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GLOSSARY, ABBREVIATIONS and EXPLANATIONS

(Only the most common abbreviations are given here)

Technical Terms

kW = kilowatt, or 1,000 watts

MW = megawatt, or 1,000 kilowatts

kWh = kilowatt-hour, or the energy supplied in one hour by one kW

HP = horsepower. 1 HP = 0.746 kW

Load Factor = is the ratio of the number of kWh supplied during a given period to the number which would have been supplied had the maximum demand been maintained throughout the period

Firm Capacity = in an isolated generating station is the maximum power available when the largest unit is out of service. This is also governed by limitations on account of boiler capacity in the case of thermal plants and water availability in the case of hydro stations. In an interconnected system, the firm capacity is the maximum power available from various generating stations after laying off adequate stand-by capacity

Indonesian Terms

AFEN = Antara Financial and Economic News

BPS = Biro Pusat Statistik, or the Central Bureau of Statistics

BPU-PLN = Badan Pimpinan Umum-Perusahaan Listrik Negara, or the General Management Board of the PLN. This existed between 1961 and 1964, when it was abolished in an administrative reorganisation

Dirdjen = Direktur Djenderal, or Director General, the chief official of a Directorate General within a Public Service department

Direksi = Board of Directors

Ditdjen = Direktorat Djenderal, or Directorate General, a main subdivision within a Public Service department

Gatrik = Direktorat Djenderal Tenaga dan Listrik, or the Directorate General for Power and Electricity

Ir = Ingenieur or Insinjur, the formal title for a person with a tertiary degree in a technical subject

PLN = Perusahaan Listrik Negara, or the State Electricity Corporation

Repelita = Rentjana Pembangunan Lima Tahun, or the Five Year Development Plan which began on 1 April 1969

Warta Cafi = Warta Cafi, a business news circular containing information about business and legal developments

Other Terms

ECAFE = Economic Commission for Asia and the Far East

ICA = International Co-operation Administration

OEEC = Organisation for European Economic Co-operation

USOM = United States Operations Mission

Explanations

1. $ = American $

2. Interviews. About fifty detailed interviews were held during the period of fieldwork for this thesis with present and past officials of the electricity industry. Many of these officials would not wish to be identified, so letters have been substituted for their names. For example:

Interview with D, 12 August 1969
Interview with B_1, 25 March 1970

Readers are warned against the game of "guess the official." Considerable care has been taken to throw readers off the track.

3. Statistics. Statistics throughout the ECAFE region are notoriously unreliable, and this is particularly true for Indonesia.

ALL FIGURES GIVEN IN THIS THESIS SHOULD BE EXAMINED WITH A GREAT DEAL OF SCEPTICISM

Although the author has taken all possible steps to cross check statistics, it is inevitable that a wide margin of

error remains. Often two figures which supposedly referred to the same magnitude varied by as much as 50 percent. A variation of 10 percent was comparatively small. To emphasise the roughness of the quantitative data, figures are often rounded in tables.

4. Unless otherwise noted, developments in Irian Barat (West Irian) are not considered.

5. Unless otherwise noted, the discussion for the period since 1957-58 refers to the Indonesian public sector only, and excludes the very considerable amount of capacity and production in Indonesia in "captive" (privately-owned) plants (see the Appendix to Chapter 5).

6. Unless otherwise noted, capacity and production from the Djatiluhur dam, now a separate state enterprise but formerly part of the PLN, have been included in all statistics.

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PART I

HISTORY AND ADMINISTRATIVE CHANGES

CHAPTER 1 Expansion Until the Second World War

Early Growth of the Industry

The first record of electricity being generated by a company for sale to the public in the Netherlands East Indies is in May 1897 by the Nederlandsch-Indisch Electriciteit Maatschappij (NIEM or Netherlands Indies Electricity Company) in the capital Batavia.[1] Records suggest that there was possibly interest in electricity generation before this however, and some of the more adventurous plantation owners may well have installed generating units on their plantations before 1897.

After the turn of the century electricity spread slowly throughout the archipelago. The expansion of the industry to most of the main towns is shown in Table 1.1, but because the Table as drawn up reflects the position in 1925, and because only main towns are shown, some elements of the growth pattern are not shown. At first the small utilities which supplied a localised market were considerably more important than the Table suggests. Indeed for the first quarter of the century the small companies played a significant role. Little information is available, but electricity was probably supplied to the public from three main sources in this period: from small private utilities; from municipality-owned plants such as in Padang and Madiun; and from some plantations and factories which sold surplus electricity to nearby consumers.

As time passed however, the importance of a few private utilities based in Java grew. The three most important of these were NIGM (Nederlandsch-Indische Gas-Maatschappij or Netherlands Indies Gas Company) which

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1. C.Smit, "Review of the History of the Overseas Gas and Electricity Company Limited, "A Century of Light and Power: Published on the Occasion of the Hundredth Anniversary of the Overseas Gas and Electricity Company Limited, Rotterdam, 10 December 1963, p.100.

TABLE 1.1 Expansion of Electricity Supply to Some Main Towns[a]

Year when *operations* began	Place	Name of Company in 1925				
		Large Utilities				Small Companies
1897	Batavia[b]	NIGM				
1899	Medan[b]	NIGM				
1902	Surakarta					*Solosche El. Mij.*
1906	Bandung[b]		GEBEO			
1910	Malang			ANIEM		
1911	Pasuruan			ANIEM		
1912	Surabaja			ANIEM		
1913	Semarang			ANIEM		
	Djatinegara[c]	NIGM				
1914	Tandjung Priok					Port Authority
1918	Salatiga			ANIEM		
	Surabaja (Port)					Port Company
1919	Jogjakarta			ANIEM		
1921	Madiun					Madiun Municipality
	Makassar	NIGM				
	Pontianak					West Borneo El. Mij.
1922	Bandjarmasin					Bandjarmasin El. Mij.
	Padang					Padang Municipality
1923	Semarang (Port)					Port Company
1924	Magelang			ANIEM		
	Pekalongan			ANIEM		
1925	Tjirebon	NIGM				
	Palembang	NIGM				
	Sukabumi		GEBEO			
	Bogor[d]		GEBEO			

Notes: a. Except for the well known case of Batavia (now Djakarta), the modern name and spelling is used.

b. Originally supply of electricity in these towns appears to have been started by a different company. In Batavia, the supply was first started by the Nederlandsch-Indisch Electriciteit Maatschappij in 1897, and NIGM took over in 1905. Until the end of 1922, Medan was served by the Electriciteit Maatschappij Medan (Medan Electricity Company). NIGM took charge on 1 January, 1923. The position is not clear for Bandung, and it may be that GEBEO did not take over supply until 1920, although it seems likely that in fact GEBEO was operating in Bandung before this date.

c. A suburb of Djakarta; in Dutch times called Mr Cornelis.

d. Previously Buitenzorg.

Source: Compiled from information given in Dienst voor Waterkracht en Electriciteit in Nederlandsche-Indie, Statistiek van de Openbare Electriciteit-Bedrijven in Nederlandsche-Indie over de jaren 1919 tot en met 1925, Batavia, Landsdrukkerij, 1932.

operated mainly in the Batavia area[1], GEBEO (Gemeenschappelijk Electriciteitsbedrijf Bandoeng en Omstreken or Municipal Electricity Works for Bandung and District) and ANIEM (Algemeene Nederlandsch-Indische Electriciteit Maatschappij or Netherlands Indies General Electricity Company) which was the largest company in Central and East Java. These utilities expanded both by obtaining concessions to operate in areas without electricity and by taking over smaller companies.

For the first decade of the century, except for small amounts of electricity generated by municipal plants expansion of the industry was in the private sector. Since about 1900 however, public support for a policy of industralization had been growing. By about 1915 the Dutch East Indies government had become concerned about the uncontrolled exploitation of hydropower and began to consider what forms of government control might be appropriate:[2]

> "In 1915 as a result of the investment spirit of the early days of the twentieth century, an Industrial Commission was formed by the Governor-General to study the possibility of modern industrial development in Indonesia (then the Dutch East Indies). According to a plan which was inspired by the industrial development in Japan, a second industrial wave was started - several plans were discussed for the lay-out of heavy industry, e.g., a blast furnace in the Lampong District, Sumatra. The ideas which motivated the Commission were different from the views officially held previously. Whereas so far the accent was on agriculture and trade only now industrialization received a definitely stronger emphasis. The extent of the Industrial Commission's

---

1. NIGM was established in 1863 to supply gas to Batavia. It expanded its interest to include electricity production by taking over the Nederlandsch-Indisch Electriciteit Maatschappij in 1905 (see note b to Table 1.1). In April 1950, its name was changed to the N.V Overzeese Gas en Electriciteitmaatschappij (OGEM or Overseas Gas and Electricity Company Limited). For further extensive details, see Smit, ibid.
2. A.M. de Neuman, Industrial Development in Indonesia, Cambridge, Students' Bookshop, 1955, p.12.

> enthusiasm can best be gauged if we note that they outlined no less than some 200 plans of modern industrial developments. In 1917 an agency for water power and electricity was established;..."

The government first became interested in the supply of water power in 1910, originally mainly for the purpose of electrifying the state railways, but later also to supply electricity to other consumers such as radio stations, industry, plantations and domestic consumers. In August 1917 the Service for Waterpower and Electricity was established as an independent subdivision of the Department of Government Enterprises. The Service was assigned the task of[1]

> "... effectively promoting an economical supply of energy to the districts ... making efficient use of the Country's waterpower for the industrial development of these colonies in general and for that of the state railways and other government industries in particular."

The Service was given wide powers to supervise the growth of the electricity supply industry, especially the development of hydroelectric power. It was expected to arrange surveys of potential sources of hydroelectricity, provide information on relevant matters to potential private investors, and in general encourage the expansion of the industry. Further, it also controlled the issue of permits to establish local generating plants, and was expected to plan and execute the construction of state-owned hydro plants.

During the post World War I period, both government and private enterprise played a part in the expansion of the industry. The government was optimistic about the hydroelectric potential of the Dutch East Indies - $5\frac{1}{2}$ million H.P. (about 4,100 MW) was mentioned as a possible economic potential in the colony excluding New Guinea[2] - and was concerned to keep the development of this source of power under strict control. Where the government did not plan

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1. Department van Landhouw Nijverheid en Handel, Handbook of the Netherlands East-Indies, Edition 1920, n.p., n.d., compiled by the Sub-Department of Commerce of the Department of Agriculture, Industry and Commerce, p. 185.
2. Division of Commerce of the Department of Agriculture, Industry and Commerce, Handbook of the Netherlands East-Indies, Edition 1924, Batavia, G. Kolff, n.d., p. 295.

to build and operate hydroelectric plants itself, it allowed private enterprise to invest only under permit. Two kinds of permit were available: licences for small plants for own use which were readily available, and licences for a maximum period of 40 years intended for larger plants and especially for the privately-owned electricity utilities. The government itself was apparently less concerned with thermal generation, and until the Second World War most of the expansion in the thermal sector was carried out by private enterprise.

The Early Twenties

Following on the establishment of the Service for Waterpower and Electricity, there was a flurry of activity in the state sector. By 1920 a number of small government-owned hydroelectric plants had been built, and some larger ones were being planned or were nearing completion. Table 1.2 shows the hydroelectric potential that existed in the public sector in September 1923.

The growth of installed capacity in both the public and the private sector over the 26 year period from 1914 to 1940 is shown in Table 1.3. Early hopes for spectacular post-war expansion of the industry were held in check by the economic conditions of the early twenties.[1] The colonial economy was affected by depressed world economic conditions, and the government of the Netherlands East Indies applied economy measures. These limited the expansion of the Service for Waterpower and Electricity, and in particular restricted the hydroelectricity investment program.

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1. For brief details of the economic conditions of the day see A.M. de Neuman, op. cit., p.13.

TABLE 1.2 Main State-Owned Hydroelectric Plants in September 1923: in Operation or in Construction

Name	Area	Purpose	Capacity (MW)	Remarks
JAVA				
Giringan	Madiun (E. Java)	Energy supply to Government Workshops and Railway in Madiun Municipality	1.4	Operating in March 1917
Tji Guereuh I	Pengalengan (W. Java)	Energy supply to Radio Malabar	0.15	Operating June 1918
Tji Guereuh II	Pengalengan	Energy supply to Radio Malabar	0.26	Operating December 1919
Pakar	Bandung	To supply Bandung area	1.2	Taken over January 1920 from another company
Plengan	Pengalengan	To supply Bandung area	3.0	Operating October 1922
Bongkok	Bandung	To supply Bandung area	3.0	Operating January 1923
Dago	Bandung	To supply Bandung area	0.7	Operating August 1923
Lamadjan	Bandung	To supply Bandung area	12.0	In construction
Ubrug	Bogor	To supply Batavia area	10.8	In construction
Kratjak	Bogor	To supply Batavia area	n.a.	In construction
OUTER ISLANDS				
Teis	Bongkulu (South Sumatra)	To supply state and private gold mines	1.4	Operating January 1920

Source: *Voor den Dienst Departement van Gouvernementsbedrijven, De Waterkrachtregelingen in Nederlandsche Indie* [The Waterpower Regulations in Netherlands Indies], 1924, and Division of Commerce of the Department of Agriculture, Industry and Commerce, Handbook of the Netherlands East-Indies, Edition 1924, Batavia, G. Kolff, n.d., p. 297.

TABLE 1.3 Installed Capacity in Private and Government Utilities 1914 to 1940

(MW)

Year	Private	Government	Total
1914	10.2	3.3	13.5
1918	13.0	8.7	21.7
1919	15.1	n.a.	n.a.
1920	14.5	n.a.	n.a.
1921	19.8	19.6	39.4
1922	24.1	25.3	49.4
1923	26.7	28.0	54.7
1924	35.0	41.7	76.7
1925	40.4	59.6	100.0
1926	47.2	61.7	108.9
1927	50.1	71.3	121.4
1928	71.8	65.5	137.3
1929	75.8	76.4	152.2
1930	87.9	79.1	167.0
1931	92.3	83.0	175.3
1932	93.9	83.0	176.9
1933	94.8	83.1	177.9
1934	95.0	89.5	184.5
1935	95.3	89.5	184.8
1936	95.6	89.5	185.1
1937	97.4	91.0	188.4
1938	109.4	90.0	199.4
1939	110.4	94.0	204.4
1940	115.3	93.8	209.1

Source: 1914, 1918, and 1921 to 1927; from various annual reports of the Dienst voor Waterkracht en Electriciteit in Nederlandsch-Indie, especially Zevende Jaarverslag 1924 [Seventh Annual Report 1924], Weltevreden, Landsdrukkerij, 1925, and Tiende Jaarverslag 1927 [Tenth Annual Report 1927], n.p., n.d.

1919 and 1920: Dienst voor Waterkracht en Electriciteit in Nederlandsche-Indie, Statistiek van de Openbare Electriciteit-Bedrijven in Nederlandsche-Indie over de jaren 1919 tot en met 1925, [Statistics for the Public Electricity Companies for the years 1919 to 1925], Batavia, Landsdrukkerij, 1932.

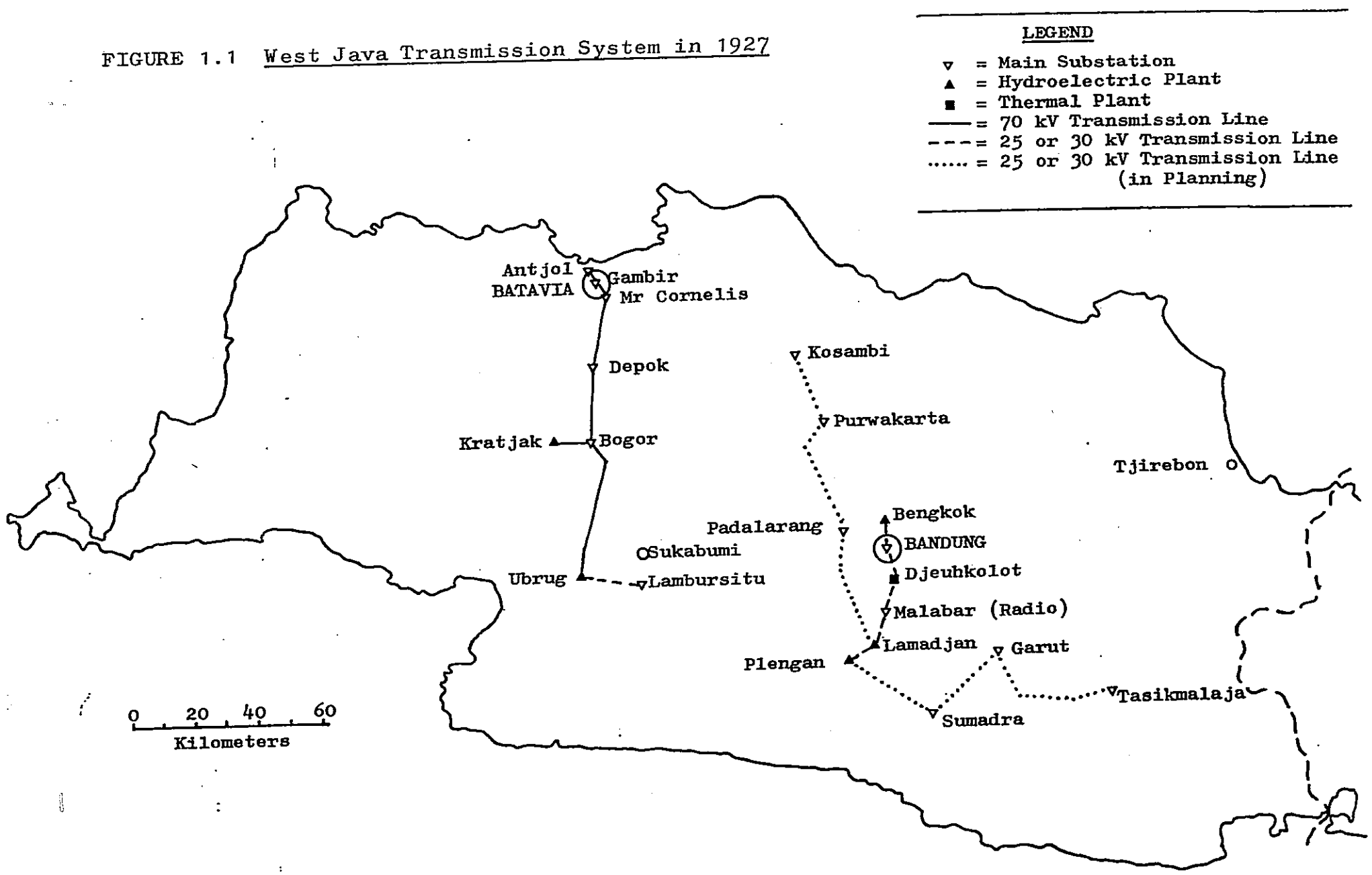
1928 to 1940: Centraal Kantoor Voor De Statistiek, Departement Van Economische Zaken, Statistisch Zakboekje voor Nederlandsche Indie, [Statistical Pocketbook for the Netherlands Indies] for years 1934, 1935, 1937, 1938, 1939 and 1940, Batavia, G. Kolff, published in years 1935, 1936, 1937, 1938, 1939 and 1940 respectively, and Central Bureau of Statistics, Department of Economic Affairs, Statistical Pocketbook of Indonesia 1941, Batavia, G. Kolff, 1947.

Nevertheless healthy expansion took place. Little data is available for the private utilities, so we will concentrate on the state sector. The main government investments in the early twenties were in West Java where two separate networks were being developed - one to supply Batavia, the other to supply Bandung and environs (see Figure 1.1). At that stage electricity in Batavia was distributed by private companies and the problem arose of introducing the new government supply from Kratjak and Ubrug, two hydro stations south of the capital, into the system. The solution adopted was to instruct government-owned institutions such as railway workshops, opium factories and the prison, to arrange only temporary contracts with private utilities. As soon as electricity was available from the state-owned plants these state enterprises were switched over to the new supply.

There was also continuing expansion on the Bandung Plateau. In 1922 two new small stations at Plengan and Bengkok (about 3 MW each) began operations and construction continued with the larger 12 MW Lamadjan plant. Shortages of electricity had developed in the area and the inauguration of the two small plants eased the position temporarily. It was expected that when Lamadjan was complete, supply would be adequate for the foreseeable future. The government's first plans for the area were to supply electricity to the radio station at Malabar, the paper factory at Padalarang and the railways. By the end of 1922 a high tension network had been opened in the area and connections installed which made it possible to supply GEBEO (which distributed the electricity).

In Central Java development was in private hands. The government had agreed to let ANIEM develop a supply system based on ANIEM's hydro plant at Tuntang midway between Semarang and Jogjakarta. At first, ANIEM's activities in Central Java were restricted to the Semarang area where electricity had first become available in 1913. In the early twenties, plans were developed by the Dutch East Indian Railway Company to electrify the railways. This encouraged ANIEM to plan for increased capacity at Tuntang to meet the new demand.

FIGURE 1.1 West Java Transmission System in 1927



Electricity development in East Java lagged slightly behind the rest of Java, but the government planned to improve the situation by constructing a hydroelectric station at Mendalan on the Kali Konto near Malang. This was intended to form the basis for a grid system supplying Surabaja, Kediri, Pasuruan, and other nearby towns. Preliminary surveys indicated that it would be economic to harness up to about 20 MW, so detailed cost estimates were worked out for a station at Mendalan which was tentatively thought of as the first of a number. It was expected that Mendalan would provide comparatively low cost power and that it would replace the thermal plant which ANIEM used. The station would be large enough to meet all of ANIEM's requirements for up to 10 or 15 years. ANIEM agreed in principle to co-operate with the government in developing a comprehensive plan for the development of the area. At the same time, plans were prepared for a transmission line from Mendalan to Surabaja.

