

Cv-165

**FILE COPY**

RESTRICTED

Report No. PU-18a

This report was prepared for use within the Bank and its affiliated organizations. They do not accept responsibility for its accuracy or completeness. The report may not be published nor may it be quoted as representing their views.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT  
INTERNATIONAL DEVELOPMENT ASSOCIATION

---

APPRAISAL OF THE  
ELECTRICITY DISTRIBUTION PROJECT,  
DJAKARTA  
OF THE  
PERUSAHAAN LISTRIK NEGARA  
INDONESIA

October 8, 1969

## CURRENCY EQUIVALENTS

### Free Market Rate, December 31, 1968

US\$1.00	=	401 Rp.
100 Rupiahs	=	US\$0.25
1 Million Rupiahs	=	US\$2,500

### Basic Exchange Rate, December 31, 1968

US\$1.00	=	326 Rp.
100 Rupiahs	=	US\$0.31
1 Million Rupiahs	=	US\$3,067

## MEASURES AND EQUIVALENTS

kw	=	kilowatt
Mw	=	megawatt (1,000 kw)
kwh	=	kilowatt hour
=	kilovolt	
VA	=	volt ampere
KVA	=	kilovolt ampere (1,000 VA)
MVA	=	megavolt ampere (1,000 KVA)

## ABBREVIATIONS AND ACRONYMS

PLN	-	Perusahaan Listrik Negara
Rp	-	Rupiah

PLN's fiscal year ends on December 31st.

INDONESIA

APPRAISAL OF THE ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA  
OF THE PERUSAHAAN LISTRIK NEGARA

TABLE OF CONTENTS

	<u>Page No.</u>
SUMMARY AND CONCLUSIONS .....	i - ii
1. INTRODUCTION .....	1
2. THE POWER SECTOR AND THE BENEFICIARY .....	3
Economic Background .....	3
Organization of the Sector .....	3
PLN's Internal Organization .....	5
Facilities of PLN .....	6
Deficiencies in System Operating Conditions .....	7
Deficiencies in Financial Operations .....	8
Available Financial Statements .....	8
Valuation of Assets .....	9
Tariffs .....	10
3. IMPROVEMENT OF THE SECTOR .....	11
Use of Management Consultants .....	11
4. THE PROJECT .....	13
Expansion Program .....	13
Description of IDA Project .....	13
Procurement and Disbursements .....	14
Engineering, Installation and Scheduling .....	15
5. JUSTIFICATION OF THE PROJECT .....	16
Incremental Rate of Return .....	17
6. FINANCIAL PLAN .....	18
7. AGREEMENTS REACHED DURING NEGOTIATIONS .....	19

---

This report has been prepared by Messrs. D. King and M. J. Reis.



## LIST OF ANNEXES

1. Organization Chart of the Public Power Sector
2. Public Power Generating Capacity
3. Public Electric Power - Five-Year Development Plan, 1969-73
4. Terms of Reference, Management Consultants
5. Project Cost Estimate
6. Actual and Forecast Sales 1965-73
7. Rate of Return on the Project
8. Summary PLN Estimated Earnings 1967-68
9. Tariffs

### Diagram

12 kv, 30 kv, 70 kv and 160 kv Networks in Java

### Map

Location of Main Generation Facilities with Installed Capacity of 5000 kw and above.



## SUMMARY AND CONCLUSIONS

i. This report appraises a project for the reinforcement and expansion of the electricity distribution system in the city of Djakarta, Indonesia, and for the provision of extensive management consulting services to improve the organization and efficiency of the power sector. An IDA credit of US\$15 million equivalent covering the foreign exchange cost of the project, with the possibility that the credit would finance a small amount of domestically manufactured equipment, is proposed. The credit would represent 72% of the total cost of the project. The Government would transfer the proceeds of the credit to Perusahaan Listrik Negara (PLN), the Government owned electricity utility, which is to carry out the project. The Government would provide the local currency funds. This would be the Bank Group's first operation in the power sector in Indonesia.

ii. In common with other sectors, upkeep of electric power facilities and their development have lagged during the long period of political and economic difficulties in Indonesia and in general power supply is now inadequate or worse. Improvement and expansion of electric power services therefore rank high among the priorities for economic action in Indonesia in the next few years and the urgent need for a number of investments in the power sector has been established. In this respect the Government, as a part of its first Five-Year Plan submitted to Parliament in 1969, has prepared a plan of expansion of publicly owned electricity facilities for the period 1969-73. An investment of about US\$260 million equivalent, of which 72% is foreign exchange, is involved, its implementation depending primarily on the degree of multilateral and bilateral assistance provided to the sector. This program would be aimed at increasing generation, transmission and distribution capacity in the country and includes the proposed Association credit.

iii. A very difficult electric power situation exists in Djakarta as the result of inadequate distribution facilities. Until they are expanded the growth of electricity use in the city will be severely limited and commercial and industrial rehabilitation and growth will be hampered.

iv. The organization and operations of the power sector are very weak. Management, operations, engineering/planning, financial operations and organization of PLN are all in need of extensive rehabilitation and improvement. For this purpose, management consulting services, estimated to cost US\$1.4 million equivalent, have been included in the proposed credit. An additional US\$600,000 equivalent is also included for engineering services for the proposed distribution system expansion. It would be desirable, but not essential for all consulting services to be provided by a single firm.

v. Given the objective of achieving the effective autonomy of PLN, and its efficient operation, a number of conditions would be attached to the proposed credit. Achievement of these goals would depend, of course, not only on the Government's intentions, but on the rehabilitation and improvement of PLN's organization and operations to the extent necessary to enable it to function effectively. The process will take some time in view of the condition of PLN. The proposed arrangements and conditions

reflect the Association's approach: this envisages a first credit to get started the rehabilitation of PLN followed, assuming satisfactory progress is achieved, by further credits/lending with more conventional conditions.

vi. There would be covenants providing for the possible amendment and/or consolidation of the laws under which PLN operates, and the re-organization and restructuring of PLN, as agreed by the Government and the Association. Additionally, the Government would undertake to implement other recommendations of the consultants found to be appropriate. In any event the Government would undertake to vest PLN with full and exclusive responsibility for the public power sector by April 1, 1971.

vii. There would also be covenants covering a valuation of assets, with the objective of laying the groundwork for rational future financial operations; and the implementation of an appropriate tariff structure and tariff levels following the valuation of assets. The immediate transfer to PLN of certain responsibilities for procurement and construction would be a condition of effectiveness of the credit, to enable PLN to efficiently proceed with the project.

viii. The proposed credit would finance the purchase of equipment and consulting services. Contingencies are not included since the project, which would provide facilities for about two years of the Five-Year Plan, is part of a continuing program. Cost data are based on the planned program of PLN modified on the basis of up-to-date unit costs provided by the Association. Both the scope of the project and certain details of it are subject to review by the consultants. Contracts would be awarded on the basis of international competitive bidding with some possibility that prospective Indonesian manufacturers of electric equipment would compete for the orders with a preference of 15%.

ix. The incremental rate of return on the project is estimated to be at least 20%, which is satisfactory.

x. The project would provide a suitable basis for an Association credit of US\$15 million to the Government of Indonesia. The Government would transfer the proceeds of the credit to PLN in the form of equity, subject to Association approval of any conditions attached thereto.

## 1. INTRODUCTION

1.01 The Bank's resident mission in Indonesia recommended in February 1969 that an IDA credit should be considered for the expansion of the electricity distribution system in Djakarta. The Government of Indonesia followed with an official request in the same month. The resident mission advised that the weakness of the distribution system was impeding the restoration and development of industry in the city and region, and that the electric power sector operations were in urgent need of reorganization.

1.02 As a result of the difficult political and economic conditions experienced in Indonesia in recent years the upkeep and development of electric power facilities were neglected. Moreover, the operations of the public power sector became disorganized and inefficient. The improvement and expansion of electric power facilities, and the reorganization and rehabilitation of the operations of the sector, therefore rank high among the priorities in Indonesia in the next few years.

1.03 A number of electric power projects are under construction assisted by bilateral or other forms of financing. The Indonesian authorities, partly with the assistance of Bank staff, have established the urgent need for a number of additional investments in the power sector and seek financing for them, largely from international lending agencies. The Government's five year plan for the extension of publicly owned electricity facilities for the period 1969-73 (para. 4.01), gives the plans in this connection. The proposed credit is part of the program.

1.04 This appraisal report covers a proposed IDA credit of US\$15 million equivalent to the Government of Indonesia for relending to Perusahaan Listrik Negara (PLN), the state owned electricity corporation, responsible for the public supply of electricity throughout Indonesia, which would carry out the project. <sup>1/</sup> The credit would finance the foreign exchange cost of the project, with the possibility that a small amount of domestically manufactured equipment would be financed by it as well. The project would consist of the reinforcement and expansion of the distribution system in Djakarta and environs, for two years of a five-year program aimed at providing facilities to supply the large repressed demand and load growth under satisfactory service conditions. The Government of Indonesia looks, as well, to the Association for assistance in rehabilitating the organization and operations of the sector and to that end the credit would also include the cost of extensive management consulting services for this purpose. This would be the Bank Group's first loan or credit for power to Indonesia.

