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Indonesia

Power Sector Institutional Development Review

December 20, 1989

Industry and Energy Operations Division

Country Department V

Asia Region

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ABSTRACT :

The objective of this review is to identify the regulatory and institutional conditions under which the continued rapid expansion of electricity supply could be achieved with the greatest efficiency and effectiveness. The results of the review suggest that the principal condition is the creation of an environment within which PLN (the State Electricity Corporation) and the other participants in the sector will be motivated to apply their initiative and creativity to reduce costs and improve service in the course of pursuing the sectoral objectives. As a general direction, the creation of such an environment will require a shift towards greater reliance on guidance through incentives rather than administrative intervention and on decentralized decision making rather than centralized control, while also taking advantage of the pressures created through competitive comparison.

CURRENCY EQUIVALENTS

Currency Unit = Indonesia Rupiah (Rp)
US \$ 1.00 = Rp 1750
Rp 1 million = US \$ 571.43

FISCAL YEAR

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ABBREVIATIONS

Agencies

BAPPENAS	- National Development Planning Agency
BPKP	- National Audit Board
DGENE	- Directorate General of Electricity and New Energy
EKUIIN	- Ministry for the Coordination of Economic, Financial and Industrial Affairs
GOI	- Government of Indonesia
MME	- Ministry of Mines and Energy
MOF	- Ministry of Finance
PLN	- State Electricity Corporation
SEKNEG	- State Secretariat

Weights and Measures

GW	- Gigawatt
GWh	- Gigawatt-hours
KVA	- Kilo Volt Ampere
KWh	- Kilowatt-hours
mcf	- thousand cubic feet
mmtpy	- million tons per year
MW	- Megawatt
TWh	- Terawatt-hours

ACKNOWLEDGEMENTS

This report is based on the work of a power sector mission which visited Indonesia from February 11 to March 2, 1989. The mission consisted of a distinguished panel of senior advisors:

- Mr. Glyn England - Past Chairman, Central Electricity Generating Board (UK).
- Mr. Jean Guilhamon - Past Director General, Electricite de France.
- Mr. N.B. Prasad - Past Secretary, Energy Department, Govt. of India.
- Mr. Joseph Swidler - Past Chairman, Federal Power Commission (US)

The panel was supported by a Bank team including Mr. Andres Liebenthal (Senior Energy Economist, Mission Leader), Mr. Vatsal Thakor (Principal Power Engineer), Mr. Sushil Bhatnagar (Financial Analyst), Mrs. Magdalena Manzo (Energy Specialist) and Mr. Evald Brond (Consultant). The mission was also assisted by Mr. David Chu, past President, Taiwan Power Company.

The mission enjoyed substantive and fruitful discussions with the major stakeholders in the power sector, including Ir. Ginanjar Kartasasmita, Minister of Mines and Energy, Drs. Radius Prawiro, Coordinating Minister of Economic, Financial and Industrial Affairs and Development Control, Prof. Dr. Saleh Afiff, Chairman, BAPPENAS, Ir. Hartarto, Minister of Industry, Mr. T. Ariwibowo, Junior Minister of Industry, and Prof. Dr. Ali Wardhana. In addition the mission had extensive meetings with Ir. Ermansyah Jamin, President Director of PLN, PLN's Board of Directors, and members of PLN's management and staff. The mission also met with PLN's Board of Supervisors, chaired by Prof. Dr. Arismunandar, Dir. Gen. of Electricity and New Energy, as well as Mr. Ilchaidi Elias, Sec. Gen., Minister of Industry, Drs. Oskar Surjaatmadja, Dir. Gen. of Monetary Affairs, Ir. Rahadi Ramelan, Dep. of Industry Studies (BPPT), representatives of other agencies and a group of major electricity customers. The mission visited North Sumatra and South Sulawesi, where it met with the Provincial Governors, PLN's regional management and staff, and observed PLN's operations in the field. A final draft of this report was discussed with the GOI in October 1989.

The mission wishes to acknowledge its gratitude for the excellent cooperation and gracious hospitality it enjoyed in the course of its work.

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

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MAP

IBRD 12453R8 PLN Generating Capacities by Regions.

SUMMARY AND RECOMMENDATIONS

Introduction

1. During the decade of the eighties, the power sector of Indonesia has grown rapidly. PLN, the State Electricity Corporation, has quadrupled in size, as its sales grew from 4.3 TWh in 1978/79 to 19.7 TWh in 1988/89, its installed capacity from 2.3 GW to 8.1 GW and the number of customers from 1.8 million to 8.9 million. This achievement is impressive, particularly considering the extension and archipelagic nature of the country. Even so, Indonesia's current electrification ratio of 24% is low by regional standards. PLN is only able to serve 54% of urban households and 13% of rural households, whereas it is estimated that at least three quarters of urban households and half of those in rural areas can afford to purchase electricity.

2. Over the same period, captive self-generation by industrial plants also grew from an installed capacity of 2.7 GW in 1978/79 to about 5.1 GW in 1987/88, not including 1.9 GW of capacity in five major enclave projects. The total installed capacity of captive generation is only slightly less than PLN's capacity. Given that grid-supplied electricity is generally more economical than diesel-based captive generation, it can be concluded that the growth of captive generation capacity has been mainly due to the inability of PLN to cater to the growing needs of the industrial sector, both in terms of quantity as well as quality of supply.

3. To close the gap between the supply and demand for its services, PLN is planning to continue its rapid expansion. Between now and the year 2000, PLN is projecting another four-fold increase in sales (to 84.0 TWh) and a nearly threefold increase in capacity (to 22.4 GW). This expansion would enable PLN to increase the proportion of electrified households from the current level of 24% (54% urban/13% rural) to about 54% (81% urban/40% rural), which would approximately satisfy the unmet demand for electricity. It would also allow PLN to meet about 80-90% of the electricity requirements of the industrial sector, which would cover all except special situations where captive generation is expected to be more economical than grid supplied electricity.

4. As in the past, PLN will be expected to carry out its expansion in a manner consistent with the broader developmental objectives of the country. As seen by the GOI, the most important are the following:

- (a) the commercial objective: As a public corporation (PERUM), PLN is expected to be profitable and make a contribution to state revenues (in the form of taxes and/or dividends).
- (b) the equality objective: To promote the development of the country in an balanced manner, PLN has been asked to pursue a uniform level of household electrification in all parts of the country.

- (c) the fairness objective: To enable the majority of the people to benefit from electrification, PLN is required to maintain electricity rates at affordable levels.

In addition to the above, other objectives that PLN has been asked to pursue include the objective of usefulness (i.e., the need to provide electricity in the quantity and quality required for economic development), the objective of selfsufficiency (i.e., the need to increase reliance on indigenous human and natural resources, supplies and equipment) and the objective of environmental preservation.

5. Although these objectives are the same as in the past, and they are embedded in the 1972 Government Regulation that established PLN, and confirmed in the 1985 Law on Electricity, their satisfactory achievement has always been a challenge. In particular, the electrification of the country in a uniform manner has obliged PLN to establish and operate about 650 separate systems, many of which are in remote areas and most of which are based on diesel generation and are not, taken by themselves, financially viable, with the attendant implications for PLN's organizational and operating efficiency. Also, maintenance of rates at affordable levels for small residential customers (who represent 92% of all customers and 31% of total sales) puts a considerable strain on PLN's finances, as it also tries to fund a rapid expansion program and keep the rates to its other customers at a reasonable level. As a result, PLN's ability to continue its expansion in a manner consistent with all of its objectives cannot be taken for granted.

6. In addition, the scarcity of fiscal resources which is likely to characterize the 1990s, as well as the growing magnitude of the resources required for PLN's expansion, makes it imperative that options be explored and a strategy be formulated to improve the effectiveness and efficiency with which these objectives are pursued. That is the purpose of this review. Recognizing that PLN is by far the country's major asset in the sector, and that, with its extensive implementation experience and technical expertise, PLN itself constitutes the most likely source of the knowledge and information which will be required to improve the performance of the sector, this study will focus on PLN, while also considering options beyond PLN, in the private and cooperative sectors. Thus, the basic question for this review is: What conditions are required for PLN (and other participants in the sector) to be able to pursue its objectives with the greatest efficiency and effectiveness?

7. The conclusion of the review is that the principal condition is the creation of an environment within which PLN and the other participants in the sector will be motivated to apply their initiative and creativity to reduce costs and improve service in the course of pursuing the sectoral objectives. As a general direction, the creation of such an environment will need to be achieved through a shift towards greater reliance on guidance through incentives rather than administrative intervention and on decentralized decisionmaking rather than centralized control, while also taking advantage of the pressures created through competitive comparison. Thus, the answer to the above question lies in deregulation, decentralization and competition. This conclusion is consistent with the broad objectives of the Government during the Repelita V (Fifth Five-Year Development Plan, 1989/90-1993/94) period.

The Need for Deregulation

8. In the mission's judgement, the most important factor affecting PLN management's motivation and ability to operate efficiently is the lack of adequate corporate autonomy.^{1/} Basically, the degree of discretion that management enjoys does not appear to be commensurate with the size of the enterprise, the multiplicity of its objectives and the need to implement a major expansion program. Management's inability to control major parameters affecting the company's performance, and the attendant dilution of authority and accountability have stifled management initiative and attention to corporate interests. Combined with a public sector tradition of consensus seeking and deference to authority, this has led to the formation of a corporate culture where risk-taking is avoided and innovative proposals are rarely put forward.

9. The source of the problem lies in the excess supervision and regulation to which PLN is subjected. In particular, a web of monitoring and approval requirements emanating from three Ministries (Mines and Energy, Finance and BAPPENAS), a Supervisory Board, and several inter-agency committees influence and intervene in major PLN corporate decisions, including those related to financing, investment, procurement and personnel compensation. The extent and detail to which these entities require reports and explanations, as well as the complexity of budgeting, funding and procurement approval procedures, have led to a high degree of involvement by Government in PLN's decision-making. As a result, supervision has been transformed into micromanagement by Government officials and staff who bear no direct responsibility for the results of PLN's operation.

10. An electric utility such as PLN has very special characteristics, not only because it is to some extent a natural monopoly, but also because it functions as an agent for development in the pursuit of the GOI's social and economic objectives. Therefore, the need to increase the autonomy of the enterprise needs to be balanced with an appreciation of the noncommercial objectives assigned to it. The objective of regulation is to induce the utility to achieve this balance in an efficient and effective manner. In the mission's view, this objective will require a streamlining of the regulatory framework along the following lines:

- (a) separation of guidance and supervision from corporate management;
- (b) simplification of performance evaluation;
- (c) transparency in the financial relationship between PLN and the GOI;
- (d) regularization of tariff adjustment;
- (e) deregulation of PLN's fuel purchases;

^{1/} "Corporate Autonomy" refers to the ability of management to make corporate decisions in an independent manner, within the context of an established legal and policy framework.

- (f) liberalization of procurement procedures; and
- (g) replacement of budget controls by a program agreement.

These options are discussed below.

Separation of Guidance and Supervision from Corporate Management

11. The motivation of PLN's management towards an entrepreneurial direction will require that the GOI treat PLN more like a business, and that PLN's management be given the freedom that is essential for the running of a large and complex enterprise. Basically, PLN's management needs to be made responsible and accountable for the company's performance, and needs to be motivated to manage on the basis of results, rather than compliance with procedures. This will require a clear separation of policy guidance from corporate management, such as is not provided by the current institutional setup.

12. While the above concept is consistent with the Law on Electrification, which limits the Government's role to "guidance and supervision", the concept is diluted in the associated Government regulations where, among others, the definition of "guidance" and "supervision", and the corresponding authority of the Minister of Mines and Energy through the DGENE and the Supervisory Board, allows for substantial intervention by the GOI in corporate decision-making. In view of the desirability of clearly separating policy guidance from corporate management, the simplest approach would be to revise or reinterpret the definition of "guidance" and "supervision", as well as "management", in the Government regulations to clarify that the authority and accountability for PLN's corporate decisions belong to its Board of Directors.

13. Under the recommended arrangement, the Minister of Mines and Energy would continue to guide PLN with the assistance of the DGENE, but such guidance would focus on matters of strategy and policy, rather than consist of directions in regard to planning and implementation. The Minister would also continue to supervise PLN with the assistance of the Supervisory Board, but such supervision would be carried out through probing into selected areas related to investment program, financing plan and budget, rather than the detailed line by line monitoring of the budget and numerous physical implementation targets. The Supervisory Board would not be involved in corporate decisions, and give up its right to participate in meetings of the Board of Directors and to ask explanations on any matters involving the management of PLN.^{2/}

14. An alternative institutional approach to separate policy guidance from corporate management would be the creation of a Policy Board, as a replacement of the Supervisory Board. The Policy Board would take over the functions of the DGENE and Supervisory Board in relation to the guidance and supervision of PLN, but have specific terms of reference to exercise these functions in a manner consistent with leaving full authority, responsibility

^{2/} In actual practice, PLN's Supervisory Board has not exercised its right to participate in meetings of the Board of Directors in the past.

and accountability for corporate decisionmaking to the Board of Directors. A secondary purpose would be to widen PLN's horizons as an enterprise by including in the Policy Board representatives not only from the GOI, but also from private enterprise and from consumers.

Simplification of PLN's Performance Evaluation

15. As currently carried out, the GOI's supervision of PLN is based on the line by line monitoring of PLN's performance against targets set in its annual work program and budget. A justification is required for any deviation in excess of 10% for any of the hundreds of line items in these documents. In addition to the annual reports, there is also a quarterly monitoring system based on a set of about 80 quarterly indicators, including about 30 budget categories and other service and operational statistics, such as sales, number of customers, transmission and distribution losses and number of accidents, all of which are disaggregated for PLN's 17 regions. This monitoring system focuses a lot of attention on subordinate targets related to predetermined plans for achieving various objectives, and constrains PLN management's flexibility in attempting innovative alternatives to meet those objectives. A more reliable approach would be to base the evaluation of PLN's performance on a simple but comprehensive measure of efficiency, complemented by a small number of indicators of its effectiveness in meeting social objectives.

16. To monitor efficiency, a recommended indicator that combines global coverage with simplicity is the cost per unit sold (Rp/kWh), adjusted for inflation. The total cost per kWh criterion can be used to evaluate efficiency at the corporate, regional and branch levels. Of course, it will have to be used properly, as different units operate under different conditions, and their performances may not be comparable. What is essential is to have a simple indicator with which everybody can identify, that motivates management and staff in the right direction, and the evolution of which over time provides a useful indicator of managerial effectiveness. As an intermediate or transitional option, the GOI should also consider the establishment of a few subordinate efficiency indicators, to provide more specific information.

17. To monitor effectiveness, it is recommended that the GOI select a limited number of additional indicators of PLN's progress in regard to the major social objectives. These indicators could be selected from the ones that the GOI is already monitoring on a quarterly basis, such as number of connected customers, number of electrified villages, frequency of outages, frequency of accidents, etc. Such a simplified approach would focus everybody on the priority objectives and the cost of achieving them, rather than distracting attention with numerous intermediate targets.

Transparency in the Financial Relationship

18. PLN's financial dependence on the GOI is the consequence of the GOI's ownership of PLN and the latter's role as the instrument for the pursuit of the GOI's objectives in the power sector. The full extent of the explicit and implicit financial flows between the GOI and PLN is difficult to determine. In general terms, the GOI imposes costs on PLN by setting specific annual village electrification and consumer connection targets, keeping electricity rates

generally low with substantial subsidies for the small residential and small industrial consumers, and setting fuel prices at levels that imply either subsidies to the producers, significant tax revenue to the GOI, or both. To enable PLN to maintain a balanced financial position in spite of the above policies, the Government provides financial support to PLN in various forms, including equity contributions from the budget and other sources, exemption from duties and taxes on externally-financed imports and protection from the foreign exchange risk on foreign borrowings. As estimated by the mission, the costs imposed by the GOI on PLN amounted to about Rp 635 billion (in 1987/88 - equivalent to more than one-third of PLN's revenue) and were balanced by a comparable amount of GOI support to PLN.

19. The issue here is that, as the GOI determines the expansion targets, sources of finance, electricity rates, fuel choices and prices, salaries, and most other factors affecting PLN's costs and revenues, there is very little freedom left for PLN's management to influence the financial performance of the company, with the attendant lack of accountability for PLN's financial performance and motivation for efficiency. As a means for improving management accountability and motivation, it is recommended that the Government put its financial relationship with PLN on a transparent basis. This would mean that PLN would be compensated (through budgetary or other transfers or tariff adjustments) for the cost of social programs. In return, PLN would be expected to contribute to state revenues through the payment of dividends, duties, taxes and full payment for foreign exchange risk coverage and other services provided by the GOI. As a first step in the direction of transparency, PLN is already preparing an estimate of the costs associated with its rural electrification program.

Regularization of Tariff Adjustment

20. Under the existing framework, the Government has the authority to set the electricity tariff, but there is no direct and formal linkage between the tariff and PLN's costs, financial objectives and performance. In the absence of clear linkages, tariff adjustments have required a prolonged period of evaluation and consensus-taking, with the attendant shortfalls in PLN's internal resource mobilization and ability to implement projects in an efficient manner.

21. Tariff adjustment is a sensitive and difficult process everywhere, particularly in low income countries where there is little room in family budgets to absorb rate increases. Some adjustments will be required, however to enable PLN to meet its financial objectives in the face of cost increases associated with inflation, changes in fuel prices, exchange rate depreciation and the growing share of sales to subsidized customers. To reduce the social impacts of such adjustments it would be desirable to move towards a system of regular adjustments based on clear rules for cost recovery and rates of return.

22. A recommended option would be to adjust the tariff on a periodic basis (say every three months) on the basis of an index of cost, such as the GDP deflator or a weighted index of PLN's fuel and other costs. The advantage would be that each adjustment would be minor, barely noticeable by the consumers. With such a system, PLN would be able to operate on a solid financial

basis with adequate internal resource generation to implement its expansion plan. To provide an incentive for efficiency improvement, it is also recommended that PLN be allowed to keep any savings from efficiency improvements to strengthen its financial position and reduce its reliance on GOI funding. Such a system of regular tariff adjustments on the basis of agreed rules would tend to reduce the drama associated with a large tariff increase. Rather than a major event, tariff adjustment would be reduced to the routine application of a contract between the GOI and PLN.

Deregulation of Fuel Purchases

23. PLN's efficiency and effectiveness is affected by the extent of GOI intervention in its fuel purchase decisions. This was illustrated in recent decisions in regard to the purchase of coal, geothermal steam and natural gas, where PLN was given no freedom of choice. Rather than having been based strictly on corporate interests, these decisions have been subject to Government intervention, with the attendant discouragement of management motivation and interest to seek out and negotiate the lowest cost solution.

24. Overall, some Government guidance is justifiable in the interest of broader sectoral objectives, such as the need to encourage the development of non-oil energy resources, and the need to reduce risk by maintaining a balance between coal- and gas-based generation. However, for the sake of efficiency, this guidance needs to be provided in such a way as not to deprive management of opportunities to exercise its skill and expertise to minimize fuel costs and maximize efficiency on behalf of the enterprise. In view of this, it is recommended that the Government set energy prices on the basis of economic principles so that no further intervention is necessary to obtain an efficient pattern and level of consumption, based solely on the customers' pursuit of their financial interest. The ongoing Energy Pricing Policy Study is expected to provide a basis for decisionmaking in this regard.

Simplification of Procurement

25. Cumbersome government procedures required for the award and implementation of supply and service contracts have resulted in costly delays and unsynchronized implementation of PLN's investment program. The issue is that such delays have nothing to do with the merits of the projects themselves, or with PLN's technical capacity to implement, and therefore constitute an unnecessary drag on the efficiency of the sector as a whole. While PLN's autonomy in the area of materials procurement and contract administration has recently been expanded, the procedures remain cumbersome and time consuming. Specific measures to streamline the procedures are discussed in para. 2.47. The objective should be to transfer to PLN full authority and accountability for all of its procurement decisions.

Replacement of Budget Controls by a Program Agreement

26. PLN's budget process, which involves lengthy consultations with the Supervisory Board, the MOF and BAPPENAS, is mechanistic and inefficient, and makes it difficult to hold management accountable for the achievement of the targets in the work program. Certainly, the efficiency and effectiveness with which the program is carried out could be substantially improved if PLN's

management had a more reliable access to the funds that are needed. A recommended approach for providing a more reliable financial basis for PLN's expansion involves the replacement of the annual budget process by a multi-year program agreement. The establishment of a program agreement would provide an opportunity to not only simplify budgetary controls, but also redefine the relationship between the GOI and PLN by pulling together all the strands of the streamlined regulatory framework discussed above into a single package.

27. The agreement, which should be as between a business and its owner, would cover the terms and conditions under which PLN would pursue the targets and objectives it is assigned by the GOI. Based on the earlier discussions, the agreement should (i) define the evaluation of corporate performance on the basis of a single efficiency criterion and at most five effectiveness targets, (ii) define the GOI's financial contribution on the basis of the cost of socially directed activities (and a schedule for phasing out these contributions in the long term), (iii) define a cost-based procedure for the periodic and automatic adjustment of the tariff, and (iv) transfer to PLN full authority and accountability for all financing, procurement, fuel choice and salary decisions. Such an agreement, which should be documented and set up for a fairly long period (three to five years), would replace the present web of approval and regulatory requirements, and allow the GOI to treat PLN on the same basis as every other enterprise, public, cooperative or private.

From Bureaucracy to Enterprise

28. For the Government to be able to treat PLN as a business, PLN needs to transform itself from a bureaucracy to a business-oriented enterprise. While the streamlining of the regulatory framework will provide the incentives, the effectiveness of these incentives will require that PLN reorganize itself to become more responsive. The guiding principle for this reorganization should be decentralization of authority, responsibility and accountability. As a complement to decentralization, a number of specific activities need to be strengthened to prepare PLN to operate in a deregulated, decentralized environment. In general, a strategy for the transformation of PLN should concentrate on the following five areas:

- (a) transformation of the corporate culture;
- (b) decentralization of operations;
- (c) human resource development;
- (d) corporate planning; and
- (e) customer service.

Transformation of the Corporate Culture

29. PLN's corporate culture still reflects many of the characteristics of a bureaucratic environment. Such characteristics include: (i) a reluctance to define clearly the authority and accountability of different levels, groups and individuals; (ii) a desire to perpetuate consensus, share responsibility

and dilute accountability; (iii) a tendency to equate efficiency with the ability to formulate and implement procedures rather than to achieve results; and (iv) a preference to evaluate proposals on the basis of the seniority of the proponent, rather than on technical merits. Not all these attributes are inherently bad, indeed, some of them contribute to organizational harmony and well-being. However, steps have to be taken to ensure that they do not take a toll on the efficiency of the organization.

30. The transformation of PLN's corporate culture from a bureaucratic to a more entrepreneurial orientation is not likely to be easy, and will need to be signalled through a series of changes that will have to affect all levels of the organization. The underlying principle for those changes is the need to introduce and implement an "accountability hierarchy", starting from the Directors and extending to the lowest level. This will require a clarification of the chain of command. The recommended approach is to start with the Board of Directors, by assigning line responsibilities to specific Directors and reducing the number of managers that report to them. The same approach should be applied at the regional management level. Further, to achieve the desired improvements in motivation and initiative, such measures need to be associated with a large degree of decentralization and delegation of authority to the operating units.

31. As a complement to the introduction of a clear concept of line and staff responsibilities, PLN management will also require a tool to create accountability at the operating level. The recommended approach is to reform the budgetary process to decentralize responsibility and transfer accountability. This can be done by using the regional budget proposals to reach agreement on regional targets and provision of resources between the regions and PLN Headquarters, the provision of resources to regional managers on the basis of this agreement, and the enforcement of accountability by regional management for the implementation of the agreed targets.

Decentralization of Operations

32. The improvement of PLN's efficiency and effectiveness will require a shortening of the administrative and physical distances between decision makers and the site of the action (i.e. the customers and the power supply system.). While most of PLN's emerging problems appear to be located in its operating units, a large proportion of PLN's high level staff is concentrated at headquarters, where they cannot address these problems effectively. The growing size of PLN, and the increasing importance of improving its quality of service and responsiveness to local needs point to the need for greater decentralization and delegation of decisionmaking, i.e. the transfer of responsibilities and accountability for decisions to the regional operating level.

33. One option which is being considered in this regard is that of breaking up PLN into two or more separate entities. This option has some merit in the context of the current regulatory framework which, on the one hand, subjects PLN to many layers of external intervention and review and, on the other, centralizes all control within PLN at the Board of Directors, with the attendant limited ability to respond effectively to regional and local requirements. With the proposed delegation of responsibility and autonomy to

PLN, and the introduction of clear lines of responsibility down to the regional levels, the inflexibility that is currently perceived will have been largely overcome.

34. In addition to considerations of responsiveness, PLN's current unified system allows a number of interregional transfers that would be difficult to replicate amongst separate entities. The most important of these is the routine transfer of trained and qualified personnel, which allows PLN to operate and maintain about 650 separate systems to a reasonable technical standard. Although these standards deserve improvement, it is doubtful that, with the existing scarcity of experienced management and technical staff, this could be achieved by splitting up the available technical personnel among separate entities. There is also the question of the transfer of financial resources, both for operating and investment purposes, from the more profitable areas of operation (such as Java) to the less profitable or loss-making regions. If these PLN-internal cross-subsidies were removed, the preservation of the financial integrity of the deficit regions would require substantive tariff increases or regular operating subsidies from the GOI. While these could be compensated from taxes on the profitable regions, there would likely be a net loss of efficiency due to higher administrative burden on the GOI and other transactions costs.

35. On balance, the advantage would seem to favor a gradual program of decentralization, under which authority for decisionmaking and accountability would progressively be handed over to regional and branch management as appropriate, in parallel with an effort to strengthen regional and branch capabilities to take over these responsibilities. The formulation of such a decentralization program would have to distinguish between the different situations found in Java and outside Java.

36. On Java, PLN's four distribution units need to be strengthened in respect of commercial and financial responsibility, planning, consumer administration and accounting functions. In addition, the recently completed physical integration of the Java grid provides a good justification for combining in one operating unit the generation, transmission and load dispatch facilities that are now divided among three units. All together, what is recommended is the creation of five reasonably autonomous operating units in Java, each of which would be responsible and accountable for the management and performance of activities within its jurisdiction. The long term objective would be to build up the financial and technical viability of the units until they could be treated as independent companies, their relationship with headquarters defined on the basis of a performance agreement, along the lines of that between GOI and PLN.

37. Outside of Java, the size and sophistication of the regional power systems have not yet reached a stage when the Java model could be followed. There will be a continued need for many years to maintain the generation, transmission and distribution functions under the same management. Also, the organization, skill mix and quality of available staff in the regional offices are still far below those required for the introduction of the degree of autonomy proposed for Java operations. The recommended approach is, therefore, to strengthen these organizations to a point where autonomy could be implemented, with the autonomous units in Java serving as the prototype of the

approach to decentralization. As initial steps in this direction, PLN should consider granting greater managerial independence in areas such as budgeting and training, where the regions are now in a position to benefit from greater autonomy.

Human Resources Development

38. A major challenge facing PLN is the need to develop its human resources to face the increasingly difficult task of managing its power supply facilities. Currently, PLN employs about 52,000 persons, of which about 37,000 are permanent, the balance being largely temporary construction workers. While criticism has often focussed on the large number of employees, the most important problem relates not so much to quantity as to adequacy. Thus, PLN's rapid growth and increasing technical sophistication will require substantial adjustments in the skill mix and technical capabilities of its staff.

39. To prepare for these changes, it is recommended that PLN formulate and implement a long term human resources development plan. This plan should be based on an assessment of existing staff resources in relation to future skill mix requirements and an evaluation of the options for meeting these requirements, including training, career development and recruitment. Areas that the plan should cover include (i) the training of replacements for the large number of the more experienced technical and managerial staff who will be retiring in the next few years; (ii) the recruitment of university trained personnel to cope with PLN's increasingly sophisticated technical systems; (iii) the development of first line supervisors and lower level managers; (iv) the upgrading of low-skilled workers into higher-level skills; and (v) the training of non-permanent employees to take over specific permanent positions in operations and maintenance.

40. The formulation of PLN's long term human resources development plan will provide a concrete basis for the recommended strengthening of PLN's training efforts. Currently, PLN devotes only about 0.25% of its revenues to training. This level is inadequate to meet the need for improved quality and quantity of training. In addition to increasing resources, it is recommended the PLN provide regional managers greater freedom to organize and implement the training program for their staff, with or without the help of the training centres managed by the Head office.