There were also vague but ambitious plans for the construction of hydroelectric projects in the Outer Islands. Initial interest centered on the possibilities of establishing hydroelectric plants near the iron and nickel ore sources believed to exist in Sulawesi, but research and surveys were soon being carried out in other areas too. The Asahan River, outlet for Lake Toba in North Sumatra, the Ranau Lake in South Sumatra, and sites in Central and South Sulawesi were all investigated. All of these areas were confidently believed to have hydro potential of well over 100 MW (over 370 MW was thought to exist at Asahan), and it was hoped that cheap power from these projects would form the basis for an industrial boom in the colony. Prospects for the development of a nitrogenous fertiliser industry, in particular, were thought to be particularly promising.

Throughout this period, as well as supervising the expansion of the public sector generating plants, the Waterpower and Electricity Service carried out extensive surveys of potential hydroelectric sources and provided a wide range of advice on the development and use of electricity. The surveys conducted were, in the Dutch manner,

particularly thorough. Field explorations were carried out and water observation posts were established at potential sites. The results of these surveys formed the basis for plans adopted by Indonesian electricity planners over thirty years later.

The Mid Twenties

By the mid-twenties there was a noticeable improvement in overall economic conditions, but the full effects were not felt in the electricity sector for some time. The economy measures introduced in the Service in 1922, which led to a reduction of both current and capital expenditure, were continued for some years.[1] Nothing definite had come of the plans to develop large projects at Asahan and in the Celebes, and the hopes that a large consortium would begin work on a nitrogen and associated industries complex at Asahan in 1924 had not eventuated.

But despite the sluggishness of the economy over the previous few years, the Service was still optimistic about the industrial future of the country. Asahan had not been abandoned, and another private consortium had shown considerable interest in establishing an electro-chemical and electrometallurgical complex based on hydropower near the Gulf of Mandar in Central Sulawesi. A concession to utilise over 70 MW of hydropower, a large project for those times, had been granted and in 1924 the scheme was reported as being in an "advanced" stage. On the basis of such developments, the government felt that hydropower in the Outer Islands could play an important role in future industrial development.

By 1924 the grid system in West Java was coming into operation. That year the Ubrug plant of about 11 MW began to supply the Batavia suburb of Mr Cornelis (now Djatinegara) through a 70 kV high tension line 110 km long. The railway

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1. Surveys and mapping were cut back to a minimum, and in 1924 for example skilled staff such as engineers had to be laid off. The number of both European and indigenous personnel employed was down from 1923.

was expected to be one of the main consumers, and tests of supply were carried out in the last months of the year. Plans were to electrify about 30 miles of railway from Manggarai (a suburb south of Batavia) to Buitenzorg (now Bogor). Construction of the Kratjak hydro plant had been held up, so it was not expected that the plant would be connected to the main system until the late twenties. A transmission network was being developed around Batavia, and the construction of high tension lines to the north of the city (Antjol) was almost complete.

South of the capital there were plans to electrify Bogor and Sukabumi. After a survey, it was decided that the most economical method of supplying Sukabumi would be to buy electricity from Ubrug rather than build a small hydro plant nearby. The municipality of Sukabumi therefore supported an application from GEBEO to buy power wholesale from the government plant at Ubrug and distribute the electricity in the town. About the same time, the government granted GEBEO a permit to supply Bogor.[1]

On the Bandung Plateau, there was a high rate of expansion with consumption almost doubling from 12.4 to 24.0 million kWh between 1923 and 1925. The Lamadjan hydro plant (12.8 MW) was all but completed by the end of 1924, and with its inauguration the first part of the plan for supplying the Bandung area (including the Malabar radio station) was complete.

In East Java, plans for the construction of the proposed Mendalan power station on the Kali Konto had been delayed because of a shortage of personnel.[2] The government apparently felt that the construction of this station

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1. This was to the chagrin of NIGM, which "did not succeed in securing a concession for supplying electricity to Buitenzorg, though it had the oldest claim". C. Smit, op.cit., p.107. One of the conditions of the permit was that eventually a new company would be formed so that all electricity distribution in West Java would be controlled by one company.

2. Other arrangements were well advanced. Steps had been taken to prevent speculation in land, and a high tension line to Surabaja had been designed which was to pass close to Modjokerto. A second line was to be constructed in an easterly direction to Malang. ANIEM was to be in charge of distribution.

was beyond its own resources, perhaps for financial reasons, so it was proposed to set up a mixed limited liability company to be known as NIWEM (Nederlandsch-Indisch Waterkracht Exploitatie Maatschappij or the Netherlands Indies Hydropower Exploitation Company) which would be jointly owned by the government and ANIEM. A Government Commission had been established to consider the issues involved and to draw up contracts between the parties.

The Late Twenties

Towards the end of the decade improvements in overall economic conditions were reflected in the industry. There was a noticeable rise in the interest shown by private individuals in using waterpower in new areas in 1926, and a sharp increase in 1927. The demand for electricity for power from plantations and for lighting from domestic consumers was increasing rapidly, both in terms of the total amount consumed and in numbers of consumers. During 1927 the amount of electricity supplied from Ubrug increased by about 25 percent from 18.9 million kWh to 23.6 million kWh. The utilities NIGM and GEBEO, as well as the government railway which opened a new line from Mr. Cornelis to Weltevreden, were all responsible for this increase in demand.[1] In 1929 the opening of the Kratjak hydro plant near Bogor, whose construction had been delayed, gave a further boost to the system.

On the Bandung Plateau there was a slight drop in consumption, but this was only temporary since demand from GEBEO was increasing and the Padalarang paper factory, an important consumer, was ready to take more power. The transmission network was being extended to Garut and Tasikmalaja to the southeast of Bandung and to the north to Kosambi in the Krawang area. This latter line was an important step. It was to be built via Padalarang which was expected to become an important consumption centre, and it was the first stage in the eventual interconnection of

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1. Details from the Tiende Jaarverslag 1927 [Tenth Annual Report 1927] of the Service for Waterpower and Electricity.

the two West Java systems with a 110 kV line. An agreement was reached with GEBEO for the supply of electricity to Garut and Tasikmalaja. The government would supply electricity from the existing power stations along a high tension line of about 190 km in length to be built to Tasikmalaja. GEBEO would be responsible for local distribution.

These expansions in the Bandung system required considerable amounts of capital funds, most of which appear to have been supplied by the government out of the 1928 and 1929 budgets. GEBEO itself made only small investments in items such as substations. The future of the industry looked good, and because GEBEO (which had a reputation as an efficient company) guaranteed to use all electricity available, the government felt confident that the investments were justified. This optimism was reinforced by gradual improvements in the industry's financial position. The government aimed for a 6 percent return on capital after depreciation had been allowed for. This was achieved in 1927 from investments on the Bandung Plateau, and was almost reached in the Batavia area. The combined result for the two areas for that year was 5.9 percent, an improvement on the 5.5 percent recorded in the previous year.[1] In East Java, the Mendalan station of 16.5 MW was ready in 1928.

At the end of the twenties therefore, the industry was in a healthy state. The total capacity in government and private utilities combined had grown from about 40 MW in 1921 to 150 MW at the end of 1929, an average annual growth rate of about 18 percent. As a result of the government's policy of actively developing hydroelectricity, there had been a rapid expansion of hydroelectric plants, especially in the public sector. These plants had come to form the backbone of the electricity supply system on Java. West Java, shown in Figure 1.1, had the best developed system with a network approaching a grid, and there were plans for interconnection in the not too far distant future. The system in Central Java was based on ANIEM's Tuntang plant, while in East Java NIWEM's Mendalan plant carried

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1. Ibid.

most of the load. In the Outer Islands the average growth rate had been equally high, but the pattern had been different (see Table 1.4). Isolated and comparatively small consumption centres separated by large distances, both from other consumption centres and from sources of hydropotential, precluded the development of hydroelectricity.

TABLE 1.4 Installed Capacity in Private and Government Utilities by Prime Mover and Area, 1928

(MW)

Type	Area	Installed Capacity Hydro	Other	Total
Private Utilities	Java & Madura	23.5	35.7	59.2
	Outer Islands	0.2	12.4	12.6
	Total	23.7	48.1	71.8
Government Utilities				
a. For sale	Java & Madura	32.6	1.7	34.3
	Outer Islands	-	2.0	2.0
b. To supply government enterprises	Java & Madura	0.4	1.4	1.8
	Outer Islands	1.6	26.1	27.7
	Total	34.6	31.2	65.8
TOTAL		58.3	79.3	137.6

Source: Division of Commerce of the Department of Agriculture, Industry and Commerce, 1930 Handbook of the Netherlands East-Indies, Batavia, G. Kolff, n.d.

Thus isolated plants, often diesel, with a very simple distribution system of low voltage lines running out to nearby consumers was the most common pattern.

The relationship between the public and the private sector was also different outside of Java. Information on the capacity in the two sectors in Java and the Outer Islands is given in Table 1.4 but some features are not shown. The Table understates the importance of the public sector on Java. In the private sector a high proportion of capacity was in small and isolated thermal and diesel

plants not connected to the main networks, or in older thermal plants which - though connected to the networks - were probably used for standby or peak use. Neither is it clear where NIWEM's Mendalan plant is included in the Table. If as seems likely it is listed in the "private" category, this is also misleading since half of the finance for the plant was provided by the government. Thus the hydroelectric capacity in the public sector was considerably more important than the Table suggests. On the other hand, the Table overstates the importance of the public sector in the Outer Islands for ordinary power and lighting consumers. Almost 28 MW of the 30 MW in the public sector was used mainly to supply government establishments, and comparatively little was provided for other uses. In other words, while in Java the government developed hydroelectric power mainly for wholesale distribution to the utilities who resold it to the public, in the Outer Islands the government developed thermal plants mainly for use in its own establishments and apparently sold very little to the private utilities.

The Thirties

The Great Depression did not hit the electricity industry as hard as it affected some other industries, but as Table 1.3 shows the rapid expansion of the twenties was brought to a halt for some years and thereafter growth until the war was modest. There was a lag before the impact of the Depression affected the industry. Throughout 1930 and 1931, the rate of growth of the twenties continued. Table 1.5 shows that in 1932 however, there was actually a drop in total consumption of electricity. Additions to capacity also dropped sharply.

The Depression led to a decline in demand, especially from smaller consumers whose demand tended to drop off much more sharply than that from large consumers such as factories. Various steps were taken to counteract the drop in total demand, the main ones being attraction of new consumers and adjustment of tariffs. Both in Java and the Outer Islands new areas were electrified and new consumers were connected. However as Table 1.5 indicates, efforts to increase the number of consumers were much more effective

TABLE 1.5 Total Consumption, Consumers and Average Consumption by Area. 1930-1940

Year	Java & Madura			Outer Islands			Total		
	Consumers ('000)	Consumption (mill.kWh)	Average Consumption (kWh)	Consumers ('000)	Consumption (mill.kWh)	Average Consumption (kWh)	Consumers ('000)	Consumption (mill.kWh)	Average Consumption (kWh)
1930	198.6	183.1	923	34.8	26.5	762	233.4	209.6	898
1931	207.4	212.6	1037	40.5	31.8	785	247.9	244.4	987
1932	197.3	199.3	1010	40.0	33.3	832	237.3	232.6	982
1933	185.6	200.3	1081	39.7	33.3	840	225.3	233.6	1035
1934	169.3	195.7	1155	39.3	34.3	873	208.6	230.0	1100
1935	165.5	199.9	1208	40.8	36.8	903	206.3	236.7	1147
1936	170.7	214.6	1257	43.0	39.8	926	213.7	254.4	1190
1937	185.1	237.2	1280	48.0	44.2	921	233.1	281.4	1208
1938	205.5	257.5	1252	53.4	52.0	974	258.9	309.5	1195
1939	229.0	275.5	1203	60.0	56.9	948	289.2	332.4	1150
1940	250.3	302.3	1208	65.4	62.1	950	315.7	364.4	1154

Source: As for years 1928 to 1940 in Table 1.3.

in the Outer Islands than in Java. In the former areas, the number of consumers remained almost constant until 1935 before increasing, while on Java there was a significant drop in the number of consumers until 1935, after which the position improved rapidly.

As well as trying to attract new consumers, the electricity utilities responded to widespread demands in 1933 and 1934 to adjust tariff rates. Criticisms were voiced in the newspapers and other public forums because of the not mistaken impression that decreases in electricity tariffs had not matched the average decrease in other prices throughout the economy. Despite earlier tariff decreases, in January 1935 a number of companies felt obliged to respond to public opinion and reduced prices, including GEBEO which revised earlier price reductions so that its prices were about $7\frac{1}{2}$ percent below those of a few years before. In May of that year further cuts were made. GEBEO, for example, reduced prices by a further $7\frac{1}{2}$ percent. These tariff cuts were apparently not uniform however, since there were some companies which did not immediately follow these reductions. In an effort to counter the drop in per capita consumption by small consumers, ANIEM and GEBEO offered significant reductions to this group. This may have had some effect because there was a sharp increase in the mid-thirties in the use of electrical household appliances such as refrigerators, stoves and radios. On the other hand, price decreases may have simply coincided with greater use of these appliances which would have occurred in any case.

The utilities were also under strong pressure to reduce prices when drawing up new contracts with larger consumers such as paper factories and marine and harbour establishments, since the cost of generating electricity with private plants had fallen.

The two main companies in West Java, NIGM and GEBEO, fared better during the period of depressed consumption than ANIEM, whose main area of activity was in Central and East Java. This was partly because some new companies expanded in West Java, such as a Goodyear factory in Bogor which was expected to consume about 2 million kWh annually (about

6 percent of GEBEO's demand at that time) when completed. The demand for power from the railways in Batavia also remained high, and there was an increasing demand from the port area of Tandjung Priok.

Despite these problems on the demand side, the industry as a whole fared comparatively well during the Depression. In 1933 a British report on economic conditions in the Netherlands East Indies was able to state that:[1]

> "there is no occasion for uneasiness with regard to the future financial success of the electricity supply services now in operation."

In West Java, the government was confident enough about the future to add a third 6.4 MW plant to Lamadjan, and in Central and East Java the utilities had plans for extensions. ANIEM applied to the government for permits to operate in new areas near Pekalongan and Djember, but the government did not feel that the expansions were justified. In addition, after raising sufficient capital ANIEM and NIWEM applied for permission to jointly erect a hydro plant of about 18 MW on the Tuntang River about 60 km south of Semarang which was planned to replace the existing 4.5 MW hydro plant as well as thermal plants at Jogjakarta, Surakarta and other towns.[2] This scheme was ultimately postponed for some years, but it is clear that the electricity utilities were not overly concerned by the slump in demand. In East Java, the Depression did not entirely halt expansion. NIWEM considered it worthwhile to carry out some small investments, and although consumption in Surabaja itself in 1933 (37.2 million kWh) was slightly down from the previous year (38.2 million kWh), the total demand on NIWEM in 1933 rose by nearly 3 percent.

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1. United Kingdom Government, Department of Overseas Trade, Economic Conditions in the Netherlands East Indies, February 1933, Report by H.A.N. Bluett and Mr W.W. Coultas, London, H.M.S.O., 1933, p. 106.
2. Ibid., p. 108.

The main effect of the Depression was apparently felt by the smaller electricity utilities. A series of mergers took place which increased the importance of the large private utilities, ANIEM in particular. A well known trading company in the Netherlands East Indies, Maintz and Co., took over a number of companies such as the Solosche Electriciteit Maatschappij (Solo Electricity Company) and Oost Java Electriciteit Maatschappij (East Java Electricity Company), while the control of various other small companies[1] passed to a representative of ANIEM. Since ANIEM itself was under the ultimate control of Maintz and Co., these mergers implied a considerable increase in concentration of ownership. Data on the size of the main electricity utilities in 1938 is presented in Table 1.6. The three largest

TABLE 1.6 Main Electricity Companies' Share of Total Sales, 1938

(million kWh)

Company	Java & Madura		All NEI	
	Sales	%	Sales	%
ANIEM	109	42	113	37
GEBEO	53	21	53	17
NIGM	32	12	55	18
All Other	64	25	88	28
TOTAL	258	100	309	100

Source: Departement van Verkeer en Waterstaat, Afdeeling Electriciteitswezen. Korte Statistiek van de Openbare Electriciteitsbedrijven in Nederlandsch-Indie over het jaar 1938 [Brief Statistics of Public Electricity Utilities in the Netherlands East Indies during the year 1938], mimeo., July 1938.

companies accounted for 75 percent of sales in Java, and 72 percent throughout the whole of the Netherlands East Indies. ANIEM was about double the size of the two next largest companies, which were of roughly equal size in terms of sales.

1. The ones listed in the Ziestiende Jaarverslag 1933 [1933 Annual Report] of the Service for Waterpower and Electricity are the Banjumas, Rembang, Sumatra, Bali and Lombok Electricity Companies.

The Table also shows where the different companies operated. Whilst all of GEBEO's sales and about 96 percent of ANIEM's sales were in Java, about 40 percent of NIGM's sales were in the Outer Islands. The many smaller companies (about twenty) that accounted for the remainder were slightly more active in the Outer Islands than in Java.

On 20 September 1934, a change occurred in the organisation of the government administrative structure when the Service for Waterpower and Electricity, which had been established on 31 July 1917, was disbanded and its activities put under a new section of the Department of Public Works. Its functions were split up and the hydrometry activities were transferred to the Department of Irrigation. The new section was responsible for electricity alone.

By 1935 the worst was over and consumption and capacity grew slowly until the war. The outbreak of the war in Europe created difficulties for the industry even though the Japanese did not invade the Netherlands East Indies until 1942. Imports of machines and spare parts became difficult to obtain and expensive, and there were long delays. Since nearly all of the industry's mechanical requirements were imported, this was a serious problem. Demand from domestic consumers for electricity for lighting continued to increase, and there was an especially sharp rise in demand as a result of defence measures. Table 1.5 shows that consumption rose by nearly 10 percent in 1940. But even this figure does not fully reflect the increased demand since the state hydroelectric companies were obliged to restrict supply in 1940 because of drought. Expansion continued during the first years of the war, both in the private and the public sectors, and electrification was extended. Progress was made on a state hydro station at Parakan near Tjirebon, and NIWEM began construction on another new hydro plant on the Kali Brantas as well as planning the construction of others. In South Sulawesi construction proceeded on a hydro station at Sawitto.

The financial results from the operations of the large private utilities had been generally good in the years preceding the Second World War with the result that their financial position in 1939 was strong. Apart from some readjustments of tariffs and an administrative reorganisation

of NIWEM, after the outbreak of the war in Europe business in the Netherlands East Indies continued as usual.

Review of the Pre Second World War Expansion

It is now time to review the expansion of the industry as a whole over the pre-war period. Before doing so, it should be noted that we have excluded from our discussion to this stage that section of the economy which contained a significant amount of privately-owned generating capacity used almost exclusively for own-consumption. This has been done for two reasons: first, we are mainly concerned in this study with the development and performance of the public sector; and second, very little information is available on the capacity which was installed almost wholly for own use.

This is not to say that privately-owned generating plants for own use were not important. As Table 1.7 shows, in 1923 this sector accounted for more than 50 percent of total installed capacity in the Netherlands East Indies, and in 1928 about one-third of total capacity was in this category.

TABLE 1.7 Total Installed Capacity in the Netherlands East Indies, 1923 and 1928
(MW)

	1923			1928		
	Hydro	Other	Total	Hydro	Other	Total
Private Utilities	2.4	22.8	25.2	23.7	48.1	71.8
Government Utilities	8.6	17.2	25.8	34.6	31.2	65.8
Privately owned plants for own use	8.4	45.8	54.2	20.0	60.0	80.0
TOTAL	19.4	85.8	105.2	78.3	139.3	217.6

Source: 1923: Division of Commerce of the Department of Agriculture, Industry and Commerce, Handbook of the Netherlands East-Indies, Edition 1924, Batavia, G. Kolff, n.d.

1928: Division of Commerce of the Department of Agriculture, Industry and Commerce, 1930 Handbook of the Netherlands East-Indies, Batavia; G.Kolff, n.d.

Indeed, it seems likely that even today over one-fifth and perhaps almost one-third of total generating capacity existing in Indonesia is in this group.[1]

The only additional information available is presented in Tables 1.8 and 1.9, which provide extra data on both the comparatively small amount of privately-owned hydro capacity intended for own use (about 20 MW in 1928) as well as capacity in the private utilities. As mentioned earlier, the government's policy was to keep the development of hydro capacity under close control. In order to enforce this, the government required that a water concession permit, of which two kinds were available, be obtained before a hydro plant could be built.

Table 1.8 gives information about small scale use of hydropower (less than 100 H.P. or about 75 kW) exclusively for own use, for which permits were granted "until further notice." In 1939 permits for the use of about 19.2 MW had been agreed to, not all of which had necessarily been taken up. The major part of approved capacity was in the European plantation sector, mainly in West Java in the Bogor and Bandung areas. The Table emphasises the difference in techniques used between the European and the indigenous sector. In the European plantation sector the average permit was for about 50 H.P. which was sufficient to run a machine of some size, while the average permit agreed to in the indigenous sector was for a very small machine (about 6 H.P.) which was often probably no more than a waterwheel of some sort.

Table 1.9 presents data on the permits granted for larger plants of over 100 H.P. These permits were given for a fixed period (40 years), and were granted not only for own use but for the supply of energy to others.[2] The total capacity of permits approved in this group (in 1939 over 84,000 H.P. or about 63 MW) was considerably larger than that granted for small hydro power uses, but when the

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1. See the appendix to Chapter 5 below.
2. Private utilities such as ANIEM and NIWEM are included here.

TABLE 1.8 Permits Granted (Given Until Further Notice) for the Private Use of Waterpower by Small Plants of less than 100 H.P.