1.05 The problems of the power sector and PLN and their solution must to a considerable extent be considered in the context of problems common to Indonesian government enterprises. The following extract from the Bank's most recent Economic Report on Indonesia, provides a useful background in this respect.

---

<sup>1/</sup> Chapter II describes the roles of the other Government offices involved in the power sector.

"As the 1969/70 year began, the Government was giving systematic consideration to a whole series of policy, institutional and procedural problems which it faces in attempting the long-delayed beginnings of economic development. Many of these problems represent the heritage of the earlier period of economic deterioration and retrogression and the accompanying decay and destruction of governmental and private organizations and economic activity. Among the problems to which consideration is being given, and on which action is to be taken gradually as study and circumstances permit, are: the combination of overstaffed government departments and enterprises with both inadequate provisions for maintenance and other services and salary levels so low as to ensure inefficiency and promote corruption; a tax structure and tax rates inappropriate to development and increased revenue collection; a customs tariff similarly in need of revision; the necessity for stimulating and encouraging expansion of both current production and productive investment by both private and government enterprises; the need, in the interest of efficiency, for reorganization of many government enterprises and for changes in structure and tariffs of public service enterprises; the need for ultimate dismantlement of the system of direct distribution of food and other commodities to Government employees and the armed forces, etc." 1/

1.06 Because of the disorganized state of the power sector and PLN it was not possible to appraise the project along customary lines. For example, this report does not include the usual financial statements, because PLN accounting records are essentially meaningless. Inasmuch as the predominant problem is that of organization and management, this topic is discussed in considerable detail.

1.07 This report was prepared by Messrs. D. King and M. J. Reis. The resident mission in Indonesia provided valuable information concerning current power sector activity, and valuable assistance in clarifying the issues with the Indonesian Authorities. The reports prepared by the Bank's economic missions to Indonesia in 1967 and 1968 were used extensively as a source of information.

---

1/ Extract from Report No. EAP-5a - Current Economic Position and Prospects of Indonesia - May 16, 1969.

## 2. THE POWER SECTOR AND THE BENEFICIARY

### Economic Background

2.01 Indonesia consists of some 3,000 islands extending about 5,000 km east-west and 2,000 km north-south. The total land area of approximately 1.9 million km<sup>2</sup> is about four times that of France. The population, which is growing 2.4% annually, was estimated at 115 million people in 1968. Seventy five percent live on the Island of Java on which Djakarta, the capital city with a population of 4,000,000, is located. Java has one of the highest population densities in the world, about 1,500 people per square mile. Sumatra has the next largest population concentration and the remainder are scattered among the many other islands of the archipelago.

2.02 The economy of Indonesia, and of Java, is essentially agrarian. Manufacturing and trade accounted for only 28% of net domestic product in 1967. Oil production is predominantly in Sumatra. With few exceptions, industry in the country is of the medium and light type, located mainly in the large cities of Java. Purchasing power is low, with an estimated per capita income in 1968 of US\$83.

2.03 Rehabilitation and development of new industry is necessary to offset its deterioration in recent years through neglect and obsolescence. This applies to the power sector equally well. A measure of the situation is that the consumption of electricity in Java of about 15 kwh per capita is one of the lowest in the world.

2.04 One of the important factors in the economy in recent years has been the condition of severe inflation starting about 1960. This has had a considerable bearing on the lack of development of the electric power sector in this period, as well as influencing other elements of the economy. This condition has improved and during the past year prices have been relatively stable.

### Organization of the Sector

2.05 In the period 1953-57 the three Dutch owned electric utility companies supplying power in Indonesia were nationalized by the Indonesian Government. The transfer was not amicable, records were destroyed and there was no transition period during which the new Indonesian management could have been trained by its predecessors. During subsequent years the decline in the efficiency of the utilities was marked by inadequate expansion and poor operating conditions. In 1961 the three nationalized utilities were consolidated into a single entity, the predecessor of PLN, responsible for all public electric utility facilities in the country. In 1965, when PLN was organized, it was relieved of the responsibility for major power station construction, which is at present carried out under other arrangements, under the authority of the Minister of Public Works and Power. Moreover, given the uncertainties as to fund availabilities, planning, which is carried out both by offices within the Ministry and PLN itself, has at best been haphazard. The sector organization is shown in Annex 1.

2.06 PLN is prospectively a very large utility. Present public and captive power generating capacity for all Indonesia (Annex 2) is only some 7 watts per capita, which compares, for example, with about 30 for India. Thus, use of electric power in Indonesia is very limited and electricity usage could grow at a very fast rate, given favorable development conditions. The public supply's inability to meet overall requirements has given rise to a substantial captive generating capacity, that is, generation provided by industrial and commercial enterprises for their own use.

2.07 PLN is presently incapable of providing adequate electric service, nor is there any reason to expect that meaningful improvements in its operation will be made without outside advice and assistance. Among its principal weaknesses are the following:

- (i) purchasing and contracting are outside managements' control, with the result that expenditures may not be responsive to priority needs. Moreover, the assumption of these functions by Government has led to a deterioration of the planning function in PLN;
- (ii) there is surplus staff; staff efficiency, pay, and morale are low;
- (iii) plant is inadequate, as are operating and maintenance techniques and procedures;
- (iv) accounting and other records are inadequate, information for control over operations is lacking or not available in a timely fashion; communications are poor;
- (v) tariffs are possibly too low, and operating expenses are almost certainly too high; collections are poor, contributing to the financial conditions under which PLN appears to operate at a loss;

These problems are discussed in the remainder of this Chapter.

2.08 PLN operates under the authorization of a body of laws relating to government agencies and enterprises in general, and a 1965 Government decree concerning it specifically. Taken in its entirety, this body of laws appears to convey autonomous powers to PLN. However, there are some conflicts in the laws, and moreover, the authority of PLN in certain respects is not established or is ill-defined.

2.09 Thus the Government retains the responsibility for setting tariffs, on the principle that their level is related to the general social welfare. The abstract principle of making a profit is recognized in the 1965 decree but it contains no guidelines in this connection, such as, for example, that of a rate of return on investment.

2.10 Notwithstanding the provisions contained in the laws, PLN does not in reality function as an autonomous body, but functions instead as a government agency responsible to the Directorate General of Power, an office of the Ministry of Public Works and Power. The Directorate General with a staff of engineers and administrative assistants controls the operations of PLN, and those of the state-owned gas company and state construction organizations as indicated in Annex 1. The Directorate General is for practical purposes the body through which the Government administers the power sector. The actual function of PLN is primarily that of implementing policies and administering them on a day-to-day basis.

2.11 PLN's management has thus been relegated to a secondary role. With the growth of the sector, this situation will become increasingly unsatisfactory and it is very important that the actual arrangements which now exist between Government, the Directorate General and PLN should be put on a more sensible basis as soon as is consistent with the capabilities of the respective organizations and personnel. PLN should, subject to normal government restraints, become autonomous with respect to setting tariff levels, procurement, construction, system planning, employment, and finance, including the raising of funds, for the public power sector. This would likely involve some modification, and consolidation, of the laws governing PLN, and the transfer of responsibility for the public power sector from the Directorate General to PLN.

2.12 Of immediate importance to the execution of the project itself is the situation whereby the Director General undertakes the negotiation and execution of contracts for the purchase of foreign equipment, responsibility for major construction and organization of construction jobs. It would be difficult for PLN to carry out the project effectively without a change in this situation, and in any case, transfer of this responsibility to PLN would be an important step in making it autonomous. Assurances have been received that as a condition of effectiveness of the proposed credit, PLN will be made responsible for procurement and construction of all new projects, including that to be financed by the proposed credit, with the exception of those now under construction. Assurances have been received, as well, that the latter will become the responsibility of PLN not later than April 1, 1971, as discussed in paragraph 3.05. The means of obtaining autonomy with regard to the other items are discussed in Chapter III.

#### PLN's Internal Organization

2.13 PLN is administered by a Board of Directors of five, under the provisions of the 1965 decree; the President and the heads of the four main departments. The President of the Board is responsible to the Minister of Public Works and Power. All members of the board are appointed by the Government.

2.14 The four main departments - personnel, operations, finance and construction - and the fourteen operating regions, report directly to the President of the Board (Annex 1). It is recognized by Government and PLN that the 16,000 employee staff of PLN, built up under former Government social welfare policies of full employment, is much in excess of actual

needs. PLN is following a policy of reduction of staff by attrition. Overstaffing of state enterprises is one of the problems the Government is now considering on a national basis and this may in itself lead to a more reasonable employment level at PLN. The studies and recommendations of the management consultants will be of prime importance in the future rationalization of this problem.

