially in excess of the basic needs level of electricity. Moreover, the total monthly bill for those that use less than about 40 KWH per month would actually decline.

IPP Program -- The conditions for a successful IPP program include:

- *A clear legal and regulatory framework* which establishes transparent ground rules for participants and assures a level playing field.
- *Maintenance of a healthy power purchaser.* PLN's financial strength is an important consideration for IPP developers. The poor performance that results from mixing social and commercial objectives and poor operating controls leads IPP developers to demand take-or-pay contracts with high thresholds in order to protect their investment.
- *A transparent bidding process.* The GOI must take a more coordinated approach to developing IPP projects. A key first step is to halt discussions on new IPP projects until a comprehensive integrated resource development plan has been instituted.
- *A competitive market for project components.* The GOI should allow PLN to compete with IPPs for new power supply opportunities, rather than administering separate programs. In addition, it should use production sharing contractors to negotiate oil, gas and geothermal supplies to IPPs and PLN.
- *Discrete project facilities for each IPP project.* Co-location of private projects at PLN sites adds extra costs and risks to IPP projects, which are passed on to PLN and the GOI by the developer.
- *A new power purchase contract* based upon the lessons of the Paiton One PPA should be developed. The new model agreement should be crafted to improve the cost/benefit balance so as to serve the current strategy for developing the sector.

Power Sector Structure -- Making the electricity system operators responsible only for commercial objectives means separating their roles from that of the GOI, which becomes one of enforcing adherence to social objectives. This separation of goals radically changes the roles of the sector's institutions. PLN and/or its restructured parts and the other service providers must be accountable for the management, supervision and control of the system. The GOI must oversee the system operators by providing policy guidance, macroeconomic planning, economic development initiatives, and regulation of economics, safety, technical quality and environmental compliance. In restructuring roles, the GOI should focus in particular on four key issues:

- *Management* -- PLN and its restructured business units should be fully corporatized, with management completely accountable for operations, a functional organization with clear lines of accountability and with the freedom to negotiate PPAs directly.
- *Planning* -- GOI planning for the sector should be limited to macroeconomic policy and long-range sectoral growth. All other planning should be by those entities responsible for the obligation to serve.
- *Regulation* -- It is recommended that an independent and non-political regulatory body be created to license and oversee all sector participants. This regulatory body would be fully staffed by a complete and independent technical and professional staff, and would have enforcement powers commensurate with its authority and responsibilities.
- *Rural Electrification (RE)* -- A new inter-ministerial organization should be created for RE planning, programming and implementation. PLN should be relieved of its responsibility for RE, and should be used by the GOI only as a contractor.

Privatization -- The following conclusions were reached regarding current privatization efforts: PLN should proceed with its preparations in a more deliberate manner; the consideration of privatization alternatives should not be limited to Gencos; an IPO may not be feasible in the near term; "carved-out" business units need an auditable track record; and sector restructuring and commercialization should precede an IPO. Two recommendations follow from these conclusions: the GOI should review privatization opportunities within the framework of sector restructuring and commercialization; and the GOI and PLN should methodically implement any privatization plan to increase potential benefits and minimize risks to PLN. With these recommendations in mind, three sector restructuring and privatization options that might be appropriate for Indonesia and PLN are discussed below.

- *Model 1 - Integrated:* In this option, two to four regional integrated utilities would be carved out of the Java-Bali grid. Each region could sell to the others by wholesale wheeling under a grid code of pricing and transfer policies. All new generation would be obtained through open competitive bid among all regionals and IPP's, and the regionals would compete for existing unserved areas.
- *Model 2 - Partial Disaggregation:* This option would keep all transmission and distribution functions together under a single PLN management, while all generation facilities would be spun off as independent units (Gencos), either singly or in groups. Each Genco would be privatized under rehabilitate-own-operate (ROO) arrangements with strategic partners, improving output and reliability and lowering costs.
- *Model 3 - Disaggregated:* In this option, only the transmission system would remain intact as a common carrier among generators and distributors. As a natural monopoly, the transmission system would serve all entities as a passive player, and could be owned jointly by the distribution companies (Discos), the GOI and/or PLN. All generation would be spun off as in the partial disaggregation model (Model 2 above).

V. NEXT STEPS

The recommendations above address an array of policy areas. They are united, however, by a few broad themes that should guide the development of a workplan for the MOF. Of these, the most important are to exert some degree of control and coordination over the array of actors and activities that are currently driving events in the sector, and to systematically define and implement the sector restructuring that is already underway. To that end, the following specific steps should be implemented without delay:

- The inter-ministerial restructuring team should immediately begin the systematic design of a comprehensive restructuring and privatization design and implementation plan that will guide PLN, other GOI entities and private parties through the process
- The MOF should commission an independent financial audit in order to establish geographical and functional profitability, measure the extent of GOI support and prepare for private sector participation
- The progress of purchased power acquisition should be slowed until need is more clearly defined and a consistent, coherent program is put in place

I. INTRODUCTION

A. Background

Indonesia's power sector is currently undergoing a process of substantial reorganization and evolution, which is driven by several forces. Rapid economic growth and the resulting increases in electricity demand have strained the financial and management resources of PLN, the state-owned utility, leading to system reliability problems and an inability to fulfill new service requests. This has caused many users to construct their own power stations: at present, nearly half of the generating capacity in Indonesia is "captive power" used for self-supply by private parties. Unfortunately, the vast majority of captive power stations are small, diesel-fired units, with high fuel costs and few economies of scale. At the same time, the Government of Indonesia (GOI) wants to reduce its rapidly increasing financial support of PLN, limiting future contributions to those that subsidize explicitly social objectives.

The GOI's responses to these developments have been to encourage increased efficiency within PLN and increased private sector participation -- and in particular, investment -- in the sector.

On the legislative front, several initiatives have been passed that are intended to both increase the efficiency of state-owned enterprises (SOEs) and examine possibilities for their privatization. Presidential Decree No. 55, passed in 1988, addressed privatization alternatives available to SOEs, and Ministerial Decrees 740 and 741 established a framework for evaluating PLN's performance, focusing primarily on efficiency. Additionally, in August 1994 the GOI changed the corporate status of PLN from *perum*, an enterprise chartered to pursue both social and commercial objectives, to *persero*, a corporation with a strictly commercial mandate. One of the key objectives of this change was to decrease PLN's reliance on government financing, which has escalated sharply in recent years due to increases in demand and aggressive GOI-mandated rural electrification targets.

Actions have also been taken by the executive branch. The Government, through its Ministry of Mines and Energy (MME), is exploring various mechanisms for promoting private participation in the sector. In other countries, such participation has provided the means to achieve greater efficiency, accessing expanded pools of capital to support needed investments and reducing costs. The primary form of private involvement to date in Indonesia has been through build-own-operate (BOO) contracts for the construction and operation of power plants that will sell their output to PLN under long-term power purchase agreements (PPAs). These contracts will help both to meet current demand and to satisfy the extremely large capital requirements needed to finance anticipated future expansion. Several concerns have been raised, however, about the contracts already signed and the bid solicitation and negotiation process, in particular about apparently expensive contract terms and the need for all the capacity currently agreed to or under negotiation.

Private sector participation in the ownership of existing assets is also being planned, and is currently under discussion within PLN, the Ministry of Finance (MOF) and the MME. In

general, these plans envision the separation of generation, transmission, and distribution functions within the Java-Bali grid and different modes of private sector participation in the generation arena. However, the roles of and relationships among PLN subsidiary companies to be created during the ongoing corporatization process, the independent power producers (IPPs) and other private entities have not been defined, nor has the allocation of business risk among these participants been determined.