Year & Area	European Estates		Indigenous Agriculture		Ice & Aerated Water Factories		Central Light & Power Stations		Other		Total		
	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	Cap.MW
1939													
West Java	133	9306	317	2333	10	428	15	344	9	.72	484	12483	9.3
Central Java	32	1525	5	138	14	594	7	217	4	108	64	2627	1.96
East Java	113	2956	23	395	16	440	38	522	6	91	196	4404	3.3
JAVA TOTAL	278	13789	354	2866	40	1462	62	1128	19	271	744	19514	14.6
Sumatra	23	894	152	328	1	4	3	22	12	4750	191	5998	4.5
Other	1	20	-	-	3	162	1	32	-	-	5	214	0.16
ALL N.E.I.	302	14703	497	3194	44	1628	66	1182	31	5021	940	25728	19.2
(Average Capacity)		(48.7)		(6.4)		(37.0)		(17.9)		(162.0)		(27.4)	
1930													
ALL N.E.I.	274	11776	194	2341	43	1502	32	721	30	5331	573	21670	16.2
1925													
ALL N.E.I.	246	11101	300	2212	40	1469	16	745	20	6573	622	22100	16.5

Source: Various issues of the Indisch Verslag, Statistisch Jaaroverzicht van Nederlandsch-Indie, [Indies Report, Statistical Annual of the Netherlands Indies], 1930-1940, prepared by the Central Kantoor voor de Statistiek of the Departement van Economische Zaken, Batavia, 1931-1940.

TABLE 1.9 Permits Granted to Use Waterpower (for a Fixed Period) for Plants of more than 100 H.P.

Year & Area	European Estates		Indigenous Agriculture		Ice & Aerated Water Factories		Central Light & Power Stations		Other		Total		Total Minus Light & Power Stations		
	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	No.	Cap.HP	Cap.MW
1939															
West Java	24	7837	1	214	-	-	4.0	4781	1	68	30	12900	26.0	8119	6.1
Central Java	2	208	-	-	1.0	83	4.0	27339	-	-	7	27630	3.0	219	0.2
East Java	13	2829	1	70	1.0	218	4.0	24985	1	50	20	28152	16.0	3167	2.4
JAVA TOTAL	39	10874	2	284	2.0	301	12.0	57105	2	118	57	68682	45.0	11577	8.6
Sumatra	12	8372	-	-	0.5	225	3.5	878	5	6223	21	15698	17.5	14820	11.1
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALL N.E.I.	51	19246	2	284	2.5	526	15.5	57983	7	6341	78	84380	62.5	26397	19.7
(Average Capacity)		(377)		(142)		(210)		(3741)		(906)		(1082)		(422)	(0.32)
1930															
ALL N.E.I.	43	15043	1	70	2.5	526	9.5	23100	5	5838	62	44577	52.5	21477	16.0
1922															
ALL N.E.I.	8	3530	1	70	1.5	130	2.5	2745	4	4210	17	10685	14.5	7940	5.9

Source: As for Table 1.8.

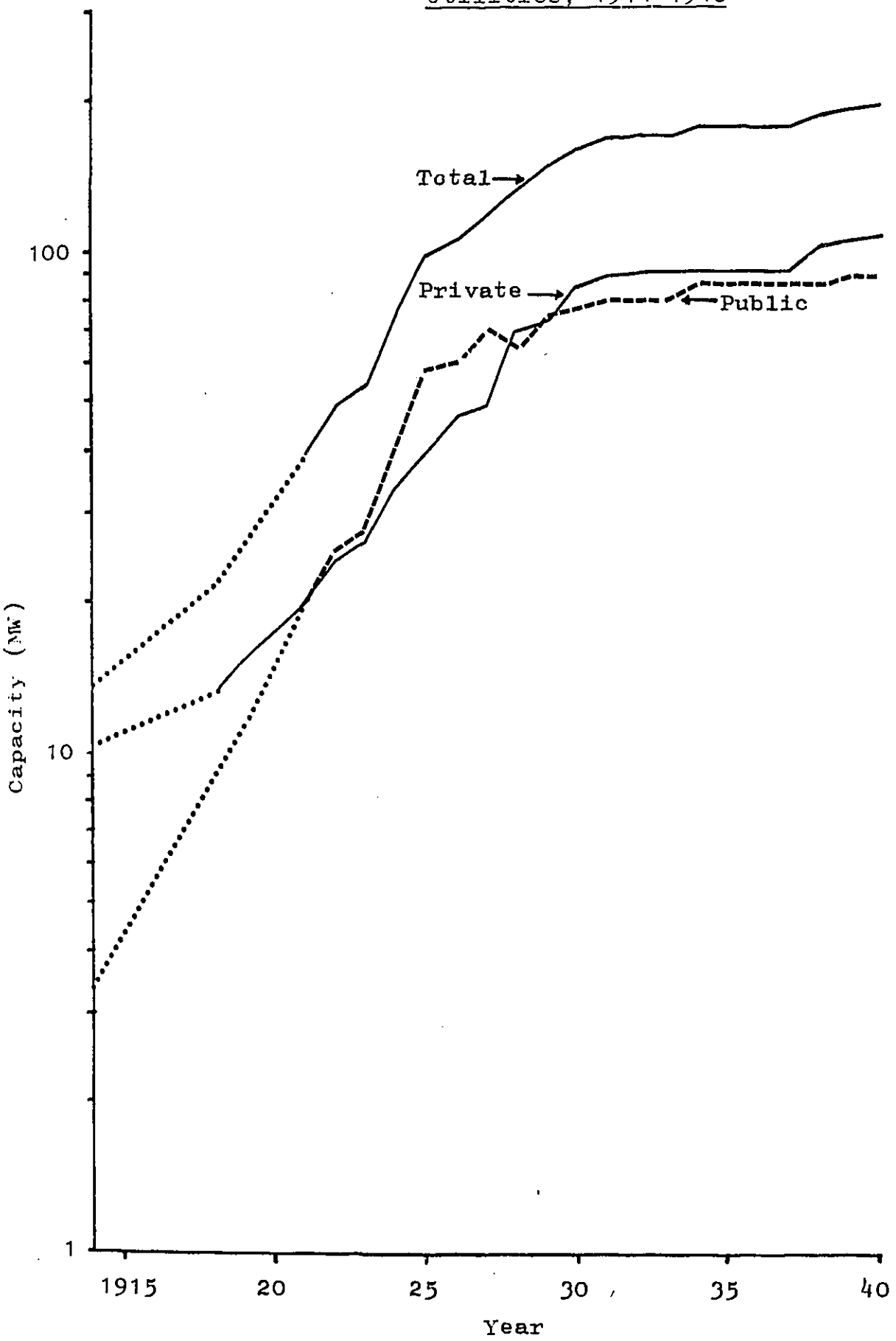
private utilities are removed from the picture (see the final column of Table 1.9), the capacity turns out to be about the same as for the smaller group (19.7 MW in 1939). Once again, excluding the electricity utilities more than half of the capacity approved was for European plantations, mainly around Bogor and Bandung. Only a very small amount of capacity was granted to the non-European agriculture sector in this group.[1]

Turning to a discussion of the public sector (including the private utilities), on the supply side apparently no output figures exist and only figures for growth of capacity are available (see Table 1.3). Capacity in the public sector grew by about 1450 percent over the quarter century from 1914 to 1940, which implies a healthy average growth rate (but not spectacular for an electricity industry in its early stages) of about 11 percent per annum. As Figure 1.2 clearly shows, there were two distinct periods. In the first 17 years until 1931, total capacity expanded rapidly at the high average rate of almost 16 percent per annum. With the onset of the Depression, growth dropped back sharply as the construction of plants begun in the boom years of the late twenties was completed. Thereafter until the war, capacity increased slowly at about 2 percent per annum. Figure 1.2 also shows that throughout the period, growth in capacity was shared about equally between the private and the public sectors.

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1. It should be noted that the total capacity of hydro permits agreed to (excluding utilities) in 1928 appeared to be about 32 MW, (15.8 MW for small plants in Table 1.8 plus about 16 MW - this is actually for 1930 - for large plants in Table 1.9), which is considerably more than the 20 MW of capacity reported in Table 1.7. The discrepancy is probably largely accounted for by permits held but not taken up.

FIGURE 1.2 Capacity in Private and Government Utilities, 1914-1940



Source: Table 1.3.

Table 1.10, providing information on growth in installed capacity by area, shows that growth was shared equally between Java and the Outer Islands. The proportion of capacity outside of Java remained almost constant over the

TABLE 1.10 Installed Capacity by Area, 1914 to 1940
(MW)

Year	Java	Outer Islands	Total
1914	10.9	2.6	13.5
1918	15.7	6.0	21.7
1925	70.5	30.1	100.6
1926	n.a.	n.a.	108.9
1927	75.4	36.6	122.0
1928	95.9	42.2	138.1
1929	109.4	43.6	153.0
1930	120.5	45.6	166.1
1931	129.2	47.1	176.3
1932	127.7	49.2	156.9
1933	n.a.	n.a.	177.9
1934[a]	134.0	51.4	184.5
1935[a]	134.2	51.4	184.8
1936[a]	133.6	51.9	185.1
1937[a]	139.0	51.9	188.4
1938[a]	147.1	52.2	199.4
1939	146.6	54.2	204.4
1940	145.9	63.2	209.1

Notes: a. Totals do not add in the source.

Source: 1914 and 1918: from various annual reports of the Dienst voor Waterkracht en Electriciteit in Nederlandsch-Indie.

1925-1932: as for Table 1.8.

1933-1940: as for years 1928 to 1940 for Table 1.3.

period at about 30 percent. Since little growth occurred during the thirties, the pattern that had developed during the twenties remained largely unaltered a decade later. Information on the proportion of each type of capacity

(by prime mover) is also available, and this is shown in Table 1.11. It can be seen that here too, expansion was shared roughly equally between the three types, with hydroelectricity growing slightly faster than the total on the average. About 50 percent of total capacity was

TABLE 1.11 Installed Capacity by Type of Prime Mover 1914 to 1940 (MW)

Year	Hydro	Thermal	Diesel	Total
1914	2.0	9.6	1.9	13.5
1918	4.4	14.0	3.3	21.7
1928	58.3	58.5	20.5	137.3
1933	84.1	61.4	33.0	178.5
1934	90.8	61.4	33.2	184.5
1935	90.8	94.8		184.8
1936	90.6	94.9		185.1
1937	95.8	95.1		188.4
1938	103.6	60.2	35.7	199.5
1939	107.5	60.8	36.3	204.6
1940	108.3	61.7	39.0	209.0

Source: 1914 to 1934 and 1938 to 1940: from the various yearbooks of the Dienst voor Waterkracht en Electriciteit in Nederlandsch-Indie.

1935 to 1937: as for years 1928 to 1940 for Table 1.3.

hydro, and about 30 percent and 20 percent thermal and diesel respectively.

Consumption

Unfortunately information on consumption is sketchy. The time series available, shown earlier in Table 1.5, covers only sales for the period 1930 to 1940. Both sales made by private utilities and bulk sales made directly by state generating companies to especially large consumers such as the railways are included. Despite private companies' efforts to counter the drop in sales by expanding the network and attracting new consumers, the number of consumers dropped quite sharply in Java and by 1935 was only 80 percent of the 1931 figure. In both Java and the Outer Islands,

the effect of the decrease in the number of consumers was partly offset by slowly increasing consumption per consumer. Over the 10 years, total sales increased by about 74 percent (an average of about 5.7 percent per annum), which was the result of an increase of 35 percent in the number of consumers and a 29 percent increase in average consumption per consumer.

Detailed information on consumption per capita and per consumer for 1938 is presented in Tables 1.12 and 1.13. It is clear that electricity was available to only a very small section of the total population - less than half of one percent were registered consumers during the whole of the thirties (see Table 1.12). In Table 1.12 it can be seen that the number of consumers per thousand inhabitants

TABLE 1.12 Consumption of Electricity per Capita in 1938

Area	Population[a] (million)	Consumers per 1,000 of Population	Average Consumption Per Capita (kWh)
Java & Madura	41.7	4.9	6.2
West Java	11.4	6.3	11.0
Central Java	15.3	3.7	3.3
East Java	15.0	5.2	5.4
Outer Islands	19.1	2.8	2.7
Sumatra	8.3	3.9	4.2
Borneo	2.2	4.0	2.7
Other	8.6	1.4	1.3
TOTAL N.E.I.	60.8	4.2	5.1

Notes: a. The Source held the population figures constant throughout the thirties, and therefore they almost certainly understate the true population in 1938.

Source: Departement van Verkeer en Waterstaat, Afdeeling Electriciteitswezen, Korte Statistiek van de Openbare Electriciteitsbedrijven in Nederlandsch-Indie over het jaar 1938 [Brief Statistics of Public Electricity Utilities in the Netherlands East Indies during the year 1938], mimeo., July 1938.

varied considerably, from 6.3 in West Java to 1.4 in some outlying regions. These low figures, combined with the low average consumption per consumer which also varied considerably, meant a very low per capita annual consumption ranging from 1.3 kWh in some outlying regions to 11.0 kWh in West Java. The average for the whole of the Netherlands East Indies was 5.1 kWh per annum, which was very low by international standards. In Australia, for example, the per capita annual consumption was about 600 kWh in 1939-1940.

However, because of the extreme concentration of the supply and use of electricity, these per capita figures are of little use except as broad comparisons for pointing up the underdeveloped nature of the economy in general and the electricity industry in particular. Table 1.13 gives detailed figures which show more accurately the pattern of consumption in 1938. Aggregate ratios show that West Java had a significantly higher average consumption per consumer than Central or East Java. Two points should be noted in making this comparison. First, the difference is exaggerated by the influence of some large consumers in West Java. If the two largest consumers (the Padalarang paper factory and the railways) are left out, the average for the area falls from 1750 kWh to 1350 kWh. If the special demand for electricity from the port area of Tandjung Priok is also allowed for, the average falls still further to 1290 kWh. This is, however, still considerably above average consumption throughout the rest of Java. Secondly, in Java 59 percent of consumers and 51 percent of total consumption were accounted for by the five large towns of Djakarta, Bandung, Semarang, Surabaja and Malang. Thus if we wish to get a better picture of consumption in the rest of Java, the influence of these five towns and the especially large consumers in West Java must be allowed for. When this is done, the variation between West Java and the rest of the island reappears. The average consumption in West Java (1850 kWh) appears to be about double that in Central (885 kWh) and East Java (870 kWh).

TABLE 1.13 Consumption of Electricity by Area and per Consumer in 1938

	(1)	(2)	(3)	(4)	(5)
	No. of Consumers ('000)	No. of "special power & industry" consumers	(2)/(1) (%)	Consumption (mill. kWh)	Average consumption per consumer = (4)/(1) (kWh/year)
Total West Java	71.5	4,520	6.3	125.0	1,750
Djakarta	30.7	1,112	3.5	28.7	935
Bandung	21.4	2,229	10.4	27.9	1,360
Tandjung Priok	0.6	53	8.8	5.1	8,685
Two Largest Consumers	0.002	2	100.0	28.4	14,200
All Others	18.8	1,124	6.0	34.8	1,850
Total Central Java	56.2	2,336	4.2	51.3	915
Semarang	16.9	587	3.5	16.5	975
All Others	39.3	1,749	4.4	34.8	885
Total East Java	77.8	2,704	3.5	81.2	1,040
Surabaya & Port	41.0	1,599	3.9	46.8	1,120
Malang	11.1	382	3.4	12.0	1,080
All Others	25.7	723	2.8	22.4	870
TOTAL Java & Madura	205.5	9,560	4.7	257.5	1,255
TOTAL Outer Islands	53.3	n.a.	n.a.	51.9	975
TOTAL N.E.I.	258.8	n.a.	n.a.	257.5	1,255

Source: As for Table 1.12.

Throughout the Netherlands East Indies as a whole, consumption in Java was higher than in the Outer Islands, both in terms of average consumption per inhabitant (6.2 kWh in Java and 2.7 kWh in the Outer Islands) and in terms of average consumption per consumer (1255 kWh as against 975 kWh). In addition, the high degree of concentration of consumption remains even when sales outside of Java are considered. The five main towns plus the two exceptionally large consumers in West Java accounted for 47 percent of all consumers and 52 percent of all sales in the colony.

Thus the pattern of consumption shortly before the Second World War was marked by two main characteristics: concentration of consumption, and wide variations in average consumption. This pattern appears to be the consequence of both demand and supply factors. On the demand side, the first characteristic is probably largely explained by the fact that the Dutch elite along with the more wealthy Chinese and Indonesians lived in the urban centres. The variations in average consumption levels also appear to have been brought about partly by the concentration of affluent domestic consumers with a high average consumption.

More important however appears to have been the influence of demand from industrial consumers. Table 1.13 includes available figures for a "special power and industry" consumer group which apparently includes especially large consumers who took electricity for power purposes.[1] There are a number of reasons for treating the data in Table 1.13 with considerable caution: power-use ratios vary considerably between industries; many factories owned their own generating plants; and the low absolute level of demand

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1. Unfortunately no clear explanation of what is included in the "special power and industry" group is available. It seems likely that also included are smaller factories which may have had very low power-use ratios.

means that the influence of just one large consumer could upset any patterns. There is, however, a very rough relationship between average consumption per consumer and the percentage of consumers in the "special power and industry" category which suggests that the influence of industrial consumers raised average consumption in Java and particularly West Java.[1] Unfortunately no data for the "special" group are available for the Outer Islands, but it seems likely that demand from industry was more important in Java than in the Outer Islands. This at least partly accounts for the lower average consumption outside Java.[2]

Supply factors probably also encouraged concentration of consumption. Originally, the location of promising markets for electricity in the main urban areas called forth comparatively large scale investments in the generation and transmission sectors in Java. This led to an important difference developing between the structure of the industry on Java and the Outer Islands. Only on Java did the industry move towards a more mature stage and develop a transmission and distribution network that approached a grid system. Elsewhere, the industry remained in a more primitive state. Once large investments had been made in generation and transmission to supply important consumption centres in Java, the utilities were probably especially keen to connect new consumers in these centres rather than expand into new areas. The discreteness of investment in the generation and transmission sectors meant

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1. Of the five main towns listed, Bandung had the highest percentage of "special" consumers as well as the highest average consumption. Bogor, which is not shown in the Table, had both an exceptionally high percentage of "special" consumers (15 percent) and an exceptionally high average consumption per consumer (2760 kWh). West Java as a whole had a significantly higher percentage of special consumers than the rest of Java.

2. In many areas in the Outer Islands electricity was available for only six hours each day. Apparently daytime demand, which would have come mainly from industries, was so low that it was not considered worthwhile operating the generating plants.

that there were worthwhile economies of scale to be gained by expanding in the few areas served by the large investments.

The technology of the industry may have been important in the distribution sector also. There is a technical and financial flexibility in distribution which does not exist in hydrogeneration or transmission. In distribution, expansion can be executed in small short-range steps, and overloading is far less serious in distribution than in generation. Expansion in hydrogeneration or transmission is undertaken in large discrete steps, and overloading in the generation sector rapidly leads to complete breakdown of the plant. Although we cannot be sure, it is not unreasonable to speculate that the flexibility of distribution may have been important during and after the Depression years. The utilities would have been more likely to favour expansion in distribution in established areas rather than open up new areas. For a relatively small investment, and sometimes for no extra investment at all(if overloading of distribution facilities was acceptable), new consumers could be connected in the established areas. In the years of financial stringency, this advantage of the established areas would have been an important point for the utilities to consider.[1]

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1. This contrast in the technical and financial flexibility between different sectors on the supply side of the industry has been discussed at length by Judith Tendler, Electric Power in Brazil: Entrepreneurship in the Public Sector, Cambridge, Massachusetts, Harvard University Press, 1968.

CHAPTER 2 Post War Recovery and the Fifties

Japanese Occupation

Only scanty details are available on the performance of the industry during the war. Sitsen provides figures of doubtful accuracy which show a surprisingly sharp rise of workers employed in "public electricity" from 8400 in December 1939 to 9300 a year later. His production figures, which show a rise from 325 to 970 million kWh over the same period, are quite unreliable.[1]

In 1940-41 demand for electric power, especially from industry, rose sharply according to ANIEM reports.[2] Extensions to capacity were made by ANIEM, some of which were completed before the Japanese invasions. After the invasion the Japanese took control of all public utilities[3] including electricity, but although the top organisational structure was altered, there were apparently few important changes in the operations of the industry. ANIEM's top executive, Ir E. van Elk, was interned soon after the Japanese occupation, but the majority of Dutch employees remained at work until January 1943 when most of the remainder were also interned. All electricity generating plants, whether owned by the central government, municipal councils or the privately-

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1. Peter H.W. Sitsen, Industrial Development of the Netherlands Indies, Bulletin 2 of the Netherlands and Netherlands Indies Council of the Institute of Pacific Relations, n.d.

2. N.V. Algemeene Nederlandsch-Indische Electriciteit Maatschappij, Mededeelingen van de Directie over de Periode 1940 — 1 Maart 1947 aan de Algemeene Vergadering van Aandeelhouders, to houden op 26 Maart 1947 [Statement of the Board of Directors covering the period 1940 — 1st March 1947 to the General Meeting of Shareholders, to be held on 26 March 1947]. Much of the information in this Chapter has been obtained from various Verslag [Annual Reports] of ANIEM for the period 1940 to 1957. Mr John Kolff gave generous help with the translations.

3. John O. Sutter, Indonesianisasi: Politics in a Changing Economy, 1940 - 1955, Ithaca, N.Y., Cornell University, 1959, p.164.

owned utilities, were apparently merged under the control of one organisation.[1]

Although the Japanese were naturally preoccupied with the war effort, the military government wanted to reap maximum economic advantage from the new colony. Japanese private businessmen were involved in the economic administration of the Netherlands East Indies, and industries important to the war effort were encouraged. In the electricity industry, the Japanese quickly finished a GEBEO transmission line from Bandung to Tjirebon, and a high tension line from Jogjakarta to Solo was also constructed. Some hydroelectric projects were started, one at Tonsealama near Lake Tonado, and another at Asahan, but it seems that little progress was made.[2] Maintenance procedures were bad, especially after the Dutch were interned, and by 1945 total capacity had fallen considerably - partly through damage to plant and partly through neglect.[3] Profits during the war were appropriated by the occupation regime.