41. A final concern in relation to PLN's human resources is the inadequacy of both the level and structure of the compensation package available to technical staff. As employment opportunities in the private sector improve, PLN will face increasing difficulty attracting high quality technical graduates and skilled staff. Even now, it cannot recruit the best technical graduates, but only "middle" quality ones. This could lead to a troublesome situation for an enterprise of the technical sophistication of PLN. To provide a basis for decisionmaking in this regard, it is recommended that PLN carry out a detailed review of PLN's salary structure and design and implement the reforms that would be required to enable it to attract and retain the high quality of staff that it needs.

Corporate Planning

42. One of the factors affecting PLN's effectiveness and efficiency is the inadequate coordination and integration between PLN's system planning, financial planning, operational planning, human resources planning, budgeting, and other short- and long term planning functions, both at headquarters and in the regions. In the absence of integrated planning, and the accompanying dearth of accurate and timely information, PLN management is continually in a position of having to make decisions with incomplete and frequently outdated information, without benefit of comprehensive evaluations of the implications of alternative options and scenarios on PLN's performance in regard to financial, physical and other objectives. This makes it difficult to manage an enterprise of PLN's size and complexity, particularly one that is facing the challenges of rapid expansion, increasing expectations for quality of service, and increased autonomy and responsibility, and points to the need to strengthen the corporate planning function

43. In view of the potential value of corporate planning, PLN has recently begun to develop this activity. Initial steps have included the establishment of planning units in the functional directorates and in the regions, the hiring of consultants, and the initial development of an MIS system. For corporate planning to achieve its full potential, it is recommended that these initial steps be complemented by additional effort in several respects: (i) the extent of management involvement, (ii) the preparation of a long term financing plan, and (iii) the quality and level of responsibility of corporate planning staff.

Customer Service

44. The improvement of PLN's customer service is one of the major areas that deserve attention as part of a program to enhance the efficiency and especially the effectiveness of PLN. The mission's observations in the field were consistent with the general impression that PLN's service falls short of the requirement of the industrial sector as well as the expectations of the public.

45. As a first area of improvement, it is recommended that PLN revamp its cumbersome billing and collection procedures for residential customers. Specific measures are discussed in para. 3.68. In addition to providing the customers with additional time and flexibility to pay their bills, the proposed simplifications would improve PLN's efficiency by releasing the thousands of local branch staff who are currently engaged in unproductive disconnection and reconnection procedures.

46. Another area where PLN's service requires improvement is in the reliability of power supply. The underlying reasons for the high frequency of outages and other service disruptions are generally the same as those that also cause high transmission and distribution losses, and relate to the poor quality of construction of the distributor network and the inadequate quality of staff and autonomy at PLN's branch offices, which are the ones responsible for handling this problem. The recommended approach to the improvement of reliability includes (i) the strengthening of the technical capabilities of

PLN's branch office staff; (ii) improvements in the training and supervision of construction contractors; and (iii) the establishment of capacity support arrangements with operators of captive generation.

The Private Sector's Contribution

47. An enhanced role for private enterprise in the development of the power sector is of interest because of the potential it offers for contributing additional financial and managerial resources, as well as increasing efficiency through competitive pressures. Although private electricity generation already plays an important role in the industrial sector as well as some rural areas, there are several approaches that can be recommended to enhance the contribution of private enterprise:

- (a) The coordinated use of existing captive generation with PLN's capacity to improve the reliability of PLN's grid;
- (b) The encouragement of additional investment in captive plants in special situations where generation costs are competitive with those of PLN's grid;
- (c) The encouragement of greater participation of rural cooperatives and small entrepreneurs in rural electrification, to reduce its cost and improve its effectiveness as an agent for local development; and
- (d) The enhancement of competitive pressures through creation of an environment where private power generation can compete with public utility generation on an equal basis.

48. Given the large installed captive generation capacity, many opportunities exist for PLN to improve its reliability, reduce its reserve requirements and augment its service through coordination of capacity. Capacity support arrangements do not currently exist and a number of legal, technical and commercial issues need to be resolved before such arrangements can be implemented. The most important of these is the issue of pricing. Basically, the maximum price that PLN should be prepared to pay for electricity from any particular source should be its system avoided costs, i.e., its long run marginal cost of capacity at the specific location or, in the case of an emergency, the cost of electricity not served. Conversely, the minimum price that the captive generator should be prepared to accept (on a long term basis) is its own long run marginal cost of supply (including a reasonable return on investment). As a first step towards the establishment of capacity support arrangements, the GOI and PLN are planning to implement selected pilot projects to collect some practical operating experience during the year 1990 and subsequently to implement standardized arrangements on a broader scale.

49. In a related area, it is also desirable to encourage investments in new captive capacity to take advantage of special situations where captive generation is economically competitive with PLN's central station generation. Examples are provided by the potential for (i) the combined generation of steam and power (cogeneration) by industries that have a continuous demand for

steam for process heating purposes, (ii) the use of selected waste materials as fuel for power generation, and (iii) the development of a hydroelectric site to meet a specific industrial requirement as well as feed into PLN's local system. To encourage such investments and thereby enhance the overall energy efficiency of the economy, it is recommended that PLN provide a market for any electricity that is generated, by offering to purchase it. Here again, by basing the purchase price on the avoided cost principle, PLN can ensure that it will only purchase the electricity if it can be generated at a cost that is no higher than its own.

50. A further area for enhanced private sector involvement is suggested by the existence of large numbers of microenterprises providing a precarious and high cost service in many rural areas. As these enterprises do not appear to be sustainable in the long term, a strategy for supporting the development of rural areas by developing their managerial, technical and labor resources into useful inputs for the electrification program needs to focus on the transfer of utility functions from PLN to village enterprises, with the eventual objective of developing them into rural distribution companies. PLN is already moving in this direction, through a concerted effort, including special procurement procedures, training and technical assistance, to develop not only village cooperatives but also private enterprises to handle construction, customer administration and line services.

51. As a final approach to taking advantage of the private sector, the GOI should consider enhancing the competitive pressures on PLN by creating an environment within which private power generation can compete on equal terms (e.g. on the basis of a BOO-build, operate and own arrangement. However, while privately owned dedicated power plants are of interest as a option, their economic advantages for Indonesia cannot be taken for granted and need to be evaluated with care. To provide a test case for the evaluation of private sector projects, it is recommended that the GOI try the BOO concept initially on a relatively easy project, e.g., that of a medium-scale run-of-river hydroelectric project (50 to 200 MW). Such a power station would always be operated on a priority basis, with minimal technical risks, and obviates the need for any project specific Government guarantees for the investor. Even in this case, a long term contract with PLN is necessary which guarantees a sale price based on PLN's long-run marginal cost of supply (on the basis of a BOO-build, own and operate arrangement).

Creation of a Competitive Environment

52. Overall, the successful implementation of the above initiatives will require the creation of a competitive environment. This would assure the private investors that they will be treated fairly in relation to PLN and provide an appropriate framework for motivating PLN to achieve the same efficiency and effectiveness as could be expected of a private company. The recommended approach is as follows:

- (a) the streamlining of the regulatory framework, including a regular tariff adjustments on a predictable basis. Tariff policies need to guarantee PLN's long term ability to pay for the purchase of electricity from private power plants. This would reassure the investor of the financial viability of his major customer and reduce the need for direct government guarantees.

- (b) the removal of existing fuel price distortions. This is required to guide investors towards the optimal choices in terms of type of fuel and technology to be used, and to ensure that public and private power generation can compete with each other on the basis of price and on being the least cost source of supply for the power system as a whole.
- (c) a transparent compensation scheme for the pursuit of social objectives. The subsidy element of socially-directed electrification programs needs to be determined and a transparent mechanism established for compensating PLN or regional or village electric enterprises on an equal basis.
- (d) the removal of financing distortions. While PLN's can count on the GOI's extensive concessionary borrowings from external sources, which are onlent to PLN at below-market rates, the private investors have to seek financing in international markets. To eliminate the advantage that PLN derives from this arrangement, without reducing the GOI's ability to benefit from concessional financing, the GOI needs to onlent these funds to PLN at rates that fully reflect their value in international markets. As a first step in this direction, the GOI has begun to charge PLN for a portion of the foreign exchange risk.
- (e) an improvement in the public enterprise salary structure and reward system. This is required to enable PLN to compete for technical and managerial talent on the same basis as private investors.

53. The creation of a competitive environment is consistent with the recognition that PLN is the country's most valuable asset in the power sector, and the GOI's current strategy of focussing private initiatives onto complementary roles. The recommended measures will support the progressive decentralization of PLN into operating units of increasing sophistication and autonomy. After this decentralization has progressed for a period of, say, five years, the GOI should review the desirability of transforming these units into independent companies. Those of the companies that are working efficiently and profitably, could later become candidates for privatization, if that is the direction desired by the Government.

A Plan of Action for the Future

54. The long term vision that emerges from the mission's recommendations is the gradual transformation of the sector into a decentralized structure with a core consisting of an integrated generation and transmission system, which coordinates with private generation plants and independent regional and local distribution companies. A competitive environment would be maintained, so that public, private and cooperative enterprises could participate in any activity in the sector, with price as the main criterion of choice. Efficiency would be stimulated through the pressure of potential or actual competition and the coincidence of corporate and sectoral interests. Interest in the pursuit of social objectives would be maintained through a transparent compensation system, which would allow recovery of costs, plus a reasonable profit,

through cross-subsidies in the tariff or budgetary transfers, without differentiation between public, private and cooperative enterprises. Responsiveness to local needs would be maintained through the decentralized structure of the sector, which would minimize the physical and administrative distance between decisionmakers and the customers.

55. The target structure is first likely to emerge in Java, as a result of its greater load density and more highly developed supply system. However the model is also achievable in the other major islands, which are gradually moving towards central-station generation and island-wide integration. For the isolated regions that will continue to have to rely on higher cost and less efficient technologies, the transparent compensation system would ensure that their needs are met at a reasonable cost to themselves, to the extent that the GOI can afford to provide some subsidy. As long as the subsidy is transparent, and uniformly applied, the operating companies would have a strong incentive for efficient operation, not only to maximize profits, but also because their production costs would be known and compared with those of other isolated systems.

56. The creation of the target environment and structure for the sector, as outlined above, will require the progressive transformation of the regulatory and institutional framework. As discussed in the report, certain weaknesses in the existing framework make it unadvisable to break up PLN into separate companies in the short term. Rather than dividing up PLN, the transformation of the sector needs to begin with a series of measures (i) to streamline the regulatory environment to make the pursuit of sectoral objectives consistent with the corporate interest, transfer responsibility and accountability for corporate performance to PLN management and enable private and cooperative enterprises to compete with PLN on an equal basis; and (ii) to strengthen PLN to prepare it for the increased corporate and managerial responsibilities associated with a more competitive environment and a more decentralized mode of operation.

57. While the formulation of a detailed plan of action for the regulatory and institutional development of the sector will require additional study, a tentative phasing of the recommended measures in a short-, medium- and long-term time frame is presented below.

Measures for the Short-term:

58. In the short term (one year), the focus of the plan of action should be on taking initial steps in the direction of deregulation and decentralization, and preparing the groundwork for more drastic measures in the future:

- (a) the separation of guidance and supervision from corporate management needs to be initiated by clarifying that the responsibility and accountability for corporate management belongs to PLN's Board of Directors. The Supervisory Board would continue to assist the Minister of Mines and Energy with the supervision of PLN (see para. 2.14) but be removed from all involvement in corporate decisions, including its right to participate in meetings of the Board of Directors and ask explanations on any matters involving the management of PLN.

- (b) the simplification of PLN's performance evaluation needs to be started with a revision of PLN's annual and quarterly reporting requirements with the purpose of focussing them on important performance objectives and eliminating the indicators that only monitor budget categories and intermediate targets (see paras. 2.18-23).
- (c) the transition towards a transparent financial relationship should begin with the preparation of separate accounting information on each of the implicit costs and subsidies that flow between the GOI and PLN (see paras. 2.27-31). As a first step in this direction, PLN is already preparing separate information for its rural electrification program. This effort needs to be expanded to cover all explicit and implicit flows.
- (d) the recent 25% increase in the electricity tariff has restored PLN's financial balance, but further adjustments will be required to maintain the level of the tariff in real terms and protect PLN's financial performance. As simulated in para. 2.39, the introduction of a policy for periodic adjustments of, say, 1% every quarter (or 4% annually) would allow PLN to meet its medium-term financial objectives and obviate the need for significant tariff increases in the future.
- (e) the creation of a competitive environment should be initiated with a reduction in the existing distortions in energy prices. The ongoing Energy Pricing Policy Study is expected to provide a basis for defining the GOI's policy in this regard.
- (f) the transfer to PLN of full responsibility and accountability for procurement coupled with simplification of procedures along the lines discussed in para. 20. The Paton steam power plant and the Gresik combined cycle plant offer good opportunities for designing and testing simplified procurement procedures that would contribute to the timely implementation of these projects.
- (g) the transformation of PLN's culture should be started through the assignment of line responsibilities to individual directors and managers, both at headquarters and in the regions, along the lines discussed in paras. 3.27-31.
- (h) the current state of development of the Java grid warrants the immediate combination of the generation, transmission and load dispatch functions under a unified management, and an increase in the degree of managerial independence of the four distribution units with respect to commercial, budgeting, consumer administration and training decisions (see paras. 3.40-42).
- (i) PLN should formulate a long term human resources development plan to identify its future skill mix requirements and the options for meeting them. In the meantime, good justification exists for increasing PLN's training efforts to meet identified needs (see paras. 3.52-53).

- (j) the ongoing effort to build up PLN's corporate planning function needs to be reinforced in regard to the involvement of senior management, the development of a long term financing plan and the quality and level of responsibility of the staff (see paras. 3.58-60).
- (k) the improvement of PLN's customer service should be started with the revamping of its billing and collection procedures along the lines discussed in para. 3.68. This would immediately release a large number of branch staff for doing more productive tasks.
- (l) the enhancement of the role of the private sector should begin with the formulation of a purchased power tariff based on PLN's system avoided costs, and the resolution of the legal and technical issues associated with PLN's purchase of power from captive operators(see paras. 4.9-13). As a first step in this direction, PLN is planning to implement a few pilot capacity support arrangements in the coming year. These efforts need to be expanded to also cover situations where captive generation costs are competitive with PLN's.

Measures for the Medium Term:

59. The medium term (two - four years), should be regarded as a transition period during which the recommended deregulation and decentralization measures are evaluated, refined and strengthened:

- (a) the GOI should evaluate the effectiveness of the approach proposed in para. 58 (a) for the separation of guidance and supervision from corporate management and review the options for strengthening it through the establishment of a Policy Board, chaired by the Minister, in lieu of the refocussed Supervisory Board.
- (b) the simplification of PLN's performance evaluation should be continued with the selection of a single efficiency indicator and at most five indicators of its effectiveness. All other indicators should be eliminated or subordinated to the principal ones.
- (c) the achievement of transparency in the financial relationship between the GOI and PLN should be complemented with the formulation and implementation of a policy of compensating PLN for the cost of socially directed programs. In return, PLN should be expected to contribute to state revenues through payment of dividends, duties and taxes, and the full cost of the foreign exchange risk and other services provided by the GOI.
- (d) the regularization of tariff adjustment should be followed, after two or three years, by a detailed review of PLN's financial condition and objectives, with a view to adjusting the tariff level and/or the tariff adjustment formula, as appropriate.

- (e) the deregulation of PLN's fuel purchase decisions should be carried out through completing the rationalization of energy prices and granting PLN full autonomy in regard to fuel choices and procurement.
- (f) the transformation of PLN's corporate culture should be strengthened by transferring responsibility and accountability to the operating level through the budgetary resource allocation process.
- (g) the decentralization of PLN's Java units should be continued through organizing them as separate profit centers and establishing a transparent chargeback system for headquarters services, including a bulk purchase tariff. The strengthening of the regional operating units outside Java should be pursued to the point where autonomy could be implemented.
- (h) PLN should carry out a review and reform of its salary and compensation system to enable it to compete for technical and managerial talent on the same basis as the private sector.
- (i) the improvement in PLN's customer service should be continued through a broadening of the concept of service to include technical assistance in electricity-related matters and public relations.
- (j) the scope for the transfer of utility functions to private and cooperative contractors should be increased through contracting out of the maintenance of thermal plants and the management of selected operating units.
- (k) the feasibility of privately owned power generation concept should be tested for the case of a simple project with minimal technical and commercial risks to clarify the GOI's approach in regard to additionality of resource, foreign exchange implications and accountability (para. 4.17).

Measures for the Long Term:

60. For the long term (5-10 years), the plan of action should focus on the consolidation and finalization of the measures that have been tested, evaluated and refined during the transition period:

- (a) PLN's transformation into a mature and financially autonomous utility should be completed with the negotiation and implementation of a performance agreement to redefine its relationship with the GOI as that between a business and its owner. As discussed in para. 2.49, the agreement would (i) define PLN's performance criterion on the basis of a single performance indicator, (ii) limit the GOI's financial contribution to the compensation of socially directed activities, (iii) base tariff adjustment on an agreed index of costs, and (iv) transfer to PLN full authority and accountability for all financing, procurement, fuel choice and salary decisions.

- (b) the decentralization of PLN should continue with the strengthening of regional operating units and the progressive delegation of responsibility and accountability to the lowest feasible levels. The terms and conditions of the relationship between the headquarters and the operating units should be defined by performance agreements along the same lines as that between the GOI and PLN. As the individual units become financially viable and technically sustainable, the GOI should consider transforming them into separate companies and, eventually, if desired, their privatization.

- (c) The creation of a competitive environment should be completed with the removal of any remaining differences in the GOI's treatment of public, private or cooperative enterprises, and the granting of licenses to the lowest cost company that meets technical requirements, regardless of ownership.

I. CURRENT STATUS AND PROBLEMS

Background of this Report

1.1 During the decade of the eighties, the power sector of Indonesia has grown rapidly. PLN, the State Electric Corporation, has accounted for the major part of this growth. Overall, PLN quadrupled in size, as its sales grew from 4.3 Twh in 1978/79 to 19.7 Twh in 1988/89, its installed capacity from 2.3 GW to 8.1 GW and the number of customers from 1.8 million to 8.9 million. This achievement is impressive, particularly considering the extension and archipelagic nature of the country, which required PLN to develop about 650 separate systems. Even so, Indonesia's current electrification ratio of 24% is low by regional standards. PLN is only able to serve 54% of urban households and 13% of rural households, whereas it is estimated that at least three quarters of urban households and half of those in rural areas can afford to purchase electricity.

1.2 Over the same period, captive selfgeneration by industrial plants also grew from an installed capacity of 2.7 GW in 1978/79 to about 5.1 GW in 1987/88, not including 1.9 GW of capacity in five major enclave projects. The total installed capacity of captive generation is only slightly less than PLN's capacity. Given that grid-supplied electricity is generally more economical than diesel-based captive generation, it can be concluded that the growth of captive generation capacity has been mainly due to the inability of PLN to cater to the growing needs of the industrial sector, both in terms of quantity as well as quality of supply.

1.3 To close the gap between the supply and demand for its services, PLN is planning to continue its rapid expansion. Between now and the year 2000, PLN is projecting another four-fold increase in sales (from 19.7 TWh to 84.0 TWh) and a nearly threefold increase in capacity (from 8.1 GW to 22.4 GW). This expansion would enable PLN to increase the proportion of electrified households from the current level of 24% (54% urban/13% rural) to about 54% (81% urban/40% rural), which would approximately satisfy the unmet demand for electricity. It would also allow PLN to meet about 80-90% of the electricity requirements of the industrial sector, which would cover all except special situations where captive generation is expected to be competitive with grid supplied electricity (such as cogeneration, availability of local hydro or waste materials as fuel, and isolated plants).

1.4 As in the past, PLN's expansion will continue to have to be carried out in a manner that is consistent with the broader developmental objectives of the country. The most important ones of these are the following:

- (a) the commercial objective: As a public corporation (PERUM), PLN is expected to be profitable and make a contribution to state revenues (in the form of taxes and/or dividends).
- (b) the equality objective: To promote the development of the country in a balanced manner, PLN has been asked to pursue a uniform level of household electrification in all parts of the country.

- (c) the fairness objective: To enable the majority of the people to benefit from electrification, PLN is required to maintain electricity rates at affordable levels.

In addition to the above, other objectives that PLN has been asked to pursue include the objective of usefulness (i.e. the need to provide electricity in the quantity and quality required for economic development), the objective of selfsufficiency (i.e. the need to increase reliance on indigenous human and natural resources, supplies and equipment) and the objective of environmental preservation.

1.5 While these objectives are the same as in the past, and they are embedded in the 1972 Government Decree that established PLN, and confirmed in the 1985 Electricity Act, their satisfactory achievement has always been a challenge. In particular, the electrification of the country in a uniform manner has obliged PLN to establish and operate about 650 separate systems, many of which are in remote areas and most of which are based on diesel generation and are not financially viable (if taken by themselves), with the attendant implications for PLN's organizational and operating efficiency. Furthermore, maintenance of rates at affordable levels for small residential customers (who represent 92% of all customers and 31% of total sales) puts a considerable strain on PLN's finances as it also tries to fund a rapid expansion program and keep the rates to its other customers at a reasonable level. As a result, PLN's ability to continue its expansion in a manner consistent with all of its objectives cannot be taken for granted.

1.6 In addition, the scarcity of fiscal resources which is likely to characterize the 1990s, as well as the growing magnitude of the resources required for PLN's expansion, make it imperative that options be explored and a strategy be formulated to improve the effectiveness and efficiency with which these objectives are pursued. That is the purpose of this review.^{1/} As PLN is by far the country's major asset in the sector, and also the designated the instrument to carry out the Government's electrification objectives, this study will focus on PLN, while also considering options beyond PLN. Thus, the basic question for this review is: What conditions are required for PLN (or whatever other institutions the GOI may establish in the future) to be able to pursue its objectives with the greatest efficiency and effectiveness?

1.7 To search for an answer to the above question it will be useful first of all to summarize the institutional framework of the sector and present an outline of PLN's capabilities and performance, as well as its strengths and weaknesses.

^{1/} This review is one of a series of sector reports that have been prepared by the World Bank, each focussing on a different aspect of the energy sector in Indonesia. A list of recent reports is shown in Annex 1.

Sector Organization

1.8 The power sector of Indonesia comprises (a) PLN, the National Electricity Authority (8149 MW); (b) captive plants installed by industrial enterprises for their own use (6972 MW); (c) a small number of cooperatives in rural areas (16 MW); and (d) a large number of unlicensed micro-enterprises that supply electricity in rural areas (300 MW). The principal agency responsible for the sector is the Ministry of Mines and Energy (MME), which regulates the sector through its Directorate General of Electricity and New Energy (DGENE). Other ministries and agencies are involved in the sector, including the Ministry of Public Works, which regulates hydropower development, and the National Atomic Energy Commission (BATAN), which is responsible for nuclear development. To ensure interministerial coordination of energy policy, the GOI established a cabinet-level National Energy Board (BAKOREN). BAKOREN is supported by a Technical Committee (PTE) consisting of senior officials from the same departments. In addition, the GOI has recently (1987) established a Special Interministerial Team (the KEPRES 35 team) to coordinate the implementation of major non-oil projects (gas, coal, geothermal) to supply fuel to the power sector.

PLN's Organization

1.9 PLN is a public corporation with responsibility for the generation, transmission and distribution of electricity. As the Electricity Authority designated in the Law on Electrification (No. 15 of 1985), PLN is responsible for carrying out the public interest in regard to the supply of electricity (i.e. for implementing of socially-directed electrification programs). Its activities are overseen by a Supervisory Board, which is chaired by the DGENE.

1.10 PLN is managed by a Board of Directors headed by a President Director, who is appointed by the President and is accountable to the Minister of Mines and Energy. The President Director has authority for all operations. The Board also includes five other directors with functional responsibility respectively for planning, construction, operations, finance and administration. Operational responsibility devolves to 17 regions, and responsibility for major construction to 12 regional project managers. Also reporting to the Board are several staff units responsible for power research, education and training, management services, an internal audit department, the Java Load Dispatch Center and an Engineering Services Center.^{2/}

PLN's Capabilities and Performance

1.11 At the heart of the current debate about the future of the power sector in Indonesia is a concern about PLN's ability to implement its development plans in an effective and efficient manner. This concern, which relates both to PLN's internal constraints as well as to the adequacy of the policy and regulatory environment, is based on a qualitative judgment of PLN's capabilities and performance against a number of important criteria:

- (i) Ability To Meet Demand: As indicated above, current estimates are that about half of the rural households and at least three

^{2/} PLN's Organization Chart is shown in Annex 2.

quarters of urban households can afford electricity, and that about 80-90% of total industrial electricity use could be more economically supplied by PLN than by captive generation. Against this potential demand, PLN currently serves only about 13% of rural households, 54% of urban households, and about 60% of industrial requirements.

- (ii) Customer Satisfaction: The general perception, even allowing for inadequate data, seems to be that, despite some improvement, the quality of PLN's supply (in terms of reliability and voltage level) falls short of the requirements of the industrial sector as well as the expectations of the public. There are also questions about PLN's ability to respond in a timely manner to requests for new connections, as reflected in the continuing investment in new captive capacity.
- (iii) Owner Satisfaction: As a state enterprise, PLN is expected to operate along commercial lines, yet it is also responsible for carrying out socially directed electrification programs in the rural areas and the Outer Islands that are not financially viable. The trade-offs between PLN's financial performance, the electricity tariff level, and PLN's ability to meet electrification targets in remote areas have not been agreed between the Government and PLN, with the resulting lack of certainty and stability in the Government's expectations about PLN's performance.
- (iv) Technical Performance: In addition to the above-mentioned general concern about the quality of PLN's supply, concerns have also been raised about PLN's ability to manage its scattered network of separate diesel systems. In general, there are substantial mismatches between capacity and demand, the maintenance of the systems is inadequate, and the quality of service is unsatisfactory.^{3/}
- (v) Financial Performance: PLN's rate of return on revalued fixed assets, the most important indicator of its financial performance, had gradually improved from a negative level in the early 1980s to reach 3.4% in 1986/87. After that, it deteriorated again to 0.1% in 1987/88 and a projected -1.1% in 1988/89. This deterioration in performance after an improving trend had strained PLN's ability to finance a substantive share of its investments out of its own resources, as well as attract new borrowings.

^{3/} In aggregate terms, PLN's installed capacity Outside Java of 2,484 MW (of which 60% is diesel based) exceeds the system peak of 1,104 MW by 125%. See Indonesia: Diesel Generation Efficiency Improvement Study, Joint UNDP/World Bank Energy Sector Management Program, Report No. 095/88, December 1988.

1.12 Overall, while the above qualitative judgments provide a basis for concern, an objective assessment of PLN's performance and capabilities can only be undertaken if there is clarity about PLN's objectives and responsibility for its decisions. The absence of clear signals in this regard deprives PLN of the environment that it needs to continue its transformation from a Government agency into an efficient and effective utility and has led to the emergence of concerns like those summarized above. To identify the specific conditions in which improvements are needed to provide the appropriate environment for PLN's current stage of development, it is useful at this point to briefly review some of PLN's strengths and weaknesses.

PLN's Strengths and Weaknesses

1.13 While necessarily judgmental, PLN's qualifications for taking the major responsibility for power supply in Indonesia may be summarized as follows:

- (i) Technical Experience: Since its creation in 1972, PLN has developed into an enterprise with about 52,000 employees, of which about 2,000 are university graduates. Its service, which includes about 650 separate systems, extends to all regencies (kabupaten) and about 70% of subregencies (kecamatan) in the country.^{4/} It constitutes the only repository of utility operating experience under all sorts of conditions found in Indonesia.
- (ii) Implementation Capacity: PLN's installed capacity has grown at an annual rate of 17% from 664 MW in 1972 to 8,149 MW in 1988. During the same period, the number of consumers grew from 1.0 million to 8.9 million. Over the last three years, PLN's has been adding over one million customers per year. Its performance in this regard is far better than that of other public enterprises in Indonesia.^{5/}
- (iii) Good Teamwork and Discipline: In spite of uncompetitive salaries (in comparison with the private sector) and a cumbersome bureaucracy, PLN staff have developed a reputation for loyalty and discipline, with high dedication to work and low turnover ratios. This very favorable working environment is supported by the establishment of merit-based career development policies, and a tradition of promoting all managers from within (with rare exceptions).
- (iv) Competence of Management: Most of PLN's senior managers have been in its employment for their entire careers and have risen

^{4/} Indonesia's administrative divisions consist of (a) Level I: 24 provinces, one national capital area, and two special areas; (b) Level II: 246 kabupaten and 55 municipalities; (c) Level III: 3,586 kecamatan; and (d) Level IV: 65,517 villages.

^{5/} PLN's generation expansion plan is summarized in Annex 3.

through the ranks on the basis of competence. They have demonstrated a good capacity to address and solve problems that are within their area of responsibility.