2.15 Region 12, the object of the expansion program under the proposed IDA credit, is responsible for the western part of Java, including Djakarta, which represents about 80% of the region's sales. The largest and most important of the 14 regions, it has 3,000 employees, and is characterized by young and enthusiastic, if somewhat inexperienced, leadership. It operates the region facilities, and prepares and executes programs of distribution system expansion when money and equipment are made available.

2.16 Aside from the difficulties arising from the role of the Directorate General, PLN's management is severely hampered by inadequate communications over the very widely spread service areas. Inadequate records, statements and systems with which to work add significantly to the problem. Moreover while PLN management and supervisory personnel appear responsible and technically qualified, they are deficient in terms of management practices and modern techniques.

2.17 Important factors in PLN's operations as a whole are overstaffing, weak morale, low salaries and the poor working conditions of lower level staff. As a Government institution PLN is subject to the salary levels which apply to Government enterprises, which are only a fraction of those paid by private enterprises. While the salaries of higher level staff are supplemented by such amenities as cars and houses they are still very low. Other classes of personnel must resort to a second job. Performance at PLN suffers accordingly.

#### Facilities of PLN

2.18 As of mid-1968 publicly owned installed generating capacity in Indonesia was 651 MW (Annex 2), including the multipurpose Djatiluhur 100 MW hydroelectric station which is under the control of another state organization 1/ which feeds into the PLN system. In 1967, approximately 1.61 billion kwh were generated and 1.16 billion kwh sold by PLN. In addition to publicly owned facilities it is estimated that privately owned generating capacity, for the supply of industrial plant, for which no accurate statistics are available, amounted to about 200 MW in 1968.

2.19 In Region 12, there were approximately 140,000 consumers in 1968 of which 130,000 were domestic and the remainder industrial and commercial. The maximum demand was 86 MW, of which 70 MW was accounted for by Djakarta. Sales amounted to 321 million kwh, distributed approximately 53% domestic, 30% commercial/industrial and 17% municipal/government. The fact that much of industry provides its own power supply (para. 2.25) is one reason for the comparatively low industrial component.

---

1/ Djatiluhur State Enterprise.

2.20 The transmission system (see map) of Region 12 is connected with that of other regions in West Java and functions as an interconnected system although power transfer is quite limited. Transmission planning aims ultimately at an interconnected system for all of Java, which would be a logical objective within about ten years. The main power supply for Djakarta is from the 100 MW Djatiluhur hydroelectric plant and the oil burning 50 MW Priok thermal station located on the city outskirts, and is delivered over a 70 kv ring transmission system around the city.

2.21 In Djakarta and environs there are approximately 300 MVA of 70/12 kv transformers supplying the primary distribution system, 135 MVA of 12 kv/220/127 volt primary distribution transformer capacity, 185 miles of primary distribution overhead circuit, 420 miles of underground distribution and 3,000 miles of secondary distribution circuit. In Djakarta proper, primary distribution is almost entirely underground and secondary distribution overhead. Portions of the older primary distribution system operating at 7 kv are gradually being converted to 12 kv.

#### Deficiencies in System Operating Conditions

2.22 There are numerous conditions of inadequate maintenance, poor voltage and unreliable service throughout PLN service territories. Poor operating conditions result from overload primarily attributable to inadequate system expansion in recent years. Maintenance and upkeep are limited by lack of money and spare parts. Moreover, operating techniques are such that the best performance possible from existing facilities is not obtained. PLN lacks up-to-date standards for system operation, maintenance and design without which it is difficult to achieve efficient utility operation.

2.23 One example of these conditions is that of electric power losses which, including station use, have been between 25% and 35% in recent years, compared with about 15% experienced in normal circumstances. While much of the very high loss figure is attributable to the overloaded system conditions, a substantial if unknown portion is due to illegal connections, and failure to read all meters and bill all accounts.

2.24 In Djakarta the situation is paradoxical in that there is at present a surplus of generating capacity which cannot be used because of the limited distribution facilities. In many parts of Djakarta primary and secondary distribution is overloaded to the extent that under peak load conditions the consumer voltage is sometimes as low as 50% of normal, a condition under which motors are inoperable. The load growth of Djakarta has been severely limited by the lack of distribution capacity, particularly in 1968. Because of this, Region 12 has deliberately kept load growth to a minimum by exacting a large connection charge from new customers (Annex 9).

2.25 Primarily because of unreliable service conditions and uncertainty as to when, ultimately, service will become reliable, most new industrial consumers in the Djakarta region in recent years have provided their own diesel-electric generating facilities. Even some of the larger non-industrial loads, such as embassies, install diesel sets. It is estimated that about half of

Djakarta's industrial load is now supplied in this manner. The fact that this is a highly uneconomic means of providing power supply reflects the extreme nature of the problems faced by consumers in Djakarta.

#### Deficiencies in Financial Operations

2.26 There are two fundamental defects in PLN's financial operations. PLN has been operating at a loss and, secondly, the apparatus for controlling its finances and accounts is in a near-chaotic condition. Probably the most important reason for both is the political and economic situation of the past decade, and its attendant inflation. Other factors include the lack of experienced financial management and staff, inability to effectively use the accounting system, inefficient operations, overstaffing and deficiencies in billings and collections.

2.27 Under the abnormal political/economic conditions, tariff increases lagged far behind inflation and given long delays in collections, revenue was entirely disproportionate to operating costs. (see para. 2.38 and Annex 9.) The Government did not pay its bills and collections from the ordinary consumer suffered. There was no alternative but for PLN to operate on a day-to-day basis, trying to meet out-of-pocket costs and where it could not, turning to the Government for funds. Government response to the problems of PLN was limited, given the order of magnitude of its other problems.

2.28 The flow of information concerning revenues and expenses from parts of the widespread service area was largely disrupted. Revenue and expense accounts were distorted and the balance sheet became meaningless in the absence of revaluation of assets to correct for the large inflation. As noted, the Government assumed direct responsibility for major construction and in many instances the new facilities were not only not incorporated into PLN's assets but the details of the agreements under which they were obtained were obscure or seemingly lost. This state of affairs would have been very difficult even for an experienced and well managed utility. In the case of PLN it was overwhelming and there was a breakdown of the finance and accounting processes.

2.29 In the past two years PLN has made some recovery but it will require considerable time, effort and assistance to put financial operations on a normal basis. Within several years this should be possible by means of the management consulting assistance proposed (para. 4 of Annex 4). The details of the financial situation which follow should therefore be read in this context, it being evident that it will not be practicable for the Association to obtain with this credit some of the specific financial undertakings customarily sought. This is in line with the Association's strategy which envisages a first credit under which the process of rehabilitating PLN would be started, and assuming reasonably satisfactory results, possible additional credits to which more conventional conditions would be attached.

#### Available Financial Statements

2.30 PLN does not have up-to-date financial statements. The latest available balance sheet as of December 31, 1965, was not completed until early in

1969 and that for December 31, 1968 is not expected to be available during 1969. PLN retained a local auditing firm to help prepare the 1965 financial statements but not to make an audit. The auditing firm noted various deficiencies concerning the 1965 financial statements which were based on such records as were available. It also pointed out that only two of the regions of PLN had externally audited reports, that available data were not uniform, which presented difficulties in the preparation of the combined statement, and that explanations in many instances were not available. In any event, the balance sheet as of December 31, 1965 is virtually meaningless because of the substantial inflation which took place both prior to and subsequent to that date.

2.31 Although its balance sheets are not significant and in any event far outdated, PLN has attempted to estimate operating results in 1967 and 1968, and these are given in Annex 8. Obviously somewhat rudimentary in makeup, they are the only indication of the recent operating position. They show that PLN operated at a loss those years. Accounts receivable from the Government and its agencies are long overdue. In this respect assurances have been received that the Government will pay accounts now outstanding within one year and, thereafter, accounts shall be paid promptly when due.

2.32 The estimates for 1967 show revenues of Rp. 2.3 billion and operating expenses of Rp. 3 million before a charge called "capital burden", made in lieu of depreciation. In these estimates "capital burden" is an arbitrary charge equal to about 10% of operating costs. The estimates for 1968 show operating revenues and operating expenses each of about Rp. 5.5 billion before "capital burden". The increase in revenues and expenses in 1968 reflected the impact of inflation. During this two year period the rupiah declined some 70% in value. No provision was made for income taxes since there was either no taxable income or the amount, if any, was not known. However, if operations were profitable, there would be a heavy tax burden. At present, tax rates start at 20% and increase to 60% before income reaches a level equivalent to US\$25,000. PLN has had to rely on the Government to make up operating losses. It has deferred payments due the Government for customs duties and fuel taxes.

2.33 Subsequent to 1965 an unsuccessful attempt was made to operate under a uniform system of accounts created with the assistance of an accountant with the Indonesian General Accounting Office, but without the assistance of independent public accountants. A combination of inertia, opposition to a new system, lack of capable staff, and inability to train personnel in new methods prevented success in this endeavor.

2.34 In view of the lack of current financial statements, it is clear that audit of the present financial position is not possible. Therefore, the Association's customary requirement of having audited statements available at the time of granting a credit cannot be imposed.