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1. The actual position is not clear, since different sources give different accounts. Suweti Ramuny, Kontrol Perbekalan dan Peralatan pada Perusahaan Listrik Negara Pusat di Djakarta [Control of Stores and Supplies in the Central Office of the State Electricity Corporation in Djakarta], unpublished thesis in the Faculty of Economics, University of Indonesia, Djakarta, 1965, mentions a Japanese government-owned enterprise, the Djawa Denki Djigyo Kosha [Java Electricity Public Corporation] which later became simply Djawa Denki Djigyo Sha [Java Electricity Company]. Ismail Nazar, Tindjauan Sekitar Penetapan/Penjesuaian Tarip Perusahaan Listrik Negara [Observations on Tariff Setting in the PLN], unpublished thesis in the Economics Faculty of the University of Indonesia, Djakarta, 1967, mentions two enterprises, one apparently run by the Army which supervised the electricity industry on Java and Sumatra, and one apparently supervised by the Japanese Navy which supervised the industry in all other areas.

2. A.M. de Neuman, op.cit., p.23, mentions these projects.

3. For example, one report of conditions during the war explains that "Diesel-engines were kept running with coconut-oil as the only fuel and lubricant. A considerable part of the transformer capacity was lost, because the people drained the oil of the transformers to use it as fuel for domestic and lighting purposes." See Compact-Commission Eximbank-Loan, No. P1/342, Paper-NR.25 [On the Electricity Supply Situation in Indonesia], mimeo., Djakarta, April 14 1950, p.4.

In April 1944, the management of the former Dutch-owned electric power utilities in Sumatra was turned over to the Nippon Power Transmission Co. which had its head offices in Padang. A similar transfer to private hands later took place on Java.[1]

The Fight for Independence

The confused situation that existed in the public sector after the Japanese surrender has been described in detail by J.O. Sutter[2] and the electricity industry was closely involved in many of the events that he discusses. The war had brought a radical change in Indonesian attitudes and Indonesians were no longer prepared to accept the Dutch back as their masters. The attitudes of the defeated Japanese helped the Indonesians too, since although they were legally required to hand over control to the Allies, the Japanese were distinctly half hearted in helping the Europeans to return. Instead, they often encouraged the Indonesians to take charge. Indonesian nationalism was running high, and political leaders were moving quickly to seize de facto control before Allied soldiers could arrive. Groups of Indonesian workers in a number of industries took over the management of their plants in response to their leaders' calls.

The employees of the gas and electricity enterprises were one of the first major groups to organise into unions and take action. Indonesian personnel began seizing electricity and gas installations on 29 September 1945, and by 27 October the services had been organised as the Office of Electricity and Gas (Djawatan Listrik dan Gas) with a head office at Bandung under Ir M.A. Sofwan who had been the former manager of the gas plant in Djakarta. On the 23rd and 24th of November the workers organisation, known as the Office of Electricity and Gas Labour Front (Barisan Boeroeh Djawatan Listrik dan Gas), held its first congress at Jogjakarta with one Kobarsjih as chairman. The leaders of the First West Java, Second West Java, Central Java and East Java districts were Irs F.J. Inkiriwang, Soedoro, Moenandar and Saljo respectively.[3]

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1. Sutter, op.cit., p.197.
2. The following account is drawn largely from Sutter, ibid.
3. Ibid., p.305.

Shortage of trained manpower was an acute problem. Inkiriwang, Moenandar and Saljo were the first three Indonesians to graduate in electrical engineering and they had but little experience in management positions.[1] Saljo, for example, had first joined the staff of ANIEM in Surabaja in 1938.

Because of Dutch attempts to regain control, the situation remained in a state of flux. At the end of 1945 the position concerning actual control and ultimate ownership was confused. The new Republican government, although issuing comparatively conciliatory statements about its intentions towards Dutch property, did not make it clear which enterprises would be returned to the Dutch, which nationalised with payment, and which simply taken over without payment. With the arrival of British and later Dutch troops, the situation deteriorated and a kind of "anarcho-syndicalism" developed. In some industries workers seized enterprises intending to hold them in trust for the Republican government, while in other industries the workers were convinced that they themselves owned the plants.[2]

Events in East Java are illustrative of how the electricity industry fared. Indonesian nationalists who had seized electricity installations in Surabaja were driven out by British troops in November 1945. They retreated to Modjokerto and Kediri, taking most valuable files with them so that they could continue to run those sections of the industry still under their control. In mid-1946 Ir Saljo, who had been acting as head in East Java, shifted to Jogjakarta where the headquarters of the Office of Electricity and Gas (still nominally in charge of the industry throughout the whole of Indonesia) was situated.

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1. Soedoro and Saljo continued to play leading roles in the industry for the next twenty years. In 1961 they became members of the first board of the State Electricity Corporation (see Chapter 3).
2. Sutter, op.cit., p.314.

The officials of the industry continued to work in Jogjakarta until the end of 1948 when Dutch troops occupied the town. Most Indonesian managers promptly resigned as an act of defiance, and although pressed to remain, refused to co-operate. Only six months passed before the Dutch were obliged to bow to international pressure, and in May 1949 the Republican government returned to Jogjakarta. The Indonesian government took over the management (though not the ownership) of the Dutch electricity firms. Later, when the government moved to Djakarta, the Office of Electricity and Gas also moved to the main capital and became the Office of Power (Djawatan Tenaga).

During this turbulent period support for nationalisation of vital industries became strong. With nationalism running high it was accepted from the beginning that the government should have a strong hand in important economic activities. In 1946 a hastily drawn up economic plan was issued which recommended inter alia that the government should have a monopoly in some areas, including the production and distribution of electricity, gas and water.[1]

From that time on it was an unquestioned tenet of Indonesian nationalist policy that electricity - along with certain other important industries - would be nationalised in the not too far distant future. For example, in the controversy following the signing of the Linggadjati Agreement (which took place in March 1947), one point of disagreement was Indonesian nationalisation of utilities. In April 1947 the Republican government said that non-Indonesian property under its de facto control would be protected and returned, except for public utilities such as railways, tram companies, and gas and electricity, which would become state property and for which compensation would be paid.[2] The Dutch refused to accept this, and on the 25th May sent the Republican government a note demanding agreement to the Dutch terms within a fortnight. Referring to public utilities, the Dutch demanded that alien property - including private enterprises ear-marked by the Republic for nationalisation - be returned

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1. Sutter, op.cit., p.498.
2. Sutter, op.cit., p.507.

to the former owners immediately. The Indonesians replied on the 8th June in a comparatively conciliatory tone, but insisted that they must have control of important industries. This the Dutch rejected, and despite further large concessions from the Indonesian government, launched their first "police action" in July 1947.

Not surprisingly, Dutch attempts to get their own way met with strong popular resistance. In the electricity industry the Labour Front of the Indonesian Electricity and Gas Office (Barisan Buruh Djawatan Listrik dan Gas Indonesia) at its third congress in Malang in May 1947 was concerned about violations of the Linggadjati Agreement and adopted a non-conciliatory attitude towards the return of Dutch property. The congress demanded that the government immediately nationalise all important services, including the Office of Electricity and Gas.[1] Two months earlier, the first congress of the youth affiliate of the union, the Youth Group of the Indonesian Electricity and Gas Office (Angkatan Moeda Djawatan Listrik dan Gas Indonesia), had shown sympathies towards nationalisation.[2]

The subject of nationalisation was one of the issues discussed at the Round Table Conference held between August and November 1949. Although the question was not finally settled, the Indonesian government held firm to the principle that important branches of the economy must be under its effective control.[3]

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1. The union also changed its name to Serikat Boeroeh Djawatan Listrik dan Gas Indonesia (Indonesian Electric and Gas Workers Union), ibid., p.473.

2. Sutter, ibid.

3. "Article 1 (4) of the R.T.C. Financial and Economic Agreement had mentioned the possibility that electricity and gas companies would be nationalized, and the RIS Government [Republican government] in June 1950 observed that it supported the eventual nationalization of such companies, yet for the moment too many political developments were occupying its attention and that of the people. Consequently, although the April congress of the Serikat Buruh Listrik dan Gas (Electric and Gas Workers Union) presided over by Kobarsjih had passed a resolution calling for nationalization, there was little other organized sentiment for further nationalization of public utilities during the RIS period." Sutter, ibid., p.868.

Twin Issues: Nationalisation and Prices

The years following the handing over of sovereignty were difficult ones for the electricity utilities. The social and economic environment was uncertain, so most industries operated only under considerable difficulties. To make matters worse, there was a good deal of public resentment directed especially towards the "vital" industries - such as electricity - which had temporarily been returned to Dutch management. Thus conditions for this latter class of firms were particularly difficult. The Dutch managers had awaited the transfer of sovereignty with trepidation since they feared that a wave of nationalism might follow. In the event, this did not occur immediately and after the transfer security i ' Indonesia tended to improve.

Electricity tariffs had risen during the war, and in 1948 were about 65 percent above the prewar level. In April 1949 further increases were reluctantly agreed to by the government, which raised the tariffs to about twice those ruling before the war. Despite these adjustments electricity price increases lagged behind rises in the general price level. The relative price of electricity had therefore fallen since the beginning of the war.[1] The private electricity companies argued that this was encouraging excess demand, which in turn led to pressures to expand capacity. For various reasons the companies were reluctant to invest heavily and instead they pressed the government to allow further tariff increases. Following on the restrictive monetary measures of March 1950, the government responded to these requests from the companies and in August 1950 increases of between 50 percent and 64 percent were allowed.

The electricity tariff increases brought forth a swift reaction in a number of cities and Committees opposing the Electricity Rate Rises were established.[2] Parliamentarians immediately took up the matter, and several speakers during the debate on the program of the Natsir government in September and October urged speedy nationalisation of electricity.

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1. ANIEM Annual Report for 1949, p.8.
2. The following discussion relies heavily on Sutter, op.cit., Chapter XXI, where he discusses the events in considerable detail.

In early October, replying to the criticisms the government took a cautious approach. It indicated that although nationalisation would certainly be implemented, the necessary steps might not be possible for some time. A number of members of parliament, including Mr Kobarsjih who was a leading member of the Indonesian Electric and Gas Workers Union (Serekat Buruh Listrik dan Gas Indonesia or SBLGI), were not satisfied with this reply. On the 25th October, the very day that the Natsir government received its vote of confidence, Kobarsjih and six colleagues submitted a motion which called on the government to:

> "carry out nationalisation of all the electric and gas companies in Indonesia within a short time so that the income and expenditure of these nationalised enterprises could be included in the State Budget for 1951."

The wording of the Kobarsjih motion and two others that were submitted to parliament, and the debate that followed, was significant for the attitudes that were revealed towards the two main issues being discussed - nationalisation and the rate increases.

On the first question, there was general agreement that nationalisation was desirable for emotional as well as political and economic reasons. Nobody seriously questioned the assumed advantages of nationalisation. This is perhaps understandable in the political atmosphere of the day. The general sentiment was expressed by one member of parliament, Djaswadi Soeprapto, who declared that there was "no real Indonesian" who did not want nationalisation. No one was eager to have his loyalty to the new nation questioned!

But the general agreement meant that the advantages and disadvantages, and particularly some of the conflicts between different objectives of nationalisation, were not considered. There was a strong feeling that somehow or other, high prices were connected to the fact that the industry was in private hands, and that nationalisation would solve a lot of the industry's problems. It was widely assumed that the government would be able to charge more reasonable prices and the "public interest" would be more effectively served. In short, nationalisation was seen as the solution to such economic problems as high prices and supposed inefficiency as well as having political advantages, and that was that!

There was more disagreement on the matter of prices. A wide difference of opinion emerged, with the government favouring commercial principles and opposing subsidies on the grounds that the users should be the ones who paid for electricity, not the entire Indonesian people. Others argued that public utilities should not be run according to strict commercial principles and that neither profit nor loss should be considered. A third more radical group, including the PKI, took the view that losses should be tolerated. Feeling over the price increases was sufficiently strong to force the government to postpone some increases and set up a state Commission on the matter.

The disagreement over prices was significant, because it indicated that there were underlying disagreements about both the objectives that public electricity concerns were to be expected to pursue, and the means by which they were to pursue the objectives. There was of course general agreement that the "public interest" would be served - that was easy to agree on - but nobody defined exactly what the public interest was. It was hoped that prices would be "reasonable", and that the state enterprises would be a source of revenue for the national budget. But what if both were not possible, and a choice had to be made? The question was not faced.

The nationalised electricity companies were also expected to be efficient. That there might be a tendency to inefficiency in an enterprise which charged low prices and therefore relied on a subsidy from the government was not considered. In fact, the inconsistencies between the objectives of low prices, a positive contribution to the government budget, and efficiency were not discussed. As we will see, the conflict between these goals has been a source of confusion for the industry ever since.

Progress Towards Nationalisation

Despite the tariff increases of 1949 and 1950, the electricity companies continued to complain that prices were low and were reluctant to finance new investment. In 1952 and 1953 the managers of the private utilities held discussions with the government on the question of further

expansion. It was agreed that the government would provide capital for new investment and that the new plants would be owned by the state.[1] However because the financial position of the country deteriorated in 1952-53, the government itself was short of funds and only the most urgent projects could be carried out. In January 1953 there was a further adjustment in tariffs when they were increased by an average of about 30 percent.[2]

During this period the various cabinets slowly proceeded with nationalisation measures.[3] Although Kobarsjih's motion urging speedy nationalisation had been passed, implementation was actually a slow process. The Natsir cabinet fell in April 1951 before it was able to act, and the new Sukiman cabinet did not consider nationalisation of existing electricity utilities important, preferring to give priority to building new electricity facilities. In December 1951 the government set up an Electric and Gas Companies Nationalisation Commission, which took about a year to examine the legal, technical and financial problems of nationalisation and made recommendations to the government.[4]

Shortly after the Commission submitted its final report in December 1952, the Wilopo cabinet (which replaced the Sukiman cabinet) decided that all electricity companies should be nationalised. But the condition of state finances was far from healthy, so it was decided that nationalisation would begin with the expropriation of entirely privately-owned companies in accordance with the terms of their concession licences. In April 1953 a commission was established to negotiate with the private companies involved.[5] The

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1. ANIEM Annual Report for 1952, p.6.
2. Ibid., p.7.
3. For further details see Sutter, op.cit., p.885, and C.Smit, op.cit., p.132.
4. Ir Soedoro, later to become one of the first Directors of the State Electricity Corporation, was secretary of the Commission.
5. This was known as the Electric and Gas Companies Nationalisation Negotiation Commission.

December 1952 decision was actually not announced by the Ali Sastroamidjojo cabinet until 2 September 1953, and it was given legal status a month later when the nationalisation of all electricity companies was decreed retrospective to the date of the cabinet decision, 23 December 1952.[1]

Although the decision was accepted by most parliamentarians, the electricity trade union leader Kobarsjih (also a parliamentarian) was dissatisfied. In early September 1953 he pointed out that his union (the SBLGI) had threatened a strong stand if all electricity and gas utilities (and not just wholly privately-owned ones) were not nationalised by the beginning of 1954. However the government stood firm and replied that it also planned to expropriate mixed enterprises, but only when financial conditions permitted. In late 1953 various small power companies were nationalised, including the Ambon Electricity Company in Maluku and the Balikpapan Electricity Company in East Kalimantan. Soon after, nationalisation of the large companies began when most of the property of OGEM, formerly NIGM, which operated mainly in Djakarta and Tjirebon was taken over on 1 January 1954. The facilities of the company were renamed Perusahaan Negara Untuk Distribusi Tenaga Listrik (Penuditel or the State Enterprise for Electricity Distribution) and headed by Ir Soedoro. In November 1954, ANIEM's facilities in Central and East Java were taken over:[2]

> "Thus three years after the passage of the Kobarsjih motion, virtually all the electricity enterprises on Java were in Government hands, either through outright ownership or through mixed enterprises. These outlays were a heavy burden on the budget, especially since they occurred as the budget deficit for other reasons had been growing larger. Accordingly, they were not followed by similar measures for other private companies outside Java (including OGEM and ANIEM plants) during the remainder of the period before the general elections."

Kobarsjih was not content with this and demanded that all electric power companies remaining in private hands be nationalised before the end of 1955. In bold disregard of

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1. Presidential Decree No. 163/1953, 3 October 1953.
2. Sutter, op.cit., p.889.

the financial state of the enterprises already nationalised, Kobarsjih bolstered his demand with the argument that nationalisation could lead to a reduction of the state budget deficit. In this he was opposed by Prime Minister Harahap who pointed out that the enterprises already nationalised, instead of contributing a sizable surplus to the state, showed losses running at the rate of over Rp 20 million annually. Harahap also said that apart from the issue of state finances, the government would only nationalise electricity companies if it was good for the progress of the state. If nationalisation hindered progress, the government would be doing the wrong thing in going ahead with nationalisation.[1]

> "The debates over the Kobarsjih motion and subsequent developments brought out the fact that Indonesian political sentiment had not been openly divided on whether or not electricity and gas companies should be nationalized, an action proposed as early as the period of the Jogjakarta Republic, with which few took issue... Moreover, virtually all major political parties agreed to the principle of a fair compensation, although some of the ultra-Marxist groups advocated placing the valuation on the property so low that the owners might consider nationalization equivalent to confiscation. The difference of opinion that was apparent during the debates and continued afterwards was over the timing of nationalization... One group - principally the moderate religious, nationalist, and socialist parties and most policy makers in the Government - felt that nationalization should be given priority only after the country's limited capital resources had been put into new productive undertakings; the other group - primarily the radical nationalists and ultra-Marxists, personified by Kobarsjih - were certain that nationalization was in the country's best interest and so should be undertaken at once without regard to the question of where to get funds for new development projects.
>
> The period under review indicated a compromise between the two divergent views; but largely because of the increased depletion of the reserves in the State treasury, it closed with an emphatic rejection of demands for ... 'nationalizing just for the sake of nationalizing.'"

ANIEM: A Case Study

Having surveyed some of the broad political and administrative aspects of the movement towards nationalisation, it is now time to look at how the industry itself fared

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1. Sutter, op.cit., p.891.

during the period. The physical condition of the industry after the war varied a good deal from place to place. Total capacity, especially on Java, had dropped considerably since 1940 because of damage and neglect, in some cases through sabotage by Indonesian forces as they retreated before advancing Dutch troops, and also because of the extensive damage done by Allied bombing to the NIWEM hydro-electric plant at Mendalan in East Java. Estimates of capacity before and after the war vary. According to Table 1.3, capacity in 1940 was about 209 MW, and official estimates are that capacity in 1945 was about 157 MW.[1] Alternatively, an Exim Bank report published in 1950 estimated that capacity dropped from 171 MW in 1940 to 140 MW in 1949.[2]

Unfortunately no detailed information on the development of the whole industry in the post-war period is available. However we do have reports of developments in ANIEM, one of the major firms and a subsidiary of the large and well-known Dutch trading company Maintz and Co.

As we saw earlier, ANIEM was the largest of the private utilities. In 1938 it served almost 45 percent of all subscribers and distributed more than 35 percent of electricity sold by the utilities. Further, the company had close links with a number of other electricity companies, so ANIEM's experience over the period can be taken as reflecting the experience of other companies.[3] A survey of the performance and difficulties of ANIEM in the post-war years will cast light on the position of the industry as a whole.[4]

By the end of 1948, all of ANIEM's undertakings had been returned to Dutch control. Some equipment was heavily damaged, but partly because the enterprise was geographically dispersed, a lot of the equipment which had been

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1. See Table 5.1.
2. See Compact-Commission Eximbank-Loan report, op.cit.
3. See the Appendix to this Chapter for Table 2.2 showing ANIEM's holdings in subsidiary companies in 1953.
4. Most of the information in this section is drawn from the Annual Reports of ANIEM for the period 1940 to 1957.

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installed before the war was still in a usable state. East Java where the Mendalan hydro station had been the main plant was the worst affected area and output there was well below pre-war levels. To make matters worse in the region a steam turbine in Surabaja had been damaged and after repairs in 1947 was operating at only about half its pre-war capacity. Efforts to cope with the shortage included the installation of some new equipment, the opening of an old diesel station in Malang which had been out of use since 1928, and the transfer of some old equipment from Central Java. ANIEM also bought a small amount of surplus electricity from the Navy installations in Surabaja. Despite these emergency steps, for several years after the war rehabilitation was hindered by shortage of equipment, and output in East Java remained well below pre-war production. Severe rationing was introduced as a result.

In Central Java, damage to transmission facilities rather than generating capacity was the main problem. The main generating plant - a hydroelectric station at Djelok on the Kali Tuntang which had been completed towards the end of the thirties - was returned to ANIEM in July 1947 undamaged. A high tension line to Semarang had to be repaired before delivery could be resumed to that area in early 1948, and it was not until mid-1949 after further repairs to the transmission system that most of the southern part of Central Java was again receiving power from Djelok.

In the smaller Ketenger network in Central Java which supplied power to some towns on the north coast (such as Pekalongan and Tegal) as well as to the Banjumas Electricity Company, the Ketenger hydro station had been severely damaged. But it was repaired fairly quickly, and supply to the main centres was soon resumed.

In the Outer Islands the situation does not appear to have been so bad. Nearly all private installations were returned to their former owners by the end of 1946. In Kalimantan, ANIEM took back full control in 1946 and found that apart from extensive damage at Bandjarmasin, equipment was in fairly good condition. After 1946 things went well and new equipment was installed in response to growing demand.

Financially the years after the war were difficult ones for ANIEM. As production and sales increased income also rose, but not enough to keep in step with rising costs. In 1948 losses were still being incurred as a result of the war and ANIEM was able to make only a small profit, all of which was ploughed back into reserves. The company was suffering from liquidity difficulties because no depreciation or other reserves had accumulated during the war. Tariff increases in April 1949 improved the financial position somewhat, but most direct assistance from the government (which had been covering some of the company's deficit) ceased and so the difficulties remained. Nevertheless the company continued to receive some assistance because the government agreed to take responsibility for especially high power costs until NIWEM's Mendalan station could supply power cheaply again. In 1950 the government introduced monetary measures which restricted the transfer overseas of the trading surplus and led to apprehensiveness on the part of Dutch owners. The company also felt that a revaluation of assets was overdue, but government approval (which was apparently needed) was not forthcoming.