1.14 The above outline of PLN's strengths and accomplishments needs to be complemented by a listing of its major weaknesses:

- (i) Variable Quality of Professional Staff: Over half of PLN's professional staff have been hired since 1980, during a period when the supply of engineering graduates was very limited and PLN's salaries were not competitive with those of the booming private sector. This has created difficulties for PLN in recruiting staff of the requisite quality into the pool from which it has to draw its middle managers and future senior managers. PLN faces an even greater problem in regard to the supply of first line supervisors, due to severe shortcomings in their training and experience.
- (ii) Weak Accounting Systems: PLN's accounting systems have not yet developed to the point where they can be effectively used for management decisions. They suffer from extensive delays in reporting as well as problems with reconciliation of accounts, discrepancies, etc. In addition to being of little use for management decisions, the weakness of the accounting system makes it difficult to maintain supervisory control over the widely scattered regional operations.
- (iii) Weak Financial Management: PLN has not yet developed a strong sense of its financial interests as a corporation, to the extent that financial considerations are not used explicitly to guide decisions. Decisions, such as many investments and fuel purchases, are not subject to financial appraisal. Also, PLN is yet to utilize effectively long term financial planning models to review the implications of alternative financing strategies.
- (iv) Inadequate Interaction with Customers: PLN has very limited knowledge of customer requirements, options and perceptions, both in regard to households as well as major industrial customers. The result has been a limited ability to structure the tariff so as to increase load factors and developmental benefits and a negative perception in the public about the quality of PLN's service.
- (v) Limited Concern for Profitability: The fact that PLN has social as well as commercial objectives has contributed to the expectation that the Government would evaluate PLN's financial performance leniently and provide it with equity contributions as needed to support the planned expansion of PLN's system. This expectation has limited the incentive for profitability, both at the corporate level as well as within PLN's individual units.

- (vi) Weak Concept of Accountability: Under existing conditions, the government exerts a substantial degree of influence on and intervenes in major corporate decisions, including those related to financing, salary levels, investment, and procurement of fuels and materials. As PLN's responsibility in regard to such corporate decisions is not well established, it is unable to control major parameters affecting its performance and efficiency, with the attendant lack of clarity in regard to accountability. Here again, the weakening of accountability at the corporate level has permeated the entire organization with a weak sense of unit and personal accountability.

Outline of the Report

1.15 The overall impression that emerges is that while PLN has to be credited with some impressive achievements in terms of its system expansion and the technical capacity of its staff, there are still many areas where its performance is a cause of concern, and where improvement is desirable. An assessment of the underlying causes for PLN's weak performance in the areas discussed above, as well as the conditions which would be required to eliminate those weaknesses, cannot be based simply on a comparison with electric utilities in other countries, all of which operate under different conditions. In addition to the technical and organizational complexity of PLN's geographically scattered supply system, any assessment of PLN also needs to take into account the objectives that the Government has asked it to pursue, which, while legitimate, involve some trade offs in relation to what a utility could be expected to achieve in any one area. While it is possible to begin the evaluation with a review of the justification of each of the objectives imposed on PLN, this has already been done in earlier reports.^{6/} Rather than evaluating the objectives, this report will take the objectives as given, and focus on ways to enhance the effectiveness and efficiency with which the objectives are pursued.

1.16 With this scope of work, the mission arrived first of all at the recognition that PLN is the Government's most valuable asset in the power sector and that, with its extensive implementation experience and technical expertise, PLN itself constitutes the most likely source of the initiatives and innovations that will be required. It is therefore incumbent on the Government, to create the environment and establish the conditions within which PLN will have the motivation and the means to not only pursue the objectives, but to do so in the most efficient and effective way that is possible.

^{6/} The Power Sector Investment Review (Report No. 5483-IND, 1985) evaluates the demand for electricity and macroeconomic justification for PLN's investment program. The Rural Electrification Review (Report No. 6144-IND, 1986), evaluates issues associated with PLN's rural electrification program. The Energy Options Review (Report No. 6583-IND, 1987) evaluates issues associated with the size and composition of PLN's expansion program.

1.17 With this approach in mind, Chapter II will review the regulatory framework, i.e. those factors that are external to PLN and largely under the control of the Government. The underlying objective will be to identify the conditions that will be required to motivate PLN's management to develop its initiative and creativity. Chapter III will discuss the organizational requirements, i.e. those factors that are internal to PLN and largely within its control. The underlying objective will be to transform PLN from a bureaucracy to an enterprise and provide it with the means required to meet the challenges that are ahead of it. Chapter IV will review the potential for enhancing the contribution of other participants in the sector, including private and cooperative enterprises.

II. STREAMLINING THE REGULATORY FRAMEWORK

Nature of the Problem

2.1 Given the recognition that PLN is the country's most valuable asset in the power sector, it is of interest to identify the conditions under which PLN's management and staff will have the incentive to organize and operate this asset in such a way as to yield the maximum benefit. In the mission's judgement, the lack of adequate corporate autonomy is the major factor affecting PLN's ability and motivation to operate efficiently. Basically, the degree of discretion that PLN's management enjoys does not appear to be commensurate with the size of the enterprise, the multiplicity of its objectives, the need to implement a major expansion program and the technical complexity of providing a satisfactory supply of electricity under widely varying conditions in a scattered archipelago. PLN management's inability to control major parameters affecting the company's effectiveness and efficiency, and the attendant dilution of responsibility and accountability for the company's performance, has stifled management initiative and attention to corporate interests. Combined with a public sector tradition of consensus seeking and deference to authority, this has led to the formation of a corporate culture where risk-taking is avoided and innovative proposals are rarely put forward.

2.2 The source of the problem lies in the excess supervision and regulation to which PLN is subjected. In particular, a web of monitoring and approval requirements emanating from three Ministries (Mines and Energy, Finance and BAPPENAS), the Supervisory Board and several inter-agency committees influence and intervene in major PLN corporate decisions, including those related to financing, investment, procurement and personnel compensation. The extent and detail to which these entities require reports and explanations, as well as the complexity of budgeting, funding and procurement approval procedures, have led to a high degree of involvement by Government in PLN's decision-making. As a result, supervision has been transformed into micromanagement by Government officials who bear no direct responsibility for the results of PLN's operation.

2.3 Of course, it can also be argued that it is precisely the fact that PLN is not an efficient and mature utility that necessitates the degree of supervision and guidance to which it is subjected. Indeed, PLN can be just as cumbersome and inefficient in areas free from direct supervision, such as diesel maintenance and operations and its billing procedures.^{7/} Even in such cases, however, a major contributing factor appears to be the lack of motivation at the operating levels that is brought about by the dilution of responsibility and accountability that permeates the company. To provide the motivation, the GOI will need to transform PLN's corporate culture by transferring greater responsibility and accountability to management and staff through a reform of the regulatory environment.

^{7/} See paras. 3.7-12 and 3.66-68.

2.4 To facilitate the discussion of options for reforming the regulatory framework, the chapter will begin with a description of the existing regulatory framework and continue with a discussion of areas where reform is required.

The Regulatory Framework

2.5 Under the existing regulatory framework, PLN's management is guided and supervised by the Minister of Mines and Energy. As described in the Government regulations 8/ (a) in the guidance of PLN, i.e., in the direction of the Corporation with regard to planning, implementation and control, the Minister is assisted technically and operationally by the Director General (DGENE) and administratively by the Secretary General (of MME), (b) in supervision, i.e., in the evaluation of PLN's performance in relation to the physical and budgetary targets, the Minister is assisted by a Supervisory Board. The Supervisory Board, which is chaired by the DGENE, consists of five Government officials appointed by the Minister taking into account the views of the Minister of Finance (MOF). It currently includes representatives of the MOF, BAPPENAS and EKUIN as well as DGENE.

2.6 The duties of the Supervisory Board provide an indication of the extent of this body's involvement in PLN's corporate decisionmaking. As stated in Government Regulation No.3/1983 on Public Corporations, the Supervisory Board will:

- (a) give opinions and suggestions to the Minister through the Director General with respect to the Corporation's draft planned targets and budget;
- (b) supervise the implementation of the plan targets and budget;
- (c) monitor the implementation of the Corporation's targets and in case these are not being met, prepare a report and propose remedial actions;
- (d) give opinions and suggestions concerning any matter that is considered to be important for the management of the Corporation; and
- (e) undertake other duties as required by the Minister.

In carrying out its duties, the Supervisory Board will have the authority to:

- (a) inspect the books and other documents, compounds, buildings and offices of the Corporation;

8/ Regulation of the Government of Indonesia 18/1972 on PLN as amended by Government Regulation 54/1981. This regulation is consistent with Regulation of the GOI No. 3/1983 Concerning Procedures for Promoting and Supervising Departmental Agencies (PERJAN), Public Corporation (PERUM) and Limited Liability State Corporations (PERSERO). Since the enactment of the Law on Electricity (15/1985), a new Government Regulation is being drafted to replace G.R. 18/1972.

- (b) ask for explanations from the management on matters involving the management of the Corporation; and
- (c) attend the meetings of the Board of Directors and give opinions on matters being discussed.^{9/}

2.7 In addition to the detailed guidance and supervision which the MME exercises through the Supervisory Board, PLN corporate decisions are subject to review and intervention from several additional sources:

- (a) PLN reports to and requires the approval of the MOF in regard to its workplan and budget, medium and long term loans, and any transfer of fixed assets;
- (b) PLN's investment program and external financing is regulated by BAPPENAS;
- (c) PLN's fuel purchase decisions require the approval of the MME;
- (d) PLN's procurement decisions require the clearance of EKUIN (for amounts greater than Rp 3 billion), MME (for tenders between Rp 1-3 billion), and DGENE for tenders between Rp 0.5-1 billion); and
- (e) PLN's tariff decisions require the approval of the MME in consultation with the President and the Cabinet.

2.8 The multiplicity of sources of supervision and intervention in PLN's corporate decisionmaking, with their different objectives, policies and procedures, has resulted in a fragmentation of control and a dilution of responsibility. It has also meant the devotion of much time and effort among PLN personnel to addressing the reporting requirements of reviewing authorities. It is not unusual to have several layers of the government review the same issue in different Ministries (occasionally even within the same ministry), with each reviewing body requiring explanations from PLN on operational details. For instance, the Supervisory Board, which is tasked with reviewing the proposed PLN annual budget is composed of representatives from various ministries (MME, BAPPENAS, MOF, EKUIN). Yet even with the Board's endorsement, PLN's budget is still subject to further review by these agencies; sometimes by the same staff from which the Board representatives are drawn.^{10/}

2.9 Conversely, the administrative burden imposed on the Ministries by their supervisory and monitoring duties in relation to PLN has meant that less time has been devoted to the formulation of sectoral plans and policies (e.g., in relation to PLN's long term financing plan, the role of the private sector, the national electrification targets, the rules for power tariff adjustment). The absence of clear policy directives results in a need for increased time

^{9/} In actual practise, PLN's Supervisory Board has not exercised its right to participate in meetings of the Board of Directors in the past.

^{10/} PLN's budget cycle is described in paras. 2.45-51.

devoted to interagency deliberations and consensus-taking, and a tendency to centralize decisionmaking at the highest levels. A similar situation is created within PLN. Without defined limits to the Government's involvement, PLN's head office staff devotes a large proportion of its time to respond to Government monitoring and reporting assignments and to attempt to second-guess the Government's position on issues of corporate interest. Thus the dearth of policy guidance reinforces a tendency to centralize decision-making at the head office, rather than to delegate responsibilities to the field.

2.10 Finally, in a sector where timely decisionmaking is important, the present set-up results in frequently prolonged delays and sometimes unsynchronized implementation of projects,^{10/} reducing their potential benefits. The adverse effect on PLN's level and quality of service has affected PLN's ability to meet its customer's expectations and undermined its public image. Ultimately, the Government is prodded to scrutinize further PLN's operations, with the attendant increase in supervision and intervention. Clearly, a solution needs to be found to break out of this cycle and confer on PLN the autonomy that it needs to operate as an efficient enterprise.

The Need for Regulatory Reform

2.11 An electric utility such as PLN has very special characteristics, not only because it is to some extent a natural monopoly (at least for the transmission and distribution of electricity), but also because it must function as an agent of development in the pursuit of the GOI's social and economic objectives. Therefore, the need to increase the autonomy of the enterprise needs to be balanced with an appreciation of the noncommercial objectives assigned to it. In the mission's view, this objective can be achieved through a streamlining of the regulatory framework along the following lines:

- (a) separation of guidance and supervision from corporate management;
- (b) simplification of the evaluation of performance;
- (c) transparency in the financial relationship;
- (d) regularization of tariff adjustment;
- (e) deregulation of fuel purchase decisions;
- (f) simplification of procurement procedures; and
- (g) replacement of budget controls by a program contract.

These options are discussed below.

^{10/} See para 3.17 for a specific example.

Separation of Guidance and Supervision from Corporate Management

2.12 The motivation of PLN's management towards an entrepreneurial direction will require that the GOI treat PLN more like a business, and that PLN's management (i.e., its Board of Directors) be given the freedom that is essential for the running of a large and complex enterprise. Basically, PLN's management needs to be made responsible and accountable for the company's performance, and needs to be motivated to manage on the basis of results, rather than compliance with procedures. This will require a clear separation of policy guidance from corporate management, such as is not provided by the current institutional setup.

2.13 The above concept is consistent with the Law on Electrification, which defines the Government's role as "guidance and supervision" and limits guidance and supervision to issues of public and workplace safety, business development, and technical standards. The concept is however diluted in Government regulations and day-to-day practice where, among others, the definition and interpretation of "guidance" and "supervision", and the corresponding authority vested in the DGENE and the Supervisory Board on behalf of the MME allow for substantial intervention of the GOI in corporate decisionmaking.

2.14 In view of the desirability of clearly separating policy guidance from corporate management, the simplest approach would be to revise or reinterpret the definition of "guidance" and "supervision", as well as "management", in the Government regulations to clarify that the authority and accountability for PLN's corporate decisions belong to its Board of Directors. Under the recommended arrangement, the Minister of Mines of Energy would continue to guide PLN with the assistance of the DGENE, but such guidance would focus on matters of strategy and policy, rather than on requiring consultation and approvals in matters of planning and implementation. The Minister would also continue to supervise PLN with the assistance of the Supervisory Board, but such supervision would be carried out through probing into selected areas related to the investment program, financing plan and budget, rather than the detailed line by line monitoring of the budget and numerous physical implementation targets in the work plan. The Supervisory Board would not be involved in corporate decisions and give up its right to participate in meetings of the Board of Directors and to ask explanations on any matters involving the management of PLN.

2.15 An alternative institutional approach to separate policy guidance from corporate management would be the creation of a Policy Board, as a replacement of the Supervisory Board. The Policy Board would take over the functions of the DGENE and Supervisory Board in relation to the guidance and supervision of PLN, but have specific terms of reference to exercise these functions in a manner consistent with leaving full authority, responsibility and authority for corporate decisionmaking to the Board of Directors. A secondary purpose would be to widen PLN's horizons as an enterprise by ensuring an input, not only from the GOI, but also from private enterprise and from consumers. The inclusion of individuals with extensive business leadership experience as members of the Policy Board would provide a substantial impetus towards the development of an enterprise culture within PLN.

Simplification of PLN's Performance Evaluation

2.16 As currently carried out, the GOI's supervision of PLN is based on the line by line monitoring of PLN's performance against targets set in its annual work program and budget. A justification is required for any deviation in excess of 10% for any of hundreds of line items in these documents. In addition to the annual reports, there is also a quarterly monitoring system based on a set of about 80 indicators, including about 30 budget categories and other service and operational statistics, such as sales, number of customers, transmission and distribution (T&D) losses and number of accidents, all of which are disaggregated for PLN's 17 operational regions.

2.17 The current system of monitoring a large number of performance indicators appears to be unnecessarily constraining and, in some cases, misleading or even conflicting. Thus, for example, even if T&D losses were declining, it does not necessarily follow that the general efficiency of the enterprise is improving, since disproportionate resources may have been deployed.^{11/} Overall, while disaggregated indicators are frequently useful tools for management, they are too cumbersome for the evaluation of PLN's performance at the policy and operation levels. This is borne out by the fact that there has been little response and reaction to the various sets of indicators submitted quarterly by PLN to the GOI suggesting that they are not really reviewed or used for decision making.

2.18 A more reliable approach would be to base the evaluation of PLN's performance on a simple but comprehensive measure of efficiency, combined with consideration of its effectiveness in meeting social objectives. For a private enterprise, the criterion of choice is profit. For a public enterprise with both social and economic objectives, the use of profit may not be appropriate. The rate of return achieved under a power tariff held at a constant level in real terms could be regarded as an ideal global indicator reflecting all effectiveness and efficiency factors. However, in the case of PLN, with its different social objectives and uncertain tariff adjustment procedures, it would be appropriate to have separate indicators for efficiency and effectiveness.

2.19 For monitoring efficiency, an indicator that combines global coverage with simplicity is the cost per unit sold (Rp/kWh), adjusted for inflation. It would be the appropriate indicator to motivate management at every level to choose optimally amongst its many options, for example:

- (a) to use more staff vs. less staff with more training;
- (b) to have work done by PLN staff vs. private contractors;
- (c) to employ preventive maintenance vs. accept greater need for repairs; and

^{11/} E.g. See para 3.18.

- (d) to invest to enhance efficiency vs. accept higher operating costs.

2.20 The total cost per kWh criterion can be used to evaluate efficiency at the corporate, regional and branch levels. Of course, it will have to be used properly, as different units operate under different conditions, and their performances may not be comparable. What is essential is to have a simple indicator which everybody can identify with, that motivates management and staff in the right direction, and the evolution of which, over time, provides a useful indicator of managerial effectiveness. In addition, the use of this indicator will appropriately focus Government's attention on the final cost of the product that is delivered, without having to become involved in the choice of means used to deliver the product.

2.21 As an intermediate or transitional option, the GOI should consider (i) eliminating those indicators that only monitor budget categories and intermediate targets, and (ii) monitoring a small number of subordinate indicators to provide additional information on efficiency-related areas of special interest. Examples of the latter could be T&D losses, customers per employee and accounts receivable (in days of sales).

2.22 To evaluate the effectiveness of PLN, it would be appropriate for the GOI to select a limited number of additional indicators that would monitor its progress in regard to the major social objectives. These indicators could be selected from the ones that the GOI is already monitoring on a quarterly basis, such as number of connected customers, number of electrified villages, frequency of outages, frequency of accidents, etc. Here again, the adoption of a small number of indicators would help to focus the attention of PLN's management and staff on meeting its most important objectives and improving its performance in these areas, without being distracted by subordinate targets related to predetermined plans for achieving these primary objectives.

2.23 Of course, the proposed simplification of PLN's performance evaluation on the basis of a single efficiency indicator and a small number (at most five) additional targets is not intended to bar the GOI from obtaining other information from PLN, as and when appropriate. The main objective of the simplification is to focus PLN's management's attention on objectives that are under its responsibility and control, and motivate it to strive for greater efficiencies by providing it with greater autonomy to manage its operations. Such an increase in autonomy would also enable GOI to hold PLN's management accountable for the results.

Transparency of Financial Relationship

2.24 To a substantial extent, PLN's lack of autonomy is a consequence of its financial dependence on the GOI. The financial dependence derives from the GOI's ownership of PLN and its role as the instrument for the pursuit of the GOI's objectives in the power sector. Thus, PLN's financing strategy is entirely determined by the GOI. Basically, the GOI (i) determines the size of PLN's investment program on the basis of its developmental and social objectives and financial resource availability, (ii) determines the

electricity tariff on the basis of at least covering PLN's operating costs and keeping electricity affordable to the majority of the population, and (iii) manages its equity contributions and borrowings on behalf of PLN in such a way as to keep it in a financially balanced position. As the principal guidepost for its financing strategy, the GOI uses the debt/equity ratio, which has risen from 7/93 in 1979/80 (end of Repelita II) to 27/73 in 1983/84 (end of Repelita III) and 43/57 in 1988/89 (end of Repelita IV), and is projected to reach 50/50 in 1993/94 (end of Repelita V). The rising debt/equity ratio is an indicator of the growing commercial orientation which is expected of PLN.

2.25 While the GOI's financial strategy for PLN is consistent with the achievement of its social objectives and the preservation of PLN's financial balance, an improvement in PLN's performance and efficiency will require the GOI to manage this financial relationship in a way that strengthens the appropriate incentives for PLN's management. Under the current system, as the GOI determines the expansion targets, sources of finance, electricity rates, fuel choices and prices, salaries, and most other factors affecting PLN's costs and revenues, there is very little freedom left for PLN's management to influence the financial performance of the company, with the attendant lack of accountability for PLN's financial performance and motivation for efficiency. As a means for improving management accountability and motivation, the Government should consider putting its financial relationship with PLN on a transparent basis. This would mean that PLN would be compensated for the cost of social programs (through budgetary transfers or tariff adjustments). In return, PLN would be expected to contribute to state revenues through the payment of dividends, duties, taxes and full payment for foreign exchange risk coverage and other services provided by the GOI.

2.26 To obtain an appreciation of the magnitude of the flows under discussion, the mission prepared tentative estimates (based on 1987/88 data):

- (a) PLN's sales to small residential consumers at average revenues of Rp 89.0/kWh and Rp 100.9/kWh ^{12/} generated total revenues of about Rp 494 billion. As the cost of serving these consumers (as estimated by the LRMC) is about Rp 159.8/kWh and Rp 142.6/kWh respectively, for a total of about Rp 804 billion, the subsidy to small residential consumers was about Rp 310 billion. On a similar basis, PLN's subsidy to small industrial consumers (tariff categories I1 and I2) would be Rp 53 billion. These amounts are, however, likely to underestimate the actual subsidies because (i) the LRMC is based on economic costs rather than financial costs, and (ii) the LRMC is based on PLN's system costs in Java, which are lower than outside Java;
- (b) PLN is obliged to purchase fuel oil at the domestic retail price of Rp 200/liter, and is not permitted to purchase it in

^{12/} For tariff categories R1 and R2, respectively, which cover residential customers with a maximum demand of 250 VA to 500 VA (R1) and 501 VA to 2200 VA (R2). For a description of PLN's tariff, see Annex 4.

international markets where the price would be about 20% lower.^{13/} The resulting difference of Rp 112 billion therefore represents a cost imposed by the Government on PLN.

2.27 To enable PLN to maintain a balanced financial position in spite of the above costs, the Government provides financial support to PLN in various forms. The following provides a rough estimate of the value of this support (in 1987/88):

- (a) The GOI's equity contributions were about Rp 860 billion, resulting in a cumulative total paid-in capital of about Rp 4,282 billion. As the sole owner and "shareholder", the Government would have been entitled to a dividend of at least, say, 8% in the amount of Rp 343 billion. As PLN was not required to pay a dividend, the foregone dividends can be regarded as a form of Government assistance to PLN;
- (b) PLN was exempt from duties and taxes (including VAT), estimated at Rp 119 million, on its externally-financed imports of goods and services, which amounted to about Rp 413 billion in 1987/88. If PLN had not been exempt, it would have capitalized the sum as part of its investment costs and subsequently amortized it over the life of the assets. On this basis, an estimated Rp 24 billion of amortization is allocable to 1987/88 as a form of Government support to PLN;
- (c) The Government made debt service payments of about Rp 534 billion on foreign loans it lent to PLN and on which it bears the foreign risk. Corresponding payments by PLN to the Government amounted to about Rp 340 billion. The difference of Rp 194 billion is an estimate of the exchange losses borne by the Government on behalf of PLN; and
- (d) At the domestic retail price of Rp 200/liter, PLN's cost of diesel oil was about Rp 253 billion, compared to about Rp 327 billion that PLN would have had to pay if it were charged the international parity price of about Rp 259/liter. The difference of Rp 74 billion represents a Government subsidy to PLN.

2.28 Table 2-1 summarizes the costs to the Government of supporting PLN and those that it imposed on PLN, as discussed above. A balancing entry of Rp 160 billion was added to the costs imposed on PLN to compensate for the likely underestimation of PLN's subsidies to the small residential and industrial consumers and to take into account the fact that PLN's operating costs (based on unrevalued depreciation and excluding interest charges) for its operations outside Java (Rp 136/kWh), which accounted for about 22% of PLN's total sales, are substantially higher than those for its operations in

^{13/} Based on a crude oil price of \$15/barrel (in 1987/88) the international parity price of fuel oil is estimated to be \$13.50/barrel equivalent to Rp 144/liter.

Java (Rp 75/kWh).^{14/} This adjustment results in the estimate of PLN's subsidies to consumers to total Rp 635 billion, equivalent to more than one third of PLN's total revenue in 1987/88.^{15/}

Table 2.1: PLN's IMPLICIT SUBSIDIES AND COSTS - 1987/88
(Billion Rupiah)

<u>Costs to Government of Support to PLN</u>	
Foregone dividends on paid-in capital	343
Exemption from duties and taxes on imports	24
Exchange losses on foreign loans onlent to PLN	194
Subsidy on high speed diesel oil	74
<u>Total</u>	<u>635</u>
 <u>Costs imposed by Government on PLN</u>	
Subsidy for small residential consumers	310
Subsidy for small industrial consumers	53
Higher price for marine fuel oil	112
Balance of subsidies to consumers	160
<u>Total</u>	<u>635</u>

Source: Mission estimates.

2.30 As discussed above, a transparent financial relationship would provide the Government with a clearer understanding of the costs of subsidizing each of PLN's socially-directed programs, and a basis for evaluating their costs and benefits in comparison with those of other budget-supported social programs. It would also enable PLN to recover the cost of such activities and programs, while maintaining an incentive for efficiency. Dependence on the Government's financial assistance need not be associated with lack of stimulus for efficiency if the cost of PLN's social programs and the Government's financial assistance can be accurately identified and isolated from the evaluation of PLN's performance with respect to its commercially-oriented operations.

2.29 As a first step towards the objective of transparency, PLN is already preparing an estimate of the costs associated with its rural electrification program. This effort needs to be expanded to cover all explicit and implicit flows between PLN and the GOI. Over the medium term, this effort should be followed up with the GOI's explicit formulation of a policy for compensating PLN for the cost of socially directed programs and recovering from PLN the full cost of the inputs it requires. Such measures are required to prepare the ground for increasing the commercial orientation of PLN to the point where it can be treated as a business, on the same basis as other businesses in the sector.

^{14/} For a breakdown of PLN's operating costs by region, see Annex 5.

^{15/} For PLN's income statement, see Annex 6.

Regularization of Tariff Adjustment

2.31 In addition to the need for transparency, the transfer to PLN's management of the responsibility and accountability for PLN's performance will also require the Government to adjust the tariff on a regular, predictable basis. Under the existing framework, the Government has the authority to set the electricity rates, but there is no direct and formal linkage between the tariff and PLN's costs, financial objectives and performance. In the absence of clear linkages, tariff adjustments have required a prolonged period of evaluation and consensus-taking, with the attendant shortfalls in PLN's internal resource mobilization and ability to implement projects in an efficient manner.

2.32 Adjusting the tariff is a sensitive and difficult process everywhere, particularly in low-income countries where there is little room in family budgets to absorb rate increases. Some adjustments will be required, however, to enable PLN to meet its financial objectives in the face of cost increases associated with inflation, changes in fuel prices, exchange rate depreciation and, possibly, the growing share of sales to subsidized customers. To reduce the social impacts of such adjustments it would be desirable to move towards a system of regular adjustments based on clear rules for cost recovery and rates of return, which would also remove the GOI from the responsibility for raising the tariff.

2.33 A possible approach would be to adjust the tariff on a periodic basis (say every three months) on the basis of a weighted index of PLN's fuel and other costs. The advantage would be that each quarterly adjustment would be minor, barely noticeable by the consumers. With such a system, PLN would be able to operate on a solid financial basis with adequate internal resource generation to implement its rapid expansion plan. To provide an incentive for efficiency improvement, PLN would be allowed to keep any savings from efficiency improvements to strengthen its financial position and reduce its reliance on GOI funding.^{16/} Every two or three years, PLN's financial condition would be subject to a detailed review and, depending on the evolution of costs in relation to PLN's financial objectives, the tariff level could be adjusted upwards or downwards by a relatively small amount. Such a system of regular tariff adjustments on the basis of agreed rules would also tend to reduce the drama associated with a large tariff increase. Rather than becoming a major event, the objective would be to reduce tariff adjustments to the routine application of a contract between the GOI and PLN. The effect of such a regular adjustment of tariffs on PLN's financial performance during the Repelita V period can be illustrated by means of a simulation.