#### Valuation of Assets

2.35 Because of inflation and inadequate accounting records an inventory and valuation of fixed assets, which has not been made, is necessary to prepare

a meaningful balance sheet, to establish a rate base and to determine depreciation. It is necessary to list and value properties and in this connection ownership of properties must be clarified. Where appropriate, properties operated but not owned by PLN should be transferred to it. Property constructed by other Government entities is not reflected on PLN's books, insofar as could be determined. Related suppliers' credits are obligations of the Government. These likewise are not reflected on the books of PLN which should undertake to assume the liability therefor. The process of valuation might take upwards of two years.

2.36 Legislation is contemplated to provide revaluation procedures which would be applied to state and private enterprise alike to reflect inflation. Evaluation of PLN's assets would have to be done with this in mind to enable future revaluations to be made in accordance with any guidelines established. Assurances have been received that a valuation of PLN's assets will be completed within twenty months of the effective date of the credit.

2.37 Customary requirements of the Association as to annual review of accounts by independent auditors cannot be imposed until a reasonable period after completion of the valuation of assets, to permit preparation of conventional financial statements. Assurances have been obtained that commencing with the fiscal year following the date of completion of the valuation, statements prepared by independent auditors satisfactory to the Association shall be prepared and submitted to it annually.

#### Tariffs

2.38 The present situation as to charges for service is not entirely satisfactory, as indicated in Annex 9. Tariffs are determined by Government largely on social/political considerations. The average price for power throughout PLN is US\$0.025 (2.5 cents) per kwh which is not low in terms of worldwide experience. Review of tariff structures and levels is necessary, and it is proposed that the management consultants carry out this work. Following this, and the determination of the asset value it should be possible to establish a reasonable rate base and rational tariff schedules. Assurances have been received that tariffs will be set at levels resulting in revenues sufficient to cover all operating expenses including taxes, debt service requirements, and a reasonable portion of capital expenditures whilst maintaining adequate working capital balances, and that tariffs determined on this basis, acceptable to the Association, will be put in effect within thirty-two months of the effective date of the credit; that is, within one year of the completion of the valuation of the assets (para. 2.36).

2.39 A requirement for an immediate change in tariff levels would not be justified in the absence of adequate financial data, especially in view of the very poor service supplied. It is quite possible that an increase in electricity rates would result in some reduction in sales in view of the marginal quality of electricity service.

### 3. IMPROVEMENT OF THE SECTOR

3.01 There is a common understanding between the Indonesian Government and the Association on the desirability of endowing PLN in fact with the autonomy granted nominally by the applicable laws, as well as other improvements obviously needed to correct the situation described in the preceding Chapter. However, considerable time and effort would be required to implement the agreed principles in terms of organization, systems, facilities, etc. The Association's strategy has been, therefore, (a) to insist on PLN's autonomy immediately over those functions for which it is reasonable and practical to do so; the responsibility for execution of certain contracts and construction (para. 2.12) are in this category; and (b) for other functions, to set general criteria insofar as practicable now, and provide a means of achieving them over a reasonable period of time. In this respect the proposed credit would lay the groundwork for the long term development of PLN, it being realized that subsequent credits which the Association might consider would afford further opportunity to achieve the objectives.

#### Use of Management Consultants

3.02 Strong measures are clearly necessary to improve sector organization and functioning so as to upgrade the efficiency and operational and financial performance of PLN. For this purpose, an amount of US\$1.4 million equivalent for management consulting assistance is included in the credit. A consulting team 1/ resident in Indonesia for about two years would assist with the management and operation of the utility and provide experts who would institute modern operations and system planning techniques, prepare standards for operation, maintenance and design and, with regard to the other problems described in Chapter II, institute appropriate purchasing and inventory policies, establish efficient systems of accounts, meter reading, billing and collections, improve financial practices, assist with the evaluation of assets, review the tariff structure and levels, review insurance practices, organize training programs and generally make recommendations on appropriate matters. Terms of Reference outlining the duties of the management consultants are contained in Annex 4.

3.03 An important task of the consultants would be to review the adequacy of the laws under which PLN functions and to assess the present organization of PLN to determine the changes which would be advisable to enable it to function autonomously and efficiently (paras. 2.08-2.15). The consultants would have to consider the relationship and the division of responsibility between PLN and the Directorate General to determine how best to accomplish this.

---

1/ The consulting services proposed would not duplicate the work now being done by Japanese consultants, scheduled for completion in 1969. Their work is intended to lay the groundwork for a study of long-term expansion of electric power facilities by making a review of immediate problems, including short-term expansion.

3.04 It is expected that many of the consultant's suggestions concerning methods, procedures and techniques employed in PLN's operations would readily be adopted. However, implementation of recommendations concerning the laws, sector organization and policy would require Government consideration and approval. Assurances have been received that recommendations of the consultants as the Government and Association shall consider appropriate, concerning organization, structure and operations of PLN, including any required consolidation, modification or supplementing of the laws applicable to PLN, will be implemented within one year of the effective date of the credit. Assurances have been received, as well, that recommendations of the consultants not in the above category, nor covered by specific undertakings of the Government, considered appropriate by the Government and Association, will be carried out promptly as made.

3.05 It is advisable that a limit should be set on the amount of time allowed for the transfer of responsibilities and functions to PLN. Assurances have been received in this respect that PLN shall be vested with full and exclusive responsibility for the public electric power sector, including planning, procurement, construction, operation, maintenance and ownership of all facilities therein, not later than April 1, 1971.

3.06 Given the comprehensive and complex nature of the management consulting task, it is important that an appropriate firm should be selected for this assignment. Assurances have been received that consultants will be selected with the assistance of, and under conditions acceptable to the Association, for the purposes described, as given in detail in Annex 4. Preliminary steps have been taken in this connection.

#### 4. THE PROJECT

##### Expansion Program

4.01 Indonesian authorities recognize the inadequate state of existing electricity supply and the need to undertake a comprehensive program of development. A five-year plan of expansion of public electricity facilities has been prepared (Annex 3) for 1969-1973, in conjunction with the Government's first five-year plan submitted to parliament early in 1969. The scale of the proposed power expansion program is less than the Indonesian authorities believe necessary, the dimensions being limited by the prospects for multilateral and bilateral aid and the local currency resources of the Government. Its implementation, involving an investment of some US\$262 million equivalent, of which 72% would be foreign exchange, is dependent in particular on the prospective external assistance being realized. The program appears appropriate. About 45% of its cost is allocated to transmission/distribution. This is a somewhat greater allocation of resources to transmission/distribution than is usual, reflecting the fact that these facilities are at present even more inadequate than is generating plant.

##### Description of IDA Project

4.02 The proposed IDA credit of \$15 million would finance the cost of equipment and supplies for two years of a five-year program of expansion of the distribution system in Djakarta and environs aimed at supplying the repressed demand and load growth under normal service conditions, and management and engineering consulting services. A small amount of the credit might be used to finance domestic procurement (paras. 4.07, 4.08) but most, if not all of it, would finance foreign exchange purchases. The total cost of the project would be US\$20.8 million equivalent.

4.03 The proposed credit would finance the purchase of approximately 80,000 kva of distribution transformers, 240 miles of 12 kv primary distribution underground cable, 15,000 meters and current limiters for unmetered customers, and associated secondary distribution circuit, poles and switchgear. A number of planning policies and design practices require review including standardization of primary and secondary distribution voltages, use of voltage regulators and capacitors, and use of pole mounted transformers. The details of the composition of the equipment given in Annex 5 may therefore be modified when reviewed by the engineering consultants (para. 4.09).

4.04 The project cost estimate as given in detail in Annex 5 and summarized below was prepared by the technical staff of Region 12, modified on the basis of discussion with the Association and up-to-date unit costs furnished by the latter. It should be reasonably accurate. Since the project is part of a continuing distribution expansion program no contingency item is included in the cost estimate.

Estimated Cost of Project

	<u>Millions of Rupiahs</u>			<u>Thousands of US\$</u>		
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Distribution Equipment	-	3,810	3,810	-	11,700	11,700
Labor, Materials, Transport	1,000	420	1,420	3,000	1,300	4,300
Customs Duties	780	-	780	2,400	-	2,400
Engineering Services	60	200	260	200	600	800
Management Consulting	<u>60</u>	<u>460</u>	<u>520</u>	<u>200</u>	<u>1,400</u>	<u>1,600</u>
Total	<u>1,900</u>	<u>4,890</u>	<u>6,790</u>	<u>5,800</u>	<u>15,000</u>	<u>20,800</u>

4.05 The local currency portion of the project, US\$5.8 million equivalent, includes US\$2.4 million equivalent for customs duties on imported equipment (an average rate of 20%), in accordance with existing regulations. Difficulties in importing goods have been experienced by state owned institutions lacking funds and therefore unable to pay duties promptly. Assurances have been received that the Government would undertake to have custom duties on imported goods for the project paid expeditiously.