Although the August 1950 tariff increases met with a hostile reception from the public and parliament, the company's attitude was that they were far too low. It later emerged that ANIEM had initially requested a 115 per-cent increase, and had in fact increased the rentals on its installations without government approval at all.[1]

Organised public resistance to the rate increases caused ANIEM some difficulties in the short-run since large numbers of consumers refused to pay. And relations with the public were not actually improved by the company's policy of promptly disconnecting recalcitrant consumers. Even though the government publicly supported ANIEM, the consumers strike came to an end only when parliament decided to establish a committee to reconsider the tariff increases. In spite of the strike in paying bills, the total damage done to ANIEM was small in the longer run since the company had gained at least part of the desired increase in tariffs.

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1. Sutter, op.cit., p.883 f.

An additional difficulty was that the company's overall financial position was obscure. ANIEM itself was presenting Annual Reports nearly a year late, and a number of subsidiary companies had not managed to finalise their post-war balance sheets even by as late as the beginning of the fifties. The confused financial position of these minor companies held up dividend payments. In 1950 for example, only two of the small companies, the Bali and Lombok Electricity Co. and the East Java Electricity Co., managed to pay dividends (of 4 percent and 6 percent respectively). In any case ANIEM shareholders in the Netherlands could only receive part of their dividends since profit transfers were restricted.

The uncertain political atmosphere and state of security in Indonesia when the transfer of sovereignty occurred had posed problems for ANIEM. Despite Dutch fears that there would be a wave of nationalist feeling, the transfer took place smoothly. But nationalist feeling had left its mark in Jogjakarta, the republican capital, and special discussions were held with the government to discuss on what terms the company would operate there, and what the exact status of workers in the town was to be. Although the company continued to supply Jogjakarta, tension remained until at least 1952.

Comparatively good progress was made in repairing damaged facilities and increasing production after 1947 (see Table 2.1) but recovery was hampered by shortage of trained personnel, difficulties in obtaining imports because of scarcity of foreign exchange, sabotage of plants, and liquidity difficulties after the 1950 monetary measures. It was not until mid-1950 that the Mendalan hydro plant was in operation and NIWEM was able to begin supplying ANIEM again. Until NIWEM resumed production, demand on ANIEM's facilities in East Java had greatly exceeded supply. As Table 2.1 shows, almost all of NIWEM's supply was absorbed into the system as soon as it was available. The benefits to the company of an increase in production were partly diminished by the widespread practice of stealing, which had grown rapidly since the war and which was apparently particularly pronounced in the Surabaja area. The Dutch companies were especially unpopular and the government was naturally reluctant to appear too sympathetic towards them. Nevertheless ANIEM received some government support in

combatting stealing, and after 1950 the position slowly improved.

In Central Java also, demand greatly exceeded supply. Sales (excluding sales to other companies) increased from about 20 million kWh in 1948 to over 70 million kWh three years later. The demand on ANIEM from small companies in the area also increased sharply, from 2.3 million kWh in 1948 to 20 million kWh in 1951. Initially all of this was sold to the Banjumas Electricity Company, but when the Solo Electricity Company resumed operations in 1950 it expanded rapidly and sales to it soon outstripped supply to the former company. Because of the excess demand, in 1951 ANIEM took measures to limit consumption. These only operated for a short time before it was necessary to tighten them. In the meantime, capacity at the Djelok plant was being extended.

In Kalimantan the company's activities were relatively more important after than before the war. Although short-run prospects there were good, ANIEM's management was doubtful about the stability of demand in the outlying regions. Since these areas were so dependent on the fortune of the plantations in the world market, the managers feared that demand for electricity was more likely to fall in an economic slump than in Java.[1]

One effect of the revolution was that ANIEM was obliged to pay more attention to the wages and working conditions of Indonesians than previously. Social mobility in Indonesia was on the increase, and Indonesians were demanding positions of control in all important institutions throughout the nation. One of the first problems that Dutch managers faced was the shortage of well qualified Indonesians to place in responsible positions. Further, almost all of those who did possess suitable qualifications and experience had worked with Dutch companies before the war, and subsequently allied themselves with the Republican government. After the transfer of sovereignty, the services of these people were badly needed by

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1. Presumably the managers of ANIEM held this opinion on the basis of practical experience. The data presented earlier for consumption during the Depression (Table 1.5) suggests rather the opposite - that consumption in Java was more sensitive to general economic conditions than in the Outer Islands.

TABLE 2.1 Production and Sales of ANIEM, 1939 and 1947 - 1957[a]

(million kWh)

	1939	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
PRODUCTION												
1. Generated	n.a.	52	80	107	160	139	156	176	43	46	47	48
2. Purchased	n.a.	0.1	3	13	28	87	105	114	n.a.	n.a.	n.a.	n.a.
NIWEM[b]	n.a.	-	-	-	14	80	98	106	n.a.	n.a.	n.a.	n.a.
Other	n.a.	0.1	3	13	13	7	8	8	n.a.	n.a.	n.a.	n.a.
3. Total	146[c]	52	83	120	188	226	261	291	n.a.	n.a.	n.a.	n.a.
SALES												
1. By Area												
East Java	n.a.	n.a.	47	62	82	108	129	147	-	-	-	n.a.
Central Java	n.a.	n.a.	22	37	64	71	77	88	3	3	4	n.a.
Kalimantan	n.a.	n.a.	8	10	12	13	14	15	13	17	17	n.a.
Total	n.a.	49	76	109	158	192	220	250	17	20	21	n.a.
2. By Type												
Lighting	n.a.	38	55	77	113	139	160	169	n.a.	n.a.	n.a.	n.a.
Industrial	n.a.	11	22	34	45	52	60	81	n.a.	n.a.	n.a.	n.a.
3. Sales to Other Companies[d]	n.a.	n.a.	2	3	13	20	25	29	13	25	25	n.a.
4. Total Apparent Sales [(4) = (1) + (3)]	n.a.	n.a.	79	112	171	211	245	279	29	45	46	n.a.
5. No. of connected Subscribers ('000)	128	56	88	118	147	165	180	195	14	14	15	15
6. No. of Employees	3,209	n.a.	3,288	3,503	3,807	3,727	3,411	3,888	731	754	577	n.a.

Notes:

a. Figures may not add due to rounding. In addition, there were sometimes small discrepancies in the data provided by ANIEM.

b. Name later changed to Waterkracht Exploitatie Maatschappij voor Indonesia, N.V. [WEMI], in the early fifties.

c. Estimated from information given that the 1948 figure was 43 percent below production in 1939.

d. Made to N.V. Electriciteitmaatschappij Banjoemas, N.V. Solosche Electriciteitmaatschappij, and N.V. Maatschappij Electra.

Source: Verslag [Annual Reports] of the N.V. Algemeene Nederlandsch-Indisch Electriciteit Maatschappij for the period 1940-1957.

the fledgling nation, and they were given important posts within the service.[1] Thus their services were not available to the private utilities. In 1950 for example, ANIEM could manage to attract only one highly qualified Indonesian to an important position. In an effort to counter the shortage of trained personnel, by 1950 special courses for Indonesian workers had been arranged by ANIEM. Other efforts to establish good relations with employees included arranging a pensions scheme and increasing wages, the latter being particularly necessary after the government's monetary measures of March 1950. Special efforts were also made to maintain good contacts with the trade unions. In view of the militancy of the SBLGI however, one suspects that at times labour-management relations must have been somewhat less than completely cordial.

In 1950 total production in ANIEM surpassed output in 1939 and in the following year rose to well above the pre-war level. From the technical point of view, conditions after 1950 were far better than those of a few years earlier. Although the political situation was uncertain because of the series of cabinet changes, security and communications throughout the country improved and it gradually became easier to manage the affairs of the company as safety of personnel and property increased. Thieving still continued but was on the decline, and was common not so much because existing consumers were not prepared to pay for the service as because it was difficult to obtain new connections.

Partly because of low tariffs, and partly because of the higher level of expectations about standards of living after

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1. The relatively amicable relations that appear to have existed between the Indonesian government and public service on one hand, and the private Dutch electricity utilities on the other, can probably largely be explained by the good personal relations between some key Indonesian officials and the Dutch managers. Although the Indonesian officials had thrown their weight behind the revolution and were firmly committed to its cause, they had held relatively prestigious positions in the Dutch utilities before the war and had worked closely with Dutch managers. Indeed some educated Indonesians of this class had married Dutch wives, were more fluent in Dutch than Indonesian, and were themselves well integrated into the Dutch colonial society.

independence, demand continued to rise rapidly. On 1 January 1953, tariffs were increased by 30 percent but apparently this was not sufficient to keep up with inflation. In an effort to meet demand old machines were repaired, but there were long delays in obtaining equipment both because of tight supply conditions in post-war Europe and because of unreliable transport to and within Indonesia. Thus complicated repairs and maintenance was time consuming and expensive.

But it was becoming clear that ANIEM's days were numbered. Despite the need for new investment ANIEM was reluctant to undertake expansion, both because of liquidity difficulties and more importantly because of the imminence of nationalisation.[1] In 1951 the government agreed to finance some new projects which ANIEM would execute but which would automatically become state-owned. However because of the government's financial position only the most urgent requirements could be met. It was not until mid-1954 that the funds for the most urgently needed plant at Bandjarmasin in Kalimantan finally became available. The result was that electricity shortages continued, and in some areas machines broke down completely.

One consequence of inflation was that it was necessary to grant frequent increases in wages, which in terms of purchasing power in 1951 were still below pre-war levels. In 1951 the company continued with training courses for both administrative and technical staff, but the administrative courses were suspended the following year because of poor results. As a substitute, some personnel were encouraged to take outside courses with financial help from the company. The technical courses on the other hand proved more successful, and by the end of 1952 a total of about 150 employees had been given training since the courses had first begun. In 1953 the technical training section was apparently expanded even further since a separate department for training was established.

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1. By 1950 OGEM's managers, too, had decided that an "extremely cautious investment policy" was "imperative." Smit, op.cit., p.131.

The financial performance of the smaller electricity companies improved after 1951, and the dividends paid to ANIEM tended to rise as a result. The Solo, Banjumas and East Java Electricity Companies all usually managed to pay a dividend of about 5 percent in the few years before nationalisation. Some companies continued to do badly, however, such as NIWEM which showed losses in both 1951 and 1952. But in none of these companies is the real position clear, since there is some evidence to suggest that in 1953 and 1954 especially, the Dutch managers attempted to withdraw as much capital as possible. In those years some dividends rose sharply. The Solo and Banjumas Electricity Companies, for example, each returned dividends of 25 percent in 1953 and 30 percent in 1954. The Sumatra Electricity Company returned similar dividends.[1]

ANIEM's main electricity concessions in East and Central Java were due to expire on the 1 January 1956. It was originally the government's plan to allow the concessions to run out, whereupon the company's assets would be purchased by the state. Perhaps in response to public pressure, the government altered its plans and exercised its right to take over the company before then, announcing that the changeover would take place on 1 August 1954. The final details of nationalisation remained vague until late in the day, because during the first half of 1954 an alternative scheme involving a managing agency system was considered. The proposal was that the government would own all assets, but allow the management of ANIEM to continue to operate the enterprise. Finally this alternative was rejected, but by then it was not possible to complete all of the necessary arrangements in time for nationalisation to take place in August. The date was postponed for three months, and on 1 November 1954 ANIEM's plant and equipment in East and Central Java passed into government hands. As can be seen from Table 2.1., this meant that ANIEM's activities were reduced to a small fraction of the pre-nationalisation level.

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1. The evidence is not conclusive, however, since some other companies preferred to plough profits into reserves or cover previous losses.

One issue that continued to cause controversy until it was finally violently settled by the anti-Dutch measures of 1957-58 was the question of compensation.[1] It was Indonesian government policy throughout the early fifties that fair compensation would be paid after nationalisation. In order to settle on a figure for payment, a commission of three members was established - one from the government, one from ANIEM, and one appointed jointly by both parties. Up to the end of 1954, although no final figure had been agreed upon the Indonesian government had made advance payments totalling Rp 75 million towards final restitution.

For the three years following partial nationalisation until 1957, ANIEM continued some relatively small operations in Central Java and in Kalimantan. Participation in other companies became a considerably more important share of the company's activities. After nationalisation a majority of ANIEM's personnel automatically become government employees. But most of the Dutch staff could not accept such a position, and were forced to accept the fact that the time had come to leave Indonesia permanently. Some of these officials had lived in the Netherlands East Indies for decades so it was a hard decision for them to make. In order to assist them resettle elsewhere (usually the Netherlands), ANIEM provided financial assistance. Some non-Dutch personnel in responsible positions, mostly Indonesians of Chinese extraction who felt that the future open to them in independent Indonesia was not particularly bright, also decided to accept financial assistance from the company to resettle in Holland. The effect of these changes is shown in Table 2.1. Employment in ANIEM's facilities at the end of 1953 was nearly 3900, whereas only about 730 were on the payroll one year later.

In its final three years of operation in Indonesia, ANIEM distributed electricity generated in the Ketenger network in the west of Central Java and in isolated diesel sets

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1. In the late sixties discussions about compensation payments for nationalised Dutch companies were reopened between Indonesia and the Netherlands. In 1971, the Indonesian government began payments to a number of former owners, including former owners of the nationalised assets of OGEM. Antara Financial and Economic News [AFEN], 13 April 1971. No information is available relating to ANIEM.

in Kalimantan. Sales in Kalimantan assumed a much larger proportion of total sales after partial nationalisation (over 35 percent in 1956) than before (about 5½ percent in 1953). Most of the electricity generated in 1955 and 1956 was sold to other companies in Central Java - the Banjumas Electricity Company and the Perusahaan Listrik Negara (State Electricity Corporation) apparently being the only major customers. A small amount of electricity was also sold in Central Java to domestic consumers. The gap between demand and supply widened after 1954 despite the fact that ANIEM carried out some small expansions of capacity by installing government-financed diesel sets. As in earlier years however, expansion was delayed because government funds were held up, and the situation was further aggravated by the acute shortage of foreign exchange needed for spares and new equipment. These delays sometimes meant that for want of one or two spare parts a machine could not function.

ANIEM's financial performance during these remaining few years was indifferent. Prices were too low to provide a healthy income from revenue, and the subsidiary companies were struggling. In preparation for the nationalisation of all remaining companies which in 1955 still appeared to be at least four or five years away, ANIEM accepted contracts (apparently for consulting work) in Jordan and in South America.

Although the government made it clear that complete nationalisation would soon take place, final details remained unclear. In 1956 when the concession for the "Electra" Company (which operated in Tulungagung in East Java) expired, the government took over the company. This gradual process did not suit ANIEM, so it was suggested to the government that a date be set for the wholesale nationalisation of all remaining concessions. In August 1957 the Indonesian government agreed that all remaining facilities would be nationalised together on 31 December 1959 or 1960. Until the final breach in 1957, the government continued to make monthly payments on the amount of compensation agreed to. A dispute had arisen between the government and ANIEM over an extra Rp 27 million claimed by the company, and this was being settled in the courts. By the end of 1957, of the

total expected 120 compensation payments, 18 had been paid.

The end of ANIEM's history in Indonesia came abruptly. Events came to a head in December 1957 when the General Assembly of the United Nations failed to approve a pro-Indonesian resolution on West Irian. All of ANIEM's remaining facilities were taken over and all Dutch personnel were relieved of their duties except for a few administrative personnel with special jobs to complete who were allowed to remain for another month or so. Most Dutch personnel prepared to leave almost immediately. After 1 January 1958, all further nationalisation compensation payments to ANIEM were stopped since financial transfers to Holland were suspended. In line with the Dutch policy of refusing to accept these events completely lying down[1] the company lodged a series of protests which, considering the political atmosphere in Indonesia, were naturally ignored.[2] Thus the first stage of nationalisation, that of the appropriation of the Dutch electricity companies, came to an end.

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1. The Netherlands government continued to protest at the nationalisation measures for some time. For details of the Dutch attitude see "Netherland's Note Regarding Nationalisation of Dutch-owned Enterprises," American Journal of International Law, vol. 54, pp.484-90, April 1960.

2. Indonesia's position on the nationalisation measures is outlined in Basic Considerations of Indonesia's Act for Nationalisation of Dutch Interests, issued by the Indonesian Embassy, Canberra, 1959.

APPENDIX TO CHAPTER 2

TABLE 2.2 ANIEM'S Holdings in Subsidiary Companies in 1953

Company		Total Share Capital ('000)	ANIEM's Holdings ('000)
Indonesian Hydropower Exploitation Co.	+f.	6,000	3,000
Indonesian Waterpiping Exploitation Co.	*f.	20	14
	+f.	480	425
Solo Electricity Co.	*Rp.	10	10
	+Rp.	1,000	968
Banjumas Electricity Co.	*Rp.	40	40
	+Rp.	800	475
Rembang Electricity Co.	*Rp.	10	10
	+Rp.	176	50
Sumatra Electricity Co.	*Rp.	50	50
	+Rp.	650	169
Bali & Lombok Electricity Co.	*Rp.	10	5
	+Rp.	750	101
East Java Electricity Co.	+Rp.	320	320
"Electra" Co.	+Rp.	200	200

Source: ANIEM Annual Report for 1953.

Notes: + = normal shares.

* = preferential shares.

CHAPTER 3 The Formation of the BPU-PLN

Introduction

Full details of the administrative structure of the industry in the public sector are not clear, but it seems that by the early fifties the Office of Power (Djawatan Tenaga) in the Ministry of Public Works had four main subsections.[1] One subsection, the Power Section (Bagian Ketenagaan), had as its main function the supervision of the utilities which were still Dutch-owned. The generation, transmission and limited distribution functions that had been carried out by the state before the war were entrusted to two other sections, Penupetel (Perusahaan Negara Untuk Pembangkitan Tenaga Listrik, or the State Enterprise for Electricity Generation) and Penuditel (Perusahaan Negara Untuk Distribusi Tenaga Listrik, or the State Enterprise for Electricity Distribution). Responsibility for the construction of new facilities that involved the state appears to have been under the control of a fourth section, the Directorate for Construction (Direksi Konstruksi).

Until the West Irian crisis in 1957 to 1958, nationalisation proceeded in an orderly fashion. When OGEM was nationalised in January 1954, it became known as PLN-Djakarta (Perusahaan Listrik Negara-Djakarta or the State Electricity Corporation for Djakarta). In November 1954, most of ANIEM was nationalised and became PLN-Djawa Tengah/Djawa Timur (State Electricity Corporation for Central and East Java). About this time the names of Penupitel and Penuditel were changed to PLN-Pembangkitan dan Penjaluran (PLN-Generation and Transmission) and PLN-Distribusi (PLN-Distribution) respectively, so that by about 1956 there were a series of different branches of the PLN designated by area or function.

During this prolonged transition period which lasted until the end of 1960, nationalisation and subsequent reorganisation led to few immediate changes. There were two main effects - a change in name, and the substitution of Indonesian for Dutch managers. Little else altered. Each PLN branch continued its internal operations largely as before, and it was a number of years before such matters as administrative practices,

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1. This information is from two officials, G and P, who were employed in the public sector at the time. (Interviewed on 27 August 1969 and 13 January 1970 respectively.)

wage rates, and retirement allowances were standardised throughout most of the industry.

The disparity in these matters came about because until 1957 Indonesia continued with the three forms of state enterprise[1] established by the Netherlands Indies government - namely, those established under the Indische Comptabiliteits Wet (the Law on Accounting Procedures) known as ICW enterprises; those established under the Indische Bedrijven Wet (Indies Enterprises Law) known as IBW enterprises; and limited liability companies owned by the state.[2] The electricity enterprises were classified as IBW enterprises and were under the control of the Department of Public Works. Certain issues, such as railway rates (and presumably electricity tariffs) required a decision from the cabinet. In addition, the budgets of the IBW enterprises were subjected to close annual scrutiny by the Ministry of Finance, the effect of which was to hamper their financial independence greatly. A further brake on their operations was that they were often run almost as a departmental form of public enterprise,[3] with such matters as pay scales and other personnel procedures uniform throughout the enterprise and the supervising department. The PLN, however, was an exception to this latter rule. After nationalisation the previous wage rates, personnel regulations, and other

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1. Extensive details are in Mohammad Sadli, "Structural and Operational Aspects of Public (Especially Industrial) Enterprises in Indonesia," Ekonomi dan Keuangan Indonesia, XIII (5/6), Mei/Djuni 1960 (also published in United Nations Technical Assistance Program, Public Industrial Management in Asia and the Far East, New York, United Nations, 1960). See also Awaludin Djamin, The Administration of Public Enterprise in Indonesia, unpublished thesis, University of Southern California, 1963, and J. Panglaykim, "Some Aspects of State Enterprises in Indonesia," Ekonomi dan Keuangan Indonesia, Tahun Ke XVI, No. 3, 1963.

2. In 1951 a new type of public enterprise was introduced when a state industrial bank, the Bank Industri Negara (BIN) was established. See Sadli, op.cit.

3. The distinction between different forms of public enterprises is discussed in the well-known study by A.H. Hanson, Public Enterprise and Economic Development, London, Routledge and Kegan Paul, 1959, Chapter XI.

practices remained unaltered. Labour conditions had varied between different sectors of the industry before nationalisation, and they continued to do so after the changeover.

Emergency Nationalisation

After the precipitate measures of December 1957, the newly nationalised electricity enterprises were carried along in the emergency changes that followed. In order to place the affairs of the industry in context, we must refer briefly to the wider events of the day.