2.34 Following upon the Government's recently approved tariff increase of 25% (effective April 1, 1989) PLN's financial position has improved substantially over its performance during the Repelita III (1979/80-1983/84)

^{16/} For the long term, after PLN has attained a stronger financial condition, the efficiency savings would not have to be retained, but could be passed on to the consumer.

and Repelita IV (1984/85-1988/89) periods. Focussing, for simplicity, on PLN's funding strategy, its self-financing ratio, which had fallen from a level of 22% during Repelita III to only 7% during Repelita IV (reflecting the absence of any tariff increase), will rise to 20% in 1989/90.^{17/} While a self-financing ratio of about 20% is appropriate for the short-term, a reasonable financial objective for a utility at PLN's stage of development would be to strive to improve its profitability in the medium-term and self-finance about 30-35% of total investments, to rely mostly on borrowings to finance the balance, and to confine Government contributions to funding the expansion of supply to socially-directed programs.

2.35 With that objective in mind, based on PLN's proposed 1989/90-1993/94 investment program of about Rp 21,865 billion ^{18/} and postulating the reliance on borrowings to increase from 29% of the funding requirements in 1989/90 to 53% in 1993/94 (with corresponding debt/equity ratios changing from 40/60 to 50/50), the following scenarios (summarized on Table 2.2) illustrate the effect of the proposed tariff policy:

- (a) Case 1: Without any tariff adjustment after 1989/90, PLN's financial performance will deteriorate and then stabilize as projected increases in operating costs (not including fuel costs) are offset by efficiency improvements. By 1993/94, while the self-financing ratio would have improved marginally to about 23%, the GOI's equity contribution for the period would have to increase by 60% (in nominal terms) to about Rp 5,747 billion (26% of the total) in relation to that during Repelita IV period, in spite of the large postulated increase in borrowings. Moreover, with a rate of return of 4.5% PLN would be facing the need for major tariff adjustment in 1993/94;
- (b) Case 2: With a tariff increase of 4% per year (or 1% per quarter), to match the projected increases in operating costs (not including fuel costs) and the rate base, PLN's financial performance would improve to meet its medium-term objectives. By 1993/94, its self-financing ratio would have increased to 38% and, with no difference in the postulated borrowings, the required Government contribution would be only Rp 4,070 billion (19% of the total). Most importantly, with a rate of return of 9.0% and a debt service coverage of 4 times, PLN would be in a good financial condition and require no significant tariff adjustments.

Investment Financing

2.36 It is useful to note at this point that, to date, PLN's investment requirements have been financed by its internal cash generation, equity contributions from the Government, and borrowings. Although PLN is authorized

^{17/} For PLN's funds flow statement, see Annex 6.

^{18/} Which is consistent with the targets of 5.9 million additional customers, 3211 MW in additional increased capacity and 19.2 TWh in additional sales.

Table 2.2: SUMMARY OF PLN'S SELECTED FINANCIAL INDICATORS

A Comparison of Cases 1 and 2

Fiiscal Year	1989/90	1990/91	1991/92	1992/93	1993/94	Total 1989/90 - 1993/94
Energy Sales (GWh)	22,897	26,112	29,932	34,169	38,850	
<u>Average Revenue Increase (%)</u>						
Case 1	25.0	0.0	0.0	0.0	0.0	
Case 2	25.0	4.0	4.0	4.0	4.0	
<u>Average Revenue (Rp/kWh)</u>						
Case 1	115.8	115.8	115.8	115.8	115.8	
Case 2	115.8	120.5	125.4	130.4	135.6	
<u>Operating Revenue (Rp bln)</u>						
Case 1	2,694	3,099	3,552	4,059	4,616	18,020
Case 2	2,694	3,222	3,638	4,557	5,386	19,697
Operating Expenses (Rp bln)	2,251	2,597	2,995	3,416	3,851	15,110
<u>Operating Income (Rp bln)</u>						
Case 1	443	502	557	643	765	2,910
Case 2	443	625	843	1,141	1,535	4,587
<u>Operating Ratio (%)</u>						
Case 1	84	84	84	84	83	
Case 2	84	81	80	75	72	
<u>Rate of Return (%)</u>						
Case 1	4.9	4.7	4.6	4.6	4.5	
Case 2	4.9	5.9	6.9	8.2	9.0	
<u>Financing Plan (Rp bln)</u>						
Capital Expenditures	2,712 (100.0)	3,129 (100.0)	4,305 (100.0)	5,479 (100.0)	6,239 (100.0)	21,865 (100.0)
Financed by:						
<u>Case 1</u>						
Net internal sources	559 (20.6)	748 (23.9)	986 (22.9)	1,243 (22.7)	1,597 (25.6)	5,133 (23.4)
Borrowings	779 (28.7)	1,398 (44.7)	2,353 (54.7)	3,148 (57.4)	3,307 (53.0)	10,985 (50.3)
Government equity	1,375 (50.7)	983 (31.4)	966 (22.4)	1,088 (19.9)	1,335 (21.4)	5,747 (26.3)
<u>Case 2</u>						
Net internal sources	559 (20.6)	871 (27.8)	1,272 (29.5)	1,741 (31.8)	2,367 (37.9)	6,810 (31.1)
Borrowings	779 (28.7)	1,398 (44.7)	2,353 (54.7)	3,148 (57.4)	3,307 (53.0)	10,985 (50.3)
Government equity	1,375 (50.7)	860 (27.5)	680 (15.8)	590 (10.8)	565 (9.1)	4,070 (18.6)
Debt/equity Ratio	40/60	41/59	44/56	48/52	50/50	
<u>Debt Service Coverage (times)</u>						
Case 1	2.0	2.2	2.4	2.7	3.0	
Case 2	2.0	2.5	2.9	3.5	4.1	
Rate Base (Rp bln)	8,955	10,628	12,173	13,957	17,008	

Notes: (1) Operating expenses, annual rates of return and rate base are based on revalued fixed assets and depreciation.
(2) Figures in parentheses represent percentage of capital expenditure.

by its charter to borrow from local and foreign lenders, and to issue its own obligations, the Government in practice has secured all foreign borrowings on behalf of PLN. Local borrowings by PLN have been from the Government-owned banks.

2.37 During Repelita IV, the Government arranged for about 90% of the investment financing required by PLN, and it is expected to do so for about 70% of the financing requirements for Repelita V. As PLN becomes profitable and its financial accounts receive clean opinions from the auditors, PLN should begin to take advantage of the recent developments in the domestic capital markets to raise finance for its investment requirements, initially by borrowings (bonds, debentures, etc.) and eventually supplement them by acquiring equity through issuance of capital stock. Given the large financing requirements of PLN, its presence in the domestic financial markets could contribute significantly to the development of those markets, as well as reduce the burden on the Government of arranging for PLN's large borrowings and providing equity contributions.

Deregulation of PLN's Fuel Purchases

2.38 PLN's efficiency and effectiveness is also affected by the extent of GOI intervention in its fuel purchase decisions, where PLN is given virtually no freedom of choice and is required to support objectives that have nothing to do with PLN's corporate interests. This can be illustrated with the example of recent decisions in regard to the purchase of coal, geothermal steam and natural gas.

2.39 For the case of coal, the price for supplies to PLN's 4x400 MW Suralaya power plant from the state-owned Bukit Asam mine has been set by the Government at Rp.66,000/ton on the basis of the financial requirements of the Bukit Asam project. This price is justified on the basis of its being the most practical way for the Government to meet its obligations in relation to the first phase (up to 3 mmpy) of Bukit Asam mine development. What is of concern, however, is that the same price will be extended to incremental supplies from future expansion of Bukit Asam, and that PLN is required to purchase them to meet the requirements of Suralaya units #3 and #4. Thus, PLN has been put in the position of having to guarantee a market for incremental supplies from Bukit Asam, regardless of whether these incremental supplies will or will not be competitive with coal supplied from other sources, for example Kalimantan.

2.40 In a similar way, the Government has committed PLN to purchase the geothermal energy to be produced from the Salak and Drajat fields (for a projected capacity of 110 MW each) at a price of US\$0.03422/kWh. This represents nearly twice the fuel cost at a coal fired plant, which is the appropriate benchmark to use. While about half of the difference will be returned to the Government in the form of taxes, the price required to satisfy the producers of geothermal steam suggests that this resource cannot compete with coal, at least on Java. Thus, rather than committing PLN to this price for future geothermal projects in Java, the efficiency objective suggests that PLN be allowed to choose its fuels on the basis of least cost criteria and postpone the development of geothermal resources unless they can be made competitive with Indonesia's abundant coal resources.

2.41 For its supplies of natural gas for the Gresik plant in East Java, PLN has been asked to accept a price of \$2.53/MCF, which has been negotiated on behalf of the Government by Pertamina and the producers. Although PLN will be the principal customer for this scheme, it was not a party to the negotiations and was not in a position directly to represent its interests. As a result, it will end up paying the highest price of gas in comparison to other customers (which also include the gas distribution company and a fertilizer plant) whereas, as the largest customer, is actually imposes the lowest economic cost per unit of gas delivered by the system. Here again, PLN is being used to collect taxes on behalf of the Government (and possibly cross-subsidize other consumers) to a far greater extent than the other consumers of gas.

2.42 Finally, as has already been mentioned, for its supplies of fuel oil, PLN is required to turn to Pertamina, which charges a price which implies a tax in relation to international prices. This tax falls largely on PLN, as it consumes about three quarters of all fuel oil in Indonesia, and is reflected in its generation costs. This circumstance puts PLN at a disadvantage when its costs are compared with those of other utilities in the region, most of which are able to purchase fuel oil in international markets without tax or duty.

2.43 Overall, some Government guidance is justifiable in the interest of broader sectoral objectives, such as the need to encourage the development of non-oil energy resources, and the need to reduce risk by maintaining a balance between coal- and gas-based generation. However, for the sake of efficiency, this guidance needs to be provided in such a way as not to deprive management of opportunities to exercise its skill and expertise to minimize fuel costs and maximize efficiency on behalf of the enterprise. In view of this, it is recommended that the Government set energy prices on the basis of economic principles so that no further intervention is needed to obtain an efficient pattern and level of consumption, based solely on the customers' pursuit of their financial interest. The ongoing Energy Pricing Policy Study is expected to provide a basis for decisionmaking in this regard.^{20/}

Simplification of Procurement Decisions

2.44 Cumbersome government procedures required for the award and implementation of supply and service contracts have resulted in costly delays and unsynchronized implementation of PLN's investment program. The issue is that such delays have nothing to do with the merits of the projects themselves, or with PLN's technical capacity to implement, and therefore constitute an unnecessary drag on the efficiency of the sector as a whole.

2.45 Under the current arrangements, PLN procurement authority is regulated on the basis of the sources of funds and size of the contract:

- (a) for purchases financed internally by corporate funds, PLN management has authority up to a ceiling of Rp 3 billion,

^{20/} The Bank-financed Energy Pricing Policy Study, under Loan 2690-IND, is expected to be completed by early 1990.

subject only to post-audit by BPKP. Contracts over Rp 3 billion must be cleared by EKUIN prior to award and are subject to both pre- and post-audit by BPKP.

- (b) for procurement under the DIP (development investment fund) or Rupiah co-financing schemes, PLN has authority up to Rp 500 million. Tenders amounting from Rp 500 million up to Rp 1 billion are to be awarded by the DGENE; those from Rp 1 billion to Rp 3 billion by the Minister of Mines and Energy; and those in excess of Rp 3 billion must receive clearance from EKUIN prior to award.
- (c) contracts financed by multilateral credits are awarded following procedures set in the respective project agreements and are reviewed and cleared with MME, EKUIN and BAPPENAS.

Further, letters of credits, import clearances, funding confirmations and other requirements necessary for contract implementation are subject to processing by Bank Indonesia, Ministry of Trade, Ministry of Finance and Customs.

2.46 The overall effect of these requirements is that the normal time required for GOI/PLN to award an equipment contract after receiving bids is 12 to 14 months. If PLN had full autonomy in procurement matters, this time should be no more than three or four months. Consequently, project implementation times are nine to ten months longer, with the attendant implications on cost and efficiency. As an example, for the 2x400 MW Paiton coal-fired power project, which is currently at the tender evaluation stage, the excessive time allotted to the procurement process implies a \$20-30 million increase in interest during construction, and about \$100 million in foregone benefits.

2.47 Although PLN's autonomy in the area of materials procurement and contract administration has recently been expanded, further streamlining of the procedures is desirable. As the new regulations stress that accountability for the award and implementation of the contracts rests on PLN officials, even in cases when prior clearances from Government are required, it would be appropriate to grant management the commensurate authority. In this connection, it is recommended that the following measures be considered in simplifying the procurement process at PLN:

- (a) delegation of authority to approve contracts should not discriminate as to the source of funds, since the same level of responsibility and accountability are involved in arriving at the decision/recommendation;
- (b) extension of the Rp 3 billion ceiling to which PLN authorization is limited in view of the relatively high volume of PLN's transactions that exceed Rp 3 billion;
- (c) allowance for greater flexibility in bidding procedures, particularly for procurement of spare parts that are proprietary in nature;

- (d) joint clearances through an inter-agency committee on a no-objection basis in lieu of the current system where PLN has to go through several ministries; and
- (e) greater emphasis on post-audit by BPKP leaving pre-audit work to PLN's comptroller or internal audit group.

2.48 Of course, simplification of the GOI's procurement procedures will also provide PLN with the needed incentive to streamline its cumbersome internal procurement procedures (see paras. 3.22-23). As a final objective, the GOI should consider the transfer to PLN of full authority and accountability for all of its procurement decisions.

Replacement of Budget Controls by a Program Agreement

2.49 A final area where streamlining is required to enhance PLN's motivation for efficiency and effectiveness relates to the annual budget process and the related supervisory controls. PLN's current budgetary procedures are mechanistic and inefficient, and involve lengthy consultations with the Supervisory Board, the MOF and BAPPENAS. A step-by-step description will provide an appreciation:

- (a) In June of the fiscal year preceding the budget year (which runs April 1-March 31), PLN informs the MOF of its indicative budgetary requirements for the next fiscal year, based on the physical targets of the current Five-year Development Plan (Repelita), in order to receive guidance as to the likely sources and magnitude of funds that will be made available. In recent years PLN has received no guidance at this point other than that the target debt/equity ratio is 40/60, which has already been superseded by events;
- (b) In October, PLN's headquarters issues general budgetary guidelines to its regions, whereupon the regions prepare their respective capital and operating proposals and submit them to headquarters. There is usually no further discussion on these proposals between headquarters and the regions;
- (c) By December, PLN submits its consolidated budget proposal to the Supervisory Board, for the latter's review and endorsement to the MME;
- (d) Between December and March, the Supervisory Board carries out a detailed review of PLN's budget proposal, requiring several meetings with management, during which the Supervisory Board secures explanations and indicates concurrence or recommends amendments on a line by line basis. It is during this budget review process that the tenor of supervision of PLN by the Supervisory Board is set and maintained during the subsequent quarterly review of corporate performance;

- (e) In February, PLN's budget proposal is sent to BAPPENAS and the MOF's Directorate of the Budget for detailed review;
- (f) In March, after the Supervisory Board is satisfied with the budget proposal, the proposal is submitted to the MME for approval, subject to concurrence by the MOF. Usually, the budget is approved by the end of March, for the fiscal year starting April 1; and
- (g) Starting in April, the allocation of the budget is discussed between PLN headquarters and the regions. Normally, regional allocations are finalized and the regional budgets are approved in May.

2.50 Approval by the MME and MOF of the annual budget does not mean that PLN has the funds to spend. In recent years, the implementation of PLN's work program has been seriously hampered by delayed confirmation of funds by the Government. For instance, for fiscal year 1988-89, final confirmation of the funding scheme was obtained by PLN eight months after the start of the budget year. Since procedures for withdrawing the funds require another three months, the funds became available for PLN's use only in December, and PLN's regions were only able to disburse from the funds in January. Accordingly, projects which are funded in one fiscal year are regularly implemented in the following fiscal year (or later) as, by the time funds become available, there are only two months left in the budget year to perform the work.

2.51 The confirmation of funds is particularly slow with respect to local currency counterpart funding of projects. These involve externally-sourced funds such as Japan Eximbank co-financing as well as budgetary transfers from the DIP (development investment fund). Unutilized budget amounts can be reconfirmed for the following year for externally-sourced funds. However, for budget items involving GOI equity contributions from the DIP, the unused allocations revert to the national treasury at year-end and must be reprocessed for inclusion in PLN's budget for the next fiscal year.

2.52 The protracted budget process has resulted in deferral of PLN's projects. The most adversely affected are the distribution projects, as these tend to be the ones with the smallest proportion of external funding. Ironically, these projects are the ones which directly affect and determine service availability to the customers. The dilatory effect of the budget and funding procedures has thus a severe impact on PLN's effectiveness in pursuing its objectives of adding over a million new connections a year, reducing distribution losses and improving service reliability.

2.53 As a result of such cumbersome procedures, it is difficult to hold PLN managers accountable for the fulfillment of the agreed targets in the work program. Certainly, the efficiency and effectiveness with which the targets are met could be substantially improved if PLN's management had a more reliable access to the funds that are needed to carry out the agreed investment program. An approach which the Government should consider for

providing a more reliable financial basis for PLN's expansion, while ensuring that its objectives are met, involves the replacement of the annual budget process by a multi-year program agreement.

2.54 The establishment of a program agreement would provide an opportunity to not only simplify budgetary controls, but also redefine the relationship between the GOI and PLN by pulling together all of the strands of the streamlined regulatory framework discussed above into a single package. This would require a transition period during which the recommended measures have been introduced, evaluated and refined. The guiding principle for the transition would be for the GOI to begin treating PLN as a business. The redefined relationship, which should be as between a business and its owner, would be formalized by means of a program agreement.

2.55 Based on the earlier discussions, the recommended program contract should:

- (a) define the evaluation of corporate performance on the basis of a single efficiency criterion (such as the unit cost of power supply) and no more than five effectiveness measures;
- (b) define the GOI's contribution on the basis of the cost of socially directed activities, with a schedule for phasing out these contributions over time as cost recovery through tariffs can be improved;
- (c) define a cost-based procedure for the periodic and automatic adjustment of the tariff; and
- (d) transfer to PLN full authority and accountability for all financing, procurement, fuel choice and salary decisions.

2.56 The objective is to arrive at a mutually agreed contract under which the GOI would guarantee conditions which would enable PLN to maintain its financial integrity, in exchange for the achievement of agreed social objectives and clear accountability for PLN's performance and efficient management. Such an agreement, which should be valid for a fairly long period (three to five years), would replace the present web of approval and regulatory requirements, and allow the GOI to treat PLN on the same basis as every other business.

2.57 This recommendation is modelled on the format of the program contract which has been implemented since 1970 between the French Government and Electricite de France (EDF) as well as other national companies. The Indonesian situation of very rapid growth, with considerable weaknesses in both the regulatory framework as well as PLN's capabilities, suggest that a transition period would be required before such a contract could be implemented.

2.58 A similar arrangement was implemented in the Philippines, between the Government and the National Power Corporation (NPC), for the 1980-1990 power

program. Because of the unprecedented level of investments involved, NPC initiated a process of Government review of the program to ensure a common understanding and elicit policy and financing support from the Government. The proposal included a specific long term financing plan, including self-financing, through appropriate tariff adjustments, Government contributions and borrowing. After requiring NPC to hold public hearings nation-wide on the program and its ramifications, the Cabinet endorsed the program for the President's approval. The approved contract embodied authorized rate adjustments to allow NPC to earn a minimum rate of return of 8%. The contract also specified the level of Government contribution for the first five years of the program, subject to full phase-out from the sixth year, when NPC's operations were expected to be fully commercial. It is noteworthy that the initiative for such effort came from the power company and the deliberations were based on the detailed proposals from NPC.

III. PREPARING PLN FOR THE FUTURE

Overview of PLN's Operations

3.1 As a complement to the streamlining of the regulatory framework, the improvement of the efficiency and effectiveness of PLN will also require a strengthening of the organization. To identify priorities for strengthening, this chapter begins with an overview of PLN's operations from a regional perspective, focussing on a few problem areas: diesel plant operations, transmission and distribution losses, low electrification intensity, and cumbersome procurement procedures. The discussion then turns from operational problems to possible institutional responses to these problems, including the transformation of PLN's bureaucratic culture, the decentralization of the decisionmaking process, the development of a long term human resources plan, the strengthening of corporate planning and the improvement of customer service.

A Regional Perspective

3.2 For an appreciation of PLN's operations it is necessary to take a look behind PLN's aggregate statistics and search out the wide diversity of PLN's operations in its fifteen operating regions. In undertaking this search it is useful to differentiate between the four regions on Java, which concentrate 6.2 million (70%) of PLN's residential customers and have an electrification ratio of 27% and the eleven regions outside Java, with 2.7 million residential customers and electrification ratios ranging from 24% in North Sumatra to 11% in Irian Jaya. PLN's 1987/88 operating statistics on these regions are summarized in Annex 5.

3.3 On Java, PLN has an integrated power grid, which can take advantage of economies of scale in generation through the use of large coal fired steam power plants for baseload, complemented by large hydro-plants to meet the peak. In addition, Java has a high population density, which results in relatively lower transmission and distribution costs per customer. As a result, PLN's operating cost per kWh sold in Java was only Rp 75 (US\$4.41) in 1987/88. Out of this, the fuel cost was Rp 44 (US\$2.61), the capital cost was Rp 16 (US\$0.92) and the personnel cost was Rp 7 (US\$0.41). Productivity of labor was at a reasonably high level, with about 13,500 employees to serve 6.2 million consumers with a sale of 13,400 GWh. The number of consumers served per employee was 457 and the electricity sales per employee were about 1.0 GWh.

3.4 The operational problems that exist in the Java system primarily relate to the inadequacy of the distribution system, resulting from a lag between demand and supply as well as substandard design, construction, maintenance and operation. These factors result in low reliability of supply and high distribution losses. A second problem area relates to unsatisfactory consumer administration, which results from cumbersome billing and collection procedures. Strengthening PLN's organization in Java will have to address these problems.

3.5 Outside Java, PLN's operating problems are more complex. As shown on Annex 5, in 1987/88, the cost per kWh sold, varied from a high of Rp 218 (US\$12.8) in Aceh (PLN's Region I) to a low of Rp 104 (US\$6.12) in East Kalimantan (PLN's Region VI). The average was Rp 136 (US\$8.0), of which fuel accounted for Rp 75 (US\$4.4), depreciation for Rp 28 (US\$1.6) and personnel for Rp 15 (US\$0.90). Thus all cost categories were higher outside Java than on Java:

- (a) The higher fuel costs resulted from the fact that nearly 62% of generation is by diesel generating units, located in over 640 isolated systems. At ideal operating efficiency, the fuel cost for a diesel generation unit would be about Rp 55-60 (US\$3.2-3.5) per kWh. The higher reported fuel cost arose from three factors: (i) high distribution losses; (ii) operation of diesel sets below their efficient operating capacity; and (iii) unsatisfactory operation and maintenance practices;
- (b) The higher capital cost was a result of two factors: (i) the scattered nature of small power systems, which results in greater capacity requirement for a given demand; and (ii) low intensity of electrification. Also contributing to the problem are the planning criteria and mismatches between peak load and unit sizes; and
- (c) The higher personnel costs are partly a result of the small and scattered systems. The number of consumers served per employee outside Java was only 163 and the units sold per employee was only 0.2 GWh., which were only 35% and 20% respectively, of the corresponding figures for Java.

3.6 To illustrate the nature of the operational problems mentioned above, it is useful at this point to take a closer look at several problem areas where there is significant potential for efficiency improvement: diesel plant operations, transmission and distribution losses, low electrification intensity and procurement procedures. For the sake of convenience the illustrations will be drawn from Region VIII (South and Southeast Sulawesi) of PLN, which the Bank mission visited. The problems, however, are similar in most regions.

Diesel Plant Operations

3.7 A first problem area that has significant impact on PLN's overall efficiency relates to the operation and maintenance of diesel plants. A specific example which illustrates the type of problems encountered pertains to the Tello power station in Ujung Pandang in South Sulawesi.

3.8 The Tello power station has an installed capacity of 122 MW, including: steam plant - 25 MW with fuel consumption of about 0.48 liters per kWh; gas turbines - 56 MW with fuel consumption of about 0.51 liters per kWh; old diesel - 5.7 MW with fuel consumption of about 0.3 liters per kWh; and new diesel - 25 MW with fuel consumption of 0.22 liters per kWh. In February 1989, the available capacity was only 82 MW. Out of the 82 MW, the

most efficient units, i.e. the two new diesel units of 12.5 MW each, were derated to 11 MW and 9.5 MW respectively. One set was available only for 6 hours per day, since its overhaul was long overdue. This situation had prevailed for more than one year. PLN expected that an overhaul of the two new diesel units could restore their capacity.

3.9 The loss of generation due to the derating and restriction of capacity of the new diesel units was about 5.0-6.0 GWh per month. Considering the differential of about 0.26 liters of fuel per kWh between these sets and the older plants, the additional fuel costs incurred at this station amounted to about Rp 260-310 million (\$153,000-\$182,000) per month. Against this the cost of the overhaul would be about \$300,000.

3.10 The reason for the delay in the overhaul was described as procedural. According to regulations, bids have to be invited from 10 local bidders for the spare parts (e.g., piston rings) needed for the overhaul. Also, a minimum of three bids have to be received. When tendering was carried out for the first time, only one bid was received and hence it was necessary to retender. As of February 1989, the retendering process was still under way.

3.11 The above example serves to illustrate the nature of the problems associated with an institutional culture where following correct procedure is assigned greater value than cost saving. Without going further, it seems as if about \$2 million in additional fuel costs had already been incurred as a result of procedural delays associated with the purchase of about \$50,000 worth of spare parts.

3.12 This case does not appear to be an isolated one, as similar problems are reported in many of the 640 diesel generating stations (with a total capacity of over 1500 MW), that PLN operates. These diesel plants are of different sizes and come from over 50 different manufacturers. More than 7000 of PLN's employees outside Java are involved in their operation and maintenance. Improving the quality of this staff; as well as streamlining the system for procuring and stocking spare-parts; preparing instruction manuals for operation and maintenance in Bahasa Indonesia, so that staff can understand them; rehabilitating selected diesel plants to recover derated capacity, and better matching between demand and supply capacity to improve the capacity utilization, are some of the priority areas that need attention from regional managers as well as from the Head Office support staff. PLN has formulated a plan of action for these improvements that will be funded from the Bank's Power Sector Efficiency Project, cofinanced by the Government of the Netherlands.

Transmission and Distribution Losses

3.13 A second problem area, which has significant impact on PLN's overall efficiency, relates to transmission and distribution (T&D) losses. At present, the reduction of T&D losses is a high priority, and constitute an important performance indicator. The T&D losses in Indonesia are estimated to be about 18.0% in FY 1988/89. The planned targets for T&D losses for the next five years are shown in Table 3.1.

TABLE 3.1: PLANNED TARGETS FOR TRANSMISSION AND DISTRIBUTION LOSSES
(%)

<u>Year</u>	<u>Java</u>	<u>Outside Java</u>	<u>Total</u>
1989/90	16.6	16.8	16.7
1990/91	16.1	16.3	16.2
1991/92	15.7	15.8	15.7
1992/93	15.2	15.4	15.2
1993/94	14.7	14.9	14.8

Source: PLN

3.14 PLN divides T&D losses into two components: technical and non-technical. The "technical" losses are those that would occur if the network was constructed, maintained and operated in accordance with the design specifications. The "non-technical" losses are the rest, and they include the consequences of unsatisfactory construction; inadequate maintenance; non-optimal operation; unsatisfactory metering, billing and collection practices; and theft.^{20/} A current estimate of non-technical (non-design) losses in PLN is about 5.0-6.0%.

3.15 One of the causes of the "non-technical" losses is the poor quality of construction of the distribution network, mainly carried out by local contractors. In South Sulawesi, the Regional Manager estimated that about 3% out of total T&D losses of 18.8% arose from this factor. The institutional implications of this are that: (a) PLN needs to be more selective in the award of construction contracts and needs to be actively involved in the training of the contractors; and (b) PLN needs to improve its capacity for supervision and quality control of the contractors' work.

3.16 Another significant factor contributing to the "non-technical" losses is the inadequate quality of staff assigned to the operation of distribution facilities. Key personnel involved with the operation and maintenance of the distribution facilities have to be familiar with the characteristics of the equipment, the design philosophy, and modern techniques. Under the current organization, the head of a PLN branch (cabang) having responsibility for, say, 150,000 consumers, would be in grade III-D (university graduate) and would be supported by subbranch (ranting) heads who may be in grade II-C (high

^{20/} In this context, a more appropriate terminology would be design-losses and non-design losses, since a significant portion of the non-design losses (currently called non-technical) have technical causes.

school graduates).^{21/} Consequently, there is a growing gap between the sophistication of the equipment and facilities that are being installed and the capability of the personnel available to operate and maintain them. To address this problem, PLN needs to upgrade the quality and the training of staff assigned to distribution. Also, the rank of branch manager and the staff managing distribution have to be elevated to be consistent with this level of expertise and responsibility.