4.06 The proposed credit would represent 82% of the project's total cost excluding the cost of customs duties. The high percentage is due to the large amount for management consulting services, the fact that nearly all equipment must be imported, and the very low cost of the Indonesian labor component.

Procurement and Disbursements

4.07 Plans are being made to establish Indonesian factories to manufacture distribution transformers and cables. Although it is highly doubtful if the factories planned would be ready in time to manufacture equipment for the project, the Government has raised the question of preference for domestic manufacturers. To anticipate the possibility that Indonesian manufacturers would be ready to supply equipment, the credit would provide that they would be permitted to participate in the bidding for IDA financed goods with a margin of preference of 15%, in accordance with present Bank policy. For the purpose of bid comparison the 15% or actual duties levied, whichever is lower, would be added to the CIF landed cost of imported equipment.

4.08 Procurement of goods financed by the credit would be on the basis of international competitive bidding except for spare parts and components of equipment needed for replacement for which such bidding would be impractical. Disbursements would be made for the full foreign exchange cost of the equipment imported and services provided. For awards to domestic manufacturers, disbursements would be made for only 75% of the amount of the award, to avoid Association financing of the cost of custom duties and other levies imposed on materials imported for use in manufacturing the finished product.

No disbursement would be made for expenditures made prior to signing of the proposed credit.

Engineering, Installation and Scheduling

4.09        Aside from the management consulting services (Annex 4) consulting engineers would be employed to review distribution planning, prepare specifications, assist with procurement, evaluate bids, and coordinate and supervise installation. An amount of US\$600,000 equivalent is included in the proposed credit for this purpose. In the past, Region 12 has carried out its own installation work, admittedly on a smaller scale than the IDA credit would involve, making use of temporary labor and contractors. In view of this and since there are several firms competent to undertake distribution construction in Indonesia, it should not be necessary to bring in a foreign construction force. Assurances have been received that consulting engineers for the provision of engineering services would be employed and construction/installation work carried out under arrangements satisfactory to IDA. It is desirable, though not strictly essential, that these services should be provided by the firm chosen to provide management consulting services, as the latter would be involved to a considerable extent in engineering and operating matters.

4.10        It would take until late 1970 to complete the review of distribution planning, prepare specifications and call tenders. Purchase of equipment, and its delivery and installation would therefore extend through 1971/72. The remainder of the 1969-73 five-year program would be carried out as financing for it, predominantly from foreign sources, became available. It is quite possible, in fact, that the five-year program would not be completed in the period envisaged in view of the time that has already elapsed and uncertainty concerning the source of financing of equipment other than that financed by the proposed credit. In this respect, one possibility would be a second credit from the Association to complete the program, since Association strategy envisages the possibility of further credits (paragraphs 2.29, 3.01).

## 5. JUSTIFICATION OF THE PROJECT

5.01 Annex 6 tabulates the available information concerning load growth of PLN and Region 12 for the period 1965-67 and gives forecasts of load for 1969-73 for Region 12 alone. The historical information is not reliable given the inadequate measurements and collection of data and many inconsistencies are found. Annex 6 shows that load growth has been stagnant for several years. However, it has been reported that peak demand in Djakarta, estimated at 70 MW in 1968 increased 11% both in 1966 and 1967, but fell off to 3% in 1968 in the face of the large connection charges described in Annex 9. It appears that while the country as a whole was in a state of malaise from the political/economic conditions, some effort was made to keep up the economy of Djakarta, and its electric system was given some priority.

5.02 Studies have been sponsored by the French Association for Technical Cooperation (ASMIC) and PLN to determine potential future load growth. They demonstrate that given the size of the population and its rate of growth, the present state of development and the electricity demand experienced prior to the political and economic conditions of this decade, the demand could theoretically reach very large figures in the 1975-80 period. The studies conclude that the investment necessary to supply this demand is beyond the means of Indonesia and the only practical approach is to set more modest consumption targets, in keeping with prospective financial resources. This approach has been used in estimating the load growth of Java, Region 12 and Djakarta. It is reasonable, given the fact that recent load growth experience is of very little value in assessing future trends.

5.03 The five-year program for the expansion of the power sector (Annex 3), and the five-year program for the expansion of the distribution system in Region 12, are therefore based on target figures of demand in 1973. It is estimated that a peak demand in Region 12 and Djakarta of the order of 185 MW and 150 MW respectively in 1973 could be met if the five-year program of distribution expansion is completed, and an associated program of expansion of generation and transmission facilities for the Region implemented. The main item in the latter is a 100 MW (two 50 MW units) expansion of the Priok thermal station, which is to be financed under Japanese bilateral assistance (Annex 3).

5.04 This would mean an annual energy growth of 19% over the next several years. This is likely to be realized since, in addition to normal growth, with the provision of adequate distribution facilities some of the self-supplied industrial consumers might turn to the PLN for supply, prospective commercial and domestic consumers who cannot now be supplied would be connected, and the usage of existing consumers would increase markedly as the voltage was raised to normal levels.

5.05 The fact that completion of the Region 12 five-year program in the time allotted is problematical does not affect the need or timing of the proposed credit. It is unlikely that the distribution system would be improved

to any significant extent prior to the expansion financed by the credit. Because of this, and in view of the present surplus of generating capacity, the project facilities would almost certainly become fully loaded as completed.

Incremental Rate of Return

5.06 Annex 7 gives details of the calculation of the incremental rate of return on the proposed project, which would enable the load growth of at least two years to be supplied. The net revenue attributable to the project over its life would yield a return of about 20% on the project's cost on the basis of present tariff levels. Given the uncertainties as to timely completion of the project and increased sales materializing as expected, the figure of 20% can not be regarded as precise, but the order of magnitude appears reasonable. While there is no basis on which to estimate the opportunity cost of capital in Indonesia at the present time given recent economic history and present conditions, it seems unlikely that the opportunity cost of capital, exclusive of inflation anticipation, would approach the return estimated.

5.07 Moreover, since the rehabilitation and development of industry would be seriously impeded if the project is not carried out, it is clear that the economic return on the project would be much greater than the estimated 20% incremental rate of return.

## 6. FINANCIAL PLAN

6.01 It is clear from what has been said that a financing plan in the ordinary sense cannot be drawn up. Increasing tariffs now - which averaging US\$0.025 per kwh are not low by world-wide standards - would not be practicable as explained in para. 2.39. To assure execution of the Association-financed project, reliance will have to be made upon government contributions not only to defray the local currency cost of the project, but also to defray PLN's operating expenses to the extent necessary. Assurances to this effect have been received.

6.02 Assurances have been received that the Government will turn over the proceeds of the credit to PLN in the form of equity. The Government is to determine whether any conditions would be attached, for example, dividend requirements, the inclusion of such provisions being subject to the agreement of the Association.

6.03 PLN, or the Government, will have to incur additional debt in connection with the five-year expansion plan. However, in view of the current inability to measure assets, earnings, or cash generation, it is not practical to consider a debt limitation covenant of the customary type as a condition of the proposed credit.

6.04 While it is not possible to forecast PLN's future financial position some estimate can be made of when it may become profitable if the various measures proposed in this report are implemented with reasonable promptness. In the course of the first two years following signing of the credit it should be possible to substantially reduce operating expenses by reductions in staff and reductions in losses resulting from improved system operations. Concurrently revenues should be substantially increased by improved methods of billing and collection of accounts. Moreover, as the project is commissioned in the period 1971-72 net revenues in Djakarta, representing a substantial portion of PLN's total revenue, would improve markedly. By 1972 PLN should be operating at some profit as a result of these improvements.

6.05 Within about three years of the signing of the credit (para. 2.38), it is expected that tariff levels would be implemented on a level to result in PLN becoming a viable utility, as measured by normal utility yardsticks. Moreover, the improvements noted in the previous paragraph might be sufficient to enable this to be done without major increase in tariff levels.

## 7. AGREEMENTS REACHED DURING NEGOTIATIONS

7.01 During negotiations in September 1969 the Association was advised of the Government's agreement that PLN should become an autonomous electric power system to provide service on a sound commercial basis, and that the sector and PLN should be reorganized to achieve this goal.

7.02 To this effect, assurances have been received that management consultants will be retained by the Government and PLN (para. 3.06) to:

- (a) assist with the management and operations of PLN;
- (b) review the adequacy of the laws under which PLN functions and make recommendations concerning their amendment and/or consolidation consistent with the objectives described in paragraph 7.01 above;
- (c) review the organization and operation of the sector and PLN and make recommendations in accordance with the objectives;
- (d) review PLN's tariff structure with regard to its adequacy vis-a-vis PLN's costs of providing service, and PLN's capital requirements;
- (e) assist with the valuation of the power facilities operated by PLN; and
- (f) review PLN's records, accounting systems and financial practices; purchasing and inventory practices; employment practices; insurance practices; system planning and operating techniques; and other facets of its operations; make recommendations appropriate thereto, and assist with the implementation of new methods and procedures, and the training of personnel.