When things came to a head in December 1957, trade unions in many industries seized control in a series of unco-ordinated actions. In order to keep the enterprises out of workers' hands and preserve order the authorities intervened. A State of Danger was proclaimed[1] and in various regions Army commanders took control. On 10 December, the Army Chief of Staff, Major General A.H. Nasution, in his capacity of Central War Administrator issued an order to all local war administrators to take over all Dutch enterprises immediately. One month later on 10 January 1958, Nasution issued a Decree which transferred the administration of Dutch-owned electricity and gas enterprises to the Minister of Public Affairs and appointed an Enterprise Administrator responsible to the Minister.[2]

The Central War Administrator however had only temporary powers which expired in mid-April. In order to clear up the legal position, on 16 April 1958 the President issued Government Regulation No. 23/1958 which reinforced the earlier emergency decrees and firmly placed all Dutch enterprises under Indonesian administration. With the promulgation of this Regulation, the administration of Dutch enterprises was entrusted "to relevant Ministries" acting "in close co-operation with the Central War Administrator." It was presumably at this point that control of the PLN officially passed to the Department of Public Works.

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1. The State of Danger was declared by Law No. 74/1957 and the Central War Administrator was given emergency powers until 17 April 1958.
2. No. Kpts/Perpu/06/1958 dated 10 January 1958.

To co-ordinate the activities of the nationalised industries, a supervisory board was established in each of the main sectors. In all fourteen boards were set up, the most important of which apparently being those in the sectors for industry and mining (BAPPIT), plantations (PPN-Baru) and trade (BUD).[1] In the electricity industry a Central Administering Board for Electricity and Gas Enterprises (P3LG - Pusat or Penguasa Perusahaan[2] Listrik dan Gas Pusat) was established in January 1958, as well as three regional Electricity and Gas Boards in Surabaja, Bandung and Djakarta.[2] Each of the four Administering Boards was responsible for operating the facilities of a number of former Dutch electricity enterprises (see Table 3.1 in the Appendix to this Chapter) and members were appointed to sit on the Boards.[3] The

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1. BAPPIT is the abbreviation for Badan Pusat Penjelenggaraan Perusahaan[2] Industri dan Tambang (Central Board for the Control of Industrial and Mining Enterprises); PPN-Baru is Pusat Perkebunan Negara Baru (New Government Estates Central); BUD is Badan Urusan Dagang (Board for Trade Matters). Further details of the fourteen boards can be found in Awaludin Djamin, op.cit., p.233; Panglaykim, op.cit.; and various Warta Cafi circulars (Series "H") issued at the time, especially Circular Numbers H.9, H.14, H.17, H.21, and Circular Number H.109. For extensive details on PPN-Baru, see J.A.C. Mackie, "Indonesia's Government Estates and their Masters," Pacific Affairs, Vol. XXXIV, No. 4, Winter 1961-62.

2. The three regional boards were known as P3LG-Surabaja, P3LG Bandung and P3LG-Djakarta respectively. The immediate post-nationalisation structure of the industry was fixed by the Minister of Public Works and Power in Letter of Decision No. Sekr. 16/3/23, dated 22 March 1958, which replaced Letters of Decision issued by the Minister earlier in 1958.

3. The chairman of the Central Administering Board, theoretically the most powerful body in the industry, was one Ir Srigati Santoso. He was assisted by three other members, Professor Ir A.M. Semawi, Ing R. Senosastro and Ir Soedoro Mangoenkoesoemo, who were in turn chairmen of the Surabaja, Bandung and Djakarta Administering Boards respectively. With the exception of Ing R. Senosastro, all of these members continued to play important roles in the industry until well into the sixties, and all became members of the first PLN Board of Management. Reading through the memberships of the regional Administering Boards (apart from the chairman already mentioned) we find other men who later rose to important positions. The list of members is Surabaja: Ir Oei Sioe Hay and Ibrahim Saleh; Bandung: Ir Abdul Kadir and Abdillah Nata Soedjana; Djakarta: Mr Gondokoesoemo, Ch. J.H. Tanod and Jaja Tasmaja.

Central Administering Board which was directly responsible to the Minister for Public Works and Power was given wide powers to ensure that the industry continued to operate as smoothly as possible.

Pressure of time, no doubt, combined with rapidly changing circumstances meant that it was not possible and may even have been undesirable to draw up detailed regulations for the industry. Instead, only very broad guidelines were laid down.[1] Matters such as pricing or investment policies were not mentioned at all at this early stage.

Parliamentary Ratification

But the hurried regulations of early 1958 were merely the first moves in a lengthy transitional period to a more permanent form of nationalisation. Steps were deemed necessary to put the nationalisation measures on a clearer legal footing, so various drafts of a Nationalisation Bill were drawn up and discussed in parliament. It was hoped to pass a Bill by the end of 1958 which would be made retrospective to 1957.[2] During discussions in parliament, members questioned various aspects of the Bill. The government accepted some criticisms, and finally the Bill was passed as Act No. 86/1958 and was promulgated on 31 December 1958.[3] The Act only laid down the main points of nationalisation, and provided for details to be spelt out in additional Government Regulations. One important provision stipulated that compensation would be paid, although details were not given.

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1. For example, it was specified that "as far as possible" managers in the electricity enterprises would be government employees from electricity enterprises who were Indonesian citizens, or "other experts from outside the... enterprises who had appropriate experience and education for the position of enterprise manager..." See Letter of Decision No. Sekr. 16/3/23, dated 22 March 1958 issued by the Minister of Public Works and Power.

2. See the Warta Cafi Circulars Series H, especially Circulars No. H.100, H.109, H.112 and H.113. Circular No. H.100 gives a proposed draft of the Bill. Circular H.109 lists the administering bodies established to control enterprises. Circulars H.112 and H.113 contained new drafts and government replies to points raised during the debates.

3. For the full text of the Act see Warta Cafi, No. 59, 14 March 1959, or Basic Considerations of Indonesia's Act for Nationalisation of Dutch Interests, issued by the Indonesian Embassy, Canberra, 1959. See also Awaludin Djamin, op.cit., Chapter VI.

Towards the end of February 1959, some matters were clarified when Government Regulation No. 2/1959 was promulgated.[1] The Regulation provided legal definitions of enterprises involved in nationalisation, contained vague references to labour relations ("... good co-operation is to be maintained between the management... and the workers...") which were left to be clarified in later Regulations, and regulated the transition to nationalisation. The various Administering Boards (including, presumably, the Administering Boards for Electricity and Gas Enterprises) were placed under the general guidance, and were required to follow the directives, of a Board for the Nationalisation of Dutch Enterprises (BANAS). In an additional move towards arranging compensation, a Committee for the Fixation of Indemnification was set up and members appointed. At the same time, Government Regulation No. 3/1959 was issued which established BANAS.[2]

After these Government Regulations had expanded on Act No. 86/1958, the way was clear to push ahead with further nationalisation measures. Various regulations which had been allowed for in Government Regulation No. 2/1959 were issued for different sectors of the economy. For example, Government Regulation No. 4/1959 dealt with tobacco estates and enterprises, and at a session on 3 March 1959 the cabinet approved two further drafts of nationalisation regulations, one of which covered electricity and gas enterprises.[3] This was promulgated on 20 May as Government Regulation No. 18/1959 dealing with the "Determination of Dutch-owned Electricity and/or Gas Enterprises to be Nationalised."[4] This short Regulation

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1. This Regulation was entitled "Basis for the Execution of the Act on the Nationalisation of Dutch Enterprises (Act No. 86.1958)", and was promulgated on 23 February 1959. For the full text see Warta Cafi, No. 60, 16 March 1959.

2. The connection between BANAS and the various Administering Boards was through the chairman of each Administering Board. All chairmen belonged to a committee, the Council of Directors, which met under the aegis of BANAS. For further details of BANAS and the Council of Directors, see Awaludin Djamin, op.cit., p.246 f.

3. See Warta Cafi Circular No. H.150.

4. For the text of the regulation see Warta Cafi circular No. H.168 and Warta Cafi No. 141, 29 June 1959.

merely listed the former Dutch enterprises which were incorporated into the PLN and specified that nationalisation was retrospective to 3 December 1957. Thus while perhaps placing the nationalisation measures which had already been carried out on a firmer legal basis, the Regulation did nothing to affect the organisation and operations of the industry already in de facto existence.

But in June 1959, a number of significant alterations were made in the formal administrative structure of the industry. Early that month, a Board of Directors for a new State Electricity Corporation (PLN) was appointed.[1] The Board, which was directly accountable to the Minister of Public Works,[2] was given full authority to manage the PLN. It was also required to draw up a draft bill to define the legal position of the enterprise more fully. Soon after, the official transfer of management from the Minister to the Board took place and the various Administering Boards were officially dissolved.[3]

As with earlier formal changes however, operations inside the various units seem to have been hardly affected. There were few changes of personnel, and according to all reports, the administrative alterations at the top level made little difference in the lower echelons. Control over the industry was formally divided between a Power Section (Bagian Ketenagaan) within the Department of Public Works and the PLN, with the former apparently having a broad administrative and general policy role, and the latter being mainly in charge of

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1. By Decree of the Minister of Public Works, No. Ment. 1/4/14 dated 6 June 1959. Three leading members of the industry were appointed to the Board of Directors; Ir Srigati Santoso (chairman), Prof. Ir Semawi and Prof. Ir Sedijatmo.

2. The BANAS was unimportant, at least as far as the electricity enterprises were concerned. The Department of Public Works was the main supervisory body. Interviews with Z, 5 March 1970, and E_1, 23 March 1970.

3. Decrees of the Minister of Public Works, No. Ment. 1/4/24 and No. Ment. 1/4/25, both dated 16 June 1959. In addition to the central Board of Directors of the PLN in Djakarta, the three operating subdivisions continued to exist. These subdivisions were known as PLN-Djakarta, PLN-Bandung, and PLN-East and Mid Java. They appear to have been the direct descendants of OGEM, GEBEO and ANIEM respectively.

operations.[1]

The 1960 Law on State Enterprises

It was accepted that the organisational structure laid down in mid-1959 was a temporary one, because there was a good deal of debate going on in government circles about what the exact legal position of state enterprises should be. Indeed as the trend towards the "Guided Economy" gathered force in the late fifties, there was much discussion of the need for institutional changes and new social goals to be introduced. Writing in 1959, the emminent Indonesian economist Mohammad Sadli reflected the uncertainty of the period and outlined developments soon to take place when he observed[2]

> "At the present moment it appears that the sector of State enterprise will become increasingly dominant, although the dividing line between State and private enterprise has not yet been fixed. Public control over industries and State ownership of vital or essential industries will always be favoured politically, but the proper interpretation of such concepts as "vital" and "essential", and the nature and extent of "public control", are still open to controversy. It is here that the ideas of major political parties differ ... Much thought is now being given to a form of public corporation by special law, in which specific regulations can be written into the law, for instance according to the type of productive activity. Separate laws are perhaps needed to regulate public corporations of a public utility nature, of a manufacturing nature, and of a service nature. While it would be cumbersome to require a separate law for each enterprise, something in the form of a master law might be worked out, under which coverage the individual enterprises could be set up."

Mainly because of the confusion that was inevitable in a situation where there was a large number of state enterprises with different backgrounds and a large number of different regulations governing their operations, it was decided to draw up one general law. In early 1960 the government appointed a

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1. The duties of the two bodies were laid down in Decree of the Minister of Public Works No. Ment. 1/5/1 dated 16 June 1959.

2. Mohammad Sadli, "Structure and Operation of Public Enterprises in Indonesia," United Nations Technical Assistance Program, Public Industrial Management in Asia and the Far East, New York, United Nations, 1960, pp.78 and 94.

committee to draft a new law.[1] Working swiftly, the committee submitted a draft to the government within two months. On 30 April, Government Regulation in Lieu of Act No. 19/1960 on State Enterprises was promulgated. Later the Regulation was submitted to Parliament for ratification, and it was passed as Act No. 19/1960 on State Enterprises.

Government Regulation (later Act) No. 19/1960 was an important watershed in the development of the Indonesian public sector because it provided the basis for many later Government Regulations.[2] The Act remained valid throughout the sixties, and its existence was again highlighted by the reliance that the "Commission of Four" placed on it in 1970 when criticising the affairs of the state-owned oil company Pertamina.[3] A number of government regulations affecting the electricity industry issued in later years were based on the Regulation, so it is worth examining in some little detail.

The preamble to the Regulation stated that it was being issued in the context of Sukarno's Political Manifesto laid down on 17 August 1959 and explained that[4]

> "it is essential to undertake a reorganisation of the production and distribution apparatus within the framework of implementing Article 33 of the Constitution;"

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1. The committee was known as the "Committee for the Formulation of the Act on State Enterprises" (Panitya Perumus Undang[2] Perusahaan Negara). See Warta Cafi, Circular No. H.259.

2. For further details of the Government Regulation see J. Panglaykim and Ingrid Palmer, State Trading Corporations in Developing Countries, Rotterdam University Press, 1959, where the full text is given; also J. Panglaykim, "Some Aspects of State Enterprises in Indonesia," Ekonomi dan Keuangan Indonesia, Tahun ke XVI, No. 3,1963; and Awaludin Djamin, op.cit., p.248.

3. The Commission of Four was established in January 1970 to examine the problem of corruption. Details are given in J.A.C. Mackie, "The Commission of Four Report on Corruption," Bulletin of Indonesian Economic Studies, Vol. VI, No. 3,November 1970. For details of the Commission of Four's allegations concerning Pertamina and the references to Act 19/1960, see Sinar Harapan, 18-24 July 1970.

4. The relevant sections of Article 33 are Clauses 2 and 3:

> "(2) Branches of production which are important for the State and which affect the life of most people shall be controlled by the State.
>
> (3) Land and water and the natural riches contained therein shall be controlled by the State and shall be made use of for the people."

Because the Regulation was intended to lay down general principles for a large number of public enterprises in different industries, it was inevitable that many matters should be left vague. The Regulation touches on a wide range of issues, some only briefly, such as the transition period to public ownership, rights of employees, financial affairs, and links with other enterprises. Most of these need not concern us here, since we will examine those points relevant to our study later. As is common in many Indonesian laws and regulations, it was left to further regulations to lay down precise details for particular public enterprises,[1] but three matters which were dealt with are worth noting - (a) the objectives for state enterprises suggested in the Regulation; (b) the problem of government control over state enterprises; and (c) the proposed General Management Boards (Badan Pimpinan Umum or BPU).

On the question of (a) objectives, it was not possible to lay down clear-cut rules which would be appropriate for all state enterprises. It was certainly intended, however, that as far as possible the enterprises should operate according to usual standards of commercial efficiency and should make a net contribution to economic development.[2] It was also clearly implied that most state enterprises (although not necessarily all) should do this by making a profit,

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1. Public enterprises did not automatically come under the law, but only as the separate relevant government regulations specified that they did. The way was also left open for new public enterprises to be established outside of Government Regulation No. 19/1960.

2. Article 4 of the Government Regulation stipulated that the "nature" of a public enterprise is "a. to supply services, b. to serve the public interest, c. to accumulate income." The "objective" is "to participate in building up a national economy in accordance with the guided economy and with giving priority to the needs of the people, to job security and satisfaction within the enterprise, and with the aim of a just and materially and spiritually prosperous society." See J. Panglaykim and Ingrid Palmer, op.cit., p.187.

because stipulations were included in the Regulation governing the distribution of the profit.[1] Further, the Explanation attached to the Regulation took pains to point out that proper accounting procedures were necessary. No secret reserves of any sort (which might be created, perhaps inadvertently, in a number of ways) were permitted, and adequate reserves were to be set aside for such items as expansion, contingencies, indemnification for nationalisation, and an employees' pension fund.[2] It was pointed out that if these procedures were not followed, the apparent accounting cost price of production would be below the real economic price, and that this could have undesirable effects - for example, unnecessary expansion.[3] Thus it was implied that as far as possible, state enterprises should stand on their own two feet and that they should be efficiently managed.

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1. Clauses 2 and 3 in Article 18 of the Regulation read as follows:

   "(2) After reductions for depreciation and for reserves as well as other reductions proper to the functioning of the enterprise, the utilisation of the net profit is determined as follows:

   a. over-all development funds, 55 percent.

   b. general reserves (up to a point where these reserves amount to twice the total capital of the enterprise), social welfare and education, compensation for production, contribution to pension and assistance funds, contribution to compensation fund: the amount of each is stipulated in the regulation of the establishment of the enterprise, and the total is 45 percent.

   (3) The utilisation of profits for general reserves and compensation, after having achieved the respective targets, may be transferred for other purposes as determined by Government Regulation."

   See Ibid., pp.191-192.

2. The vital question of whether historical costs or replacement costs were to be used for calculation of depreciation was not clarified.

3. The assumption behind this suggestion was that investment policies were to be somehow connected with pricing policies. As we shall see below, such an assumption (for the electricity industry at least) was unduly optimistic.

In the provisions dealing with (b) government control over state enterprises, an underlying ambiguity in the government's attitude was apparent. In various articles - in those dealing with the minister's authority over the management of an enterprise, with the enterprise's annual budget, and with financial control - a considerable amount of independence was taken away from the management.[1] The balance between autonomy and accountability for state enterprises is traditionally a difficult and sensitive matter to settle, and the vagueness of the Regulation on this issue was most unsatisfactory. The loose provisions meant that the managers of state enterprises had little or no legal protection against interference from the relevant minister. If the conflict between accountability and autonomy had been solved in the individual government regulations drawn up for each sector, the omission would not have been so important. As it was however, most subsequent government regulations followed the principles laid down in the Regulation on State Enterprises closely. In the electricity industry at least, this conflict continued to be important throughout the sixties.

An important concept that Government Regulation No. 19/1960 introduced was (c) the General Management Board (BPU). It was provided that a General Management Board could be formed within

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1. Especially articles 24, 15, and 17 and 25 respectively. See also J.A.C. Mackie's comments on Government Regulation No. 19/1960 after a visit to Indonesia in late 1960 and early 1961 to study state-owned plantations:

> "It appears that the Government intends to build up the unit into what, in theory, amounts to a quasi-autonomous public corporation with an independent budget - subject, however, to supervision from above. This was the explanation given to me of the intention of Ordinance 19, ...On one estate I head this Decree described in terms suggesting that it laid the basis for what could be quite substantial autonomy...But in fact [estate officials] will be so hedged round with general directives from above, that any development along these lines will be exceedingly difficult, especially while the prevailing climate of hostility to policies in any way tainted with "liberal thinking" continues. Ordinance 19 may have been conceived as a genuine attempt to decentralise authority to a viable local unit...But within the hierachy of levels of "supervision" which the Dutch bequeathed to Indonesia as the standard pattern of administration... the degree of effective autonomy left to the Unit is not likely to be very great."

J.A.C. Mackie, "Indonesia's Government Estates and their Masters," op.cit., p.344.

a particular government department to co-ordinate the activities of a number of similar state enterprises. Four different types of BPU were envisaged, ranging from a comparatively powerful BPU in which decision making was centralised, to a fairly loose type of organisation where the BPU acted only as a co-ordinator of the various activities of the largely independent state enterprises.[1] The distinction between the different forms of BPU, however, was not clear.

Dr J. Panglaykim, a commentator with a wide knowledge of the Indonesian state sector, writing in 1963 was forced to conclude[2]

> "In our opinion, there is in substance not much difference between the four types of Board. All of them can be regarded as the top management of the state enterprises. There might be some confusion in what is meant specifically by the different words introduced in the text in describing the four types...it appears that a more precise description is necessary..."

The Establishment of the BPU-PLN

Government Regulation No. 19/1960 opened the way for a further and more permanent administrative reorganisation in the electricity sector. After the draft of the Regulation on State Enterprises was approved by the Indonesian cabinet on April 12. 1960, a committee was set up within the PLN to draft an appropriate government regulation for the PLN.[3] Although this committee was instructed to complete its task within a month, there was a considerable delay (whether within the committee or elsewhere is not clear). It was not until 29 March 1961 that Government Regulation No. 67/1961 was finally promulgated establishing the Badan Pimpinan Umum - Perusahaan Listrik Negara (BPU-PLN or General Management Board of the State Electricity Corporation).

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1. More complete details are given in Warta Cafi Circular No. H.259.
2. J. Panglaykim, "Some Aspects of State Enterprises in Indonesia," op.cit., 1963, p.9.
3. See Decree of the Board of Directors of the PLN, No.Kpts./008/DDPLN/60 dated 28 April 1960. The committee was composed entirely of officials from within the PLN. Its members were Prof. Dr A.M. Semawi (chairman), Dr R.M. Saljo, Mr S. Gondokoesoemo S.H., Prof. Dr Go Dhiam Ing, Dr R. Harianto Soemarsono, and Mr Ch. J.H. Tanod.

The establishment of the BPU-PLN[1] was an important event in the administrative development of the industry. It marked the end of the transition phase to full nationalisation, which had in effect been taking place for almost a decade, and was the first attempt to lay down a permanent set of basic ground rules and an organisational structure. The Regulation was modelled on Government Regulation No. 19/1960, and in the main dealt with the same range of matters. The Regulation, which was declared valid retrospective to 1 January 1961, listed the former Dutch enterprises which were to be incorporated in the BPU. It stipulated that the BPU-PLN was to be a corporate body, which implied that the management was intended to be relatively powerful. (This was in contrast to some other BPUs which were not incorporated, and in which the management's powers were more limited.)

Perhaps because the Regulation followed the previous Regulation on State Enterprises so closely, it was just as vague on a number of important matters. On the question of objectives for example, Regulation No. 67/1961 added little to the earlier more general Regulation. There were broad phrases specifying the need to "participate in national economic development in conformity with the principles of the guided economy" and laying down the technical requirements of producing and distributing electricity and gas, but very little to guide a manager concerned with financial performance. The same clauses on secret reserves and utilisation of profit as were written into Regulation No. 19/1960 were included, so the objects of a surplus of revenue over expenditure combined with reasonably efficient operations were implied. On the other hand, the Explanation attached to the Regulation rather gave the game away - the need for low tariffs that the people could afford was emphasised; the BPU-PLN was allowed very considerable tax relief so that prices could be kept low; and it was admitted that while a full cost price would involve a rise in tariffs, this could

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1. The term "BPU-PLN" was used loosely within the industry, and often did not refer to the Board of Directors itself (which was known as the Direksi), but to the whole of the public electricity utility.

not be allowed because it was politically unacceptable. In other words, while the Regulation implied the need for profitable operations and efficiency, it also provided clear indications that high priority would be given to low prices.