3.17 Contributing to the difficulty in reducing T&D losses is the lack of correlation between the priority assigned to this task and budgetary priorities. For example, in Ujung Pandang, infrastructure for changing the distribution voltage from 12 kV to 20 kV has been installed at a cost of several million dollars, but the actual changeover, expected to cost about Rp 3.0 billion, has been deferred by over one year due to lack of budget. Similarly, long delays in the installation of materials for loss reduction, costing millions of dollars, have taken place. Large quantities of such materials are in PLN's warehouses awaiting the provision of the Rupiah budget for their installation. To improve its efficiency, PLN needs to give explicit priority in the budget process to its high priority activities, which are presumably those that will bring the highest financial benefits.

3.18 Examples can also be quoted on the other hand, to demonstrate that financial allocations for loss reduction are made in the budget that are disproportionate compared to the expected benefit. For example, the budget proposal for FY 1989/90, the "non-technical" loss reduction program, was as shown in Table 3.2.

Table 3.2: PLN's Non-Technical Loss Reduction Program, 1989/90

<u>Area of Improvement</u>	<u>Proposed Investment</u> (Rp. Billion)	<u>Expected Loss Reduction</u> (%)	<u>Annual Cost Savings</u> (Rp. Billion)
Potential transformer stations	7.35	0.54	14.55
Current transformer stations	17.62	0.07	1.89
Three-phase meters	11.41	0.04	1.08
Single-phase meters	30.95	0.05	1.35
<u>Total</u>	<u>67.33</u>	<u>0.70</u>	<u>18.87</u>

Source: PLN

^{21/} Note: Grade I - Workers, skilled and semi-skilled.
 Grade II - Mid- to Semi-Supervisory staff.
 Grade III - Supervisors to Lower Managers.
 Grade IV - Middle and Senior Managers.

3.19 Although one might justify an investment of Rp 67.33 billion to reduce T&D losses by 0.70%, equivalent to annual cost savings of Rp.18.9 billion, one hardly would justify an expenditure of Rp 30.95 billion for calibrating (about 619,000) single phase meters to reduce losses by 0.05%, since the benefit would amount to just Rp 1.3 billion per year. This emphasizes the need for PLN to carry out financial analysis of all investment proposals.

Low Electrification Intensity

3.20 PLN is under strong pressure to maximize the number of electrified villages. As a result, the designated targets in this regard are pursued even at the cost of not connecting new customers in areas where infrastructure is already available. For example, in the city of Ujung Pandang, about 120,000 of a total of 240,000 households have supply from PLN. Thousands of consumers are on the waiting list for supply and are willing to pay the connection charges. However, since the connection charge (an average of Rp 43,500 per household) covers only about 60% of the connection cost to PLN (about Rp. 75,000 per household), the regional manager cannot connect them unless he receives the budget allocation for this purpose. However, the budget allocation is designated for extension of supply to new villages. As a result, waiting lists remain long and provide people with a strong incentive to purchase electricity from neighbors, with detrimental effects on the rate of capacity utilization of the existing network and on PLN revenue (when electricity is sold illegally between neighbors, sales are constrained by the limited capacity of existing connections).

3.21 An increase in the intensity of electrification would achieve a significant improvement in PLN's efficiency by spreading the capital costs associated with an infrastructure investment over a wider sales base. Such an intensification can be achieved by strengthening the capability in the Regional offices to: (a) prepare development plans that are based on technical, economic and financial analysis of alternatives; and (b) achieve greater coordination between various developmental activities that promote productive uses of electricity during daylight hours, to improve the load factor. Strengthening of these functions at the regions is, therefore, a priority. Recently, PLN has initiated actions in this direction by establishing planning and commercial functions in the regions, but the effort has still not begun to bear fruit because of the lack of trained manpower and a lack of clarity in the regions' mandate in respect of these functions. It is important to convey to the regions that their success will be judged by their ability to improve the productivity of capital, fuel and human resources and reduce the cost per kWh in real terms.

Cumbersome Procurement Procedures

3.22 Possibly contrary to the impression conveyed in the discussion of the regulatory framework (paras. 2.43-46) not all procurement delays are the result of Government regulations. For every procurement tender, PLN takes several months to finalize an evaluation report, even after consultants have completed the technical evaluation. For every evaluation, a committee with ten members is required to certify that the evaluation is satisfactory. In

each instance (over 200 in a year), the committee is chaired by the Chief of the Procurement Division of the Construction Directorate. For every recommendation for contract award forwarded to PLN's Board of Directors, the Chief of Procurement and the Director of Construction are required to sign a letter undertaking personal responsibility for the correctness of the recommendations. Even after the successful tenderer has been selected and approved, the letter of intent for the award of the contract is so worded as to avoid any liability on the part of PLN or any responsibility on the part of the contractor. When the contract is signed, its effectiveness is conditional on several subsequent approvals. As a consequence, PLN often lands in situations where contractors are not bound by the tender conditions and can claim additional costs. In an efficient procurement procedure, the award of a contract should take no more than 90 to 120 days after the opening of the bids.

3.23 The appointment of consultants is an even more leisurely process. PLN has a list of 27 steps from the preparation of the terms of reference to sending the signed contract to BAPPENAS for approval (Annex 7). The standard elapsed time for completing these steps is 11.5 months. Even in urgent cases, it is rarely possible to reduce this time, since compliance with procedures take precedence over the urgency of the task. A specific example relates to the appointment of a firm of accountants to help PLN's accounts department to improve the quality of its work. The need was identified as urgent late in 1987; a consulting firm was still unselected as of March, 1989. The main hurdle has been the procedure which requires that at least six bids should be received for such an assignment, whereas PLN had succeeded in receiving only five bids.

Approaches to Organizational Development

3.24 Given the above overview of PLN's operations, it is evident that there is a wide range of areas where institutional response is required to improve PLN's efficiency and effectiveness. On the basis of the mission's review of PLN's organizational requirements, five general areas were identified where improvement is needed:

- (a) transformation of the corporate culture;
- (b) decentralization of operations;
- (c) human resource development;
- (d) corporate planning; and
- (e) customer service.

Transformation of the Corporate Culture

3.25 PLN's corporate culture still reflects many of the characteristics of a bureaucratic environment. Such characteristics include: (i) a reluctance to define clearly the responsibility and accountability of different levels, groups and individuals; (ii) a general desire to perpetuate consensus, shared responsibility, and consequent dilution of accountability; (iii) a tendency to equate efficiency with the ability to formulate and implement procedures rather than to achieve results; and (iv) a preference to evaluate proposals on the basis on the seniority of the proponent, rather than on (technical) merits. Not all of these attributes are inherently bad and, indeed, some of them contribute to organizational harmony and well-being. Steps have to be taken however, to ensure that they do not take a toll of the efficiency of the organization. There are some indications that this is happening to a growing extent.

3.26 The transformation of PLN's culture from a bureaucratic to a more entrepreneurial orientation is unlikely to be easy, and will need to be signalled through a series of changes that will have to affect all levels of the organization. The underlying principle for those changes is the need to introduce and implement an "accountability hierarchy", starting from the Directors and extending to the lowest level. This will require first a clear definition of the concept of accountability, which should encompass accountability for the cost, quality and timeliness of the task. This concept needs to be reflected in all procedures and steps introduced to ensure quality control or management supervision, which must be so designed as not to dilute the responsibility and accountability of the group or individual that is responsible for the task.

Creating Clear Lines of Responsibility

3.27 Once the concept of accountability has been clarified, the next step is to reflect the accountability hierarchy in a chain of command. This will require a change in the current structures of both headquarters and regional managements. Under the current structure, there are eleven regional managers outside Java, seven operating units in Java, twelve project construction managers and four central staff unit managers, all of whom report directly to the Board of Directors as an entity, but not to any member of the Board in a line capacity. All decisions are handed out to middle managers in the name of the Board of Directors, who have collective responsibility. One consequence is that the Board of Directors is continually in session discussing all aspects of the enterprise, with only limited interaction between the Directors and the regions. The other consequence is that the span of control of the Board is so large that decisions are difficult to reach and to communicate, with the attendant implications for efficiency and effectiveness.

3.28 The solution to this organizational problem lies in assigning line responsibilities to specific Directors and reducing the number of units that report to them. The essential principle would be to have a clear chain of command and a manageable span of control. Further, to achieve the desired

improvements in motivation and initiative, such measures need to be associated with a large degree of decentralization and delegation of authority to the operating units. Although the design of a structure to achieve these objectives will require further study, specific options that should be considered include:

- (a) assignment of line responsibility for the twelve project construction units and the Engineering Services Center to the Director of Construction. This would simply clarify and formalize an existing informal reporting pattern;
- (b) the assignment of line responsibility for the central staff units to specific Directors, as appropriate; and
- (c) the assignment of line responsibility for all operating units to the Director of Operations;

3.29 Another option that should be considered is the addition of a new Director for Generation. In addition to reducing the span of control of the Director of Operations, it would be appropriate to gather all the large generating stations under a single group as the technical and managerial skills required for running large power stations are significantly different from those required for operating small diesel units and the transmission/distribution system. Such a split exists in Java to some extent and, with the coming on stream of large power stations outside Java, it would be appropriate to extend it there. This would enable the regional managers to devote greater attention to interfacing with consumers and improving the quality of supply.

3.30 The same principle of clarifying the chain of command needs to be applied to management at the regional level. At present, regional management is organized along similar lines as PLN's Head Office (Annex 2). The Regional Manager is assisted by four deputies viz., (i) Operations; (ii) Construction; (iii) Finance; and (iv) Personnel and Administration. The deputies assist the Regional Manager in discharging his functions but do not have line responsibility. In South Sulawesi, in addition to the four deputy managers, twelve other executives report to the Regional Manager. They are: (i) the Head of Internal Control; (ii) seven branch managers; (iii) the Chiefs of Ujung Pandang Distribution Control Center and the Load Dispatch Center; and (iv) the Heads of special units such as the Tello thermal plant and the Bakaru hydro plant.

3.31 In practice, informal reporting relations do develop. For example, the Branch Managers report to the Deputy Manager for Operations for all technical matters, to the Deputy Manager for Finance for financial matters, and to the Deputy for Administration for personnel matters. Even if the informal chain of command works well, the organizational concept is not conducive to quick and efficient response to the operating problems and certainly dilutes the accountability for performance. Therefore, serious consideration should be given to introducing a clear concept of line and staff responsibility in the regional organization.

Strengthening the Budgetary Process

3.32 As a complement to the introduction of a clear concept of line and staff responsibility, PLN management will also require a tool to create accountability at the operating level. This points to the need to reform the budgetary process as a means to decentralize responsibility and transfer accountability.

3.33 As has already been discussed (see paras 2.48-50) PLN's budgetary process is mechanistic and inefficient, and makes it difficult to hold regional managers accountable for not fulfilling the targets in the work plan; notwithstanding the fact that there is little interaction between regional managers and the budget officials at headquarters in formulating the targets and relating them to corporate objectives. Strengthening the budgetary process would involve the use of the regional budget proposals to reach an agreement on the corporate targets and provision of resources between the regional managers and the PLN Head Office, in the first step, and then providing resources in time to the regional managers to implement the agreed work plan. A recommended long term objective for this process would be the establishment of annual program contracts between headquarters and the regions, along the same lines as those proposed between the GOI and PLN.

Decentralization of Operations

3.34 In addition to transforming the corporate culture, the improvement of PLN's efficiency and effectiveness will also require a shortening of the administrative and physical distances between the decisionmakers and the site of the action (i.e. the customers and the power supply system). While most of PLN's emerging problems appear to be located in its operating units, a large portion of PLN's high level staff is concentrated at headquarters, where they are poorly placed to address these problems effectively. The growing size of PLN, and the increasing importance of addressing problems where and when they occur, will require a move towards greater decentralization and delegation of decisionmaking, i.e. the transfer of responsibility and accountability for decisions to the regional operating level.

3.35 One option that is being considered in this regard is the division of PLN into two or more separate entities. This option has some merit in the context of the current regulatory framework which, on one hand, subjects PLN to many layers of external intervention and review and, on the other, centralizes all control within PLN in the Board of Directors, with the attendant limited ability to respond effectively to regional and local requirements (e.g. Tello power plant and Ujung Padang waitlist).^{22/} With the proposed delegation of greater responsibility and autonomy to PLN, and the introduction of clear lines of responsibility down to the regional levels, the inflexibility that is currently perceived will have been largely overcome.

3.36 In addition to considerations of responsiveness, PLN's current unified system allows a number of interregional transfers that would be difficult to replicate amongst separate entities. The most important of these

^{22/} See paras. 3.8-11 and 3.64-65.

is the routine transfer of trained and qualified personnel , which allows PLN to operate and maintain about 650 separate systems to a reasonable technical standard. Although these standards deserve improvement, it is doubtful that, with the existing scarcity of experienced management and technical staff, this could be achieved by splitting up the available technical personnel among separate entities. There is also the question of the transfer of financial resources, both for operating and investment purposes, from the more profitable areas of operation (such as Java) to the less profitable or loss-making regions. If these PLN-internal cross-subsidies were removed, the preservation of the financial integrity of the deficit regions would require substantive tariff increases or regular operating subsidies from the GOI. A final consideration are the costs associated with an abrupt reorganization, which could tie up PLN's scarce managerial resources for several years and affect staff motivation. All this would be occurring at a time of rapid expansion, the efficient and timely implementation of which is a high national priority.

3.37 On balance, the advantage would seem to favor a more gradual program of decentralization, under which autonomy and responsibility for decisionmaking would progressively be handed over to regional and branch management as appropriate, in parallel with an effort to strengthen regional and branch capabilities to assume these responsibilities.

Java

3.38 On Java, PLN's distribution functions are divided among four regional managers, each reporting to the Board of Directors. This organizational arrangement needs to be strengthened in respect of commercial and financial responsibility, planning, consumer administration and accounting functions. The guiding principle should be to treat each of the distribution areas as a reasonably autonomous ^{23/} entity with responsibility for (i) paying for the bulk purchase of energy; (ii) planning and implementing its expansion plans; (iii) reliability of service and consumer relations; (iv) billing and consumer administration; and (v) productivity and profitability improvements. Gradually, the relationship between these entities and PLN's Board, should evolve in a manner similar to that between PLN and the Government. (i.e., PLN's Board would approve the budget and a program contract for each entity annually and leave the entity managers free to implement these plans, and be responsible and accountable for the performance.) PLN's Head Office could centrally provide certain specialized services, such as data processing, financial management, training, design and engineering and management information support. Progressively, a system could be evolved by which each region would have transparent accounting of the costs of the services it receives, so that PLN could determine if such services are being rendered in a cost effective manner.

^{23/} I.e., units enjoying increased managerial independence for decisionmaking within broad policies determined by the Board of Directors and constrained by PLN technical, accounting and other standards.

3.39 The generation and transmission facilities on Java are divided among three organizations: Generation and Transmission for West and Central Java, Generation and Transmission for East Java, and the Load Dispatch Center. In view of the recently completed physical integration of the system, a good justification exists for combining these organizations. This entity should have complete responsibility for planning, construction, operation and maintenance of all generating and transmission facilities at voltages of 150 kV and above. It should charge a uniform bulk energy rate to the four distribution areas, as well as to Bali, which is connected with the Java system. This organization should have responsibility for implementing a least cost generation expansion plan in Java to meet the demand targets approved by PLN's Board and the Government. It should be obliged to improve the efficiency of the operations and minimize the cost of bulk energy delivered to the distribution units. Once again, certain central services of PLN could assist the Java generation and transmission entity, for planning, design, engineering, construction, financial planning, accounting and other functions.

3.40 In substance, the above concept would result in the creation of five reasonably autonomous operating units in Java, each of which would be responsible and accountable for the management and performance of functions within its control, without the dilution that currently takes place due to diffused lines of responsibility and accountability. When sufficient progress is made in realizing this concept over a period of, say, five years, the GOI should review the desirability of transforming these units into independent companies. Those of the companies that are working efficiently and profitably, could later become candidates for privatization, if that is the direction desired by the Government.

Outside Java

3.41 The size and sophistication of the regional power systems outside Java have not yet reached a stage when the Java model could be followed. There will be a continued need for many years to maintain the generation, transmission and distribution functions under the same management. Also, the organization, skill mix and quality of available staff in the regional offices is still far below those required for the introduction of the degree of autonomy proposed for Java operations. The priority, therefore, will be to strengthen these organizations to a point where autonomy could be implemented. This is not to suggest that areas do not exist even now, such as budgeting and training, where the regions would not benefit by greater autonomy.

3.42 The need for strengthening the regional organizations can be illustrated with the example of the South Sulawesi region. In 1988/89, this region had a total permanent staff of 2,014 persons, composed of 2 in Grade IV, 78 in Grade III, 710 in Grade II and 958 in Grade I. Of these, 34 were engineers, 15 administrative graduates and 65 had semi-academic (diploma) qualifications. Therefore, the ratio of academically trained staff to the total was 5.7%. This is low, if the regional management is to perform the variety of technical and managerial functions that are necessary, as discussed in earlier paragraphs. The ratio would rise to 10% or more for a satisfactory organization. For example, in a developed country, a utility serving the same number of consumers will probably have 15-20% of its staff in the academically trained category.

Human Resources Development

3.43 One of the major challenges facing PLN lies in the need to develop its human resources to face the increasingly difficult task of managing its power supply facilities. Currently, PLN employs about 52,000 persons, of which about 37,000 are permanent, the balance being largely temporary construction workers (see Table 3.3). Criticism has often focussed on the large number of employees, but the most important problem with PLN's workforce relates to quantity as to its adequacy for PLN's requirements. Rapid growth and increasing technical sophistication will require substantial adjustments in the skill mix and technical capabilities of PLN's staff. The successful preparation for these changes will require the formulation and implementation of a long term human resources development plan, the strengthening of PLN's training efforts, and improvements in salaries and compensation.

TABLE 3.3: PLN PERSONNEL, BY GRADE CATEGORIES, 1988

<u>Category</u>	<u>Number</u>
<u>I. Permanent</u>	
Grade I: skilled and semiskilled workers	12,487
Grade II: low- to mid-supervisory staff	20,815
Grade III: supervisors to lower managers	3,161
Grade IV: middle to senior managers	220
<u>Subtotal</u>	<u>36,683</u>
<u>II. Non-Permanent</u>	14,520
<u>Total</u>	<u>51,203</u>

Source: PLN

The Need for Human Resources Planning

3.44 PLN's workforce includes only 2,188 university graduates, of which 1,655 are graduates in technical areas. The percentage of university trained personnel in the total staff is 4.3%, which is low for an electricity utility. The ratio would be 10-15% in developed countries. PLN is able to manage its affairs with such a low proportion of academically trained staff because: (a) it entrusts a lot of its high skill activities to foreign consultants; (b) it entrusts almost all its construction activities to contractors; and (c) it neglects many high skill functions needed in the regions (e.g., detailed planning, consumer relations, etc.). The implications for efficiency and effectiveness of the shortage of technical personnel are

evident in the poor performance of PLN's generating stations (diesel and thermal), poor quality control of construction and low reliability of supply in distribution.

3.45 Of particular concern is the fact that of the total number of technical graduates, nearly 60% have been recruited since 1981/82 and have less than seven years of experience. Of the remainder, no more than 200 have more than twenty years of experience. Thus, a substantial number of the more experienced senior technical and managerial staff will be retiring in the next five years. In view of the emerging shortfall in senior staff, training of suitable replacements is urgent. Also, arrangements need to be considered to retain selected senior staff after the mandatory retirement age (of 56) until such time as qualified replacements are available.

3.46 Increasing the number of academically trained personnel should be carried out through recruitment, and followed up by providing assignments and training to the new entrants over a period of five years to make them fully productive utility employees. Recruitment of university graduates progressed at a rate of about 200 per year from 1981/82 to 1985/86, when their number in the staff grew from 913 to 2003, but a matter of some concern is the slowdown in subsequent years when a virtual hiring freeze was in effect. This trend has to be reversed, so that lack of trained manpower will not constrain future growth. In particular, PLN needs to put together a long term human resource development plan, including future skill mix requirements and targeted recruitment, training and career development plans to meet these requirements.

3.47 PLN's workforce also includes 2,092 semi-academic (three-year college or its equivalent) diploma holders, of whom 1,362 are technical and 730 are non-technical. This workforce provides the backbone of middle level supervisors and lower level managers, and needs the same degree of attention to recruitment, training and career development planning as the university graduates. So far, PLN has no well-designed program in place for training university graduates or semi-academic diploma holders. To remedy this deficiency, this group of staff also needs to be covered in the proposed long term human resource development plan.

3.48 One third of PLN's permanent workforce consists of semi-skilled or low-skilled employees. In recent years, their recruitment has also been frozen, and PLN has met the requirements of its rapidly growing system thorough an extensive program of contracting out customer administration, construction and other services, at some savings in overall costs. In addition to further extending the transfer of services to contractors, continued improvements in efficiency will require PLN to plan its technology, systems and procedures in such a way as to reduce the need for a large number of semi-skilled or low-skilled persons. Discussions in para. 3.64-65 will show how nearly 200 persons in the Ujung Pandang branch office were employed in non-productive endeavors due to cumbersome billing and consumer disconnection procedures. Similar instances can be found in many operations and maintenance activities. For example, cleaning staff in power stations and substations can be considerably reduced if buildings have air filtration and circulation systems or if industrial vacuum cleaners are used for dust removal. The essential objective, whose achievement would be monitored through the total cost per unit indicator, should be to ensure that in the new facilities that

are constructed, the new systems and procedures that are introduced and the new equipment that is purchased for operation and maintenance, take due cognizance of the options to reduce the requirements of semi- or un-skilled workforce.

3.49 In regard to PLN's non-permanent staff, a large proportion is associated with construction activities. As the pace of growth begins to decline over the next five years, some portion of this work force will be absorbed in the operation and maintenance activities. Therefore, the non-permanent employees should be regarded as a pool of workers receiving training through construction activities for possible absorption in the permanent pool for operation and maintenance. PLN needs to take this into account in its human resource development planning, which should also cover the non-permanent staff, with the objective of training at least some of them for specific functions of PLN's permanent staff.

Training

3.50 The formulation of PLN's long-term human resources development plan will provide a concrete basis for the needed strengthening of PLN's training efforts. PLN already runs a large number of training centers (PUSDIKLAT), mainly geared towards preparing the staff needed at semi-skilled and skilled levels for operation, maintenance and construction of power supply facilities. Areas have already been identified for reinforcing these training facilities, which include operation and maintenance of thermal power plants, diesel plants and distribution facilities. There is a need to accelerate this effort to ensure that thousands of PLN's staff employed in the operation of diesel power plants and distribution facilities are adequately trained to perform their functions. The current program, which provides training to about 1200-1500 of PLN staff each year through PUSDIKLAT is too small for the needs of PLN. Also the program has to be augmented to include high skill and supervisory staff.

3.51 It is evident that considerable additional resources will have to be devoted to the training of low-skilled staff into higher skill levels, recently graduated diploma holders into supervisory staff, and recent university graduates into management staff. Currently, PLN spends only about 0.25% of its revenues on training. This level is inadequate to meet the need for improved quality and quantity of training. As an example EDF (in France) devotes about 2% of its revenue for staff training.^{24/}

3.52 Since the training of the staff is one of the most important activities that needs to be strengthened, consideration should also be given to providing regional managers greater freedom to organize and implement the training program for their staff, with or without the help of the PUSDIKLAT managed by the Head office. Regional managers are acutely aware of the need for increased training efforts but are frustrated by the lack of adequate support from the PUSDIKLAT .

^{24/} This figure includes the salaries of staff during their training period.

Salary and Compensation

3.53 A final concern in relation to PLN's human resources is the inadequacy of both the level and structure of the compensation package available to technical staff. As employment opportunities in the private sector improve, PLN will face increasing difficulty attracting high quality technical graduates and skilled staff. Even now, it cannot recruit the best technical graduates, but only "middle" quality ones. This could lead to a troublesome situation for an enterprise of the technical sophistication of PLN. It indicates the need for a detailed review and reform of PLN's salary structure and reward system to enable it to attract and retain the high quality of staff that it needs to operate and expand in an efficient and effective manner.

Corporate Planning

3.54 One of the factors affecting PLN's effectiveness and efficiency is the inadequate coordination and integration between PLN's system planning, financial planning, operational planning, human resources development, budgeting, and other short- and long term planning functions, both at headquarters and in the regions. In the absence of integrated planning, and the accompanying dearth of accurate and timely information, PLN's management is continually in a position of having to make decisions with only partial (and, frequently, inaccurate) information, and without benefit of more comprehensive evaluations of the implications of alternative options on PLN's performance in regard to financial, physical and other objectives. This makes it very difficult to manage an enterprise of PLN's size and complexity.

3.55 The objective of corporate planning is to provide the framework and the discipline that will be required for the coordination of the whole range of planning activities within an enterprise, including their preparation, approval and the regular evaluation of their implementation. For the specific case of PLN, corporate planning would provide the much needed linkage between the objectives required by the Government, the long range system expansion plan, a long run financing plan, and the annual work plan and budget. It would provide an opportunity for defining policy directions and making corporate decisions. It would also serve as a tool for PLN to clarify and work out with the GOI the tradeoffs between the achievement of the various developmental objectives and the means for achieving them, including sources of finance, tariff adjustments and performance targets.

3.56 In view of the potential value of corporate planning, PLN has recently begun to develop this activity. Initial steps have included the establishment of planning units in the functional directorates and in the regions, the hiring of consultants, and the initial development of an MIS system. For corporate planning to achieve its full potential, these initial efforts will have to be strengthened in several respects: (i) the quality and level of responsibility of corporate planning staff, (ii) the extent of management involvement, (iii) the development of a long term financing plan, (iv) the quality and level of responsibility of financial planning staff, and (v) the improvement of the management information system. These areas are discussed below.

3.57 The most critical element for the success of PLN's corporate planning process will be the more prominent and active involvement of its senior management. This involvement should not be limited to merely receiving plans submitted by the staff. Although directors may be averse to formally engaging in the strategic planning process, their contribution is important to clarify the corporate objectives and priorities and for the formulation of possible options for pursuing them, as well as for ensuring that plans are properly implemented and the resources necessary for success are available.

3.58 A second critical element for the development of a successful corporate plan is a well-formulated financial plan. Since electric utility operations involve capital-intensive and long-gestation projects, long-term financial planning has to be performed to ensure that sufficient funds are available to implement the program. The financial plan should embody the targeted levels of revenues, debt and equity contribution, indicating the progressive steps to achieving them as well as present implications of alternative funding structures. For instance, faced with an increasing tendency of budgetary curtailment, the financial plan should establish which activities and projects would be cut back under various levels of funding shortfalls. In this manner, management and the government can be amply forewarned of the consequences of funding limitations.

3.59 The enhancement of PLN's corporate planning functions will also require improvements in both the capability and level of responsibility of the corporate planning and financial planning staff. To be effective, the staff will need to become familiar with modern planning techniques and procedures, such as modelling and the use of scenario analyses, to aid management decisionmaking and the evaluation of future strategies. They also need to develop a capacity to translate corporate objectives into action programs, and to monitor and evaluate results in order to measure performance. In the case of the regional units, an upgrading of the planning function would be desirable, to enable the unit to bear effectively the responsibility for coordinating and integrating the operational, financial and administrative plans of the regional offices.

3.60 Finally, corporate planning could serve also as the cornerstone of the proposed program contracts between PLN headquarters and the regions, and between PLN and the Government. In such a role, it is a tool that should elicit the commitment and accountability from all PLN personnel. Accordingly, the corporate plan document should reflect the basic commitments of management as clearly and concisely as possible for everyone's ease of understanding and set the general tone for performance evaluation. Individual annual operational plans or program contracts with the regions should be based on the corporate plan. Likewise, the corporate plan can serve as the basis for forging agreement with the Government on what is expected of PLN management and, in turn, the level of financial and policy support to be committed to by the Government.

Customer Service

3.61 The improvement of PLN's customer service is one major areas that deserves attention as part of a program to enhance the efficiency and especially the effectiveness of PLN. The mission's observations in regard to the construction and management of distribution lines and the operation and maintenance of diesel power plants are consistent with the general impression that PLN's service falls short of the requirement of the industrial sector as well as the expectations of the public. To develop an approach to the resolution of this problem, this section will discuss three areas of customer service where improvement is needed: customer administration, technical service and public relations.

Consumer Administration

3.62 A discussion of the function associated with consumer connection, billing and collection procedures, which absorb a substantial proportion of staff, would provide an appreciation of the scope for efficiency improvements through strengthening the autonomy and capacity of PLN's regional offices.