7.03 With regard to implementation of recommendations of the consultants, assurances were received that:

- (a) in general, those recommendations considered appropriate by the Government and the Association will be implemented (para. 3.04);
- (b) those concerning organization, structure and operations of PLN, including recommendations concerning the modification of the laws applicable to PLN, considered appropriate by the Government and Association, shall be implemented within one year of the effective date of the credit (para. 3.04);
- (c) in any event, PLN shall be vested with full and exclusive responsibility for the public electric power sector not later than April 1, 1971 (para. 3.05);

- (d) within 20 months of the effective date of the credit the valuation of assets will be completed (para. 2.36); and
- (e) within 32 months of the effective date of the credit, a revised tariff structure acceptable to PLN and the Association will be put in effect (para. 2.38).

7.04 Assurances were received respecting financial aspects that:

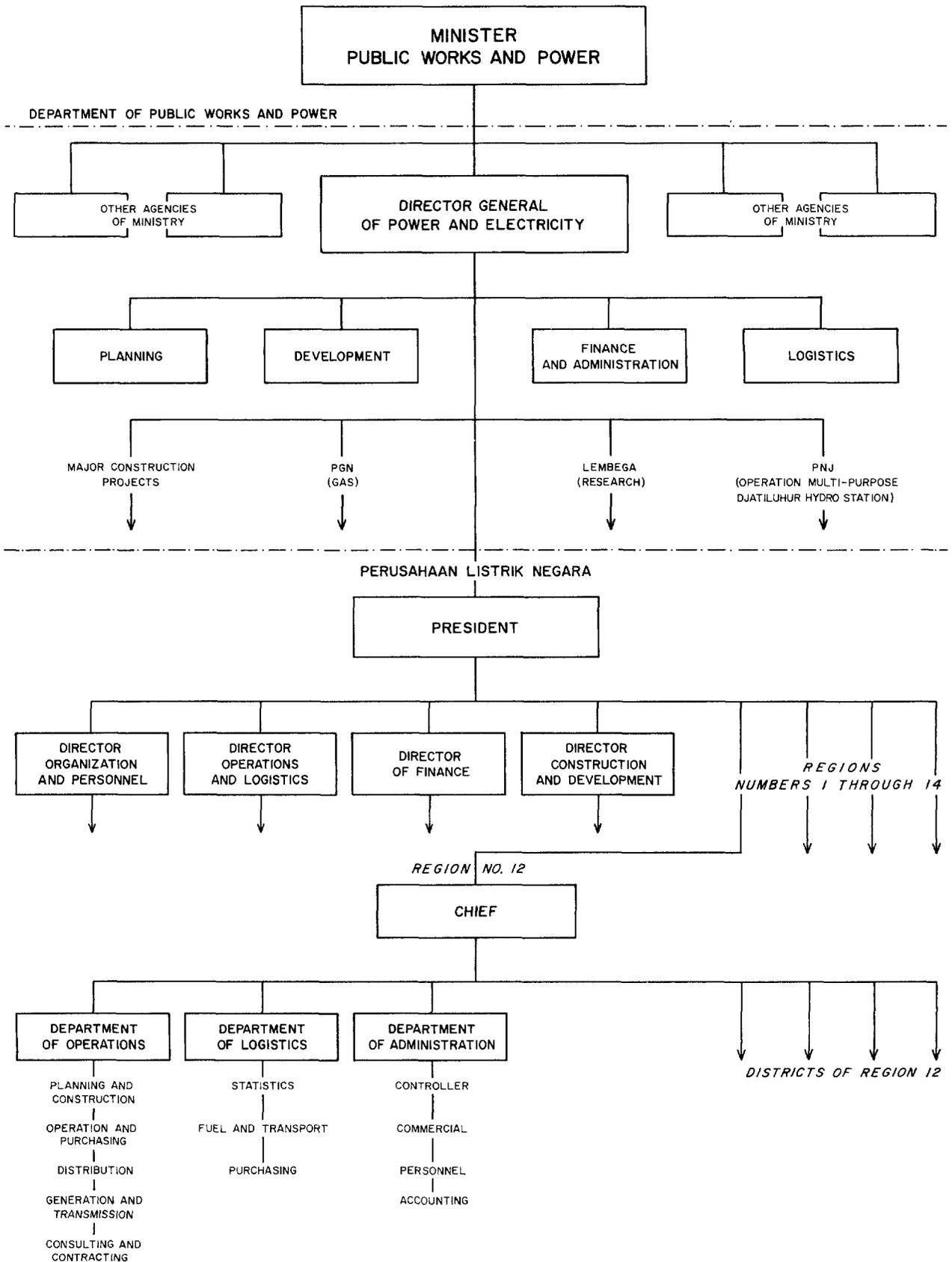
- (a) the Government will promptly provide all the local currency necessary to carry out the project, including customs duties (paras. 6.01, 4.05) and will make available to PLN such funds as may be necessary to defray operating expenses to the extent revenues are inadequate (para. 6.01);
- (b) the Government will pay accounts now outstanding with PLN within 12 months of the signing of the credit and thereafter pay accounts promptly when due (para. 2.31); and
- (c) PLN's accounts will be certified annually by independent auditors beginning not later than the fiscal year following completion of the evaluation of assets (para. 2.37).

7.05 As a condition of effectiveness of the credit the Government has undertaken to transfer to PLN responsibility for procurement and construction of all projects, excepting those now under construction (para. 2.12).

7.06 The Government has undertaken to turn over the proceeds of the credit to PLN in the form of equity, subject to Association approval of any conditions which may be attached thereto (para. 6.02).

October 8, 1969

# INDONESIA: ELECTRIC DISTRIBUTION PROJECT ORGANIZATION CHART OF THE PUBLIC POWER SECTOR





INDONESIA

ELECTRICITY DISTRIBUTION PROJECT - DJAKARTA

Public Power Generating Capacity  
(as of June 30, 1968)

PERUSAHAAN LISTRIK NEGARA (PLN) REGIONS	Number of Stations	Number of Units & Installed Capacity								Total Installed Capacity kw
		Hydro		Steam		Diesel		Gas Turbine		
		Units	kw	Units	kw	Units	kw	Units	kw	
I NORTH SUMATRA (Medan)	19	2	120	-	-	75	24,245	1	12,250	36,615
II SOUTH SUMATRA (Palembang)	10	2	1,320	-	-	30	21,206	1	12,250	34,776
III WEST KALIMANTAN (Pontianak)	8	-	-	-	-	17	4,322	-	-	4,322
IV NORTH, CENTRAL & SOUTH KALIMANTAN (Bandjarbaru)	10	-	-	-	-	26	7,842	-	-	7,842
V NORTH SULAWESI (Manado)	8	1	4,440	-	-	16	2,932	-	-	7,372
VI SOUTH SULAWESI (Makassar)	8	-	-	-	-	18	14,457	-	-	14,457
VII MALAKU (Ambon)	6	-	-	-	-	29	4,292	-	-	4,292
VIII NUSA TENGGARA (Denpasar)	21	-	-	-	-	58	6,513	-	-	6,513
IX EAST JAVA (Surabaya)	25	15	42,722	6	59,482	59	20,567	-	-	122,771
X CENTRAL JAVA (Semarang)	28	14	42,300	-	-	61	21,593	1	12,250	76,143
XI EAST WEST JAVA (Bandung)	11	27	182,952	-	-	10	2,614	-	-	185,566
XII WEST WEST JAVA (Djakarta)	11	6	33,675	6	62,700	37	36,861	-	-	133,236
XIII ATJEH (Banda Atjeh)	9	-	-	-	-	27	3,742	-	-	3,742
XIV WEST SUMATRA (Padang)	23	1	70	6	3,012	53	10,325	-	-	13,407
TOTALS	<u>197</u>	<u>68</u>	<u>307,599</u>	<u>18</u>	<u>125,194</u>	<u>516</u>	<u>181,511</u>	<u>3</u>	<u>36,750</u>	<u>651,054</u>



INDONESIA  
ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA

Public Electric Power  
Five-Year Development Plan, 1969-73  
(Thousands of US\$ Equivalent)