In addition, the GOI is currently exploring the initial public offering (IPO) of shares as a mechanism for accessing private funds for the development of the power sector. As part of sector restructuring the GOI intends to select a commercially viable subsidiary or subsidiaries of PLN for offer via an IPO. Such an effort, however, requires the development of disaggregated financial data in order to determine the profitability of potential subsidiaries without GOI support, and must consider the impact of existing cross-subsidies between regions and customer classes.

After identifying these options for promoting efficiency and private participation within the sector, the GOI requested technical assistance to assist in analyzing them. As part of its on-going program with the GOI and the power sector, USAID retained Price Waterhouse LLP ("Price Waterhouse") to provide such assistance to the MOF. Several of the issues described above were examined by the Price Waterhouse team, with a focus on the role the MOF should play in establishing sector policy that will promote efficient private participation in electricity supply.

B. Study Objectives

The MOF is the GOI ministry with responsibility for monitoring PLN financial performance. Pursuant to the increased importance of financial performance that accompanies the change to *persero* status, the MOF requested technical assistance to investigate the sector with the following objectives:

- To assist the MOF in causing the development of power sector policies that promote greater efficiency within PLN and the private sector under the current conditions of rapid electricity demand growth, with a particular emphasis on alternative approaches to privatization

- To advise the MOF on the role it should play in the proposed corporatization and selected privatization of PLN, either through the IPO model or the combined strategic investor/IPO model

C. Scope and Methodology

The Price Waterhouse team was asked to review current and proposed policies relating to the following specific issues, within the context of the objectives described above:

- Electricity tariffs and subsidies
- Design and status of the IPP program
- An appropriate structure for the electricity sector
- The role of privatization in achieving sectoral goals

Activities undertaken included the following:

- Review of documents produced by other consultants, advisors to the MOF and MME, PLN and other GOI entities, including PPAs for contracts already signed or under negotiation
- Interviews with officials from PLN, the MOF, the MME, financial advisors to the GOI and other consultants
- Analysis of data obtained from these and other sources

The conclusions and recommendations of the team were provided in a series of presentations to the Director General for State-Owned Enterprises at the MOF, who holds a seat on PLN's Board of Commissioners (akin to a Board of Directors in the U.S.), as well as representing the Minister of Finance, who in turn serves as shareholder on behalf of the GOI. This report details those findings.

D. Structure of the Report

Section II describes the current Indonesian power sector and two significant problems that cut across the policy areas addressed by the report. Section III then examines the current situation within the power sector in each of the four areas of investigation, detailing the challenges faced by the GOI, policies that have been implemented or planned to meet them, and perceived concerns with those policies. Section IV presents the recommendations of the Price Waterhouse team for addressing these concerns.

II. CURRENT SITUATION

A. Description of the Sector

1. Physical Characteristics

The PLN system can be divided into two distinct, and quite different, parts: the Java-Bali grid and the Outer Islands.

The Java-Bali grid, which interconnects those two islands, represents 80 percent of PLN's total demand, and is consistently profitable. It is an integrated utility, with major power plants connected by a 500 KV transmission system. Generation and transmission are managed by two units: Western Java and Eastern Java-Bali. Distribution is organized into four regions: West Java, Central Java, Jakarta and Eastern Java-Bali. The central Load Dispatch Center controls the operation of the entire generation and transmission systems.

The Java-Bali system is characterized by hypergrowth in demand, averaging about 16 percent per year, projected to continue at that pace for the foreseeable future. Its transmission system is not robust and is susceptible to line failures and "islanding".

The Outer Islands are represented by hundreds of isolated and small systems with few interconnections (except on Sumatra, where some extensive systems exist). Almost universally, these systems are uneconomic; they are chronically under-maintained and difficult to operate effectively. PLN's operations in the Outer Islands are organized into 11 geographic regions (Wilayahs): four on Sumatra, two on Kalimantan, two on Sulawesi, and three representing other islands or groups of islands. A small amount of electricity service on some islands is also provided by cooperatives.

2. *Organization and Financing*

The Indonesian power sector currently consists of PLN, captive power stations, and scattered cooperatives and small-scale stations providing power to rural customers. Although GOI laws permit private operators to participate in the sector, they have done so primarily in response to PLN's inability to provide reliable service to certain customers (i.e., industrial and commercial users) and in certain areas (rural locations). Therefore, although these operators account for somewhat less than half of total installed capacity in Indonesia, they are generally not commercial producers or distributors of power. Private participation in commercial activities, such as non-PLN distribution systems and wholesale or retail wheeling, is permitted by current laws, but these alternatives are not currently practical in most circumstances.

PLN is an entity of the GOI, which controls the company at the ministerial level, through the MME and the MOF; at the board level, through a GOI-appointed Board of Commissioners; and at the management level, through direct supervision of the company's planning, management and budgeting functions. PLN's operations are financed by:

- The GOI, through direct subsidies, grants and loans from donor agencies, "soft" loans (at favorable rates or with little expectation of a return), exchange rate protection and other forms of transfer mechanisms
- Domestic investors through the issuance of short-term bonds
- Self-financing through internally generated capital

Consistent with its prior status as a *perum*, PLN has been expected to meet both social and commercial objectives through its operations. Thus, the GOI has instituted policies -- such as uniform tariffs and rural electrification -- aimed at meeting certain social goals that require PLN to operate under non-commercial terms. This burden is partially met by cross-subsidizing these activities with surpluses earned from profitable customers. It also has led to a lack of accountability for commercially oriented operations, since their lack of efficiency can always be attributed to the exigencies of fulfilling PLN's "social mission".

B. Problem Areas

1. Excess Capacity and Unbalanced Investment

Indonesia currently has both substantial excess generation capacity and significant unmet demand, in large part the result of a transmission and distribution bottleneck in many areas of the Java-Bali grid. The magnitude of current excess capacity is indicated by the system reserve margin, which in 1993/94 was approximately 62 percent for Java-Bali and 104 percent off-Java, compared with the National Electricity Reliability Council standard of 20-25 percent for North America. Moreover, this situation will be exacerbated over the near-to-medium term if current plans for substantial new PLN and private investment in additional generation capacity are realized.

The extent of current unmet demand is difficult to measure precisely, but several indicators give an idea of its magnitude. PLN statistics on its waiting list provide a starting point. Over 2.1 million applications for new connections were received during the 1993/94 fiscal year, representing 6,700 MVA of potential connected load. Although 2,100 MVA of new capacity was connected during the year, the waiting list at year end remained at 6,600 MVA, or 48 percent of PLN's installed capacity. Another indication of unmet demand is Indonesia's low level of electrification. Per capita electricity consumption, electricity intensity (KWH consumed per dollar of GDP) and the share of population with access to electricity are all the lowest in the region, as illustrated in Table 1.

Table 1
Comparative Indicators of Electrification

Country	1993 Per Capita Consumption (KWH)	1990 Electricity Intensity (KWH/$000 GDP)	1990 Access to Electricity (% of population)
Singapore	5983	NA	100
South Korea	2901	639	100
Malaysia	1598	441	82
Thailand	996	617	71
Philippines	334	523	61
Indonesia	275	234	24

Source: Asian Development Bank. Electric Utilities Data Book, 1993; Chan, Angello. *Asia/Pacific Utilities: Privatization Drive for Indonesian Power*. Morgan Stanley Investment Research, Japan & Asia/Pacific, October 28, 1994.

As noted above, transmission and distribution bottlenecks are in large part responsible for the coexistence of both excess capacity and excess demand. These bottlenecks have led to significant reliability problems. Although PLN uses a loss-of-load-probability (LOLP) of three days as its reliability target -- an unusually high figure relative to world standards -- there were 12 to 14 interruptions per customer in 1993/94, of an average duration of 8 to 9

hours, or 4.9 days overall. Reliability has been one of the key factors driving the continued growth of captive power, and the reluctance of self-generators that are connected to the PLN grid to use PLN power as their primary supply.