3.63 Consumer Connection: About 1.2 million new consumers are added to PLN's supply each year. This is a major and important activity since the effectiveness of PLN is judged by the number of new consumers it is able to connect. Other performance indicators are willingly sacrificed in the pursuit of this goal. Even during years of acute budgetary constraints, when investments in distribution facilities and construction of distribution lines and substations fell short by as much as 30 to 50% of the target, consumer connection targets have been achieved or exceeded by all regions. Predictably, a price has been paid in terms of poor quality of construction, lower reliability of supply, and higher losses. The stage has now been reached when an integrated approach is required in implementing distribution expansion to achieve a balance between the number of consumer connections and construction quality, detailed planning and design, and maintenance and operation. Delegating full responsibility to regional managers for all these aspects of distribution and providing them fiscal and human resources to achieve the objectives is the only practical solution.

3.64 Billing and Collection: PLN's system of billing and collection is cumbersome and requires simplification. This can be illustrated with the example of the South Sulawesi region, where the total number of consumers is about 364,000 consisting of 828 - industrial, 12,930 - commercial, 3,547 - Government, 160 - street lighting, 9,719 - social and a balance of about 337,000 residential. Out of the residential consumers, about 306,000 belong to the lowest tariff category R1, with a connected load of less than 500 VA. Consumer meters are read every month, mainly by contractors who charge Rp 40 per consumer. Based on meter readings, bills are prepared by the branch office and sent to sub-branches and designated payment points. Consumers are required to go to the payment points, find their bill amount and make payment by the 20th of each month. All bills not paid by that date are returned to the branch office, which is the only place authorized to receive delayed payments.

3.65 An average of about one third of the bills, mainly for residential consumers in R1 category, are returned for nonpayment. The average monthly bill for such consumers is about Rp 5000. In Ujung Pandang, about 20,000 of the 140,000 bills are returned every month for nonpayment on time. Delinquent consumers are required to be disconnected. However, the staff required for doing so would be so large as to make it impractical. Therefore, in Ujung Pandang, about 4,000 consumers are disconnected each month. On disconnection, most of the consumers pay the bill, a penalty of Rp 1000 and a reconnection charge, also of Rp 1000. On average, only about 100 out of 4000 consumers remain delinquent. The process involving billing, disconnection and reconnection keeps about 200 PLN staff busy at the branch office (70% of the total staff) throughout the month. The cost of this activity has not been calculated, but it is unlikely that the delayed payment penalty and the reconnection charge are adequate to cover the costs.

3.66 On the basis of the above situation, which the mission also encountered in Jakarta, and which appears to be representative, four cost saving simplifications suggest themselves:

- (a) consumers should be informed of their bill amount at the time of the meter reading;
- (b) consumers should have the flexibility to make payment by mail, by money order or by a check to any of the payment points;
- (c) the delayed payment charge should be graded to impose only a small penalty (say 10% of the bill) for a delay up to one week;
- (d) meter readings for residential consumers in the R1 category should be taken only once every 3 months, with monthly bills estimated as one third of the three months' bill.

Such simplifications should release many branch staff members for more productive tasks, and would improve consumer service.

Technical Service

3.67 Another area where PLN's service requires improvement is in the reliability of power supply. Spot checks with a few customers carried out by the mission confirm other indications that inadequate reliability is often the decisive factor leading to investments in captive generation. Although there is no statistically reliable information on outages, voltage fluctuations and other service disruptions, the mission's check indicates a frequency of about 10-15 outages per year in the Jakarta area. The duration of interruptions varied from a few minutes to several hours. Almost all of these outages are highly localized and can be attributed to problems with transmission and distribution, rather than shortfalls in generation capacity. There are, of course, several areas (such as North Sumatra and West Kalimantan) where shortage of generation is the cause of regular planned outages.

3.68 The underlying reasons for the high frequency of outages and other service disruptions are generally the same as those for high transmission and distribution losses, and relate to the poor quality of construction of the distribution network and the inadequate quality of staff and lack of autonomy at PLN's district offices, which are the ones responsible for handling this problem. As discussed above (see para. 3.15), the resolution of this problem will require the strengthening of the technical capabilities of PLN's district office staff, and improvements in the training and supervision of construction contractors. In addition, the improvement of reliability of supply will also require a change in the design philosophy of the grid, involving the development of a meshed network, rather than radial lines, and the replacement of uninsulated lines by insulated ones.^{25/} Another approach to improving the reliability of supply involves the establishment of capacity support arrangements with operators of captive generation. (see para. 4.11-14).

Public Relations

3.69 The current scope of PLN's approach to customer service is largely limited to the administration of the initial connection and the monthly electricity bill. A very limited amount of effort, largely in the form of pamphlets and TV ads, is directed towards informing residential customers of billing and payment procedures, indoor and outdoor safety, and the illegal use of electricity. Given the extensive gap between the quality of PLN's service and customers' expectation, a more comprehensive approach to public relations should result in substantial benefits to PLN, not only in terms of improved customer relations, but also with respect to aspects such as load factor, capacity utilization and demand management, all of which could lead to measurable improvements in system efficiency.

3.70 To avoid the potential for dilution of effort through unfocused activities, it would be desirable to focus the strengthening of PLN's public relations program on a few specific objectives, such as:

- (a) improving customer service by provision of information on options and facilities;
- (b) establishing a positive corporate image through dissemination of PLN's achievements;
- (c) softening the effects of service disruptions through advance notice of outages and a more responsive approach to customer complaints; and
- (d) educating the public on efficient and productive uses of electricity.

3.71 Of the above areas, the highest priority should be given to establishing a more responsive approach to customer complaints. The absence of such a mechanism deprives customers of a channel for venting their grievances

^{25/} PLN has recently begun with this type of replacement.

and may have contributed to the resistance encountered against PLN's recent tariff adjustment, and the eruption of discontent which ensued after the rates were increased. To address the public's perception that PLN is unresponsive to customer needs, every branch office needs to designate some personnel with the responsibility of responding to customer calls, queries and complaints. The goal is to convey to the customers that somebody is listening to them, and that their letters are not being lost in a bureaucratic maze. The policy should be to always provide a response:

- (a) If the complaint or request is legitimate, the customer should be informed of the appropriate action to be taken by PLN;
- (a) If a decision on a complaint or request will take some time, the customer should be promptly informed of this fact, and given an estimate of the time required; and
- (b) If the complaint or request cannot be accommodated, an acknowledgement of receipt with a standard explanation should go a long way towards establishing goodwill.

In addition to improving customer service and the corporate image, the establishment of a systematic customer response mechanism should also prove to be a valuable tool for management to monitor the quality of PLN's technical service and pinpoint problem areas for future improvement.

IV. ENHANCING THE PRIVATE SECTOR'S CONTRIBUTION

Existing Private Sector Activities

4.1 An exploration of the role of private enterprise in the development of the power sector is of interest because of its potential for contributing additional financial and managerial resources, as well as increasing efficiency through competitive pressures. Non-PLN electricity already plays an important role in the industrial sector as well as in some rural areas, but the present regulatory arrangements are far from optimal and could be substantially improved. To provide a basis for discussing possible options for improvement, this chapter begins with an assessment of ongoing private sector activities in the power sector, continues with an identification of the issues that emerge, and concludes with an outline of the proposed future role of the private sector.

4.2 The three areas in which private enterprises are currently involved in the power sector in Indonesia are through captive power generation by industries, small-scale generation and distribution in rural areas, and the performance of services, such as equipment installation and maintenance and administrative functions, rendered on a contractual basis for PLN.

Captive Generation

4.3 As has already been discussed, captive generation currently accounts for about 7.0 GW, equivalent to nearly half of total installed capacity in Indonesia. Of the total, about 53% is located on Java and about 34% is connected to PLN's grid and is used mainly for standby purposes. It is estimated that about two-thirds of industrial power requirements in Indonesia are supplied through captive power plants. From 1978/79 until 1987/88, captive power capacity, excluding that of major oil and mining concerns, has grown at an average of 7.3% per year, compared to the 15.0% annual growth in PLN's installed capacity for the same period.

4.4 Under existing regulations, all investments in captive generation require a license from the DGENE. The main criterion for issuance of this license is a verification that PLN is unable to supply electricity within the required time frame at the proposed site. Most captive capacity was installed in the late 1970s when PLN suffered from chronic shortages of capacity. In recent years PLN has had adequate generation capacity in most areas, and the continued growth in captive generation capacity appears to have been due the inadequate quality of PLN supply and PLN's inability to respond to new load requirements in a timely manner. Thus, PLN requires a lead time of about two years for land and right-of-way acquisition, while it is frequently asked to connect a large industrial load with less than a year's advance notice. As a consequence, even though PLN's grid based supply is usually more economical than diesel-based captive generation, the industrial investor frequently adds new captive generation capacity, intending to switch to PLN's service as soon as it becomes available. This situation points to the need for improved coordination between power sector and industrial development.

Small-Scale Generation in Rural Areas

4.5 Under existing regulations, a license is required for any enterprise to sell electricity to the public, with the exception of systems with less than 5 kVA capacity. The principal criterion for granting a permit is that the tariff be similar to PLN's. As most of the potential enterprises would use diesel-based generation, their costs cannot compete with PLN's more efficient large central power plants and, not having access to cross-subsidies, they could not be financially viable with a tariff similar to PLN's. As a consequence, the only private sector response to the unmet demand for electricity has been in the unregulated under 5 kVA range, where there has been a proliferation of thousands of microenterprises providing a precarious and high cost service to small numbers of customers in rural areas.^{26/} In view of the small size of the required investments, such microenterprises are easy to establish but difficult to sustain, as they cannot afford the requisite technical and managerial skills, financial stability, and legal status. As a result, their service is generally of a low standard, and they are regarded by their operators and customers as only a makeshift solution until such time as PLN's service can be extended into the area. Also, because of their limited technical and organizational development, neither the equipment nor the skills employed by these microenterprises are compatible with PLN's system, and there is nothing of value that PLN can use when it eventually reaches the area.

4.6 The only exceptions are three rural electric cooperatives established in outer islands by the Ministry of Cooperatives with assistance from the USAID. These rural electric cooperatives provide a reasonable standard of service to about 50,000 thousand customers at a price that is nearly twice that of PLN's. Even so, they are not financially viable and their future is uncertain.

4.7 The basic issue here is that even large diesel based supply systems, i.e. those serving at least 10,000 customers and having an installed capacity of 5 MW, will have operating costs of at least Rp.200/kWh,^{27/} which is about twice the average revenue that PLN obtains from its residential customers in rural areas, and therefore will require a tariff of more than twice the level of PLN's in order to be financially viable. As a result:

- (a) the GOI's approval and acceptance of the tariff level required to enable these enterprises to be financially viable and make a reasonable rate of return is difficult, as it would run counter to its objective of equality;^{28/} and

^{26/} They typically consist of one person operating a 2-5 kVA genset (costing \$1,000-2,000) 4-5 hours/day, serving 15-70 households and charging 400-800 Rp/kwh.

^{27/} Based on PLN's costs in its smallest regions, see Annex 5.

^{28/} The willingness to pay of village customers has been established at far higher levels on the basis of the rates and the costs of kerosene lighting and battery-operated TV sets.

- (b) it is unrealistic to attract and incorporate villages that are already being served by PLN into the service area of a new independent system. While PLN serves only about 30% of all villages, these include most of the larger villages. Unless some of these villages can be transferred to the service area of the new systems, the new electric enterprises will be unable to obtain areas that are compact and have enough potential customers to make them financially viable.

Sub-contracting of Services

4.7 The third area of private participation in the power sector is in the performance of customer administration and technical services at the distribution end of PLN's system. Due to manpower and management constraints, and to reduce costs, PLN has been sub-contracting to private parties the functions of meter-reading, customer disconnection and reconnection, line installation and maintenance and other service activities. As discussed in para. 3.15, the technical capability of the private contractors has sometimes been inadequate, in which cases PLN has had to initiate the training of contractor groups for the transfer of necessary skills.

Future Areas for Private Sector Participation

4.8 In recognition of the potential financial and managerial resources that private enterprise could bring to the power sector, and of the wide gap between the demand for electricity and PLN's supply capacity, the Law on Electrification provides that opportunities shall be given to cooperative and private enterprises to supply electricity. This provision represents a change in the previous policy direction under which, over the 1950s and 1960s, the existing private companies in the sector, some of which dated from colonial times, and others which had been set up by local governments, were taken over by the Government and consolidated into a Government agency which became PLN in 1972. As currently envisaged by the Government, private and cooperative enterprises are to play a role that is complementary to that of PLN, concentrating on areas that PLN is unable to serve, and on functions that they can provide at lower cost than PLN. Thus, in contrast to its current efforts at deregulating several sectors of the economy, the Government intends to maintain a strong presence in the power sector. This reflects the emphasis placed by the Government on the social objectives of electricity development.

4.9 The Law on Electrification establishes a three-tiered framework to organize the activities of the sector. The first tier involves PLN, the National Electricity Authority, designated to meet the power requirements of the entire nation. Within PLN's service area, a second tier of private enterprises or cooperatives can be granted licenses to operate electricity systems for supply to the public. Within the service areas of PLN and the private and cooperative enterprises, licenses can be issued for private captive generation (the third tier) and for the sale of their excess power to the second-tier licensee or PLN. Complementing these efforts on electrification is the participation of private contractors in the area of

maintenance and installation of electrical service equipment, including other services such as meter reading.

4.10 Although the rules and regulations corresponding to the above sectoral framework have not yet been defined, there are several approaches to enhance the contribution of private enterprise, including existing activities, that deserve to be explored and /or reinforced:

- (a) The coordinated use of existing captive generation with PLN's capacity to improve the reliability of PLN's grid;
- (b) The encouragement of additional investment in captive plants in special situations where generation costs are expected to be competitive with those of PLN's grid;
- (c) The encouragement of greater participation of rural cooperatives and small entrepreneurs in rural electrification to improve its effectiveness as an agent for local development and reduce its costs; and
- (d) The enhancement of competitive pressures through creation of an environment where private power generation can compete with public utility generation on an equal basis.

Coordination with Captive Capacity

4.11 Given the large installed captive generation capacity, many opportunities exist for PLN to improve its reliability, reduce its costs, and augment its service by providing incentives and establishing a framework for improved coordination. Aside from special circumstances where captive generation may be more economical than PLN's own (see para. 4.15), there are two general situations where there is a clear benefit from coordination and where it would seem to be feasible to arrive at mutually beneficial arrangements: (i) utilization of captive capacity to support PLN's grid reliability on an emergency basis, and (ii) utilization of captive capacity in lieu of grid supply to meet the owner's own requirements and relieve the grid on an emergency basis. The efficiency gains from the proposed arrangements would derive, in the short run, from a reduction in the frequency of outages in PLN's grid and, in the long run, from a reduction in PLN's capacity reserve requirements. An indication of the magnitude of these benefits is provided by the difference between the cost of an outage,^{29/} and the cost of diesel-based captive generation (say, Rp.200/kWh).

4.12 Although the current regulatory framework allows the sale of power from captive generators to PLN, such capacity support arrangements as proposed above do not currently exist and a number of legal, technical and commercial issues need to be resolved before such arrangements can be implemented. The most important of these is the issue of pricing. Basically, the maximum price that PLN should be prepared to pay for electricity from any particular source

^{29/} Estimated in a recent study by PLN to average Rp 4000/kWh for industrial users.

should be determined on the basis of PLN's system avoided costs, i.e. the long run marginal cost of capacity at the specific location, or, in the case of an emergency, the cost of electricity not served. Conversely, the minimum price that the captive generator should be prepared to accept is the long run marginal cost of supply (including a reasonable return on investment).

4.13 Based on the above general principles, several points need to be taken into account in the design of a pricing formula for capacity support arrangements:

- (a) as the main purpose is to support PLN's system capacity, PLN should be prepared to pay capacity charges in addition to the appropriate (peak and off-peak) energy rates where the capacity support can be guaranteed;
- (b) as the value to PLN of any electricity supplied depends on the location of the generating facility and the alternative source of PLN generation, a separate system avoided cost calculation is required in respect to each separate contract taking into account PLN's transmission costs (and losses); and
- (c) from the perspective of the captive capacity owner/operator, the attractiveness of the pricing formula offered by PLN will be assessed largely on the basis of the anticipated rate of return on investment arising from the income stream produced by that formula.

4.14 In view of the potential benefits of capacity support arrangements, the GOI and PLN are in the process of establishing basic rules and regulations to utilize captive generation capacity in coordination with PLN's system. Current plans are to implement selected pilot projects to collect some practical operating experience during the year 1990 and subsequently to implement standardized arrangements on a broader scale.

Encouragement of Economic Captive Generation

4.15 While PLN's large coal-, gas- or hydro-generation plants are expected to be more economical than smaller-scale, mostly diesel-based captive generation, there are special situations where captive generation is economically competitive. In general three types of situations deserve to be encouraged through appropriate adjustments in the current regulatory framework:

- (a) where an industry has a continuous demand for steam for process heating purposes, the combined generation of steam and electric power (cogeneration) will have a higher thermal efficiency than simple thermal power generation. Although cogeneration is a capital intensive process, its high thermal efficiency makes it

an economically attractive option for increasing the energy efficiency of the economy.^{30/}

- (b) where a plant produces a waste (such as sugar mill bagasse, saw mill waste, rice husks, etc.,) that can be used as fuel, the industry should be encouraged to use the waste to generate electricity.
- (c) where a local resource (such as a hydro site, a coal mine, a geothermal reservoir or a peat deposit) can be developed to meet a specific industrial requirement as well as feed into PLN's local system.^{31/}

To provide a market for such activities, PLN should be prepared to purchase the electricity that is generated. By basing the purchase price of electricity on the avoided cost principle, PLN can ensure that it will only purchase the electricity if it can be generated at a cost that is no higher than its own.

Rural Electrification and Private Distribution Systems

4.16 As discussed above, the proliferation of microenterprises supplying electricity in rural areas provides only a weak basis for their future electrification by PLN, as both the physical assets and technical skills they employ are incompatible with those required by PLN. As these enterprises do not appear to be sustainable in the long-term, a strategy for supporting the development of rural areas by developing their managerial, technical and labor resources needs to focus on the transfer of PLN's utility functions (consumer administration, operations and maintenance) to village cooperatives or enterprises, supported by training and technical assistance as appropriate.

4.17 The existing framework for cooperation between MME and the Ministry of Cooperatives for the takeover of utility functions by village electric cooperatives (KUD) provides a useful starting point for such a strategy. Under the existing arrangements, there are four pola (schemes) for the participation of the village cooperatives in the rural electrification program:

^{30/} The regulatory framework for granting of permits to captive power plant operation should take into account the economic aspects of industrial power supply. For example, in India, new industries applying for a license for captive power generation are first asked to demonstrate that co-generation is unfeasible in their plant before they are granted a license for a captive power-only unit.

^{31/} Examples of the above are provided by P.T. Inalum's Asahan Hydro in N. Sumatra (603 MW), P.T. Inco's Laron Hydro in S.E. Sulawesi (165 MW) and P.N.T.B. Ombilin's coal fired steam plant in W. Sumatra (90 MW). In all of these cases, the price negotiated by PLN is below the LRMC, with the result that these companies have no interest in further expansion for sale to PLN.

- (a) Pola 1: the cooperative handles metering, billing and light maintenance (tree pruning) functions as a contractor for PLN, on a fee for service basis;
- (b) Pola 2: the cooperative installs housewiring as a contractor of the customer, with a license and a price schedule approved by PLN;
- (c) Pola 3: the cooperative purchases electricity in bulk ("at the village transformer") from PLN (which treats it as a customer) and takes over all local distribution functions;
- (d) Pola 4: the cooperative generates and distributes its own electricity, independently of PLN, subject to GOI regulation.

4.18 Since the establishment of this framework in 1979, pola 1 and pola 2 schemes (mostly in combination) have been taken by about 700 village cooperatives serving about 3,000 villages (out of 19,000 villages electrified by PLN), mostly concentrated on Java. To date, no pola 3 arrangement has been established,^{32/} mainly due to the fact that its financial feasibility would require that the cooperative either charge a price (to its household customers) that is higher than PLN's or pay a price for its bulk purchases from PLN that contains approximately the same level of subsidy that PLN provides to its own household customers. PLN has been reluctant to define such a subsidized bulk purchase price for rural distribution enterprises as there is no mechanism for it to recover the costs associated with such subsidized sales, which would be beyond its control. Thus the establishment of a transparent mechanism to enable PLN to recover the costs associated with subsidized sales (as discussed in para. 2.26) is a prerequisite for the incremental transfer to village cooperatives (or private enterprises) of PLN's rural electric distribution function..

4.19 With regard to pola 4, of which three examples already exist (para. 4.6), the main constraint to their development appears to be the difficulty of assembling a territory that has enough potential customers to enable them to attain the scale of operations that is required to afford the technical and managerial expertise needed for long term sustainability. Of course, the fact that they would have to charge a tariff that is about twice that of PLN's makes it unrealistic for them to take-over any villages that are already being served by PLN.

4.20 As the establishment of rural electric enterprises under the pola 4 scheme, independently of PLN, appears increasingly unfeasible, a strategy for channelling the managerial, technical and labor resources available in rural areas into the electrification effort needs to focus on the transfer of utility functions from PLN to village enterprises, with the eventual objective

^{32/} Aside from a special case which takes advantage of the excess generation capacity of a fertilizer plant in Aceh, as well as a low \$1.00/mcf price for gas (compared to \$3.00/mcf price faced by PLN in Medan), to sell electricity in the local area at a lower price than PLN.

of developing them into rural distribution companies, on the basis of pola 3. PLN is already moving in this direction, through a concerted effort to develop not only village cooperatives but also private enterprises to handle construction, customer administration and line services.

4.21 For the future, the scope of functions to be entrusted to private parties could be expanded to include management contracts for selected operating units, including distribution and generation, and long term maintenance contracts for thermal plants. This approach requires the development and strict application of a system for evaluating the economic justification for and work performance under contract agreements. For example, the hiring of private contractual services to undertake various customer administration and technical services work should be subject to at least the following criteria:

- (a) The cost of contracting should be lower than or equal to the actual cost of the same activity if handled by PLN personnel;
- (b) PLN must be in a position to control and strictly supervise the contracted work.

Moreover, PLN should not lose sight of the fact that it, and not the private contractors, is the entity directly and finally accountable to the power consumers for quality service.

Investment in Dedicated Power Plants

4.22 In addition to taking advantage of existing captive capacity and special situations, the GOI should also consider enhancing the competitive pressures on PLN by creating an environment within which private power generation schemes, can compete on equal terms. Although private power generation is of interest as a option, its economic advantages for Indonesia cannot be taken for granted and need to be evaluated with care. Of particular importance is the framework for evaluating private sector projects vis-a-vis government projects. To obtain some comparative information for this evaluation, the GOI has solicited BOT (Build, Operate and Transfer) proposals for the 900-1500 MW gas-fired Gresik project in East Java, in addition to equipment and civil works supply tenders along traditional procurement lines.

4.23 Given the Government's present position that all risks shall be assumed by the investor, it would be reasonable for the investor to demand a performance guarantee of PLN with respect to the power purchase agreement, inasmuch as PLN's ability to perform its end of the contract is dependent on the tariff set by the Government. In addition to financial capacity, PLN's willingness to purchase the plant's electricity will depend on the cost of generation from alternative sources, which in turn is a function of the price of primary fuels and the efficiency of the BOT plant in relation to other plants in the grid. In the absence of any guarantee from PLN or the Government, the investors' risk-adjusted expected rate of return is likely to be markedly higher than PLN's, and is unlikely to be compensated by minor savings from shorter construction periods (assuming relief from PLN's

regulatory constraints) and possible higher efficiency of operation. The resulting higher production costs are likely to render the BOT option economically unattractive, in which case the GOI should not proceed with it.

4.24 The BOT concept also raises the question of the ability of the Government (or PLN) to ensure that at the time of transfer of ownership, it will receive an asset capable of reliable operation during its remaining economic life. In addition, to the extent that there is a "transfer", the BOT project should be regarded (and evaluated) as an alternative form of financing an asset (for PLN) rather than as a private sector investment.

4.25 To obtain a better test of the viability of private investment in dedicated power plants (on a BOO-build, own and operate basis), it should initially be tried for a relatively easy case, e.g., that of a medium-scale run-of-river hydroelectric project (50 to 200 MW). Such a power station will always be operated on a priority basis, with minimal technical risks, and obviates the need for a "take or pay" guarantee for the investor. Even in this case, a long-term contract with PLN is necessary to guarantee a sale price based on PLN's long-run marginal cost of supply in the region for the operating period prior to the plant's transfer. The testing of the BOO concept with a case with virtually no technical or commercial risks would afford the GOI an opportunity to clarify its approach in regard to several generic issues associated with the concept:

- (a) additionality: the GOI needs to ensure that the credits to be tapped by the investor do not pre-empt the availability of credit for other priority projects.
- (b) foreign exchange constraint: the GOI needs to review the implications of repatriation of profit and debt service requirements on the balance of payments.
- (c) accountability: since BOO proposals are likely to involve the participation of several firms working together as a consortium, it is important to identify the lead party and be confident that it will assume responsibility and accountability for project performance. Depending on the size and criticality of the plant involved, the completion and operation of the BOO project could greatly affect the operation of an entire grid, and a thinly spread accountability arrangement among the consortium members could make it difficult for the Government or PLN to effectively supervise the project along the agreed terms of supply.

Creation of a Competitive Environment

4.26 Overall, the successful implementation of the above initiatives will require the creation of a competitive environment. This would assure the private investors that they will be treated fairly in relation to PLN and provide an appropriate framework for motivating PLN to achieve the same efficiency and effectiveness as could be expected of a private company. The recommended approach is as follows:

- (a) the streamlining of the regulatory framework, including a regular tariff adjustment on a predictable basis. Tariff policies need to guarantee PLN's long term ability to pay for the purchase of electricity from private power plants. This would reassure the investor of the financial viability of his major customer and reduce the need for direct government guarantees;
- (b) the removal of existing fuel price distortions. This is required to guide investors towards the optimal choices in terms of type of fuel and technology to be used, and to ensure that public and private power generation can compete with each other on the basis of price and on being part of the least cost expansion plan for the power system as a whole;
- (c) a transparent compensation scheme for the pursuit of social objectives. The subsidy element of socially-directed electrification programs must be determined and a transparent mechanism established for compensating PLN or a regional or village electric enterprises on an equal basis;
- (d) the removal of financing distortions. The domestic capital market is insufficiently developed to provide financing to either private investors or PLN. While PLN can count on the GOI's extensive concessionary borrowings from external sources, which are onlent to PLN at below-market rates, the private investors have to seek financing in international markets. To eliminate the advantage that PLN derives from this arrangement, without reducing the GOI's ability to benefit from concessional financing, the GOI needs to onlend these funds to PLN at rates that fully reflect their value in international markets. As a first step in this direction, the GOI has begun to charge PLN for a portion of the foreign exchange risk;^{33/} and
- (e) an improvement in the public enterprise salary structure and reward system. This is required to enable PLN to compete for technical and managerial talent on the same basis as private investors.

4.27 The creation of a competitive environment is consistent with the recognition that PLN is the country's most valuable asset in the power sector, and the GOI's current strategy of focussing private initiatives onto complementary roles. The recommended measures will support the progressive decentralization of PLN into operating units of increasing sophistication and autonomy. After this decentralization has progressed for over a period of,

^{33/} The most recent subsidiary loan agreements between the GOI and PLN, related to the Bank's Power Sector Efficiency Project and Paiton Thermal Power Project, include a provision for a 1.90% fee in partial compensation for the GOI's coverage of the foreign exchange risk.

say, five years, the GOI should review the desirability of transforming these units into independent companies. Those of the companies which are working efficiently and profitably, could later become candidates for privatization, if that is the direction desired by the Government.