FACILITY	Capacity	Period	C O S T			FOREIGN ASSISTANCE	
			Local Component	Foreign Component	Total	Amount	Origin
Surveys and Consulting		1967-73	2,100	5,500	7,600	5,500	Japanese and other sources
<u>Construction of Generating Stations</u>							
Riam Kanan Hydro	20 MW	1969-72	9,500	7,600	17,100	7,600	Japanese
Karang Kates Hydro (Multi-Purpose)	70 MW	1969-73	3,600	10,800	14,400	10,800	Japanese
Garung Hydro	20 MW	1969-74	1,050	7,500	8,550	7,500	Being sought.
Batang Agam Hydro	10 MW	1969-73	850	5,000	5,850	5,000	Project still under consideration.
Asahan River Hydro	460 MW	After 1973	1,200	13,500	14,700	13,500	Total cost estimated at US\$70 million equivalent; project would only go ahead in conjunction with establishment aluminum smelter, and venture is in early exploration stage.
Priok Thermal Station (Extension)	100 MW	1969-72	10,900	12,000	22,900	12,000	Japanese
Semarang Thermal Station	60 MW	1969-73	8,900	10,000	18,900	10,000	Possible US - Necessity for station not settled.
Medan Thermal Station	25 MW	1969-73	7,100	7,000	14,100	7,000	Assistance sought.
Makassar Thermal Station	25 MW	-1970	1,700	-	1,700	-	Near completion, Yugoslav credit financed equipment.
Palembang Thermal Station	25 MW	-1971	6,000	-	6,000	-	Completion 1971; Yugoslav credit financed equipment.
Sub-Total - Generation			50,800	73,400	124,200	73,400	
Transmission		1969-73	6,500	25,000	31,500	25,000	With respect to transmission, distribution and diesel stations work in 1969
Distribution		1969-73	8,500	76,000	84,500	76,000	is underway with some assistance from US, Czechoslovakia, UK, France and the Netherlands. US\$15,000,000 proposed IDA credit will provide for some of future requirements, but most of foreign assistance required remains to be obtained or negotiated.
Rehabilitation of Diesel Power Plants		1969-73	4,300	9,600	13,900	9,600	
TOTAL			72,200	189,500	261,700	189,500	

Note: Import duties and sales taxes not included in estimates.

May 12, 1969



INDONESIA

ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA

Terms of Reference, Management Consultants

1. The following are the Terms of Reference under which management consultants would be employed to assist the development in Indonesia of the publicly owned electricity organization, Perusahaan Listrik Negara (PLN).
2. To some extent delineation of the activities of the management consultants would await a review of conditions by them during the first months of their activities; it would be necessary for them to know in greater detail the problems of PLN before the full extent of the consulting assignment can be established. The following description of the duties of the management consultants should therefore be read in this context.
3. It is envisaged that a resident team composed of three or four senior consultants who have a background of utility management experience in organization, engineering, including distribution, and finance would be located in Indonesia for a period of about two years to advise and assist PLN in the management of its affairs. The work of the consultants would involve, as well, dealing with the Ministry of Public Works and Power, which has jurisdiction over PLN.
4. The consulting team would arrange to have experts in particular fields from its home organization visit Indonesia for appropriate periods of time to (a) institute the use of modern operations and system planning techniques; (b) prepare standards, with the help of the home organization, for operation, maintenance and distribution design on a system-wide basis; (c) establish a system planning department; (d) institute appropriate purchasing and inventory policies and procedures to implement them; (e) establish a modern system of uniform accounts and institute procedures to ensure their effective use; (f) institute efficient meter reading, billing and collection procedures; (g) provide training in financial management, including cash flow and financial planning techniques; (h) review the tariffs structures; (i) review tariff levels; (j) assist with the evaluation of assets of PLN; (k) review insurance practices; (l) review employment practices; and (m) organize training program for staff at the supervisory and operation/maintenance levels, in cooperation with training programs already established.
5. With respect to the foregoing it is expected that the consultants' suggestions concerning methods, procedures and practices involving PLN's routine operations would be accepted readily, and incorporated in the operations. With respect to matters and recommendations requiring policy consideration and review, such as tariff structure and employment practices, the consultants would prepare recommendations for consideration of Government, the Association and PLN.



6. The intent of the Government of Indonesia is to give PLN full responsibility for the public electric power sector, including planning, procurement, construction, operation, maintenance and ownership of all facilities therein. The consultants would review and make recommendations concerning (a) the internal organization of PLN, (b) the rationale of the sector organization, including the relationship between the Ministry of PLN, and the functions the Ministry exercises which might be assumed by PLN, (c) the body of laws under which PLN functions and such amendment, modification, and/or consolidation as may be considered necessary thereto to provide PLN with responsibility for the public power sector and autonomy in the conduct of its affairs.
7. It is implicit that in advising and assisting the management of PLN the management consultants would advise it, among other things, on plans for expansion, and other major matters of this nature.
8. One of the main thrusts of the management consulting activity would be to impart "know-how" to PLN staff in discussions and by illustration and demonstration. Reports would be prepared by the consultants to describe progress and to advise of the results of specific studies (e.g. tariffs) and make recommendations thereto.

September 29, 1969



INDONESIA  
ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA

Project Cost Estimate

	<u>Millions of Rupiahs</u>			<u>Thousands of US\$</u>				
	<u>1/</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>1/</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
Distribution Transformers	-		340	340	-		1,050	1,050
Cable	-		1,150	1,150	-		3,520	3,520
Secondary Overhead Circuit	-		980	980	-		3,000	3,000
Switchgear	-		520	520	-		1,600	1,600
Street Lighting	-		70	70	-		210	210
Metering	-		80	80	-		260	260
Telemetry	-		120	120	-		360	360
Miscellaneous	-		550	550	-		1,700	1,700
Labor and Materials	1,000		-	1,000	3,000		-	3,000
Transportation	-		420	420	-		1,300	1,300
Custom Duties	780		-	780	2,400		-	2,400
Engineering Services	60		200	260	200		600	800
Management Consulting Services		60	460	520		200	1,400	1,600
Total		<u>1,900</u>	<u>4,890</u>	<u>6,790</u>		<u>5,800</u>	<u>15,000</u>	<u>20,800</u>

---

1/ The basic exchange rate, 326 Rupiahs to US\$1.00, is used here as it is the dominant rate of exchange in Indonesian economic activity and is applied to import transactions.

July 22, 1969



INDONESIA

ELECTRICITY DISTRIBUTION PROJECT

Actual and Forecast Sales 1965-73

	<u>PERUSAHAAN LISTRIK NEGARA (PLN)</u>					<u>PLN REGION 12</u>		
	<u>Production Total</u>	<u>Sales Java</u>	<u>Sales Other</u>	<u>Sales Total</u>	<u>% Annual Sales Increase</u>	<u>Demand MW</u>	<u>Sales Millions kwh</u>	<u>% Annual Sales Increase</u>
	(Millions kwh)							
1965 <u>1/</u>	1,513	953	220	1,173	-	78.0	317	-
1966 <u>1/</u>	1,561	919	211	1,130	(-) 3.5	78.3	301	(-) 5.0
1967 <u>1/</u>	1,609	939	219	1,158	2.5	83.1	309	3.0
1968 (Estimated)						86.0	321	4.0
1969 (Forecast)				<u>2/</u>		92.0	353	10.0
1970						103.0	406	15.0
1971						124.0	487	20.0
1972						151.0	607	25.0
1973						185.0	760	25.0

1/ Historical data must be considered as indicative only as records are not complete and there are numerous inconsistencies.

2/ There is no meaningful forecast for the entire PLN system, although there are some estimates of growth of the more important regions.

May 26, 1969



INDONESIA

ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA

Rate of Return on the Project

1. The rate of return of the Djakarta distribution project is the discount rate at which the present worth of the cost of the project equals the present worth of the net revenue derived from it over its 25-year life.
2. The following information and assumptions were used in calculating the rate of return:
  - (a) The cost of the project has been assumed to be the actual cost of the facilities to be provided under the proposed IDA credit, including the local currency component financing to be provided by the Indonesian Government. Excluded from this cost are customs duties which would likely be levied by the Indonesian Government; their amount would constitute an internal transfer between the Government and PLN and would not affect the rate of return of the project from the overall standpoint of the economy.
  - (b) Normally, in this calculation, the cost of the project would include an appropriate portion of the cost of generation and transmission facilities which would be employed to supply and transmit the power to be utilized during the life of the project. This has not been done in this case since there is a surplus of generating capacity in the Djakarta area which cannot be utilized by existing distribution facilities. The only capital expenditure involved is that on behalf of the distribution facilities.
  - (c) Annual net revenue equal to annual gross revenue less operating costs. Annual gross revenue is equal to the annual kwh sales attributed to the project multiplied by the applicable tariff. For the purpose of calculating the rate of return, operating costs exclude any income tax which the Government might levy on PLN profits in the future. That is, net revenue is the revenue before income taxes are applied since they are a direct benefit to the economy and, again, constitute an internal transfer.
  - (d) It is assumed that the average revenue per kwh on additional power sales attributable to the project would be US2.5¢ equivalent, about the current tariff level. This is reasonable in that it is unlikely that the average tariff would be lower than this in the foreseeable future, assuming appropriate corrections to tariffs to compensate for any further inflation which may occur.
  - (e) Gross operating expenses include the incremental costs of operation applicable to the project as well as those of the operating facilities from which the requisite power production would be obtained. No additional labor cost would be entailed as Region No. 12 of PLN is already overstaffed. Additional operating costs involved comprise the cost of materials for maintenance and the cost of fuel oil which would be burned in the Priok thermal station from which the additional production would be obtained.



3. The rate of return is estimated at 20%. The assumptions made are conservative and the figure of 20% can therefore be assumed conservative as well.