Excess capacity is expensive, contributing unnecessarily to the tariff increases that must occur as PLN moves to a fully commercial status. How much this excess capacity will ultimately cost Indonesian consumers will depend on several factors:

- The growth of demand relative to planning forecasts
- The rate at which transmission and distribution (T&D) bottlenecks are addressed so that consumption can be brought in line with demand
- The amount of capacity planned under the PLN "Super Crash Program" and various IPP contracts that is actually built

As noted in Section III.B below, in the worst-case scenario -- in which much of the IPP capacity currently under contract, negotiation or discussion is not needed -- average tariffs could rise as much as seven cents per KWH in the medium-to-long term as a result.

2. *Captive Power and an Unbalanced Customer Base*

In 1990 captive power in Indonesia accounted for 29 percent of generation, far higher than the 3 to 12 percent shares observed in 12 other large developing countries evaluated in a recent analysis. Although estimates vary, this share appears to have held steady or increased since 1990. Installed captive capacity in 1993/94 was 9,196 MVA, or 40.3 percent of the combined PLN and captive total. This represents a 11.3 percent increase over 1992/93 captive capacity, indicating that the incentives to bypass PLN have not decreased.

Heavy reliance on captive power has high costs for its owners, PLN and the Indonesian economy and environment. Although some large industrial self-generating units have thermal efficiencies that match that of PLN, most small users rely on inefficient diesel gensets that are both more expensive than reliable grid-supplied power and detrimental to the environment. In addition, they hinder Indonesia's attempts to reduce its reliance on diesel and other light distillates that must be imported due to inadequate refining capacity. A 1993 study estimated the economic cost of captive power in Java-Bali more than $1 billion per year for two types of economic costs: the diversion of large shares of private capital away from productive investment and into captive capacity; and the high cost of generation in backup units. This estimate does not include the economic cost of importing diesel, nor environmental costs.

Captive power also has large costs for PLN, because it is commercial and industrial load that is being lost. These customers have several desirable characteristics for power companies. Most importantly, their demand is spread out across the day more evenly than that of residential customers, which flattens the load curve and allows more base-load generation. In addition to having technical advantages for maintaining system stability, this has the dual financial benefit of both reducing average per KWH generation costs and increasing average

revenue per dollar of investment. In addition, large consumers are cost-effective for capital-constrained power sectors and companies: they have low technical losses, which reduces gross generation requirements; and yield high sales and revenues per employee due to their large load sizes. Finally, under the current tariff structure large commercial and residential customers -- who both account for the bulk of sales in their customer categories and are the most likely to invest in captive power -- pay above-cost tariffs, with the excess used for cross-subsidizing small consumers of all types.

Commercial and industrial sales, revenues and connected capacity have remained essentially constant as a share of the PLN total over the last five years. Their combined share, however, is significantly below the level observed in neighboring countries, as illustrated in Table 2. Although Indonesia has roughly the same share of power consumption going to industry, a considerably smaller percentage is accounted for by commercial consumers.

Table 2
1990 Shares of Electricity Consumption by Sector

Country	Industrial	Commercial	Combined Industrial & Commercial
Malaysia	48	31	79
Philippines	52	20	72
Thailand	49	20	69
South Korea	65	16	81
Indonesia	38	11	49

Source: Asian Development Bank. Electric Utilities Data Book, 1993.

III. ANALYSIS OF POLICY ISSUES

A. Electricity Tariffs and Subsidies

There are three principal tariff and subsidy issues that must be resolved if efforts to increase efficiency and private participation in the sector are to be successful:

- The inability to measure and track the level of financial support actually provided by the GOI
- Extensive cross-subsidies embedded in the tariff structure
- PLN's lack of control over its costs and revenues

The inability to accurately measure GOI direct and indirect subsidies is largely an accounting problem, but it is one that must be addressed before the actual profitability -- and therefore value -- of any PLN business unit can be determined. A recent estimate put the total subsidy for the 1993/94 fiscal year at from Rp. 932 to Rp. 2,257 billion. In addition to the fact that

this range is so large as to be of little value, it cannot be allocated to different geographical or functional units with any degree of accuracy. Such a lump-sum transfer provides no incentive for minimizing costs, nor for soliciting customers and providing services that maximize revenue. It also reinforces the lack of accountability produced by a mixing of commerical and social objectives by obviating the need to determine whether a particular operation is profitable and taking appropriate steps if it is not. Without a clear delineation between commercial and social activities, those that should be profitable but are not can simply be written off as part of the "social mission", relieving management of the need to cut costs or increase revenues.

The GOI has historically maintained two types of cross-subsidies through its tariff policy: from Java-Bali to the Outer Islands; and from large users to small. The first of these is implemented through a geographically uniform tariff. Because the PLN service area consists of some 650 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 the case in the Outer Islands, where the average cost of service is Rp. 214, while average revenue is only Rp. 157. This provides an incentive to avoid connecting any customers at all, since most are unprofitable. Residential customers are connected based on quantitative GOI targets, however, so that it is only the commercial and industrial customers who are denied service. The result is a situation where potentially profitable commercial and industrial customers are not connected in areas where PLN has excess capacity, while the residential customers PLN is forced to connect continue to drain the resources of the company.

The second type of significant cross-subsidy flows from large to small consumers. Table 3 provides an estimate of the magnitude of these cross-subsidies. The largest beneficiaries by far are small residential consumers, who will receive up to Rp. 851 billion in subsidies from other customers in 1994/95. Small industrial users also benefit, while large users of all types are taxed. These cross-subsidies provide a strong incentive for commercial and industrial customers -- with the exception of small industrial users, who account for only ten percent of all industrial sales -- to leave the system.

Table 3
Projected 1994/95 Cross-Subsidies under Current Rate Structure (Rp. billions)

Customer Type	Total Subsidy (Tax)
Small Residential	851
Small Industrial	49
Large Residential	(256)
Medium & Large Commercial	(403)
Large Industrial	(200)

Source: Preliminary Price Waterhouse calculations using PLN forecasted budget data.

Finally, under the current structure of GOI policies, PLN does not have control over the prices and sources of its inputs and revenues, nor over how to make the most productive use of its investments. On the revenue side, the base tariff levels that determine its financial viability are set on an administrative, *ad hoc* basis, and are often not reflective of major changes in PLN's revenue requirements. On the cost side, fuel prices are also determined administratively, and while the current price of high-speed diesel fuel was intended to include a subsidy, changes in world market conditions have left the administered price above market levels, which creates a tax paid by PLN to PERTAMINA. In addition, the latter's monopoly control over hydrocarbon resources allows it to impose punitive, non-market contract terms on PLN, effectively shifting to PLN risks typically borne by fuel suppliers.

The current implicit tax on diesel fuel -- which is PLN's largest fuel charge -- adds approximately 15 to 25 percent to its world price, or Rp. 160 to 250 billion per year in extra expenditures. Rural electrification, the targets for which are also administratively set, is consuming a growing share of operational and investment resources as quantitative targets are raised and villages become more isolated. Repelita VI calls for an increase in electrified villages from 32,649 to 50,308 and for an increase in connected customers from 8.6 to 11.3 million. To put this in perspective, the previous three Repelitas connected 5.2 million households over 15 years, while the current plan calls for an additional 6.6 million in five years. On a more basic level, PLN does not even have the ability to determine with certainty what its costs for specific activities and regions are, and therefore whether they are profitable.

B. IPP Program

Indonesia expects from 15 to 25 percent annual demand growth for electricity over the next twenty years. This growth is projected to result from system-wide expansion and pent-up demand for electricity services due to insufficient transmission and distribution capacity. In order to respond to this growth, the GOI embarked on a program to expand generating capacity through the inclusion of IPPs in the sector. The first IPP power purchase

agreement, for the 2,400 MW Paiton One project, was recently signed by the GOI and the developer, and an additional 4,000 to 6,000 MW of IPP projects are planned.