Similarly, in the provisions dealing with government control over the BPU-PLN, the Regulation followed the principles laid down in Regulation No. 19/1960. Wide powers were given to the Minister of Public Works and Power to supervise the President Director and the management, and few limitations which might have protected the managers' independence were placed on the Minister.[1]

Details of the administrative structure were not spelt out in the Regulation, but were presumably decided at about the same time. The result of the merger was to create one organisation for the whole of Indonesia, which was a large state enterprise even by the standards of the day. This meant that the PLN management was expected to co-ordinate operations over a huge area - a task which was greatly complicated by poor communications. In terms of employment the BPU-PLN appears to have been large also, with over 15,000 and perhaps about 20,000 people employed in 1961. This seems to have been considerably more than the number working in many other state enterprises.[2]

Figure 3.1 (in the Appendix to this Chapter) illustrates the organisational structure. The Board of Directors (Direksi) was composed of a President Director assisted by four other Directors. On 5 May 1961 officials were app-

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1. For example, in Article 8 it is stipulated that "the President Director is accountable to the Minister...," and Article 13 stipulates that "the system and method of performing the management will be laid down in a regulation which will be issued by the Management and legalised by the Minister."

2. Reliable figures for comparative purposes are not available, but an indication of numbers of personnel in selected government enterprises is given in Biro Pusat Statistik, Statistical Pocketbook of Indonesia 1964 to 1967, Djakarta, 1968. It is not clear from this source whether the enterprises listed are all of the BPU form, and so they may not be comparable. Further, many BPUs are not listed.

ointed to fill these positions.[1] Ir Srigati Santoso was appointed as President Director, and Prof. Ir R.M. Sedijatmo Hatmohoedojo, Ir. R. Soedoro Mangoenkoesoemo, Ir R.M. Saljo and Ir P.C. Harjasudirja were appointed as Directors. In theory, the Board of Directors was an all-powerful body within the BPU-PLN, although in practice (for reasons which we will return to shortly) things often did not work out that way.

However, the role that the five new Directors played was not unimportant. Perhaps the most noticeable fact about the Board was its professional technical competence and that it was composed of "old hands." All of these men were regarded as elder statesmen of the industry, having been associated with either the state-owned plants or the Dutch utilities for many years. Unlike the boards of many other state enterprises, there were no military representatives. Indeed throughout the whole history of the industry, it has been comparatively free of direct military intrusion in the upper echelons of management. Srigati Santoso had held important positions in the Indonesian public service, having been Secretary General of the Department of Public Works and Power since November 1956, and later concurrently held the position of chairman of the P3LG-Pusat. Sedijatmo was a much respected figure who had a reputation as a thoughtful, almost philosophical, man and as an inventor of some repute. Soedoro and Saljo also had long service in the industry - Saljo had first begun work for ANIEM before the war, while Soedoro had been associated with GEBEO. Both had risen to prominence immediately after the war and had been in responsible positions ever since. Soedoro it will be recalled was a member of the P3LG-Pusat by virtue of his chairmanship of P3LG-Djakarta. The fifth director, Harjasudirdja, worked in the industry after the war until the early fifties, when he went to London for further study. He was recalled in 1955, and was for some time head of various construction projects (such as Asahan, Tes and Tonsea-lama) as well as lecturing in universities.

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1. Presidential Decree No. 191/1961, 5 May 1961.

The management of the BPU-PLN was under the control of five functional Divisions or Dinas, one of which (Division I under Sedijatmo) was responsible for long term planning and large scale construction only. The other four Divisions were concerned with operating problems and co-ordinated the activities of the fourteen regional boards (exploitasi).

One effect of the formation of the BPU-PLN was to change the method of ministerial control over the industry. Before the establishment of the new body, there had been a section within the Public Works Department which advised the Minister on the supervision of the PLN. After the beginning of 1961 this was no longer so. In fact, the only direct link between the Minister and the enterprise was through Ir Srigati Santoso, the President Director, who continued to hold the position of Secretary General in the Public Works Department. Thus superficially the new form of state enterprise appeared to have more freedom than the one it replaced. But we shall see that such an interpretation is too simple. It will be argued later that while the PLN management had increased freedom in some directions, its ability to actually implement these decisions was in practice severely restricted, especially by the shortage of finance. This divorce between formal administrative responsibility and effective control soon proved to be a source of great difficulty for the new Directors.

Reasons for the Formation of the BPU-PLN

Two questions arise when the formation of the BPU-PLN is reviewed. Why was it that one large enterprise was established rather than a number of smaller ones? Second, why was it that more thought was not given to the conflict between accountability and autonomy? These two questions are particular forms of two more general questions: Why was this particular type of state enterprise chosen?, and why was so little thought apparently given to the problems that the new state enterprise could be expected to face?[1]

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1. This was confirmed during interviews. A number of officials involved in the events of the day reported that little thought had been given to these matters before the formation of the BPU-PLN. For example, interview with E_1, 23 March 1970.

The main reason for the selection of the BPU form was that there was, in fact, little choice. After 1958, the Indonesian government became increasingly authoritarian and restrictive, and attempted to regulate economic activity more and more closely. In this period, the influence of the technically-skilled pragmatic, administrator-type leaders such as Hatta and Sjahrir was on the wane. Power was shifting quickly towards the groups of leaders whom Herbert Feith has called "solidarity makers." These latter men tended to be ideologues, far more at home with symbols, ceremony and exhortation, than with the prosaic administrative and economic tasks that the former group was trained to execute.

There was a widespread feeling after the apparent failures of the period of "liberal democracy" in the early and mid-fifties that Indonesia's political revolution was "unfinished." Tight state control over all sectors of the economy was considered essential to the achievement of Indonesia's social goals. Writing in the early sixties, Sadli explained[1]

> "In order to reach this more just and prosperous society, the revolution seeks to rebuild in a variety of ways the political, economic and social structure. The most important force in this revolution is the state and its government, which acting as the 'hammer' must guide the changes and social structure. Guided Economy is thus but a part of the entire state policy which also includes Guided Democracy to organise the new structure of political life...The view of our revolutionary goals and methods is also very different if compared with the picture a short time ago. The political factor, i.e. the political consciousness in the revolution's goals has become more dominant. We have returned to a more revolutionary revolution, in which the political aims (of rebuilding the old structure) have become important again, frequently transcending the economic aims (to improve productivity). Thus, while before we sought to improve production with the existing variety of economic tools and institutions (private, foreign, and state), now the political character of the economic institutions must be screened and, where necessary, reorganised to be more in

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1. Mohammad Sadli, "The Relation of Guided Economy to the Development of Socialism in Indonesia," in Johnson, Sadli and Subroto, Readings in Business Administration and Economics, Djakarta, 1961, quoted in Douglas S. Paauw, "From Colonial to Guided Economy," in Ruth T. McVey (ed), Indonesia, New Haven, Conn., HRAF Press, 1963, p.206 and 208, Emphasis in original.

> keeping with the revolutionary goal. In this way rebuilding the structure often becomes more important than increasing production."

And when the Manipol-USDEK[1] was announced early in 1960, President Sukarno enthusiastically denounced "free-fight liberalism," "reformism," and "compromise." In this political atmosphere, it was only natural that the government should try to control closely the performance of state enterprises.

It is not that the "solidarity type" leaders were influential within the electricity industry. Indeed the industry was comparatively free of this type of influence. Rather, it was that the social climate of the day meant that the dull administrative-type questions were best not asked. If PLN managers had questioned whether a centralised BPU form of state enterprise was really suitable for the particular problems of the electricity industry, they would have run the risk of being labelled "liberal" or "colonial" (routine-bound) in their way of thinking. It was unwise to appear to be resisting "retooling" - the renovation of the leadership of the revolution, all the state agencies, all instruments of production and distribution, and all parties and social and economic institutions. Under these circumstances, it is hardly surprising that a centralised BPU form was adopted with little debate, or that state enterprise managers' need for a degree of autonomy was not taken into account. Politics was to rule supreme over economics. Less "liberalism" was being called for, not more.[2]

A second more specific reason was that PLN Directors hoped that some of the problems which they foresaw might solve themselves. The need to finalise the form of the new electricity enterprise was probably thought urgent. To pause and consider carefully the particular form of state enterprise to be established would, even if politically practicable, have

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1. The Manipol-USDEK was the creed consisting of five ideas - the 1945 constitution, Socialism à la Indonesia, Guided Democracy, Guided Economy, and Indonesian Personality - which made up the theme of Sukarno's Independence Day Speech in August 1959. For further details, see Herbert Feith, "Dynamics of Guided Democracy," in Ruth T. McVey (ed.), op.cit., p.366 f.

2. For further details of the points outlined above, see Paauw and Feith in McVey, op.cit.

entailed months of delay. Since the industry had been in the process of "being nationalised" since the early fifties, decision makers in the Public Works Department and the PLN very likely felt that enough delay was enough.

The possibility of a decentralised BPU-PLN with comparatively autonomous units never seriously seemed a possibility. Two particular factors probably suggested to the decision makers that a large national enterprise with centralised control was more desirable than several small ones. One was the financial position of some of the branches, and the other was the scarcity of experienced managers. A number of the regional units regularly turned in disappointing financial results, and often made losses. It was felt that in one large enterprise, the more profitable units could carry the weaker ones. Another advantage of centralisation was thought to be the more efficient use of experienced managers. There was only a handful of men with tertiary qualifications and lengthy experience in Indonesia, and it seemed better to group these men together in Djakarta rather than spread them widely as heads of independent regional enterprises. In any case, most major policy decisions were made in Djakarta, and it was desirable that the old hands of the industry were situated where their political sway and personal influence counted most.

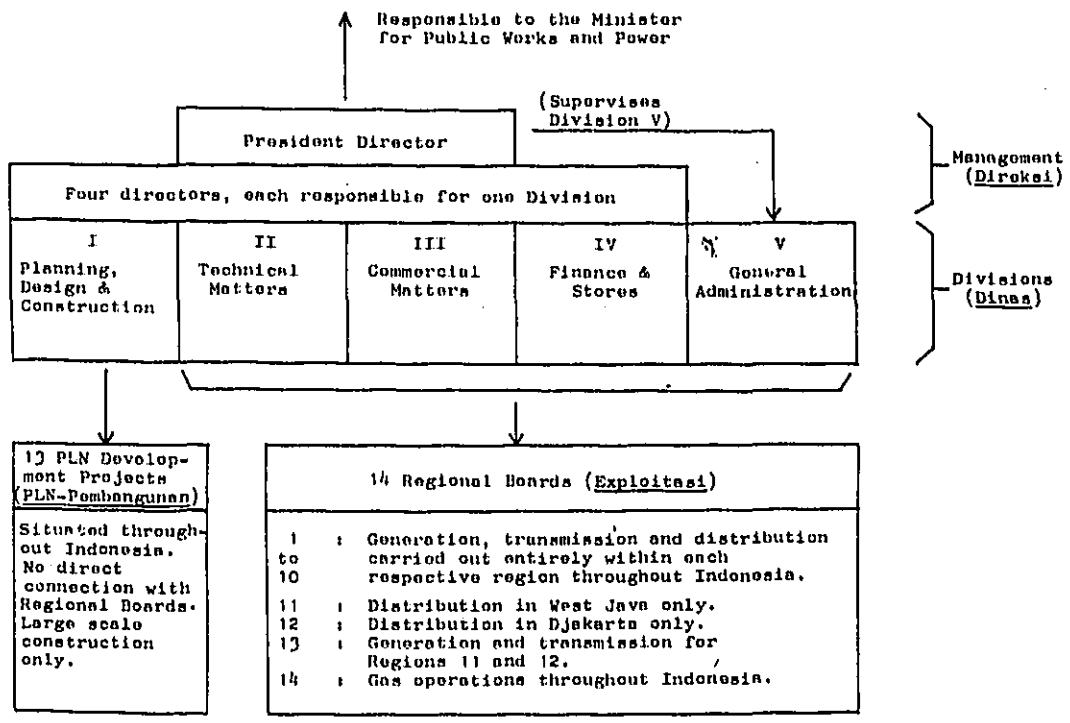
APPENDIX TO CHAPTER 3

TABLE 3.1 Former Dutch Electricity Enterprises Taken over by Indonesian Electricity and Gas Administering Boards

New Board	Former Enterprise Taken Over
Central Administering Board for Electricity and Gas Enterprises. (PJLG-Pusat)	Maintz and Co. ANIEM Indonesian Hydropower Exploitation Co. GEBEO OGEM Samarinda-Tanggarang Electricity Co. Balikpapan Electricity Co.
Surabaja Administering Board for Electricity and Gas Enterprises. (PJLG-Surabaja)	Maintz and Co. ANIEM Indonesian Hydropower Exploitation Co.
Bandung Administering Board for Electricity and Gas Enterprises. (PJLG-Bandung)	GEBEO
Djakarta Administering Board for Electricity and Gas Enterprises. (PJLG-Djakarta)	OGEM

Source: Letter of Decision No. Sekr. 16/3/23, dated 22 March 1958 issued by the Minister of Public Works and Power.

FIGURE 3.1 Administrative Structure of the BPU-PLN



Source: Interview with E, 11 August 1969.

CHAPTER 4 The Demise of the BPU-PLN and Subsequent Reorganisations

Later we will review the technical and economic performance of the industry during the sixties. Here we will concentrate on the administrative problems that the BPU-PLN faced. We are taking up this issue because by the end of 1963, it was widely believed that the BPU-PLN organisational structure was unsatisfactory - even a failure. The result was that after four years' existence, at the end of 1964 the BPU-PLN was disbanded. In fact since the initial formation of the BPU-PLN in early 1961, there have been four major administrative changes, the most recent being in mid-1970. Each reorganisation was an attempt to improve the operations of the firm, and the process appears in many respects to have been unsuccessful. It is thus important that the basic reasons for the reorganisations be analysed.

We will discuss the organisational forms that replaced the BPU-PLN presently. The issue arises here of what factors were responsible for the "failure" of the BPU-PLN? Were they the sorts of factors which one might expect a reorganisation to be sufficient to deal with - or were they factors which were largely independent of the particular organisational structure of the industry? It is worthwhile trying to answer this question, because there is a tendency in Indonesia to put much emphasis on the formation of new institutions, whether they be Five Year Plans or administrative reorganisations. Only too often, the basic reasons for the "failure" of the institutions being replaced are not analysed. It is almost as if the symbolism of the creation of the new form is more important than the substance.

Financial Problems

One factor which led to increasing dissatisfaction with the BPU-PLN was the deterioration in its financial position. As we saw above, it was originally hoped that the BPU-PLN would yield a surplus. In fact, it is clear that its deficits steadily increased.[1] Thus during the four years

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1. Rough estimates of the financial performance of the BPU-PLN for the 1961-1964 period (see Chapters 12 and 13) reinforce officials' reports that the financial position deteriorated.

1961 to 1964, the BPU-PLN came to rely increasingly on subsidies from the government budget and became a net recipient rather than a net contributor. This may not have mattered so much but for the fact that managers often could not account satisfactorily for the use of the subsidies. Accounting procedures within the enterprise were so bad that it was sometimes not possible to separate the finances of the gas and electricity enterprises. Further, public service officials and politicians suspected - according to PLN regional officers often with good cause - that funds provided for investment purposes were frequently used for current operating expenditures.

When it became clear that the BPU-PLN's financial dependence on the government was not likely to decrease in the foreseeable future, pressures arose for increased control over the subsidies. The confused accounting systems simply made matters worse since suspicions of irregular procedures could not be disproved by the BPU-PLN management, and so the feeling grew that greater control should be exercised by the Department of Public Works and Power over the internal affairs of the state enterprise.[1]

Relationship with the Public Works Department

A second factor which reinforced the feeling that the BPU-PLN was a law unto itself was that formally, the only link between the enterprise and its parent department was through the President Director, Ir Srigati Santoso, who was also Secretary General to the Minister for Public Works and Power. In practice communications were not as restricted as this might imply. The Minister conferred with not only Ir Srigati Santoso, but also with the appropriate Directors on important points of detail.[2]

However both Ir Srigati Santoso and the Minister had reservations about the system. Ir Srigati Santoso sometimes found himself in a difficult position representing both the views of the BPU-PLN and of the Department to the Minister. Apart from the pressure of work that resulted from holding two important positions, Ir Srigati Santoso felt that he

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1. Interviews with P, 13 January 1970; W, 24 February 1970; and Ż, 5 March 1970.
2. Interview with Z, 5 March 1970.

had to try to see both sides of a question and present the pros and cons to the Minister. The Minister was not happy with the system because he really had little choice but to rely largely on the recommendations put forward by the BPU-PLN itself. Since there was no screening body within his department, there were no officials on whom he could rely to examine the BPU-PLN's claims critically and to submit counter arguments if necessary. This lack of effective ministerial control strengthened the criticism that the BPU-PLN was "a state within a state" and that greater scrutiny would not be a bad thing.

"Regionalism" in the Industry

A further reason that dissatisfaction with the BPU-PLN grew was that it was obvious that the enterprise was not running well. While external conditions gave rise to an increasing problem of "regionalism" with most regional boards largely beyond the control of Djakarta, there were also internal problems (mainly, though not wholly, in Djakarta) arising from faction fights and personality clashes. In addition, the performance of the Board of Directors appears to have been a complicating factor.

In retrospect it can be seen that the phenomenon of "regionalism" was made almost inevitable by three main external factors: (a) poor communications, (b) the different historical backgrounds and practices deriving from the origins of the BPU-PLN in different Dutch private firms, and (c) the different operating conditions that the various regional boards faced.

(a) Poor communications alone were a major source of difficulty, and have continued to be so up to the present day. Discussing the problem in general terms, in the early sixties Douglas S. Paauw wrote:[1]

> "...the economy has not been integrated by an adequate transport and communications network...Freight movement by rail, shipping, and air are all reported to have

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1. Douglas S. Paauw, op.cit., pp.167 and 196. For a more recent discussion of how communication difficulties affect public officials (albeit not in the electricity industry, but there are close similarities) see David Mitchell, "Wanokalada: A Case Study in Local Administration," Bulletin of Indonesian Economic Studies, Vol. VI, No.2, July 1970, esp. pp. 76-78.

> fallen seriously in 1958 and, despite some recovery in 1959 and 1960, the volume of freight remained below that moved in the mid-1950s. After the Dutch-owned KPM fleet was barred from Indonesian waters in 1957, interisland transport declined seriously, and despite Indonesian emphasis on building a national shipping fleet, shipping facilities are still below the volume available in 1957..."

Not only was transport for materials slow, but communications were unreliable and messages to and from Djakarta were often lost or badly delayed. An official in charge of one regional board in the Outer Islands recalled his problems as follows:[1]

> "There was a lot of de facto decentralisation because of long delays. If a problem cropped up, I would send a telegram to the Directors outlining the problem and asking them to consider it and give a decision. I would also indicate that if there was no reply within, say, a week, I would take certain steps. After a week there was often no reply, so I would make whatever decision I saw fit and send a telegram to Djakarta explaining that I had settled the problem. Sometimes there would be a reply with instructions within a week; sometimes a reply acknowledging my telegram followed by agreement to my decision later; sometimes no reply ever."

Regionalism was also encouraged by the (b) historical background of the different units. The various Dutch firms had faced different local problems, and had developed different traditions (which particularly affected the attitudes of local staff towards the central office) and different rules and standards for operations. There is general agreement that ANIEM was the best disciplined and organised of the companies.[2] The firm was well run technically, and it was the rule that all important changes and repairs had to be supervised by officials from Surabaja, even though this often led to delays. In addition, ANIEM had a number of

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1. Interview with J_1, 8 May 1970.

2. It was asserted by one experienced official that ANIEM had an advantage over the other enterprises in that its concession areas were comparatively easy to operate in. (Interview with F_1, 15 April 1970.) The validity of this claim, while difficult to test, is not immediately obvious. GEBEO, for example, operated entirely in West Java, and there seems no reason why its concession area should have been more difficult than ANIEM's. OGEM on the other hand had substantial operations in the Outer Islands, which may have complicated matters considerably.

detailed manuals to guide employees. Thus a high value was placed on uniformity. This apparently had the effect of discouraging initiative, which was not important during the Dutch period when most decisions were routine, but there were disadvantages after nationalisation when clear directions from the centre were not forthcoming and the situation was confused. OGEM's staff, in contrast, were used to more decentralisation. Since a substantial share of operations was in the Outer Islands, it was necessary to allow regional managers considerable discretion in dealing with local conditions. The lack of guidance from the central management was therefore less important than for ex-ANIEM staff. GEBEO was in between the extremes of ANIEM and OGEM. GEBEO operated entirely within West Java so decentralisation was not needed. But neither did GEBEO put as much emphasis on standardisation as ANIEM. In addition to the "big three," the dozen or so smaller electricity companies all had operated with their own particular procedures.

The effect of the differences that had existed between the Dutch firms was felt after the BPU-PLN was formed. For one thing, according to PLN officials' reports employees in old ANIEM areas expected more detailed directions from the central office than did staff previously employed by other companies. An official who held high positions in both old ANIEM areas in Java and OGEM areas in South Sumatra reported that he found the difference quite marked.[1] The old ANIEM staff, for example, tended to want letters of authority on matters which staff in other areas were more casual about. One former official who worked for two years in the BPU-PLN also has commented on the especially high pride amongst ex-ANIEM employees in the traditions of ANIEM.[2] Thus the attitude of the employees had an influence on the <u>de facto</u> authority of the Board of Directors. The Central and East Java regions tended to follow the decisions of the Board more

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1. Interview with F_1, 15 April 1970.
2. Interview with A, 10 May 1969.

closely than did other regions.[1]

A more important consequence of the differences between the Dutch private firms was the variation throughout the industry in such matters as wages and pensions, recording (statistical) and accounting procedures, and technical standards. In 1959 a visiting team of experts reported that[2]

> "It is to be noted that P.L.N.-Djakarta, P.L.N.-East and Mid Java, and P.L.N.-Bandung operate with considerable local autonomy, with their own business offices, collection agencies, local purchasing and management staffs, local labor and executive payrolls, local fuel purchasing, et cetera."