4. There is no basis on which to estimate the opportunity cost of capital in Indonesia at the present time given the recent economic history and its present state of flux. However, since the estimated 20% return is in effect independent of inflationary forces, tariffs being assumed maintained at at least their present level in terms of purchasing power, it is unlikely that the cost of capital would approach the estimated return.



INDONESIA  
ELECTRICITY DISTRIBUTION PROJECT

Rate of Return on Project  
(Millions US\$)

	<u>Capital Expenditure</u>	<u>Annual Revenue</u>	<u>Annual Expenses</u>	<u>Annual Net Revenue</u>
1971	4.4	0.5	0.1	0.4
1972	8.4	2.5	0.4	2.1
1973	3.6	3.5	0.6	2.9
1974	-	3.5	0.6	2.9
1975	-	3.5	0.6	2.9
"		"	"	"
"		"	"	"
"		"	"	"
1997	-	3.5	0.6	2.9
Present Worth 1970	11.58			11.75
Discount Rate 20.0%				

May 26, 1969



## INDONESIA

ELECTRICITY DISTRIBUTION PROJECT, DJAKARTASummary by PLN of Estimated Earnings 1967 and 1968

(In thousands of Rupiahs) 1/

<u>Operating Cost</u>	<u>1967</u>	<u>1968</u>
Fuel and lubricating oil (including transportation charges)	773,455	2,222,845
Labor cost	589,172	1,519,658
Repair and maintenance	1,305,980	751,030
Miscellaneous	<u>298,302</u>	<u>1,040,608</u>
	2,966,909	5,534,141
Capital burden	<u>291,736</u>	<u>553,414</u>
<b>TOTAL OPERATING COST</b>	<b>3,258,645</b>	<b>6,087,555</b>
 <u>Revenues</u>		
Sales	2,241,833	4,944,189
Other revenues	<u>90,613</u>	<u>623,660</u>
<b>TOTAL REVENUES</b>	<b><u>2,332,446</u></b>	<b><u>5,567,849</u></b>
 <u>Balance</u>		
Operating costs minus Revenues	926,199	519,706

NOTE:

1. The 1968 financial account is based on the realization figures of the first half year and the estimates for the second half year.
2. The current kwh sold in 1968 are estimated at 1,246,504,000 kwh.
3. The deficit of Rp. 519,706,000.- is partly covered though deferred import duties, the amount of which is estimated at Rp.200,000,000.-.
4. The 1967 account is based on the realization figures of the first half year and the estimates for the second half year.

---

1/ The value of the Rupiah declined from about 90 to US\$1.00 at the end of 1966 to 326 to US\$1.00 at the end of 1968.

July, 22, 1969



INDONESIA

ELECTRICITY DISTRIBUTION PROJECT, DJAKARTA

Tariffs

1. Tariff levels are determined by Government after discussions with PLN, the result being a compromise between social-political considerations and PLN's needs. Tariffs 1/ are comprised of basic schedules which are uniform throughout Indonesia and charges for transportation of fuel which vary with regions from about 1/10ths of a cent to as high as 1½ cents per kwh. For the country as a whole the basic tariff averages about 2¼ cents per kwh, and the transportation for fuel charge averages about 3/10ths of a cent per kwh.
2. Tariffs were changed six times between 1963 and 1968, reflecting the extreme inflation in Indonesia. The most recent increases, those of May 1, 1968 in basic tariffs, varied considerably for different classes of service in an attempt to improve the rate structure.
3. The basic tariff structure favors the small consumer who pays less per kwh than the other customers. In Region 12 the average price paid by the domestic consumer, as the level of consumption per customer rises, increases from about 1 cent to 3 cents per kwh, reflecting the social policy of the Government. Industrial tariffs (including a demand charge) average about 2¼ cents per kwh and commercial tariffs 4½ to 5 cents per kwh, the higher rate being paid by the larger commercial customers.
4. New customers pay heavy connection charges, a temporary measure which varies in different regions. For industrial customers such charges currently in effect in Region 12 are about 11 cents per VA. The charge is about 1¼ cents per VA for small domestic customers and almost 30 cents per VA for the large domestic and commercial customers. For the small domestic customer the connection charge exceeds three years of regular bills.

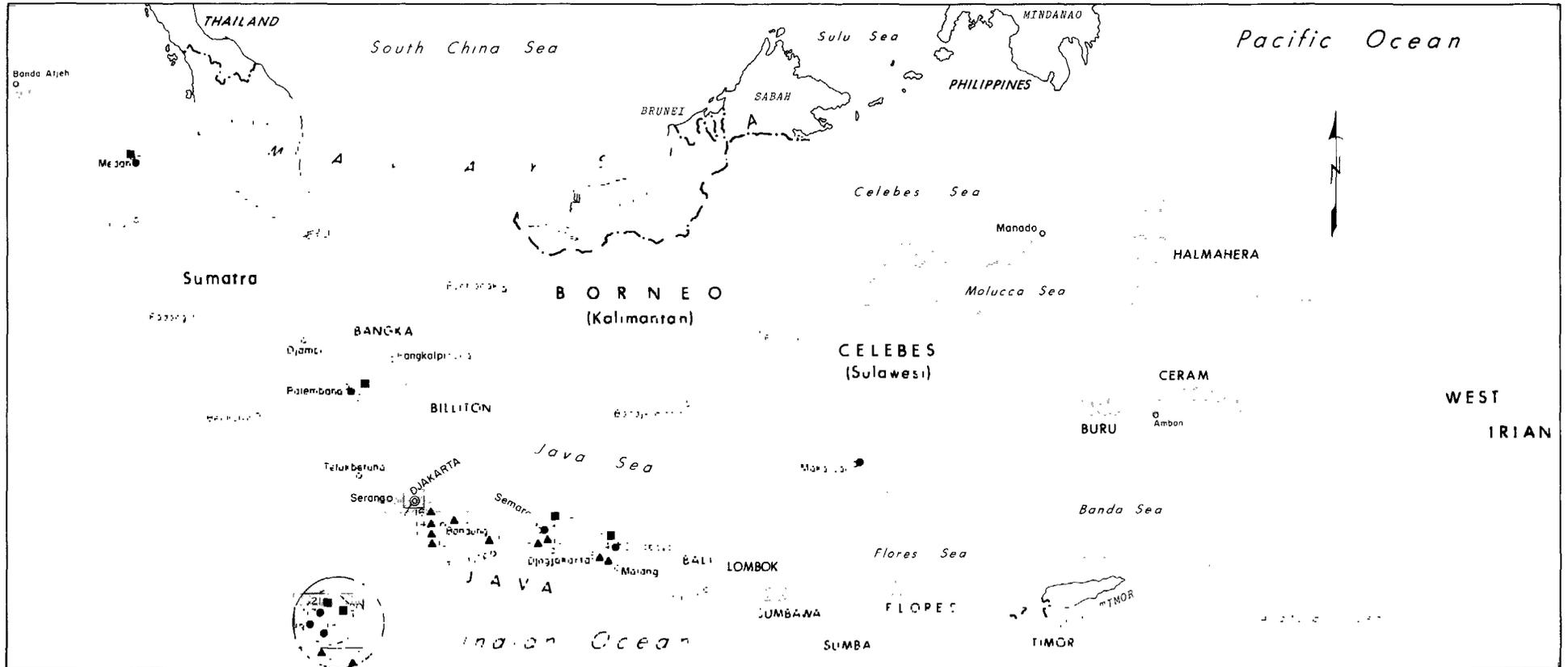
---

1/ For convenience of interpretation price per kwh is stated in terms of equivalent US cents.

June 26, 1969



INDONESIA  
**LOCATION OF MAIN GENERATION FACILITIES  
 WITH INSTALLED CAPACITY OF 5000KW AND ABOVE**



● **DIESEL**

Installed  
MW

1. Medan	16.2
2. Palembang	14.1
3. Makassar	13.1
4. Ngagel	8.0
5. Kalisari	6.0
17. Antjol	11.0
18. Karet	12.0
19. Kebajoran	12.6

■ **STEAM OR GAS TURBINE**

Installed  
MW

5. Tanjung Perak (Surabaya)	50.0
20. Gambir (Djakarta)	12.7
21. Tanjung Priok (Djakarta)	50.0
24. Semarang	12.5
25. Palembang	12.5
26. Medan	12.5

▲ **HYDRO**

Installed  
MW

6. Mendalan	23.0
7. Siman	10.8
9. Djelok	20.5
10. Timo	12.0
11. Ketenger	7.0
12. Plengan	5.2
13. Lamadjan	19.2
14. Tjikalong	19.2
15. Parakan Kondang	10.0
16. Djatilunur	100.0
22. Ubrug	17.1
23. Kratjak	16.6

□ **PROJECT LOCATION  
 (Djakarta Distribution  
 System Expansion)**

0 100 200 300 400 500  
 KILOMETERS

0 100 200 300 400 500  
 MILES



INDONESIA  
**DIAGRAM OF  
 12kv, 30kv, 70kv AND 150kv NETWORKS IN JAVA**