In order to respond effectively to Indonesia's growing demand for power, the IPP program should be based on the results of a comprehensive system plan which incorporates both reliable demand projections and supply planning. The current projections for demand growth are quite "soft", with wide variations in the estimates provided by different sources. Under these circumstances, it is impossible to assess the potential impact of the IPP program. Similarly, poor supply planning could also result in too much or too little capacity. PLN data suggests an uncoordinated approach to the acquisition of IPP generation. Both solicited and unsolicited projects are under development, in addition to the GOI's own *Super Crash* program to construct new capacity. However, there is no systematic approach to least-cost acquisition. Therefore, it is unclear what goals are being met, and whether the cost of new capacity is being minimized.

In addition to the direct cost of acquired capacity which may be in excess of demand, the Paiton One PPA, which may be used as the model for future agreements with IPP developers, guarantees the purchase of a high minimum amount of power from IPP projects. This "take-or-pay" contract means that regardless of the cost of IPP power relative to other generators, PLN must pay for the contracted amount of power. Such take-or-pay contracts, when the minimum take is relatively high, can disrupt the economic dispatch of the system, raising overall costs to PLN. Based on the GOI's current plan for the IPP program, it is estimated that the total cost of IPP power could reach as high as $4 billion by the year 2000, as illustrated in Table 4.

Moreover, Presidential Decree No. 68/1994 (October 8, 1994) provides for the pass-through of IPP costs to the consumer. Table 4 calculates the potential cost impact of the IPP program if the PPAs for the remaining planned projects contain the same terms as the Paiton One PPA. The analysis estimates the additional per KWH cost of the IPP program if the existing capacity plus PLN generating additions meet the actual demand for electricity needs of the Java-Bali grid to be US$0.07 over the base charge.[1] This translates into anywhere from a 51 percent increase in the average per KWH charge for low voltage commercial customers to a 125 percent increase for high voltage industrial customers. The increase for residential customers is estimated at 101 percent over the average per KWH charge.

[1] This estimate is based upon power rates agreed upon by the MME. Where specific contract rates were not available, comparable technology contracts were used.

Table 4
IPP Cost Analysis:
Estimated Payments to IPP Projects
(US $000's)

Project	Capacity (MW)	1997	1998	1999	2000	2001	2002	2003
Cliegon I	400		215,846	226,639	237,971	249,869	262,363	275,481
Paiton 5&6	1220			735,279	772,043	810,645	851,178	893,737
Paiton 7&8	1230		688,617	723,048	759,201	797,161	837,019	878,870
Tanjung Jati B	1320		739,004	775,954	814,752	855,490	898,264	943,177
Tanjung Jati A	1200				671,822	705,413	740,684	777,718
Pasuruan	500	223,380	234,549	246,276	258,590	271,520	285,096	299,351
Sepong	400	174,832	183,574	192,752	202,390	212,509	223,135	234,292
Bali 1 & 2	60		33,954	35,651	37,434	39,306	41,271	43,335
Candikuning	50		28,295	29,710	31,195	32,755	34,393	36,112
Darajat 2	55		31,124	32,680	34,315	36,090	37,832	39,723
Dieng	95		53,760	56,448	59,271	62,234	65,346	$68,613
Karaha	55		31,124	32,680	34,315	36,030	37,832	$39,723
Patuha	40		23,529	24,706	25,941	27,238	28,600	$30,030
Salak	165		97,059	101,912	107,007	112,357	117,975	$123,874
Wayang Windu	40		23,529	24,706	25,941	27,238	28,600	$30,030
Total Cost		398,212	2,383,965	3,238,443	4,072,187	4,275,796	4,489,586	4,714,065
Energy Sales (GWH)		47,437	50,900	54,616	58,603	62,881	67,471	72396
Potential per KWH increase*		**$0.01**	**$0.05**	**$0.06**	**$0.07**	**$0.07**	**$0.07**	**$0.07**

Source: Various PLN public documents and news reports.

* Represents additional cost to consumers if PLN's existing capacity and the Super-Crash Program meet the basic demand requirements for power

Assumptions:
1. Project list, capacity factor, gas project power prices and energy sales growth rate per Director General letter of December 12, 1994.
2. Power rates per MME letters according to technology type.
3. Power rate escalation at 5 percent per annum.

In addition to meeting the expected need for increased generating capacity, the objectives for the IPP program are to:

Mobilize international capital for domestic infrastructure projects: The international capital markets have funded companies and intermediaries to invest in electric generating projects throughout the world. In accordance with the strategy to reduce PLN's reliance on GOI financing, the IPP program aims to take advantage of the availability of international capital. Despite what has thus far been an *ad hoc* effort, the IPP program has attracted significant attention, as demonstrated by a healthy response to solicited projects and the submission of unsolicited projects by international developers. However, the uncertainty created by the continual announcement of new projects, the restructuring of PLN, and the evolution of GOI policy supporting these projects has meant that the cost of international capital may be higher than necessary.

Assist in moving the power sector from social service provider to commercial industry: This objective reflects the broad GOI policy of promoting the transformation of PLN to a commercial operator, and the recognition that power generation is an area both where large amounts of capital are needed and where the private sector is most likely to participate. Paiton One and other IPP projects are unlikely to realize the anticipated efficiency gains generally associated with the opening of the state sector to private operators if the GOI does not implement complementary changes in the way the power sector is organized and operated. In particular, commercial and social operations must be separated so that managers responsible for the former are accountable for their profitability, which includes the acquisition of privately produced power. Without these changes, the IPP's have little incentive to assume risks and provide competitive service. Instead, they will be integrated into the current sector structure and compound the existing inefficiencies.

Create a competitive environment for the acquisition of generating capacity: The GOI's effort to solicit projects is aimed at creating competition for generating capacity. To date, however, the bid process has lacked transparency, making it difficult to ascertain whether the best developer is selected. Furthermore, the disorganized, protracted negotiation of the Paiton One project and the imposition of a number of uncommercial terms on the developer by the GOI virtually eliminated any competitive gains that could have been realized.

Transfer business and financial risks from the GOI to private parties: One of the most important incentives to the Government for establishing an IPP program is the opportunity to transfer business risks to the private sector. While all risks are borne by the Government and the consumer under the current system, the introduction of IPPs aims to distribute risks more evenly to the various private sector participants: the IPP sponsor, the lender providing project financing to the sponsor, and the insurer. Table 5 illustrates the risk distribution for a typical IPP project. Table 6 shows the distribution of project risks under the Paiton One agreement; few of the project risks have been reallocated because GOI contract terms made the cost of assuming these risks higher than the project sponsors and lenders were willing to pay.

Table 5
Project Risk Allocation for Typical IPP Projects*

Project Participants	Categories of Risk							
	Legal & Regulatory	Currency	Inflation/ Interest Rate	Market	Construction & Completion	O&M	Fuel Supply/Price	Catastrophic Loss
GOI	X	X	X	?	?	?	?/?	
PLN Shareholders	X		?	X		?	?/?	
Sponsors			?/?		X	X	X/X	X
Lenders					X	X		
Insurers					X	X	X	X
Consumers	X	X	X/X	X	?	?	X/X	?

* Question marks (?) indicate project risk categories where the degree of risk sharing is generally a matter for negotiation by the project participants.

Table 6
Project Risk Allocation for Paiton One Project*

Project Participants	Categories of Risk							
	Legal & Regulatory	Currency	Inflation/ Interest Rate	Market	Construction & Completion	O&M	Fuel Supply/Price	Catastrophic Loss
GOI	X	X	X	X	X	X	X/X	X
PLN Shareholders	X		X	X	X	X	X/X	X
Sponsors					?		X/X	?
Lenders								
Insurers					?	?		?
Consumers	X	X	X/X	X	X	X	X/X	X

Source: Paiton One PPA

* Question marks (?) indicate project risk categories where the Paiton One PPA resulted in some degree of risk sharing with other project participants.