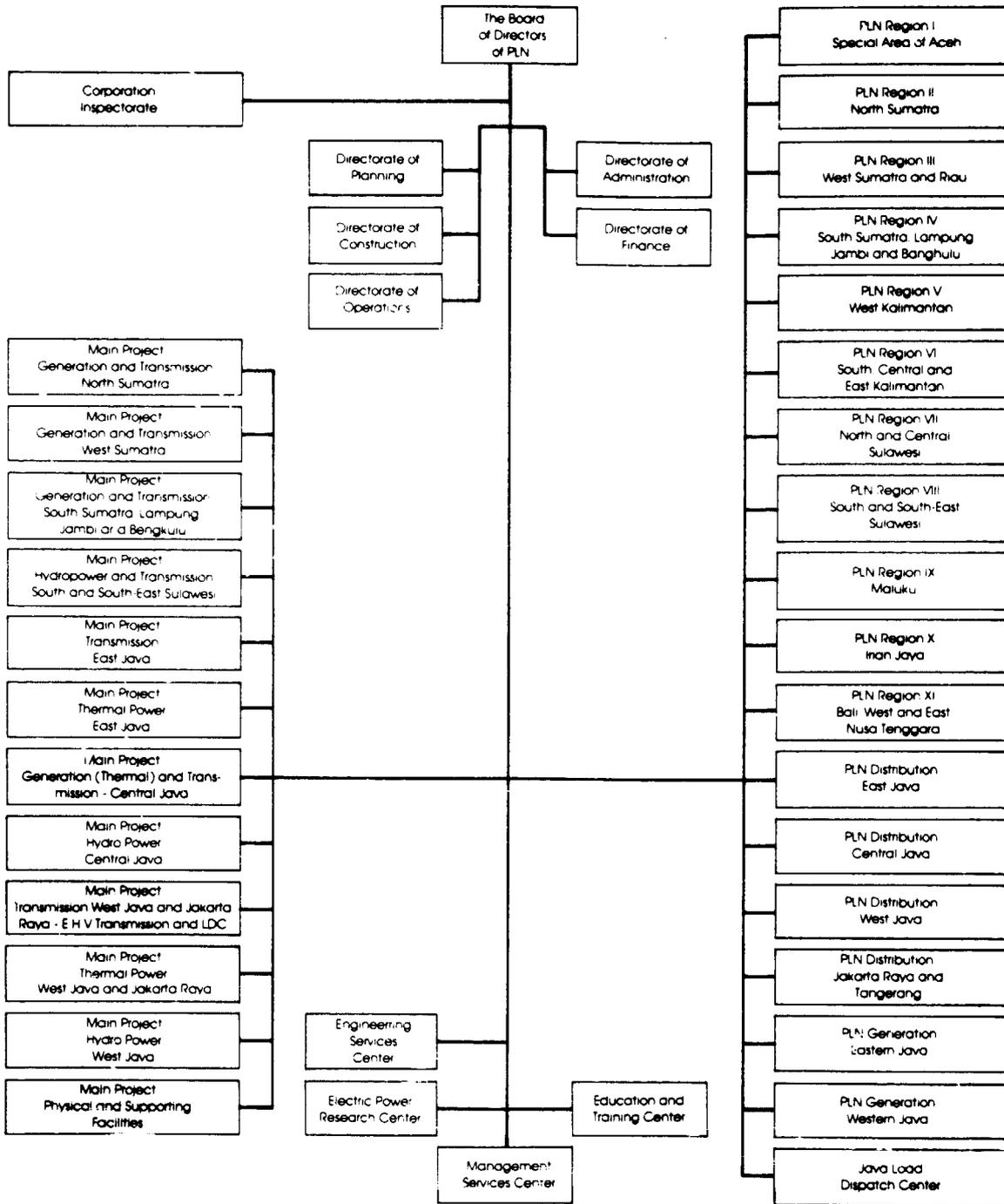
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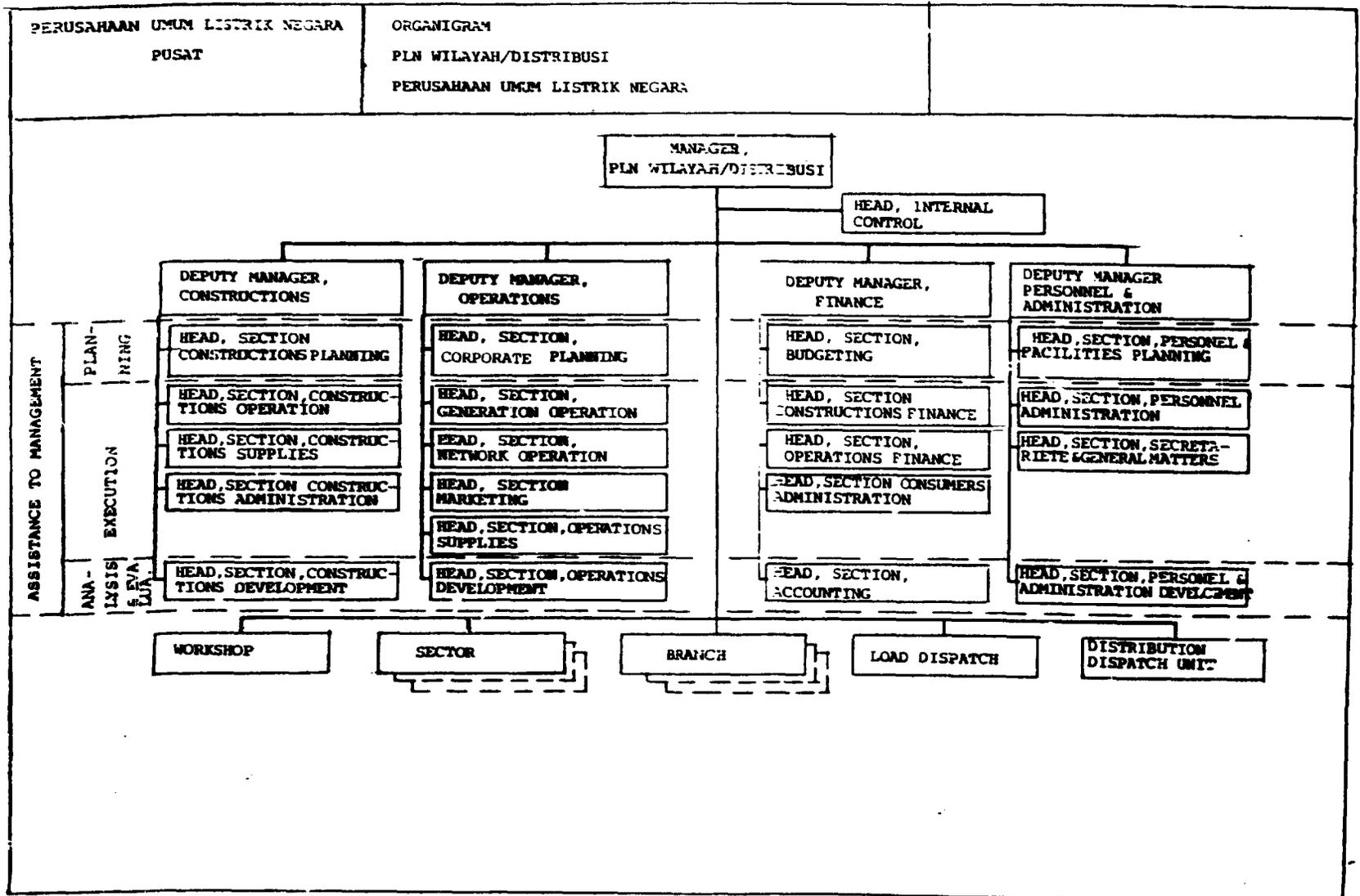
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

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INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW
Organization Chart of PLN





INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW
PLN's Generation Expansion Plan
Java

	Actual 1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Sales (Gwh)	13,249	15,345	17,647	20,293	23,235	26,488	30,065	33,973	38,220	42,806	47,729	52,979	58,541	66,396
Increase (%)	14.4	15.8	15.0	15.0	14.5	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.5	10.0
Losses T&D (Gwh)	3,188	3,368	3,743	4,157	4,593	5,047	5,518	5,998	6,483	6,970	7,460	7,954	8,454	8,964
(%)	18.4	17.1	16.6	16.1	15.7	15.2	14.7	14.3	13.8	13.3	13.1	12.8	12.6	12.4
Sent Out Energy (Gwh)	16,435	18,713	21,390	24,450	27,828	31,535	35,581	39,969	44,703	49,778	55,339	61,249	67,485	74,020
Station Use (Gwh)	880	988	1,124	1,290	1,482	1,649	1,861	2,093	2,333	2,599	2,898	3,207	3,534	3,870
(%)	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Gross Generation (Gwh)	17,315	19,701	22,541	25,740	29,290	33,184	37,442	42,062	47,036	52,375	58,235	64,456	71,019	77,890
System Peak (Mw)	2,882	3,250	3,714	4,246	4,832	5,476	6,178	6,941	7,782	8,643	9,609	10,636	11,719	12,853
Increase (%)	-	13.6	14.3	14.3	13.8	13.3	12.8	12.4	11.8	11.4	11.2	10.7	10.2	9.7
System LF (%)	69	69	69	69	69	69	69	69	69	69	69	69	69	69
Installed Capacity (MW)														
Hydro Power Plant														
Basia	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235	1,235
Wadas Lintang #1-2	0	16	16	16	16	16	16	16	16	16	16	16	16	16
Wrica #1-3	0	60	180	180	180	180	180	180	180	180	180	180	180	180
Sangsuruh	0	29	29	29	29	29	29	29	29	29	29	29	29	29
Kasamban	0	0	0	0	0	0	0	0	33	33	33	33	33	33
Cirta	0	500	500	500	500	500	500	500	500	1,000	1,000	1,000	1,000	1,000
Ciliman	0	0	0	0	0	0	10	10	10	10	10	10	10	10
Tulungagung	0	0	0	0	0	0	30	30	30	30	30	30	30	30
Kedungombo	0	0	0	23	23	23	23	23	23	23	23	23	23	23
Jatigede	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maung	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	1,235	1,840	1,960	1,983	1,983	1,983	2,023	2,023	2,056	2,556	2,556	2,556	2,556	2,556
Stream Power Plant														
Residual Oil (MFO)														
Basia	1,475	1,475	1,400	1,400	1,400	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Cresik #3-4	0	400	400	0	0	0	0	0	0	0	0	0	0	0
Subtotal	1,475	1,875	1,800	1,400	1,400	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Natural Gas														
Cresik #3-4, 1-2	0	0	0	400	400	600	600	600	600	600	600	600	600	600
Subtotal	0	0	0	400	400	600	600	600	600	600	600	600	600	600
Coal														
Basia	800	800	800	800	800	800	800	800	800	800	800	800	800	800
Surasaya #3-7	0	400	800	800	800	800	1,400	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Panaron #1-4	0	0	0	0	0	0	800	800	1,400	2,000	2,000	2,000	2,000	2,000
Central Java #1-4	0	0	0	0	0	0	0	0	0	1,200	1,200	2,400	2,400	2,400
West Java #1-4	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200	2,400
Subtotal	800	1,200	1,600	1,600	1,600	1,600	2,400	3,000	4,200	4,200	6,600	7,800	9,000	10,200
Gas Turbine Power Plant														
Distillate Oil (HSD)														
Basia	530	530	530	530	530	530	530	445	400	280	60	20	20	20
Project	0	0	0	0	0	0	0	100	100	200	200	300	500	700
Subtotal	530	530	530	530	530	530	530	545	500	480	260	320	520	720
Natural Gas	80	80	80	80	80	80	80	80	80	0	0	0	0	0
Geothermal Power Plant														
Kamojang #1-3	140	140	140	140	140	140	140	140	140	140	140	140	140	140
Salak #1-2	0	0	0	0	110	110	110	110	110	110	110	110	110	110
Drajat #1-2	0	0	0	0	0	110	110	110	110	110	110	110	110	110
Subtotal	140	140	140	140	250	360	360	360	360	360	360	360	360	360
Combined Cycle Power Plant														
East Java #1-3	0	0	0	0	0	600	900	900	900	900	900	900	900	900
Total	4,280	5,665	6,110	6,133	6,243	6,953	8,093	8,708	9,896	10,876	12,476	13,736	15,136	16,536

Source: PLN

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW
PLN's Generation Expansion Plan

Outside Java

	Actual 1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Sales (Gwh)	3,674	4,337	5,050	5,819	6,697	7,681	8,785	9,889	11,083	12,424	13,933	15,643	17,492	19,567
Increase (%)	14.5	18.0	16.4	15.2	15.1	14.7	14.4	12.6	12.1	12.1	12.2	12.3	11.8	11.9
Losses T&D (%)	17.1	17.3	18.8	18.3	15.8	15.4	14.9	14.4	13.9	13.4	13.0	12.5	12.5	12.5
Sent. Out Energy (Gwh)	4,508	5,289	6,122	7,011	8,020	9,144	10,304	11,635	12,963	14,447	16,110	17,981	20,106	22,491
Station Use (%)	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Gross Generation (Gwh)	4,696	5,509	6,377	7,304	8,334	9,525	10,829	12,119	13,503	15,049	16,781	18,730	20,944	23,428
System Peak (MW)	971	1,104	1,261.0	1,437.0	1,621	1,844	2,081	2,327	2,588	2,851	3,189	3,521	3,919	4,366
System LF (%)	55	57	58	58	58	59	59	59	60	60	60	61	61	61
Installed Capacity (Mw)														
Hydro Power Plants														
Basia	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9	181.9
Mini Hydro	0.0	0.0	0.0	0.0	0.6	12.0	24.4	37.2	46.5	46.5	46.5	46.5	46.5	46.5
Puasangan IV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.0	31.0	31.0	31.0	31.0	31.0
Tasur Stage I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	214.0	214.0	214.0
Renun	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.0	80.0	80.0	80.0	80.0	80.0
Singharak I #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.0	90.0	90.0	90.0	90.0	90.0
Singharak II #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90.0	90.0	90.0
Kotoangang #1-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	111.0
Tas I #1-4	0.0	0.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Basia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.0	31.0	31.0	31.0
Musi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	88.0	88.0
Pada Kembang	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	30.0	30.0	31.0
Rias Kias	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.2	29.2	29.2	29.2
Tanggari I	0.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Tanggari II	0.0	0.0	0.0	0.0	0.0	0.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Palu I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5	44.5	44.5	44.5	44.5
Poigar II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Bakur #1-2	0.0	0.0	0.0	0.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0	128.0
Malas I #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	92.0
Sentan #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	13.0	13.0	13.0	13.0	13.0
Putih I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	18.0	18.0	18.0	18.0	18.0
Putih II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.0	17.0
Ayung	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.0
Ira Lalara	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.0
Subtotal	181.9	181.9	214.9	214.9	341.5	352.9	384.3	397.1	636.6	680.9	741.9	1,075.1	1,160.1	1,442.1
Oil														
Distillate Oil (HSD)														
Basia	1,070.4	1,034.1	1,002.3	969.4	938.1	904.5	868.1	813.1	774.7	716.8	620.5	565.5	532.4	503.4
Project	349.4	547.1	547.1	825.6	867.6	679.6	707.1	724.6	761.6	776.1	815.1	862.6	882.7	918.2
Subtotal	1,419.8	1,581.2	1,549.4	1,595.0	1,605.7	1,584.1	1,555.2	1,537.7	1,536.3	1,492.9	1,435.6	1,428.1	1,415.1	1,421.6
Residual Oil (MFO)														
Project	0.0	0.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Steam Power Plants														
Natural Gas														
Basia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medan #1-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	200.0	400.0	400.0
Kramasan #1-2	0.0	0.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	0.0	0.0
Banda Aceh #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	50.0
Lhok Seumawe #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0
Belawan #1-2	0.0	0.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0
Jamb.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0
Balikpapan #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0
Subtotal	0.0	0.0	155.0	155.0	155.0	155.0	155.0	155.0	305.0	305.0	405.0	655.0	830.0	830.0
Coal														
Basia	0.0	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dembelin #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bukit Asam #1-	85.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0
Tarakan #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	130.0	130.0	130.0	130.0	130.0	130.0
Balikpapan #1-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Banjarmasin #1-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Ujung Padang #1-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0
Subtotal	85.0	130.0	130.0	130.0	130.0	295.0	295.0	445.0	675.0	675.0	675.0	740.0	740.0	830.0
Residual Oil (MFO)														
Basia	180.0	180.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	0.0	0.0	0.0	0.0	0.0
Belawan #3-4	0.0	0.0	0.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0	130.0
Subtotal	180.0	180.0	25.0	155.0	155.0	155.0	155.0	155.0	155.0	130.0	130.0	130.0	130.0	130.0
Peat														
Pontianak I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Geothermal														
Kerinci	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	5.0	5.0	5.0	5.0
Lahendong	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	30.0	30.0	30.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	5.0	35.0	35.0	35.0	35.0
Gas Turbine Power Plant														
Natural Gas														
Basia	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	111.0	96.0	96.0	42.0	42.0	42.0
Payasaar #1-2	0.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	0.0	0.0	0.0	0.0
Belawan #1-2	0.0	100.0	200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	111.0	241.0	341.0	141.0	141.0	141.0	141.0	141.0	141.0	12.0	96.0	42.0	42.0	42.0
Distillate Oil (HSD)														
Basia	183.0	153.0	138.0	138.0	138.0	138.0	138.0	138.0	138.0	138.0	123.0	103.0	103.0	103.0
Medan #1-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	200.0
Balikpapan #1-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0
Bitung #1-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	75.0
Ujung Padang #1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	25.0	25.0	25.0
Padang	0.0	0.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Subtotal	183.0	153.0	138.0	158.0	158.0	158.0	158.0	158.0	158.0	158.0	168.0	248.0	248.0	498.0
Combined Cycle (N. Gas)														
Project	0.0	0.0	0.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
Total	2,140.7	2,424.1	2,577.3	2,872.9	3,010.1	3,165.3	3,297.5	3,634.8	4,257.7	4,218.8	4,332.5	4,999.2	5,246.2	5,894.7

INDONESIAPOWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEWPLN's TariffExplanation of the Tariff Categories
in the Basic Tariffs of Electricity, 1989

Tariff category	Contracted power	Explanation of tariff category
S ₁	to 200 VA	For small consumers (low voltage)
S ₂	250 VA to 200 kVA	For small to medium social institutions (low voltage)
S ₃	201 kVA and over	For large social institutions (medium voltage)
R ₁	250 VA to 500 VA	For small residential service (low voltage)
R ₂	501 VA to 2,200 VA	For small residential service (low voltage)
R ₃	2,201 VA to 6,600 VA	For medium residential service (low voltage)
R ₄	6,601 VA and over	For large residential service (low voltage)
U ₁	250 VA to 2,200 VA	For small commercial service (low voltage)
U ₂	2,201 VA to 200 kVA	For medium commercial service (low voltage)
U ₃	201 kVA and over	For large commercial service (medium voltage)
U ₄	-	For temporary service (low voltage)
I ₁ /H	250 VA to 99 kVA	For small hotel industry service (low voltage)
I ₂ /H	100 kVA to 200 kVA	For medium hotel industry service (low voltage)
I ₃ /H	201 kVA and over	For large hotel industry service (medium voltage)
I ₁	450 VA to 13.9 kVA	For small industrial service (low voltage)
I ₂	14 kVA to 200 kVA	For medium industrial service (low voltage)
I ₃	201 kVA and over	For medium industrial service (medium voltage)
I ₄	10,000 kVA and over	For large industrial service (high voltage)
G ₁	250 VA to 200 kVA	For small to medium office service (low voltage)
G ₂	201 kVA and over	For large office service (medium voltage)
J	-	For street lighting service (low voltage)

Source: PLN Finance Department.

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN's Tariff

History of Tariff Adjustments, 1982-1989

Tariff category	1982 (February)			1983 (February)			1984 (March)			1986 (August)			1989 (April)		
	Demand charge (Rp/kVA)	Energy charge (Rp/kWh)	Average price (Rp/kWh)	Demand charge (Rp/kVA)	Energy charge (Rp/kWh)	Average price (Rp/kWh)	Demand charge (Rp/kVA)	Energy charge (Rp/kWh)	Average price (Rp/kWh)	Demand charge (Rp/kVA)	Energy charge (Rp/kWh)	Average price (Rp/kWh)	Demand charge (Rp/kVA)	Energy charge (Rp/kWh)	Average price (Rp/kWh)
S ₁	/a	-	-	/b	-	-	/c	-	-	/c	-	50.50	/d	-	57.50
S ₂	1,600	22.00	34.12	1,600	35.00	48.22	2,100	43.50	60.57	2,100	43.50	65.62	2,700	45.00	81.97
S ₃	-	-	-	-	-	-	-	-	-	-	-	-	3,160	P=136.50 OP=68.00	94.92
R ₁	1,600	37.50	48.85	1,600	56.00	67.21	2,100	70.50	85.19	2,100	70.50	89.56	3,160	63.50 for < 60hrs./mo. 86.00 for > 60hrs./mo.	103.54
R ₂	1,600	45.50	55.76	1,600	67.00	79.12	2,100	84.50	98.41	2,100	84.50	100.07	3,160	76.00 for < 60hrs./mo. 115.50 for > 60hrs./mo.	119.74
R ₃	2,800	63.50	88.08	2,800	97.00	121.78	3,680	126.50	156.42	3,680	126.50	159.60	5,520	155.50	202.96
R ₄	2,800	79.50	99.08	2,800	117.50	137.50	3,680	158.00	184.10	3,680	158.00	188.81	5,520	196.50	239.91
U ₁	2,800	66.00	84.67	2,800	99.50	121.04	3,680	134.00	160.10	3,680	134.00	167.37	5,520	166.00 for < 150hrs./mo. 133.00 for > 150hrs./mo.	209.50
U ₂	2,800	70.00	96.17	2,800	108.50	137.37	3,680	150.00	189.73	3,680	150.00	190.92	5,520	186.50 for < 150hrs./mo. 149.50 for > 150hrs./mo.	244.43
U ₃	1,750	WBP = 74.00 LWBP = 46.50	63.46	1,750	P = 111.00 OP = 70.00	89.28	2,300	P = 158.00 OP = 99.00	123.17	2,300	P = 158.00 OP = 99.00	118.7	3,460	P=219.50 OP=109.50	152.07
U ₄	-	160.00	160.00	-	221.00	221.00	-	307.00	307.00	-	307.00	307.00	-	400.00	400.00
I ₁ H	2,800	54.50	68.03	-	-	-	-	-	-	-	-	91.43	3,460	87.00	112.45
I ₂ H	1,750	38.50	44.45	-	-	-	-	-	-	-	-	82.18	3,460	95.00	114.58
I ₃ H	-	-	-	-	-	-	-	-	-	-	-	73.44	34,160	94.00	102.55
I ₁	1,750	WBP = 49.00 LWBP = 30.50	53.33	1,750	P = 81.50 OP = 51.00	76.65	2,300	P = 106.00 OP = 66.00	93.97	2,300	P = 97.50 OP = 60.50	90.88	3,460	68.00	105.91
I ₂	1,750	WBP = 45.50 LWBP = 29.00	48.09	1,750	P = 77.00 OP = 48.00	67.15	2,300	P = 100.00 OP = 62.50	85.51	2,300	P = 92.50 OP = 57.50	82.46	3,460	P=138.50 OP=70.00	106.92
I ₃	1,600	WBP = 44.00 LWBP = 27.50	38.19	1,600	P = 68.50 OP = 43.00	56.40	2,100	P = 96.50 OP = 60.50	75.88	2,100	P = 90.50 OP = 56.50	73.23	3,160	P=134.00 OP=58.00	95.03
I ₄	1,500	WBP = 40.00 LWBP = 25.50	34.01	1,500	P = 58.00 OP = 37.00	44.12	1,970	P = 81.50 OP = 52.00	61.13	1,970	P = 77.00 OP = 48.50	59.22	2,960	P=119.50 OP=60.00	78.90
C ₁	2,800	46.00	62.00	2,800	71.00	89.06	3,680	96.00	120.86	3,680	96.00	125.71	5,520	122.50	161.04
C ₂ /MV	1,500	WBP = 46.00 LWBP = 30.00	44.10	1,500	P = 72.00 OP = 47.00	64.02	1,970	P = 99.00 OP = 65.00	84.92	1,970	P = 99.00 OP = 65.00	87.88	2,960	P=159.50 OP=79.50	112.47
J	-	41.00	41.00	-	56.50	56.50	-	76.50	76.50	-	76.50	76.50	-	98.00	98.00
Average			53.91			74.72			98.32			92.65			115.81

/a Tariff S₁: 100 to 200 VA = Rp 1,465 to 2,935/month
 /b Tariff S₁: 100 to 200 VA = Rp 2,010 to 4,020/month
 /c Tariff S₁: 100 to 200 VA = Rp 2,510 to 5,025/month
 /d Tariff S₁: 60 to 200 VA = Rp 1,750 to 5,450/month

Note: WBP = P = Peak hours (18:00-22:00)
 LWBP = OP = Off-peak hours (22:00-18:00)

For 1983, the tariff category was reduced to 17 tariff categories. Categories H₁ (now I₁/H) and H₂ (now I₂/H) for hotel consumers with low voltage were grouped into I₁ and I₂, respectively. For 1989, the tariff category is expanded from 17 to 21 categories. A new tariff category (S₃) has been established for large social institutions with medium voltage, and separate tariff categories (I₁/H, I₂/H, I₃/H) have been established for hotel consumers with low and medium voltages, who were previously grouped with industrial consumers at corresponding voltages (I₁, I₂ and I₃). The average price shown for 1986 relates to the tariff categories in 1989.

Source: PLN Finance Department

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ANNEX 4
Table 2

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN's Wilayah: An Overview (1987/88)

Indicators	Wilayah	Sumatra				Kalimantan		Sulawesi		Ambon IX	Irian Jaya X	Bali to E. Timor XI	Total outside Java	Jabotabek	West Java	Central Java	East Java	Total Java	Total Indonesia
		I	II	III	IV	V	VI	VII	VIII										
Population ('000): Total	3,239.4	10,120.7	6,873.1	14,111.2	2,941.2	5,525.2	4,220.3	8,424.6	1,747.6	1,427.9	9,805.8	64,436.8	10,811.8	31,361.6	31,459.8	32,387.6	164,010.8	174,447.5	
Of which: Rural	2,906.8	7,241.1	5,445.4	11,071.7	2,328.5	4,411.6	3,514.1	6,561.6	1,497.5	1,075.0	8,312.7	54,365.8	1,985.0	23,627.7	24,455.9	24,861.0	74,927.6	129,293.4	
Households (1988)	664.8	2,024.1	1,388.6	2,822.2	588.2	1,105.0	844.0	1,684.9	349.5	285.6	1,961.1	13,687.4	2,162.4	6,270.3	6,292.0	6,477.5	21,202.1	34,889.5	
Electrification ratio (%)	15.2	24.1	17.8	13.3	13.0	22.5	21.4	22.4	17.8	11.4	17.0	18.4	58.6	25.8	24.0	21.5	27.3	23.8	
Number of consumers ('000)	123.4	529.8	271.4	411.7	91.4	276.1	197.9	402.3	68.4	39.0	363.9	2,775.2	1,359.9	1,703.6	1,624.1	1,472.3	6,159.9	8,935.1	
Energy sales (GWh) (1987-89)	103.6	906.9	420.4	683.3	129.2	403.4	173.8	384.5	63.1	73.8	337.1	3,679.1	5,275.7	3,207.2	1,736.6	3,179.2	13,387.7	17,076.8	
Load factor (%)	52	61	57	57	54	56	55	57	49	57	51	57	69	63	61	68	69	66	
Peak load (MW) (1988)	33	242	125	232	40	113	56	108	23	21	111	1,104	1,134.8	972.7	510.2	715.8	3,250.0	4,354.0	
Installed capacity (MW)	139.4	527.9	266.8	470.3	108.2	265.7	147.0	231.2	61.7	54.3	235.7	2,510.0	-	-	-	-	5,728.0	8,238.0	
Of which: Hydro	0.4	51.0	79.0	2.4	-	30.0	33.0	2.0	-	0.1	0.5	198.4	-	-	-	-	1,903.0	2,101.4	
Steam	0.0	130.0	-	155.0	-	-	-	25.0	-	-	-	310.0	-	-	-	-	3,075.0	3,385.0	
Diesel	139.0	104.9	144.8	261.9	106.2	215.7	114.0	149.2	61.7	54.2	215.2	1,570.6	-	-	-	-	-	1,570.6	
Gas turbines	-	242.0	43.0	51.0	-	20.0	-	55.0	-	-	20.0	431.0	-	-	-	-	610.0	1,041.0	
Geothermal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140.0	140.0	
Capacity utilization (%) (Peak load ÷ installed capacity)	23.7	45.8	46.8	49.4	37.0	42.5	38.1	46.7	37.3	38.9	47.1	44.0	-	-	-	-	56.7	52.8	
Employees (total)	1,276	2,327	1,985	2,833	797	1,702	1,304	1,944	435	690	1,683	16,976	3,125	4,078	2,559	3,710	13,472	30,448	
Of which: Permanent	822	1,961	1,352	1,785	507	1,185	819	1,756	275	412	1,143	12,017	2,527	3,329	1,798	3,272	10,926	22,948	
Grades I and II	782	1,846	1,274	1,703	457	1,123	773	1,678	252	380	1,074	11,342	2,422	3,174	1,702	3,151	10,449	21,791	
Net fixed assets in operation (Rp million) (31/31/88)	68,910	235,557	193,058	284,655	68,358	89,619	96,004	121,919	48,141	53,818	126,757	1,388,795	-	-	-	-	3,538,481	-	
Revenue from operations (Rp million) (FY87/88)	12,385	82,858	41,090	69,733	14,249	43,500	18,882	39,171	7,230	9,109	35,841	374,048	-	-	-	-	1,254,821	1,624,869	
Operating expenses (Rp million) (FY87/88)	22,556	123,509	45,163	94,016	19,614	42,029	27,703	55,807	12,529	14,990	42,785	500,701	-	-	-	-	1,064,190	1,504,891	
Of which: Fuel cost	8,471	87,395	19,255	57,823	10,409	23,221	11,518	35,066	5,528	5,688	10,671	275,047	-	-	-	-	595,000	870,047	
Personnel	3,595	8,187	6,302	9,087	2,629	5,770	4,330	6,282	1,530	2,847	5,135	55,694	-	-	-	-	92,000	147,694	
Depreciation	6,011	15,831	13,964	18,958	3,867	8,170	8,179	8,157	3,773	4,570	11,069	102,548	-	-	-	-	211,500	314,048	
Operating income (loss) (Rp million) (FY87/88)	(10,171)	(40,651)	(4,073)	(24,283)	(5,365)	1,471	(8,820)	(16,637)	(5,298)	(5,882)	(6,944)	(128,653)	-	-	-	-	152,000	25,347	
T&D losses (%)	23.28	17.15	23.06	18.0	20.17	12.58	22.40	18.78	21.00	19.19	16.09	18.31	20.18	14.20	12.00	15.14	18.84	18.73	
Station use (%)	6.04	3.01	2.66	6.94	4.55	2.79	3.50	3.41	4.79	3.81	1.98	3.87	-	-	-	-	4.94	4.71	
MWh sold per employee	81.19	389.73	211.79	241.19	162.10	237.02	133.28	197.79	145.06	106.96	200.30	216.72	-	-	-	-	994.48	560.88	
Consumers per employee	96.71	227.67	136.72	145.32	114.68	162.22	151.76	206.94	157.24	56.52	216.22	163.48	-	-	-	-	457.24	293.45	
Total operating cost (Rp) per kWh sold	217.72	136.19	107.43	137.61	151.81	104.19	159.39	145.14	198.55	203.12	126.92	136.09	-	-	-	-	74.95	88.12	
Of which: Fuel cost per kWh	81.76	96.37	45.80	84.64	80.56	57.56	66.27	91.19	87.61	77.07	31.65	74.78	-	-	-	-	44.41	50.94	
Depreciation per kWh	58.02	17.45	33.21	27.75	29.93	20.25	47.06	21.21	59.79	61.92	32.83	27.87	-	-	-	-	15.79	18.39	
Personnel per kWh	34.70	9.03	15.00	13.30	20.34	14.30	24.91	16.34	24.25	38.57	15.23	15.13	-	-	-	-	6.87	8.65	