C. Power Sector Structure

1. Objectives and Selection Criteria

The objective of restructuring the power sector is to make it more economically efficient so it can sustain itself profitably and support the country's overall economic development and social plans. To achieve this objective, the GOI must separate the sector's commercial objectives from the social policies it is also being asked to implement. For commercialization of the sector to succeed, managers responsible for commercial activities must be made fully accountable for the profitability of those activities, without the benefit of falling back on the exigencies of social responsibilities to explain unsatisfactory results. The achievement of social goals, therefore, must be left solely to the Government.

Criteria for implementing the goal of economic efficiency include: (1) aligning all GOI policies, laws and regulations to support commercialization; (2) encouraging the use of competition and market mechanisms to provide maximum economic discipline, especially by providing opportunities for the private sector to invest in, own and manage sector assets and operations; and (3) distributing risks to the party that can best bear them, whether it be the GOI, PLN (as it exists or may be restructured) or the private sector. This last criterion means that the risks of planning, management, control, dispatch, and service quality and reliability should reside with those directly responsible for the function.

2. Models for Java-Bali

Historically, all electricity utilities were fully integrated, combining generation (G), transmission (T) and distribution (D) functions under a monopoly status granted by the state. PLN is one such utility, as are the utilities in France (EdF) and the United States. Such a structure was justified by the long-held assumption that electricity service was a natural monopoly. In the U.K. in the 1980's, however, and to a lesser extent in the U.S. in the 1970's, that assumption was proven erroneous. The U.K now has a fully disaggregated system with G provided by any entity under open competition selling into the network, T remaining a single entity as common carrier of service and clearinghouse for supply, and D divided into distinct regional monopolies with the proviso, however, that any generator can supply any customer in the entire system by making contractual arrangements. By separating physical distribution from commercial supply, the U.K. has maximized competition. Several countries are currently emulating variations of the U.K. model, including Spain, Chile and Ukraine.

Between the integrated and fully disaggregated models lies a variety of partially disaggregated models. In some instances, such as Thailand, T and D are kept together as a regulated monopoly and G is open to competition. In other cases, like the Philippines, G is disaggregated, T is kept as a single entity and D is divided among several entities, each with regulated monopoly status. Other variations between the two extremes are being explored by various countries, depending on their unique situations and institutions. For example,

Mexico and Malaysia are closer to the fully integrated end of the spectrum and Argentina closer to the U.K. disaggregated model.

In choosing a model for Indonesia from this continuum, several tradeoffs must be considered. For example, disaggregated models allow for the greatest amount of competition and, therefore, the least intensive regulation. Integrated models have a higher tendency to encourage monopolistic behavior and therefore require the most intensive regulation for consumer protection. On the other hand, integrated models are easier to implement, require the least amount of institutional change, and have the clearest lines of responsibility, especially for the all-important obligation-to-serve requirement. Disaggregated models need more sophisticated management, more system coordination by government (or another agency), and have much more difficult transition periods from the existing situation. Completely disaggregated models have not yet been fully proven in environments like Indonesia, and even in the U.K., which is marked by stable and mature demand-supply relationships, much tinkering is still being carried out.

Two other critical considerations must be addressed by the GOI while selecting an appropriate restructuring model. First, which type of model best supports the ability of the system to make necessary T and D investments? Second, which model has the greater appeal to outside investors and is more "IPO-able"? In both cases, the model which best links entities to their markets and best creates incentives for management to pursue the outstanding market potential of the Java-Bali grid will be preferred. Integrated models provide more resources under single management and best capture economies of scale to allow management to plan and execute T and D functions more easily. The higher the integration of units and the closer those integrated units come to interfacing directly with the markets, the easier it will be to demonstrate their growth and profit potential, and therefore to attract investors.

D. Privatization

1. Recent Activities

Over the course of last year there have been numerous public announcements concerning the proposed privatization of PLN's generation subsidiaries. These announcements have come from various ministries and government offices, but the most important to date was that made by President Suharto, in November 1994, calling for the rapid restructuring of PLN in order to prepare for privatization. Subsequently, in an announcement by the President of PLN, it was disclosed that PLN was in the last stages of selecting "joint-venture partners" or "strategic allies" for power generation subsidiaries, numbering anywhere from three to six, to be established in 1995.

Although there have been announcements regarding the privatization of generation companies (Gencos), these Gencos have not been established yet, nor is there any indication that formal plans for their creation have been developed. Efforts to address this policy void have been slow and it is unlikely that all the issues can be addressed by April 1995, the proposed deadline for the announcement of joint-venture or strategic partners for the Genco

subsidiaries. Currently, the issue of restructuring PLN is being studied by working groups within PLN that report to a special inter-ministerial restructuring group, team Tujuh, which consists of representatives from the MOF, the MME and the President of PLN. This team is supported by three working groups that are analyzing PLN's mission, capital structure and human resources and organization, respectively. In addition to these GOI groups, Price Waterhouse and RCG/Hagler Bailly have substantially completed Phase I of the MOPA project, wherein they have reviewed 12 functional areas of PLN's structure and operations. In regards to privatization of the proposed subsidiaries, a draft workplan has been submitted to PLN under Phase II of the MOPA project.

An explicit framework for the future sector structure and its regulatory framework are vital in order to derive the maximum benefit from any proposed privatization. The lack of a formal framework or plan regarding the formation of Gencos and their business relationships with PLN and regulatory relationship with pertinent GOI entities is a significant hinderance to both private parties and the GOI in judging the financial and business merits of any proposed deal. In addition, given a stable and well-defined backdrop private parties are willing to participate to the fullest with their investments and technical expertise.

The presence of a regulatory and sectoral framework not only optimizes investors' participation, it also minimizes the risks for GOI: once a position is established by a strategic investor or any other private party and commercial arrangements are in place, future modifications to them cannot be accomplished without great disruption and cost to the entire system. The GOI therefore has to be wary of the fact that granting a stake in subsidiaries of PLN ties it to a long-term commitment, which if not properly planned limits the ability of PLN and the power sector to provide adequate and reliable service.

In addition to the lack of a framework within which to proceed with the current privatization, there has been limited discussion of possible alternatives for privatization. Until now the focus has been on privatization of generation assets or subsidiaries because their activities are not connected to PLN's social objectives. Although Gencos offer separation of social from commercial objectives, it is also possible to implement other structures, such as vertically integrated utilities or distribution companies, whereby the social mission is retained either through or in parallel with the privatized company. The resolution of these issues is of the utmost priority if the current privatization and future privatization efforts are to be successful.

2. *Financial and Investment Considerations*

The key financial consideration impacting privatization opportunities is the limited number of PLN units that are profitable. Almost all of these, with the possible exception of one Wilayah, are in the Java-Bali system. Other units may be made profitable, but not before some of the business challenges described in previous sections are met. Of particular importance is rectifying the current imbalance between generation and transmission investment, which has led to transmission bottlenecks that prevent excess capacity from fulfilling unmet demand. Also important is rationalizing the tariff structure of the Outer Islands and reducing cross-subsidies from large to small consumers.

If the privatization strategy includes an IPO component, the hurdles to be met are even greater. Successful IPOs have in common the following features:

- Successful track record
- Franchise or opportunity for growth
- Regulatory framework
- Established commercial relationships
- Attractive risk/reward profile

As indicated in other sections of this report, many of these areas require considerable work before they will meet the standards of an international IPO. In addition to these purely business considerations, a PLN subsidiary offered in an IPO must meet the listing requirements of the exchanges on which it will be offered, as detailed in the following list:

- Key SEC registration requirements for all U.S. exchanges (Reg. S-X):
  - Audited financial statements with 2 years of balance sheets and 3 years of income and cash flow statements

- Key listing requirements of NYSE for foreign registrants:
  - Market capitalization of at least $100 million
  - Net tangible assets (tangible stockholder equity) of at least $100 million
  - Pre-tax income for the past 3 years of at least $100 million, with a minimum annual income of $25 million

- Key listing requirements for Jakarta Stock Exchange (JSX):
  - Financial report audited by registered accountant and company has received unqualified opinion for latest five years
  - The company has been established and in operation for at least 3 years
  - The company has made operational and net profits in the last two fiscal years
  - Minimum assets of Rp. 20 billion, minimum equity of Rp. 7.5 billion and minimum market capitalization of Rp. 40 billion
  - Shares listed at the request of the Minister of Finance shall be exempt from the requirements stated above

Given the above listing requirements, the prospects of any near-term offering are very limited. Only PLN as a consolidated unit can currently meet the requirement for 3 years of auditable financial statements for an international offering. Though JSX requirements can be waived by the Minister of Finance, PLN is unlikely to receive an exemption from the NYSE requirements. In addition to being unable to meet the audit requirements the NYSE, the current accounting and business structure of PLN poses problems for "carving out" business units for privatization.

By definition, the "carve out" of a business unit from a larger fiscal entity involves the historical restatement of the unit's assets, liabilities, revenues and expenses on a separate company basis. This is analogous to what PLN is attempting to do by creating a subsidiary

Genco under the current privatization plan. But given PLN's current structure there are various complexities that must be dealt with before a successful "carve out" is possible.

First, PLN's business units are not complete accounting entities. The balance sheets of PLN's Wilayah- and Java-based profit centers do not include cash balances, long-term debt and other customary assets and liabilities. Second, transfer prices for electricity among the Java-based distribution and generation units were only initiated in 1994 on a test basis, and formally adopted by the Board of Commissioners for fiscal year 1995. Third, there is a lack of clear division among generation and transmission assets and costs in the Java system, because the generation and transmission assets are co-mingled in many sector-level accounting units. Finally, the Project unit, which manages on-going capital additions to generation, transmission and distribution, is separate from the individual Wilayah for which the capacity additions have been commissioned.

IV. RECOMMENDATIONS

A. Electricity Tariffs and Subsidies

The principal objective of efforts to reform the tariff structure should be to allow tariffs for customers that are not to be subsidized to move toward the cost of serving them. Only when this occurs will they be profitable for PLN to connect and serve. Although this solution involves the reduction and eventual elimination of geographic and size-based cross-subsidies that have been in place for many years, there is substantial evidence of an ability and willingness to pay higher rates among many customers that are currently subsidized. Two different surveys have found that approximately 25 to 50 percent of rural residential customers are able and willing to pay higher prices for electricity. This stated willingness is buttressed by the fact that some rural consumers already pay tariffs to electricity cooperatives that are two to three times those charged by PLN. Commercial and industrial customers would also be willing to pay more, a fact which is illustrated by customers on waiting lists that would be paying the implicit taxes illustrated in Table 3 if they are connected.

In addition, those subsidies that the GOI decides should remain must be carefully targeted so as to benefit only the customers for whom they are intended. The World Bank estimates that only five percent of current subsidies to small residential consumers go towards the provision of basic levels of service (15 to 25 KWH per month per household) for the poorest consumers, with the remainder providing benefits for those who are both able and willing to pay unsubsidized rates and/or levels of consumption above basic needs for poor consumers.

Moreover, the smallest residential consumers (tariff category S1) pay only a monthly demand charge, with no per KWH tariff. This has two effects that run counter to the principle of careful targeting. First, it requires poor consumers to pay a flat monthly fee that they may find difficult to bear, and does not allow them to vary the monthly burden of the electricity payment by reducing consumption. Second, it subsidizes consumption levels far in excess of those that could reasonably be described as basic needs. The average monthly usage for S1 consumers is 83 KWH, and they draw the maximum current allowed by their connection over

550 hours per month, compared with 128 to 141 hours for the other residential tariff categories.

An example of how residential subsidies could be more carefully targeted is provided in the hypothetical tariff structure illustrated in Table 7 and Figure 1. By eliminating demand charges for the two smallest tariff categories and implementing a "life-line" rate for the first 30 KWH of consumption for all users, the total residential subsidy would be reduced by approximately Rp. 490 billion. This reduction would mean higher total bills for many consumers in the R1 and R2 tariff categories, but only for those that are using substantially in excess of the basic needs level of electricity.

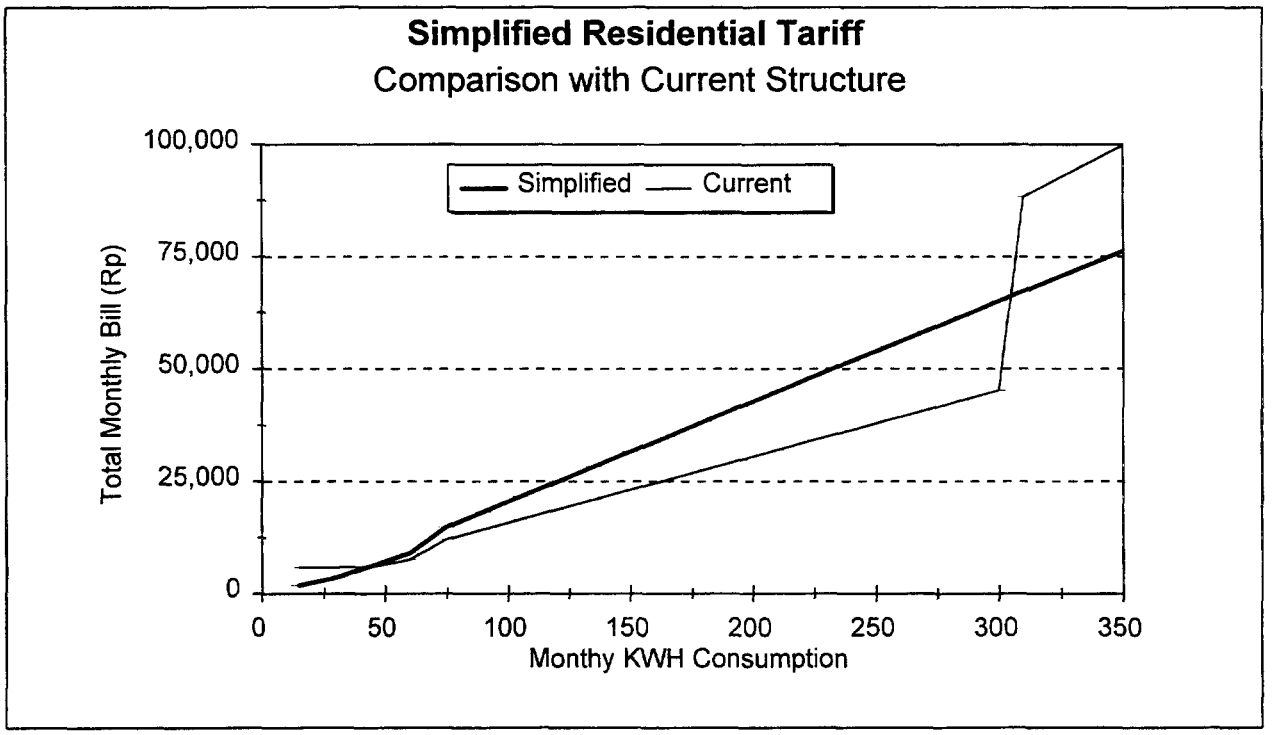
Table 7
Subsidy Reduction under Simplified Residential Tariff Structure

Tariff Class	Monthly Demand Charge (Rp. per KW)	Energy Charge			Annual Subsidy Reduction (Rp. 000s)
		< =30 KWH	30-60 KWH	>60 KWH	
S1		120.00	180.00	180.00	0
R1		120.00	180.00	180.00	196,984,550
R2	6,000	120.00	180.00	180.00	296,580,390
R3	6,000	120.00	180.00	180.00	(62,603,420)
R4	6,000	120.00	180.00	180.00	(142,884,658)
Total					**288,076,862**

Source: Preliminary Price Waterhouse calculations using PLN forecasted budget data.