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEWPLN - Past Financial ResultsIncome Statements
(Rp billion)

Fiscal year	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
Sales increase (%)	22.1	20.3	18.0	9.9	10.4	15.1	18.4	15.5
Energy sales (GWh)	6,528	7,845	9,101	10,000	11,041	12,706	14,786	17,077
Average revenue (Rp/kWh)	41.4	43.3	53.5	78.0	97.8	96.6	93.5	92.6
Energy revenue	271	340	514	760	1,080	1,227	1,382	1,581
Other operating revenue	13	16	21	27	31	36	43	48
<u>Total Revenues</u>	<u>284</u>	<u>356</u>	<u>535</u>	<u>787</u>	<u>1,111</u>	<u>1,263</u>	<u>1,425</u>	<u>1,629</u>
<u>Operating Expenses</u>								
Fuel/bulk power	99	147	283	477	712	775	720	881
Operations	86	107	143	165	203	237	251	320
Depreciation	73	121	145	158	204	261	321	434
<u>Total Expenses</u>	<u>258</u>	<u>375</u>	<u>571</u>	<u>800</u>	<u>1,119</u>	<u>1,273</u>	<u>1,292</u>	<u>1,635</u>
<u>Operating Income</u>	<u>26</u>	<u>(19)</u>	<u>(36)</u>	<u>(13)</u>	<u>(8)</u>	<u>(10)</u>	<u>133</u>	<u>(6)</u>
Other income (net)	(6)	1	-	-	(14)	(21)	(9)	(8)
Gross interest	12	29	33	63	144	110	164	214
Less: interest during construction	12	27	28	44	120	86	77	96
<u>Interest Charged to Operations</u>	<u>-</u>	<u>2</u>	<u>5</u>	<u>19</u>	<u>24</u>	<u>24</u>	<u>87</u>	<u>118</u>
<u>Net Income /a</u>	<u>20</u>	<u>(20)</u>	<u>(41)</u>	<u>(32)</u>	<u>(46)</u>	<u>(55)</u>	<u>37</u>	<u>(132)</u>
Rate base /b	787	976	1,218	1,497	1,998	2,779	3,867	5,093
Rate of return (%)	3.5	(1.9)	(3.0)	(0.9)	(0.4)	(0.3)	3.4	(0.1)
Operating ratio (%)	91	105	107	102	101	101	91	100

/a Before taxes.

/b Based on revaluation of fixed assets from FY79/80 onwards, in accordance with Government Regulation No. 45/1986 dated October 2, 1986.

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Past Financial Results

Balance Sheets
(Rp billion)

Fiscal year	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
ASSETS								
<u>Fixed Assets</u>								
Plant in service	1,233	1,718	2,124	2,771	3,710	5,002	6,833	8,735
Less: Accumulated depreciation	143	276	435	614	842	1,136	1,584	2,153
Net plant in service	1,090	1,442	1,689	2,157	2,868	3,866	5,249	6,582
Work in progress	856	1,057	1,370	1,878	2,148	2,503	3,192	4,089
<u>Total Fixed Assets</u>	<u>1,946</u>	<u>2,499</u>	<u>3,059</u>	<u>4,035</u>	<u>5,016</u>	<u>6,369</u>	<u>8,441</u>	<u>10,671</u>
<u>Current Assets</u>								
Cash	136	179	237	142	131	124	216	239
Inventories	79	98	122	171	213	280	146	210
Receivables	63	86	108	185	186	208	226	263
Other current assets	23	23	30	44	44	45	29	26
<u>Total Current Assets</u>	<u>301</u>	<u>384</u>	<u>497</u>	<u>522</u>	<u>574</u>	<u>657</u>	<u>617</u>	<u>738</u>
<u>Other Assets</u>								
	-	-	1	1	18	20	69	143
<u>TOTAL ASSETS</u>	<u>2,247</u>	<u>2,883</u>	<u>3,557</u>	<u>4,558</u>	<u>5,608</u>	<u>7,046</u>	<u>9,127</u>	<u>11,552</u>
<u>EQUITY AND LIABILITIES</u>								
Paid-in capital	1,189	1,468	1,779	2,017	2,442	3,000	3,422	4,282
Retained earnings	(6)	(33)	(69)	(97)	(143)	(193)	(152)	(284)
Revaluation reserve	633	811	931	1,083	1,238	1,439	2,120	2,865
<u>Total Equity</u>	<u>1,812</u>	<u>2,246</u>	<u>2,641</u>	<u>3,003</u>	<u>3,537</u>	<u>4,246</u>	<u>5,390</u>	<u>6,863</u>
Long-term debt (net)	151	276	417	866	1,302	1,856	2,535	3,140
Current liabilities	67	112	208	235	227	312	465	696
Other liabilities /a	213	249	291	454	542	632	737	853
<u>TOTAL EQUITY AND LIABILITIES</u>	<u>2,247</u>	<u>2,883</u>	<u>3,557</u>	<u>4,558</u>	<u>5,608</u>	<u>7,043</u>	<u>9,127</u>	<u>11,552</u>
Debt % of debt + equity /b	10	14	17	27	32	36	40	41
Current ratio (times)	4.6	3.4	2.4	2.2	2.5	2.1	1.3	1.1

/a Including consumers' contributions and deposits.

/b Including consumers' contributions, but excluding revaluation surplus.

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Past Financial Results

Funds Flow Statements
(Rp billion)

Fiscal year	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
<u>Internal Sources of Funds</u>								
Net income before interest and tax	20	(18)	(36)	(13)	(22)	(31)	124	(14)
Depreciation	73	121	145	158	204	261	321	434
Consumers contributions and other adjustments	42	30	45	167	71	89	108	116
<u>Total Internal Funds</u>	<u>135</u>	<u>133</u>	<u>154</u>	<u>312</u>	<u>253</u>	<u>319</u>	<u>553</u>	<u>536</u>
<u>Operational Requirements</u>								
Variation working capital and others	23	(5)	(41)	93	71	68	(107)	107
Debt repayment	-	8	11	21	52	112	87	269
Interest charged to operations	-	2	5	19	24	24	87	118
<u>Total Operational Requirement</u>	<u>23</u>	<u>5</u>	<u>(25)</u>	<u>133</u>	<u>147</u>	<u>204</u>	<u>(67)</u>	<u>494</u>
Total capital investment	303	496	585	981	1,030	1,408	1,712	1,918
<u>Balance to be Financed</u>	<u>191</u>	<u>368</u>	<u>406</u>	<u>802</u>	<u>924</u>	<u>1,293</u>	<u>1,226</u>	<u>1,875</u>
<u>Financed by</u>								
Borrowings	64	132	153	469	488	728	896	1,038
Government contributions	191	279	311	238	425	558	442	860
<u>Total Capital Sources</u>	<u>255</u>	<u>411</u>	<u>464</u>	<u>707</u>	<u>913</u>	<u>1,286</u>	<u>1,318</u>	<u>1,898</u>
<u>Cash Increase/Decrease</u>	<u>64</u>	<u>43</u>	<u>58</u>	<u>(95)</u>	<u>(11)</u>	<u>(7)</u>	<u>92</u>	<u>23</u>
Debt service coverage ratio (times)	-	10.3	6.8	3.6	2.4	1.7	2.6	1.1
Contribution to construction:								
Annual (%)	37.0	25.8	30.6	18.2	11.4	8.7	23.0	1.0
3-year average (%) <u>/a</u>	28.4	29.9	30.3	23.6	18.3	12.2	15.3	10.7

/a Current and two preceding years.

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Indonesia Operations

Income Statements
(Rp billion)

Fiscal year	Actual		Estimate	Projection					
	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Energy sales (GWh)	14,786	17,077	19,882	22,697	26,112	29,932	34,169	38,850	43,862
Sales increase (%)	16.4	15.5	16.4	14.2	15.1	14.6	14.2	13.7	12.9
Average revenue (Rp/kWh)	93.47	92.60	92.30	115.81	120.52	125.35	130.38	135.62	141.01
Average revenue increase (%)	(3.3)	(0.9)	(0.3)	25.0	4.0	4.0	4.0	4.0	4.0
Operating Revenues									
Energy revenue	1,382	1,581	1,835	2,629	3,147	3,762	4,455	5,269	6,185
Other operating revenue	43	48	55	65	75	86	102	117	136
Total Revenue	1,425	1,629	1,890	2,694	3,222	3,838	4,557	5,386	6,321
Operating Expenses									
Fuel and lubricating oil	701	870	1,040	1,160	1,240	1,455	1,660	1,799	1,945
Power purchased	19	11	10	12	13	13	13	13	13
Personnel expense	131	149	189	215	228	242	257	272	288
Repair/maintenance	76	116	101	135	161	187	224	284	333
Depreciation	321	434	567	640	860	997	1,156	1,390	1,661
Other expenses	44	55	60	89	95	101	106	113	119
Total Expenses	1,292	1,635	1,967	2,251	2,597	2,995	3,416	3,851	4,359
Operating Income	133	(6)	(77)	443	625	843	1,141	1,535	1,962
Nonoperating income	13	25	7	13	18	23	30	39	50
Nonoperating expense	22	33	13	34	37	41	46	50	54
Other Income (Net)	(9)	(8)	(6)	(21)	(19)	(18)	(16)	(11)	(4)
Net Income Before Interest	124	(14)	(83)	422	606	825	1,125	1,524	1,958
Total interest	164	214	257	321	440	687	998	1,363	1,721
Less: I.D.C.	77	96	136	68	155	393	697	1,024	1,393
Interest charged to operations	87	118	121	253	285	294	301	339	328
Net Income	37	(132)	(204)	169	321	531	824	1,185	1,630
Rate base	3,867	5,093	6,924	8,955	10,628	12,173	13,957	17,008	20,411
Rate of return (%)	3.4	(0.1)	(1.1)	4.9	5.9	6.9	8.2	9.0	9.6
Operating ratio (%)	91	100	104	84	81	80	75	72	69

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Java Operations

Income Statements
(Rp billion)

Fiscal year	Actual		Estimate	Projection					
	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Energy sales (GWh)	11,577	13,398	15,501	17,754	20,293	23,235	26,488	30,065	33,873
Sales increase (%)	15.2	15.7	15.7	14.5	14.3	14.5	14.0	13.5	13.0
Average revenue (Rp/kWh)	91.69	90.99	90.56	113.20	117.73	122.44	127.34	132.43	137.73
Average revenue increase (%)	(3.4)	(0.8)	(0.4)	25.0	4.0	4.0	4.0	4.0	4.0
<u>Operating Revenues</u>									
Energy revenue	1,061	1,219	1,404	2,010	2,389	2,845	3,373	3,982	4,679
Other operating revenue	33	36	46	47	53	60	69	78	89
<u>Total Revenues</u>	<u>1,095</u>	<u>1,255</u>	<u>1,450</u>	<u>2,057</u>	<u>2,442</u>	<u>2,905</u>	<u>3,442</u>	<u>4,060</u>	<u>4,768</u>
<u>Operating Expenses</u>									
Fuel and lubricating oil	450	595	722	797	843	1,020	1,193	1,263	1,395
Power purchased	17	10	9	11	11	11	11	11	11
Personnel expense	81	92	134	130	138	146	155	164	174
Repair/maintenance	46	73	68	87	102	115	139	179	213
Depreciation	225	300	392	140	601	689	797	966	1,166
Other expenses	29	33	48	63	67	71	75	80	84
<u>Total Expenses</u>	<u>848</u>	<u>1,103</u>	<u>1,373</u>	<u>1,528</u>	<u>1,762</u>	<u>2,052</u>	<u>2,370</u>	<u>2,663</u>	<u>3,043</u>
<u>Operating Income</u>	<u>247</u>	<u>152</u>	<u>77</u>	<u>529</u>	<u>680</u>	<u>853</u>	<u>1,072</u>	<u>1,397</u>	<u>1,725</u>
Nonoperating income	11	7	4	7	14	18	23	30	39
Nonoperating expense	14	9	7	18	29	32	35	39	42
<u>Other Income (Net)</u>	<u>(3)</u>	<u>(2)</u>	<u>(3)</u>	<u>(11)</u>	<u>(15)</u>	<u>(14)</u>	<u>(12)</u>	<u>(9)</u>	<u>(3)</u>
<u>Net Income Before Interest</u>	<u>244</u>	<u>150</u>	<u>74</u>	<u>518</u>	<u>665</u>	<u>839</u>	<u>1,060</u>	<u>1,388</u>	<u>1,722</u>
Interest charged to operations	68	98	101	203	215	223	210	226	204
<u>Net Income</u>	<u>176</u>	<u>52</u>	<u>(27)</u>	<u>315</u>	<u>450</u>	<u>616</u>	<u>850</u>	<u>1,162</u>	<u>1,518</u>
Rate base (revalued)	2,846	3,652	4,980	6,614	7,772	8,641	9,802	12,050	14,639
Rate of return (%)	8.7	4.2	1.5	8.0	8.7	8.9	10.9	11.6	11.8
Operating ratio (%)	78	88	94	74	72	71	69	66	64

INDONESIAPOWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEWPLN - Non-Java OperationsIncome Statements
(Rp billion)

Fiscal year	Actual		Estimate	Projection					
	1988/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
Energy sales (GWh)	3,209	3,679	4,381	4,943	5,819	6,697	7,681	8,786	9,889
Sales increase (%)	20.9	14.6	19.1	12.8	17.7	15.1	14.7	14.4	12.8
Average revenue (Rp/kWh)	99.86	98.47	98.32	126.20	130.21	135.42	140.84	146.47	152.33
Average revenue increase (%)	(2.9)	(1.4)	(0.2)	27.3	4.0	4.0	4.0	4.0	4.0
<u>Operating Revenues</u>									
Energy revenue	320	362	431	619	758	907	1,082	1,287	1,506
Other operating revenue	9	12	9	18	22	28	33	39	47
<u>Total Revenues</u>	<u>330</u>	<u>374</u>	<u>440</u>	<u>637</u>	<u>780</u>	<u>933</u>	<u>1,115</u>	<u>1,326</u>	<u>1,553</u>
<u>Operating Expenses</u>									
Fuel and lubricating oil	251	275	318	363	397	435	467	516	550
Power purchased	2	1	1	1	2	2	2	2	2
Personnel expense	50	57	55	86	90	96	102	108	114
Repair/maintenance	30	43	33	48	59	72	85	105	120
Depreciation	96	134	175	200	259	308	359	424	495
Other expenses	15	22	12	26	28	30	31	33	35
<u>Total Expenses</u>	<u>444</u>	<u>532</u>	<u>594</u>	<u>723</u>	<u>835</u>	<u>943</u>	<u>1,046</u>	<u>1,188</u>	<u>1,316</u>
<u>Operating Income</u>	<u>(114)</u>	<u>(158)</u>	<u>(154)</u>	<u>(86)</u>	<u>(55)</u>	<u>(10)</u>	<u>69</u>	<u>138</u>	<u>237</u>
Nonoperating income	2	18	3	6	4	5	7	9	11
Nonoperating expense	8	24	6	16	8	9	11	11	12
<u>Other Income (Net)</u>	<u>(6)</u>	<u>(6)</u>	<u>(3)</u>	<u>(10)</u>	<u>(4)</u>	<u>(4)</u>	<u>(4)</u>	<u>(2)</u>	<u>(1)</u>
<u>Net Income Before Interest</u>	<u>(120)</u>	<u>(164)</u>	<u>(157)</u>	<u>(96)</u>	<u>(59)</u>	<u>(14)</u>	<u>65</u>	<u>136</u>	<u>236</u>
Interest charged to operations	19	20	20	50	70	71	91	113	124
<u>Net Income</u>	<u>(139)</u>	<u>(184)</u>	<u>(177)</u>	<u>(146)</u>	<u>(129)</u>	<u>(85)</u>	<u>(26)</u>	<u>23</u>	<u>112</u>
Rate base (revalued)	1,021	1,441	1,944	2,341	2,856	3,532	4,155	4,958	5,772
Rate of return (%)	(11.1)	(10.9)	(7.8)	(3.7)	(1.9)	(0.3)	1.7	2.8	4.1
Operating ratio (%)	135	142	135	113	107	101	94	90	85

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Indonesia Operations

Balance Sheets
(Rp billion)

Fiscal year	Actual		Estimate 1988/89	Projection					
	1986/87	1987/88		1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
ASSETS									
Fixed Assets									
Plant in service	6,833	8,735	12,053	14,621	17,653	20,416	24,300	30,162	35,463
Less: Accum. depreciation	1,584	2,153	2,863	3,694	4,773	5,981	7,402	9,120	11,185
Operating plant	<u>5,249</u>	<u>6,582</u>	<u>9,190</u>	<u>10,927</u>	<u>12,880</u>	<u>14,435</u>	<u>16,898</u>	<u>21,042</u>	<u>24,278</u>
Work in progress	3,192	4,089	4,541	5,750	7,061	9,687	12,615	14,627	18,551
Total Fixed Assets	<u>8,441</u>	<u>10,671</u>	<u>13,731</u>	<u>16,677</u>	<u>19,931</u>	<u>24,122</u>	<u>29,513</u>	<u>35,669</u>	<u>42,829</u>
Current Assets									
Cash and bank	210	239	100	100	344	420	480	525	585
Accounts receivable	181	204	252	302	345	411	488	577	678
Inventories	146	210	211	247	241	278	322	371	423
Other current assets	74	85	87	165	182	200	220	242	266
Total Current Assets	<u>617</u>	<u>738</u>	<u>650</u>	<u>815</u>	<u>1,112</u>	<u>1,309</u>	<u>1,510</u>	<u>1,715</u>	<u>1,951</u>
Other assets	69	143	211	228	232	234	237	239	241
TOTAL ASSETS	<u>9,127</u>	<u>11,552</u>	<u>14,592</u>	<u>17,720</u>	<u>21,275</u>	<u>25,665</u>	<u>31,260</u>	<u>37,623</u>	<u>45,021</u>
EQUITY AND LIABILITIES									
Equity									
Paid-in capital	3,422	4,282	5,605	6,980	7,840	8,520	9,110	9,675	10,225
Retained earnings	(152)	(284)	(485)	(316)	5	536	1,360	2,545	4,175
Revaluation surplus	2,120	2,865	3,547	4,430	5,416	6,300	7,369	8,677	10,256
Total Equity	<u>5,390</u>	<u>6,863</u>	<u>8,667</u>	<u>11,094</u>	<u>13,261</u>	<u>15,356</u>	<u>17,839</u>	<u>20,897</u>	<u>24,656</u>
Long-term debt (LTD)	2,748	3,458	4,740	5,240	6,400	8,439	11,255	14,217	17,458
Less: Current portion	213	318	258	260	332	349	364	382	435
Net long-term debt	<u>2,535</u>	<u>3,140</u>	<u>4,482</u>	<u>4,980</u>	<u>6,068</u>	<u>8,090</u>	<u>10,891</u>	<u>13,835</u>	<u>17,023</u>
Current Liabilities									
Current portion of LTD	213	318	258	260	353	349	364	382	435
Accounts payable	218	316	180	246	262	284	310	341	378
Other current liabilities	34	62	15	20	21	22	23	24	26
Total Current Liabilities	<u>465</u>	<u>696</u>	<u>453</u>	<u>526</u>	<u>636</u>	<u>655</u>	<u>697</u>	<u>747</u>	<u>839</u>
Consumers' contributions	539	606	695	765	904	1,053	1,220	1,408	1,620
Other liabilities /a	198	247	292	355	426	511	613	736	883
TOTAL EQUITY & LIABILITIES	<u>9,127</u>	<u>11,552</u>	<u>14,592</u>	<u>17,720</u>	<u>21,275</u>	<u>25,665</u>	<u>31,260</u>	<u>37,623</u>	<u>45,021</u>
Current ratio (times)	1.3	1.1	1.4	1.5	1.8	2.0	2.2	2.3	2.3
Debt as % debt plus equity /b	39.9	40.5	43.5	40.1	40.9	44.4	48.2	50.4	51.5
Accounts receivable (days)	48	47	42	42	40	40	40	40	40

/a Including consumers' deposits.

/b Including consumers' contributions, but excluding revaluation surplus.

INDONESIA

POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN - Indonesia Operations

Funds Flow Statements
(Rp billion)

Fiscal year	Actual		Estimate	Projection					
	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95
SOURCES OF FUNDS									
<u>Internal Sources</u>									
Net income before interest	124	(14)	(83)	422	606	825	1,125	1,524	1,958
Depreciation	321	434	567	640	860	997	1,156	1,390	1,661
Consumers' contributions	63	67	89	70	139	149	167	188	212
Other	45	49	50	71	71	85	102	123	147
<u>Total Internal Sources</u>	<u>553</u>	<u>536</u>	<u>623</u>	<u>1,203</u>	<u>1,676</u>	<u>2,058</u>	<u>2,550</u>	<u>3,225</u>	<u>3,978</u>
<u>Debt Service</u>									
Interest charged operations	87	118	121	253	295	294	301	339	328
Debt repayment	87	269	260	281	310	332	349	364	362
<u>Total Debt Service</u>	<u>174</u>	<u>386</u>	<u>381</u>	<u>534</u>	<u>605</u>	<u>626</u>	<u>650</u>	<u>703</u>	<u>710</u>
<u>Net Internal Sources</u>	<u>379</u>	<u>150</u>	<u>242</u>	<u>669</u>	<u>1,081</u>	<u>1,430</u>	<u>1,900</u>	<u>2,522</u>	<u>3,268</u>
<u>Borrowings</u>									
Existing borrowings	896	1,038	1,602	558	356	154	161	71	-
Future borrowings	-	-	-	221	1,042	2,199	2,987	3,236	3,568
<u>Total Borrowings</u>	<u>896</u>	<u>1,038</u>	<u>1,602</u>	<u>779</u>	<u>1,398</u>	<u>2,353</u>	<u>3,148</u>	<u>3,307</u>	<u>3,568</u>
Government equity	422	860	1,323	1,375	860	680	590	565	550
<u>TOTAL SOURCES</u>	<u>1,697</u>	<u>2,048</u>	<u>3,167</u>	<u>2,823</u>	<u>3,339</u>	<u>4,463</u>	<u>5,638</u>	<u>6,394</u>	<u>7,386</u>
APPLICATIONS OF FUNDS									
<u>Capital Expenditure</u>									
Construction expenditure	1,635	1,823	2,813	2,646	2,973	3,912	4,782	5,215	5,849
Interest during construction	77	96	136	68	155	393	697	1,024	1,393
<u>Total Capital Expenditure</u>	<u>1,712</u>	<u>1,918</u>	<u>2,949</u>	<u>2,713</u>	<u>3,129</u>	<u>4,305</u>	<u>5,479</u>	<u>6,239</u>	<u>7,242</u>
Changes in working capital and other	(15)	130	218	110	210	158	159	155	144
<u>TOTAL APPLICATIONS</u>	<u>1,697</u>	<u>2,048</u>	<u>3,167</u>	<u>2,823</u>	<u>3,339</u>	<u>4,463</u>	<u>6,638</u>	<u>6,394</u>	<u>7,386</u>
<u>Increase (Decrease) in Cash</u>	<u>92</u>	<u>23</u>	<u>(139)</u>	<u>-</u>	<u>244</u>	<u>76</u>	<u>60</u>	<u>45</u>	<u>60</u>
Cash at beginning of year	124	216	239	100	100	344	420	480	525
Cash at end of year	216	239	100	100	344	420	480	525	585
Annual debt service coverage ratio (times)	2.6	1.1	1.3	2.5	2.9	3.5	4.1	5.1	
<u>Self-Financing Ratio (%)</u>									
Annual	23.0	1.0	0.8	20.6	27.8	29.5	31.8	37.9	43.1
3-year moving average (current + 2 past years)	15.8	10.7	6.7	3.0	16.6	26.6	30.1	33.6	38.1

INDONESIA
POWER SECTOR INSTITUTIONAL DEVELOPMENT REVIEW

PLN'S PROCEDURE FOR THE
PROCUREMENT OF CONSULTANTS

<u>Previous Regulation</u>	<u>New Regulation</u>
1. Preparation of TOR	1. Same
2. Preparation of Shortlist	2. Same
3. PLN's BOD approval of TOR and Shortlist	3. Same
4. Sending the TOR & Shortlist to TPP/Sekneg	Not required
5. Sending the TOR & Shortlist to Bank/Donor	4. Same
6. TOR & Shortlist approved by TPP/Sekneg	Not required
7. TOR & Shortlist approved by Bank/Donor	5. Same
8. Invitation Later to Consultants to submit proposal	6. Same
9. Prebid Conference	7. Same
10. Forming PLN's Team for Evaluation & Negotiations	8. Same
11. Preparation for Evaluation	9. Same
12. Evaluation of technical proposal	10. Same
13. Sending the evaluation result to PLN's BOD	11. Same
14. PLN's BOD approval of evaluation result	12. Same
15. Sending the evaluation result to TPP/Sekneg	Not required
16. TPP/Sekneg approval of the evaluation result	Not required
17. Sending the evaluation result to Bank/Donor	13. Same
18. Bank/Donor approval of the evaluation result	14. Same
19. Invitation to the first in rank Consultant for negotiations	15. Same
20. PLN's internal meeting for negotiations	16. Same
21. Negotiations started	17. Same
22. Negotiations finished	18. Same
23. Sending invitation letter to the Interministerial meeting	19. Changed to: "Sending the draft contract to PLN's BOD meeting".

<u>Previous Regulation</u>	<u>New Regulation</u>
24. Interministerial meeting	20. Changed to: "PLN's BOD approval".
25. Sending the draft contract to TPP/Sekneg (for contracts more than Rp 500 million)	21. Changed to: "Sending the draft contract to MENKO EKUIN (for contracts more than Rp 3 billion) Not required
26. Discuss the draft contract in TPP/Sekneg	22. Changed to: "MENKO EKUIN approval of the draft contract".
27. TPP/Sekneg approval of the draft contract	23. Same
28. Sending the draft contract to Bank/Donor for approval	24. Same
29. Bank/Donor approval of draft contract	Not required
30. Sending the draft contract to TPP of Ministry of Mines & Energy (for contracts less than Rp 500 million)	Not required
31. Discuss the draft contract in TPP of Ministry of Mines & Energy	Not required
32. TPP Ministry of Mines and Energy approval	25. Same
33. Contract signing	26. Same
34. Contract distributed to all PLN bodies	27. Same
35. Sending the signed contract to BAPPENAS for approval	

Total duration about 14,5 months

Total duration about 11,5 months