Moreover, as illustrated in Figure 1, the total monthly bill for those that use less than about 40 KWH per month would actually decline. The line representing the simplified structure approximates the cost of service (as calculated by PLN) for most levels of consumption. Thus, the triangular area between the two lines in the middle of the exhibit represents subsidies to consumers whose monthly consumption falls between about 40 and 300 KWH per month, which is clearly above the basic needs level. Implementing the simplified structure would raise rates for these consumers and lower them for those at low levels of consumption, which is the objective of the subsidies, as well as for those at very high levels, who are currently being heavily taxed to support those customers in the middle of the consumption range. This is just one example of how the tariff structure could be modified to achieve more careful targeting and a reduction in overall subsidy costs. Any such modification, however, should adhere to the two recommendations above: moving the tariffs of consumers that are not to be subsidized towards the cost of serving them; and targeting more carefully those that are to be subsidized.

Figure 1



Source: Preliminary Price Waterhouse calculations using PLN forecasted budget data.

B. IPP Program

The conditions for a successful IPP program include:

- **A clear legal and regulatory framework** which establishes transparent ground rules for participants and assures a level playing field. The lack of an independent regulator under the current structure means that many development risks and their associated costs must be borne by the GOI.

- **Maintenance of a healthy power purchaser**. PLN's financial strength is an important consideration for IPP developers. The under-performance of the company that results from the mixing of social and commercial objectives and poor operating controls leads IPP developers to demand take-or-pay contracts with high thresholds in order to protect their investment. The restructuring of the sector and of PLN for optimal efficiency is a key goal that will also increase the attractiveness of the IPP program to international developers.

- **A transparent bidding process.** The GOI must take a more coordinated approach to developing IPP projects. A key first step is to halt discussions on new IPP projects until a comprehensive integrated resource development plan has been instituted. Such a plan will prevent delays in new projects and reduce market uncertainty for all projects.

- **A competitive market for project components.** The GOI should allow PLN to compete with IPPs for new power supply opportunities, rather than administering separate programs. In addition, the GOI should eliminate import duties on equipment for wholesale power generation and use production sharing contractors to negotiate oil, gas and geothermal supplies to IPPs and PLN. A final step towards improving the competitiveness of the IPP program involves allowing pipeline companies to develop gas transportation and distribution infrastructure in conjunction with gas purchasing through production-sharing contractors.

- **Discrete project facilities for each IPP project.** Co-location of private projects at PLN sites adds extra costs and risks to IPP projects, which are passed on to PLN and the GOI by the developer. Using an integrated resource development plan, IPP projects should be based upon a set amount of power to be purchased, rather than particular sites. The GOI should also consider selling PLN assets to IPP investors as part of a bid solicitation program.

- **A new power purchase contract** based upon the lessons of the Paiton One PPA should be developed. The terms of the Paiton One agreement are "pioneer" terms and do not necessarily reflect the terms and conditions needed to attract additional power supplies at competitive prices. A thorough review of the Paiton One agreement is recommended with the following objectives: (1) to quantify and evaluate the potential costs of concessions made to the developer; and (2) to measure the benefits of the agreement in terms of the stated GOI objectives for the program. The preliminary analysis provided in this report suggests that the costs of the agreement outweigh the benefits to the government. The new model agreement should be crafted to improve the cost/benefit balance so as to serve the current strategy for developing the power sector.

C. Power Sector Structure

Making the electricity system operators responsible only for commercial objectives (efficiency, quality, reliability, investment sufficiency and system adequacy) means separating their roles from that of the GOI, which becomes one of enforcing adherence to social objectives (fairness, equality, self-sufficiency and environmental protection).

This separation of goals radically changes the roles of the sector's institutions. PLN, or its restructured parts, and the other service providers must become completely responsible for the management, supervision and control of the system, including being ultimately accountable for its planning (demand forecasting, integrated resource planning, fuel mix,

etc.), development, operation, financing, budgeting and customer service. The GOI must oversee the system operators by providing policy guidance, macroeconomic planning, economic development initiatives, and regulation of economics (prices, rate of return, etc.), safety, technical quality and environmental compliance.

To achieve market-driven efficiency, the electricity sector must maximize the appropriate use of economic tools: full commercialization, full decentralization, employment of private sector participants as strategic investment partners or contract managers of operations, use of independent power producers to fulfill resource plans and IPOs of appropriate business units. On the other hand, the GOI must provide overall and consistent policy development for the sector, establish a full-function regulatory body, direct the rural electrification program, make all subsidies explicit and direct to the desired recipients and enforce a transparent and equitable commercial code.

In restructuring roles, the GOI should focus in particular on four key issues:

Management of PLN:

- PLN and its restructured business units should be fully corporatized, with management (Board of Commissioners) fully accountable for total operations, a functional organization with clear lines of accountability all the way to the top and with the freedom to negotiate PPAs directly with IPP's or others as needed
- PLN and its restructured business units should be fully commercialized by decentralizing all units as profit centers, making all operations profit- and customer-oriented, and providing incentives for management and labor productivity

Planning:

- GOI planning for the sector should be limited to overall macroeconomic policy and long-range sectoral growth
- All other planning responsibility -- system, integrated resource, operational -- should be borne by those units/parties that are ultimately responsible for the obligation to serve customers
- The planning functions of PLN and its restructured business unit should be fully professionalized and placed under the direct control of senior management

Regulation: It is recommended that an independent and non-political regulatory body be created to license and oversee PLN, any new entities created by restructuring PLN, electricity coops, captive power and IPP's. The new body should be led by a board appointed on a staggered basis representing the GOI, consumers from all sectors, private sector providers, PLN and electricity industry experts. This regulatory body would be fully staffed by a complete and independent technical and professional staff, and would have enforcement powers commensurate with its authority and responsibilities.

Rural Electrification (RE): It is recommended that a new inter-ministerial organization be created for RE planning, programming and implementation, including at a minimum the Ministries of Finance, Energy and Cooperatives. PLN should be relieved of its responsibility for RE, and should be used by the GOI only as a contractor for implementing RE plans. The GOI should directly budget and fund RE, including any necessary rate subsidies. (Part of such plans could be paid for by an excise tax on commercial electricity sales.) RE programs should be made part of Wilayah-based sector restructuring, incorporating Government RE goals and explicit subsidy payments into the restructuring plans for each region. As part of building economic efficiency into RE, investment plans and support payments should be directed to productive economic activities in each region.

D. Privatization

Given the complexities inherent in implementing a successful privatization, as well as their inter-relationship to the restructuring and other issues discussed in this report, the following conclusions were reached regarding current privatization efforts:

- PLN should proceed with its preparations in a more deliberate manner
- The consideration of privatization alternatives should not be limited to Gencos
- An IPO may not be feasible in the near term
- "Carved-out" business units need an auditable track record
- Sector restructuring and commercialization should precede an IPO

Two recommendations follow from these conclusions:

- The GOI should review privatization opportunities within the framework of sector restructuring and commercialization
- The GOI and PLN should methodically implement any privatization plan to increase potential benefits and minimize risks to PLN

With these recommendations in mind, there are several alternatives for privatizing PLN within the context of a well-designed restructuring plan. Sector restructuring options and their corresponding privatization options that might be appropriate for Indonesia and PLN are discussed below.

Model 1 - Integrated: In this option, two to four regional integrated utilities would be carved out of the Java-Bali grid. The regional systems would be fully integrated through the transmission system. The integrated utilities would be managed jointly by the regionals, and each region could sell to the others by wholesale wheeling under a grid code of pricing and transfer policies. All new generation would be obtained through open competitive bid among all regions and IPP's. The regionals would compete for existing unserved areas (and perhaps even areas within one region), and they could also compete for individual customers through retail wheeling across regions. Competition would be managed by the regulatory body.

This model should evoke high investor interest in the regionals, both as IPO candidates and for strategic investment partners. Because the model involves only small amounts of institutional change, system planning and reorganization would be simplified, and management would remain relatively intact. The obligation to serve would reside clearly with the regionals, giving them a clear interest in making transmission and distribution investments to grow their businesses. This model does, however, require the most intricate regulation to preserve efficiency through competition. Regulation would be greatly simplified if retail prices were governed by the price-cap (RPI-X) method, which is recommended.

Privatization of an Integrated Utility: The privatization of the Java-Bali system would allow management to address the unique and interdependent problems of generation, distribution and transmission in a focused manner, and assure a more balanced future development of the system. The Java-Bali system could also be used to support the Outer Islands, through commercial arrangements, and taxes and dividends paid out by the company could be directed towards non-commercial operations such as rural electrification and Outer Islands development.

Privatization of the Java-Bali system would create a private monopoly, requiring a strong and effective regulatory system. Also needed would be policy decisions on the role of private power and non-commercial obligations of the Java-Bali system, including rural electrification and the obligation to serve. Additionally, the Outer Islands would need to be separated from the Java-Bali system and managed by a government utility system.

Model 2 - Partial Disaggregation: This option would keep all transmission and distribution functions together under a single PLN management, while all generation facilities would be spun off as independent units (Gencos), either singly or in groups. Each Genco would be privatized under rehabilitate-own-operate (ROO) arrangements with strategic partners, improving output and reliability and lowering costs. All generation would be purchased by the transmission and distribution company under PPAs negotiated with the Gencos, and would be fully dispatchable by the transmission and distribution company. Gencos could be acquired or merged as desired by their owners. All new generation would be purchased under open competitive bidding by Gencos or new IPPs. Retail wheeling would be allowed for certain sizes of customers.

The transmission and distribution company should attract substantial investor interest as it has significant market power and growth potential. Each of the Gencos would attract strategic investors in relation to the size and quality of the generating assets they control. Sale proceeds from any spin-off or IPO could be applied immediately to transmission and distribution investments by PLN. The transmission and distribution company would essentially be the same as the existing PLN, net of generation responsibilities, and so would have the same clear obligation to serve as it does now. With little institutional change at the transmission and distribution level, system planning, development and operation would be similar to existing requirements, making the transition to the restructured model easier. Regulation would also be simplified through the use of price-cap regulation for retail tariffs.

Privatization Under a Partially Disaggregated Utility Scenario: Generation companies are highly saleable businesses because of their relatively predictable cash flow and opportunities for growth. The creation of Gencos would also provide PLN with funds to reinvest in other segments of its business, such as transmission and distribution and the Outer Islands. Additionally, prices of wholesale electricity could be determined competitively if appropriate commercial and regulatory arrangements are established.

There are various issues that would have to be addressed in the near term for effective operation of Gencos. First, PLN would have to create financially viable subsidiaries that would be put on a commercial footing either with or without the help of a strategic investor. There also would have to be a framework for selling electricity to PLN transmission and distribution units. Lastly, there would have to be a coherent policy regarding future capacity additions by PLN, Gencos, and IPPs that provides reasonable opportunities for the growth of the Gencos without compromising competition and system reliability.

Model 3 - Disaggregated: In this option, only the transmission system would remain intact as a common carrier among generators and distributors. As a natural monopoly, the transmission system would serve all entities as a passive player, and could be owned jointly by the distribution companies (Discos), the GOI and/or PLN. All generation would be spun off as in the partial disaggregation model (Model 2 above). Discos would each be given a regional franchise for their service territories, and would be responsible for supplying their customers by contracting with the Gencos or IPPs. All new generation would be obtained by open competitive bid conducted by each of the Discos and could include bidding by other Discos. Retail wheeling would be allowed for certain sizes of customers.

This option maximizes competition but involves the greatest amount of change. Investor interest in Gencos and Discos should be strong, but investors might be wary of investing in system elements until the entire system is in place and working, making transition more problematic. The key entity in this system is the transmission system, which will require sophisticated transfer pricing mechanisms and operations. To work optimally, this model requires a robust transmission system. The responsibility and impetus for making transmission system investments, however, would be unclear. The obligation to serve would reside with the Discos, which would need substantial control of the transmission system to achieve their objectives. With adequate attention to transmission system requirements, this model would be the simplest to regulate. Again, price-cap regulation of retail rates (as well as transmission rates) is strongly recommended with this model.

Privatization Under a Disaggregated Utility Scenario: In addition to the issues raised above regarding the sale of Gencos, privatization under a disaggregated utility scenario should include consideration of the attractiveness of the Discos to the private sector. The creation of distribution units is one possible means of addressing the problems facing the transmission and distribution systems of PLN. Discos can be created in partnership with a strategic investor, allowing PLN to raise private capital but also to tap into the technical expertise of the strategic investor to address key issues such as T&D bottlenecks, poor customer service, uneven customer mix and excessive reliance of captive power. Additionally, a successful

commercial turn-around of the Discos would create value for the entire system by enhancing the revenue stream from an improved customer base.

The key issues to be addressed in order for Discos to be effective are the creation of appropriate economic regulation of tariffs and determination of the companies' role in serving the "social mission". Both of these factors would not only determine the effectiveness of the Discos but directly affect their salability.

Table 8 illustrates the profitable business units that might be of interest to investors.

Table 8
Profitable PLN Business Units -- 1993/94
(Rp. billions)

Business Unit	Assets	Revenues	Net Income
Integrated System			
PLN	30,376	6,062	583
Java System	14,025	4,867	1,158
Wilayah VII	760	119	2
Bali	164	106	5
Distribution Systems			
Jakarta DKI Distribution	1,492	1,949	430
Java West Distribution	1,184	1,275	5
Java East Distribution	1,110	988	20
Generation & Transmission Units			
Java-Bali East	2,298	1,143	141
Java West	7,132	2,629	565

Source: PLN. Income Statements by Wilayah, Fiscal Year 1993/94' Balance Sheet by Wilayah, Fiscal Year 1993/94.

V. NEXT STEPS

The recommendations contained in Section IV address a broad array of policy areas. They are united, however, by a few broad themes that should guide the development of a workplan for the MOF. Of these, the most important are to exert some degree of control and coordination over the array of actors and activities that are currently driving events in the sector, and to systematically define and implement the sector restructuring that is already underway. To that end, the following specific steps should be implemented without delay:

- The inter-ministerial restructuring team should immediately begin the systematic design of a comprehensive restructuring and privatization design and implementation plan that will guide PLN, other GOI entities and private parties through the process. This plan should address all of the areas discussed in this report, and should be developed with the support of the already established PLN working groups and outside specialists familiar with similar efforts in other countries.

- The MOF should commission an independent financial audit in order to establish geographical and functional profitability, measure the extent of GOI support and prepare for private sector participation.

- The progress of purchased power acquisition should be slowed until need is more clearly defined and a consistent, well-designed IPP program and guidelines are developed. This will avoid the financial, economic and political costs of acquiring unneeded capacity and provide the essential first step to putting current IPP negotiations into on a consistent, competitive framework.

These steps will lay the groundwork for a successful sector restructuring effort, and avoid the creation or exacerbation of problems that are expensive and/or politically difficult to rectify.

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