The Directors recognised that standardisation should be given high priority early in the piece, because the lack of uniformity made it difficult to integrate the activities of the enterprise satisfactorily. Despite this early recognition of the problem efforts at standardisation proceeded slowly. The job was not fully completed when the BPU-PLN was disbanded at the end of 1964, and even in 1970 there were still some technical matters which had not been completely standardised. Writing in late 1962 (almost two years after the BPU-PLN had been formed) an ECAFE team which had visited Indonesia to study rural electrification problems commented on these problems in a detailed statement that deserves to be reproduced in length:[3]

> "It is understood that PLN with its constituent regional units is still in the process of reorganisation and unification in respect of working procedures and policies etc. Meanwhile the various individual undertakings are continuing to follow their own past practices, methods of book-keeping etc. It is learnt that, for these reasons, the PLN central office has

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1. Just how important historical factors really were in strengthening the Board's authority in Java is open to question. Better communications in Java were certainly an important factor also.

2. Feasibility Report Answering Questions Presented by the Export-Import Bank Regarding the Surabaja Power System, submitted by Westinghouse Electric International Company and Laramore, Douglass and Popham-Engineers, September 1959, mimeographed, p.4.

3. A Report by the Panel of Experts on Rural Electrification on Electric Power Development in Indonesia with special reference to Rural Electrification, Bangkok, mimeographed, January 1963, pp. 3 and 14 and 15 (emphasis in the original).

not yet been able to collect and compile all essential information and data on the technical and commercial aspects of the constituent units...

Another important point concerning PLN's organisational structure is the relationship of the various regional bodies known as Exploitations [regional boards] to the headquarters divisions. Enquiries made by the Panel indicated that the Exploitations are generally responsible to the Board of Directors as a whole and that they seek the assistance of the headquarters technical divisions only as and when necessary. It would appear that the various Exploitations enjoy considerable autonomy and free scope in carrying out their work, which, considering the large area and the long distances involved, are undoubtedly necessary to unimpeded progress. However, it is also important to ensure that the regional Exploitations conform to the overall policies, programmes, standards and procedures formulated by the PLN headquarters.

In the course of its travels through the regions covered by Exploitation XI and II, the Panel observed that these regional bodies were carrying on their normal day-to-day activities rather independently. Extensions to the distribution systems within a given region, other necessary modifications and purchases of materials are all undertaken by the regional Exploitation concerned without any effective control by the headquarters. The Exploitations follow their own technical designs for lines, transformers and services, etc. Their expenses for wages and salaries, for purchasing materials required for extensions, for fuel oil and for all miscellaneous expenses are met directly from the revenues collected within the Exploitation. Any surplus in the revenues after disbursing the payments against expenditures is returned to the Headquarters. In fact the practice of using local revenues directly to meet local expenses is followed even by the sub-offices. Such practices seriously impair proper budgeting and effective financial control. It is very important that strictly orthodox commercial financial controls are introduced so that the Headquarters will be able to keep a proper watch on expenditure by the various Exploitations."

The third factor encouracing regionalism was (c) the very real differences in operating conditions between the various regions. Conditions such as the strength of trade unions, the technical state of the equipment, uniformity in administration systems within any one region, and the financial position varied considerably. For example, in the early sixties Regional Board II operating mainly in South Sumatra had quite different problems to those existing in

Regional Board IX in East Java. The area which Regional Board II administered was composed of sections of different former Dutch enterprises and so within the area there was considerable variation in administrative and technical practices. As a first step all branches were required to adopt methods previously used by OGEM. This first form of standardisation was completed by the end of 1961. In contrast, the administrative system throughout East Java was comparatively standardised since most of the operations in the area had been carried out by ANIEM.

Labour relations differed considerably between the two areas also. Surabaja and the surrounding area was well known as a strong centre of PKI (Partai Komunis Indonesia, or the Indonesian Communist Party) activities, and this was reflected inside the local electricity industry. The head of the regional board estimated that at times 50 percent or more of his work was spent on labour matters. In contrast, labour relations posed no problems in South Sumatra. Militant unions were comparatively weak in the latter area, while the army was comparatively strong.

Local conditions in Makassar in South Sulawesi presented different problems again. The most urgent issue was the poor technical condition of plant. The demand for lighting was high, and there were strong social pressures on the regional electricity officials to maintain supply and to defer shutting down plant for maintenance for as long as possible. Standardisation of administration also posed a problem in South Sulawesi, but apparently not to the same degree as in South Sumatra. The area had been neglected since the Dutch left, and since guidance from the central office was not forthcoming, the regional head simply introduced whatever standardisation measures seemed appropriate. Labour disputes were comparatively unimportant for two reasons. First, both the communist and non-communist unions were strong, and it was possible to play these rival groups off against each other to some extent. Second, the armed forces were strong in the area because Makassar was the centre for military operations in West Irian. Any trade union activities that endangered the local electricity supply were likely to incur the wrath of the armed forces - consequently trade union activities were rather limited!

The financial position of the regional boards varied also. As we saw above, one of the advantages of forming one large BPU-PLN for the whole of Indonesia was thought to be the fact that surplus areas could carry deficit areas. In general, the regional boards in Java tended to have a healthier financial position than those in the Outer Islands - or at least they were apparently more self-sufficient in so far as financing operating costs was concerned.

Internal Difficulties

As well as these external influences which led to a feeling that the BPU-PLN organisation structure may have been a mistake, there were internal difficulties which exacerbated the dissatisfaction. We can distinguish two main problems - the performance of the Board of Directors, and a series of faction fights within the enterprise.

There is general agreement amongst officials of the day that there were weaknesses in the leadership provided by the first Board of Directors. This is not a criticism of the personal efforts made by the Directors. Indeed considering the difficulties of the time, in many respects the Board appears to have done well. The members of the Board were probably the best men available. Nevertheless their administrative experience and formal qualifications were not entirely suitable for the positions they held, since they were basically electrical engineers untrained in management. It is true that most of them had considerable administrative experience in the Indonesian public service, but the management qualities required of a public servant are very different to those required of an effective manager of a state enterprise.

There was a widespread feeling that the Directors did not work together closely enough, since co-ordination between them seemed to be poor. Decisions taken by one Director sometimes appeared to conflict with decisions issued by another. One official discussed the Board's activities in the following terms:[1]

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1. Interview with A_1, 16 March 1970.

> "The BPU-PLN Directors did not work well as a team... they all seemed to be very specialised in their separate fields, and did not discuss matters together except in very general terms. I don't think that they liked their jobs as managers - I don't think they wanted to be Directors. They were simply the logical choice at that stage, all having had extensive experience in the industry. Their appointment was really an emergency step which had to be done when the state enterprise was formed."

This apparent poor co-ordination at the centre was also commented upon by heads of regional boards of the day. One of them reported that[1]

> "We felt there was no Direksi [Board of Directors] - we were like warlords...If local revenues were sufficient, we could manage with very little contact with the Direksi. We would recognise their authority if convenient. If it was not convenient, we would not recognise their authority."

On a wide range of matters such as wages and pension schemes, labour disputes, administration and financial problems, there were complaints of lack of guidance from the central office. It seems that the Directors were aware of the problem because a member of the Board himself commented, as an explanation for the failure to co-ordinate internal operations fully, that[2]

> "...we knew we lacked the instruments for uniform guidelines and we must therefore create the instruments for managing Exploitasis..."

and added that in fact, the job was not fully completed even when the BPU-PLN was disbanded. They never, he felt, really settled in as a managing board.

A second source of internal trouble was friction between rival groups. The true position is difficult to sort out, but it appears that the enterprise was divided in two main ways - by age group, and by political allegiance. The first division was between the older and the younger generation. Many of the older senior employees had worked with the Dutch and were thought by the younger generation to be (or at least accused of being) too pro-Dutch. The younger group was important because it included many young engineers who had joined the firm during the late fifties and who had

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1. Interview with F_1, 15 April 1970.
2. Interview with Z, 5 March 1970.

been rapidly promoted to responsible positions.[1] In addition, it was suggested that some employees of Chinese background formed a third distinct and neutral group which was not identified with either of the two larger factions.[2]

It is hard to judge just how important the age division was. We have already noticed that the first Board of Directors was composed of old hands. It seems likely that they would often have had little alternative but to rely heavily on the advice of other employees who had gained long practical experience under the Dutch. We have also noticed that there was a tendency to observe old and well-known traditions in the different areas. It seems likely that employees who had followed the same procedures for a long time would be reluctant to change them, especially if they were not convinced that the new methods were an improvement. Further, the suggestion that the older workers in the industry were "pro-Dutch" was often very unfair, since most of them had loyally supported the revolution. Such criticisms often tend to unify men and may have encouraged the older workers to identify themselves as a distinct group.[3]

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1. This division has been noted in other state enterprises. Discussing the state trading corporations, Panglaykim and Palmer reported that:
   "Between the experienced managers and young graduates, areas of conflict arose. The experienced group may well have been afraid that the young graduates would replace them too soon. They may have tried to protect themselves against this by keeping information and experience to themselves."
   Panglaykim and Palmer, op.cit., p.76.

2. One former official who recalled these three groups remarked on the "tremendous factionalism" that was clear in the early sixties. According to this official the factionalism was well-known and widely discussed within the BPU-PLN. Interview, 10 May 1969. A former Director also mentioned that the factionalism "certainly existed" and that the "Chinese were a neutralist group." Interview, E_1, 7 April 1970.

3. Discussing how informal groups developed in the state trading corporations, Panglaykim and Palmer wrote:
   "The ties between people who during the revolution fought together in the same unit constitute a binding factor. When one member of such a group is appointed to a responsible job, many other members of the group will join him in the corporation. Gradually they will form an informal group, with their own friends appointed to various positions in the organisation."
   Panglaykim and Palmer, op.cit., p.81.

From about 1957 onwards there was an influx of young engineering graduates who were anti-Dutch, or at least believed in the need to sweep aside old practices and adapt Dutch customs to "true" Indonesian needs. Some were graduates from Dutch universities who began their education in the early fifties after relations between the new Indonesia and Holland began to improve. Others were graduates from the well-known Institute of Technology in Bandung (ITB).[1]

The sudden influx of qualified people had important effects. Because of the desperate shortage of trained people, these young men tended to be promoted rapidly over the heads of older Indonesians in the middle ranks, where the shortage of skilled manpower though serious, was not as acute as in the highest echelons. The rapid rise of these graduates led to friction with older staff, since not only were the younger men inexperienced as leaders, but the older staff often resented and did not understand the new methods that were being introduced.[2]

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1. Examples of this younger group can be found in those holding the most senior positions in the industry after the post-1965 coup changes: Ir Ahmad M. Hoesni, who began work in the industry in 1957, soon rose to the position of a regional head and later held the position of Director General of Gas and Electricity until mid-1970; Ir Amir Husein, who was President Director of the PLN for some years prior to early 1970 was linked with this group; Ir Sufrani, who became head of the Planning Section in the Directorate General for Gas and Electricity from 1966, first began work in the late fifties and was given charge of the Asahan Project in North Sumatra in 1961; Dr. A. Arismunandar, who studied in Canada between 1956 and 1960 and who later returned to Canada for three years after 1963 to study for a PhD, in 1966 became Head of the Power Research Institute (Lembaga Masalah Ketenagaan) in Djakarta, which is attached to the Directorate General for Gas and Electricity; Ir Tjiptojuwono, who graduated from the ITB in 1955 and joined the electricity industry in 1957, later held various high positions including head of an administrative section in the Directorate General for Gas and Electricity.

2. Not too much should be made of the age division. It has been suggested that the division was deliberately exploited, and that the older officials sometimes discriminated against newcomers by giving promotion to other people simply because they had long service in the industry. But there were no doubt times when it was sensible to prefer the extensive practical experience of an older man over the recently acquired formal qualifications of a younger one. Although such a decision might be honestly taken, it would be open to a charge of bias which would be difficult to disprove. Younger and ambitious men, eager with the spirit of change of the day and seeing the need for rapid improvement (as well as not being actually averse to promotion), could easily read into "conservative" promotions a resistance to change which was not really present.

A further division within the BPU-PLN was between the militant left wing groups and their opponents.[1] Although information on this issue was not readily forthcoming, it is clear that the political division was a significant one and that it grew in importance until the 1965 coup. The militant unions were strong in the electricity enterprise, and there is general agreement that about two-thirds of the employees were supporters. We will discuss the influence of trade unions, and in particular the PKI union, in greater detail later. It is sufficient to note here that this second division cut across the first division, and so it is difficult to isolate the factors involved in any disputes during the period. There were strong opponents of and sympathisers to communism in both the younger and older groups. This meant that such changes as promotions and (later) the proposed administrative reorganisation of the BPU-PLN were viewed by all groups with suspicion and with an eye to their own political advantage rather than with an eye to the overall welfare of the industry. A wide range of issues, such as the establishment and operations of the enterprise councils (Dewan Perusahaan)[2], pricing policy and promotions, became issues to be opposed or supported on the basis of political rather than economic criteria. Such faction splits within a newly formed enterprise could hardly be conducive to efficient internal operations.

Reorganisation - The Solution?

We have thus far isolated several external and internal factors which encouraged a growing feeling that the BPU-PLN type of state enterprise was unsatisfactory. Although we have separated out the different influences for convenience, they were of course interrelated. If the financial position had not deteriorated, the cry for closer ministerial control

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1. At the time that this study was carried out, anti-communist feeling was still running high in Indonesia. The position was particularly sensitive in the electricity industry as a result of a labour dispute involving allegations that employees who were still sympathetic to communism were being harboured in the industry. (This dispute, known as the "77 Employees Problem," is discussed below in the Appendix to Chapter 10.) As a result, it was not possible to discuss this issue in depth with any of the officials interviewed.

2. See below, Chapter 10, for details of the councils.

may not have arisen. The shortage of finance also hampered operations in many ways. For example, the Directors were obliged to spend a good deal of time lobbying for additional funds from the government, and so had less time for other matters.

The public attitudes of the time also counted against the BPU-PLN. There was a good deal of suspicion of the state enterprises, and many BPU's were coming under attack for poor performance and alleged corruption.[1] Many proposals for major organisational changes were made in the 1961 - 1965 period.[2] The PKI, equally, was eager to push forward with radical social change, and alleged that the newly nationalised enterprises were not really being run in a socialistic fashion. They charged that workers were still not being treated properly, and they played on the public suspicion

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1. Hostility towards the state trading corporations was an important factor in the decision to reorganise the trading sector.
   "Since the Bhaktis [state trading corporations] were established, the management of the state trading corporations has never been offered an opportunity to consolidate its organisation. Faced with an unfriendly environment that later (especially in 1964 and 1965) developed into open hostility to them and to the very existence of the public trading sector, they were given no real incentive to consolidate. The top managers were always facing the possibility of dismissal at any moment, so that their morale was not high... From August 1964 to March 1965 the Bhaktis were in an impasse. They were not even united in their attitude to the pressure directed against them... These pressures and the attacks in the newspapers became more severe, however, and finally it was decided to dissolve all nine Bhaktis and regroup them..."
   Panglaykim and Palmer, op.cit., pp. 8 and 9. See also p.52.

2. See, for example, the statement by Drs Suhardiman, President of SOKSI (the anti-communist Central Organisation of Indonesian Socialist Workers) calling for a complete overhaul of state corporations, in Antara Financial & Economic News, 14 February 1963, and the suggestion from SOKSI that President Sukarno himself should take over the leadership of the state enterprises, AFEN, 12 March 1963. Later in 1963 the Chairman of the Indonesian Chamber of Commerce, Ir Omar Tusin, called for more parliamentary control over state enterprises, AFEN, 8 May 1963.

that many state enterprise managers - especially army men appointed to BPUs with no apparent qualifications for the job - were involved in featherbedding and corruption.

Because of all these difficulties, the feeling that closer departmental control over the electricity enterprise was needed became very strong. By 1964 it was clear that a reorganisation was needed, even if only as a response to the strong pressure. It seems that the confused financial position was the most important influence in bringing about the change. Large subsidies were being provided by this stage, both for current as well as capital expenditure. It was felt that a clearer separation should be made between large scale construction costs, the gas section, and the electricity section of the BPU-PLN in order to establish more accountability over the use of the funds.

We are now in a position to return to the question posed at the beginning of this Chapter - was it the organisational structure that was at fault, or were there more fundamental reasons for the failure of the BPU-PLN? Was it to be expected that a reorganisation would solve the industry's problems? In reviewing the difficulties that the BPU-PLN faced, we can see that a reorganisation would provide a good opportunity to tackle some problems, would open the way to dealing with others without necessarily making it likely that they would be solved, and would probably not contribute to the solution of others.

Considering the reasons that led to pressure for change, a reorganisation would certainly be likely to lead to clearer divisions between the large scale construction section, and the gas and electricity sections, and to bring more control over these sections into the Department of Public Works and Power. It would also be a convenient opportunity to reshuffle some of the top officials of the enterprise, and perhaps allow the younger generation more influence.

A second type of problem was that which the reorganisation might have settled - or at least alleviated - but which might also have easily lingered on. The conflict between accountability and autonomy was the most important of this type of

issue. One former Director summed up the matter as follows:[1]

> "The main criticism made of the BPU-PLN was that it had too much power. People said that the Minister had delegated all his authority to it, and therefore it had all the powers of a minister. The problem was that the delegation of authority and responsibility was not accompanied by enough delegation of financial independence."

In other words, there was a separation between administrative responsibility (which was in the hands of the BPU-PLN) and financial control (which lay elsewhere). While the BPU-PLN had the responsibilities of a highly autonomous and relatively non-accountable organisation, it did not have the financial autonomy that this sort of organisation needs. The BPU-PLN was widely considered to be a "state within a state," to be "too big," and to have the maximum independence that a state enterprise could have. Thus when problems cropped up in its operations the blame was laid on the BPU-PLN itself. In fact it did not have nearly as much independence as people said it did. Because of its financial dependence on the government, the management had little more independence than the head of a "departmental" form of public enterprise is usually allowed. Thus the vagueness over the precise relationship between the enterprise and the government, evident in the laws of 1960 and 1961, came to affect the operations of the BPU-PLN in a very important way.

The reorganisation of late 1964 opened the way for a re-examination of the accountability-autonomy problem, and offered the possibility of a redefinition of the relationship between the state electricity enterprise and the government. But a precondition for this was an identification of the problem - and there is no evidence that the clear thought required was given to the issue. Some high officials appreciated the basic dilemma that existed, but the changes of 1964 were carried out in just as chaotic a political and economic atmosphere as those of 1960 and 1961. As with the initial establishment of the BPU-PLN, the future was unclear and the lessons of the past did not seem a reliable guide. There was strong pressure in favour of change, and there was at least some prospect of improvements. Under these circum-

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1. Interview with E_1, 23 March 1970.

stances, it was better for an official to go along with the changes than court unpopularity by opposing them.

There was a third category of problems that a reorganisation could do little to alter - the factors external to the enterprise, such as those encouraging regionalism, and the widespread suspicion of any government activities (including government business activities). To the extent that these influences were important in the break-up of the BPU-PLN, and to the extent that it was not appreciated that these were problems of the Indonesian economic environment and thus independent of the form of enterprise, it was likely that dissatisfaction with any new form of state electricity enterprise would continue. It does seem to have been widely appreciated, however, that these influences were a hazard of the times and that they would continue to exist after the reorganisation. There was some mention of more decentralised management in an attempt to cope with the phenomenon of regionalism, but in the end nothing came of it.[1]

The Abolition of the BPU-PLN

The abolition of the BPU-PLN took place over a number of months, beginning in July 1964 with a Regulation from the Minister for Public Works and Energy which outlined the proposed changes.[2] The change was taken a step further in October when control of large scale projects financed from the national budget was transferred from the Planning and Construction Division of the BPU-PLN to a new Directorate for Power (Direktorat Ketenagaan) established in the Department of Public Works and Energy.[3] On 28 December, the BPU-PLN

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1. One suggestion was that a number of separate regional enterprises should be established, with broad central co-ordination. This would mean that the industry would have an organisational structure rather like a federation. Interview with E_1, 23 March 1970.
2. Regulation of the Minister of Public Works and Energy No. 5/PRT/1964 dated July 17 1964.
3. Decree of the Minister for Public Works and Energy No. 94/Kpts/1964 dated 27 October 1964. A Power Research Institute (Lembaga Masalah Ketenagaan) was also established within the Directorate for Power to assist, inter alia, with project planning.

was formally dissolved and two separate state enterprises, the Perusahaan Listrik Negara (State Electricity Corporation) and the Perusahaan Gas Negara (State Gas Corporation) were established.[1] The reorganisation was put on a firmer legal footing in mid-May 1965, when Government Regulation No. 19/1965 was issued by President Sukarno which replaced Government Regulation No. 67/1961 by dissolving the BPU-PLN and establishing the two new corporations.[2]

These changes had three main effects - an administrative reorganisation, a change in the relationship between both the investment and operating sectors of the industry and the Ministry, and a reshuffle of personnel. The establishment of the Directorate of Power was intended to give the Minister more control over both large scale investment and the operations of the PLN and the PGN.[3] The Directorate was responsible for most of the functions of the former Planning and Construction Division, for arranging tariff matters, and for generally supervising the operations of the PLN (and PGN). One of the first changes after the reorganisation was an alteration to the financial reports of the PLN so that a clearer picture of the enterprise's operating position was available. The government wanted to know what the true financial position of the PLN was once the capital grants were removed from the picture. The state investments were eventually separated out from the PLN's 1965 balance sheets and listed in the financial records of the Directorate.

The abolition of the BPU-PLN had the desired effect of altering the relationship between the PLN and the Ministry. Since large scale construction was under the control of the

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1. Regulation of the Minister for Public Works and Energy No. 9/PRT/1964 dated 28 December 1964.
2. The Government Regulation was promulgated on 13 May.
3. Ir Srigati Santoso no longer had a "dual role" as President Director of the PLN and Secretary General of the Public Works Department. One Ir Hartono Kadri, who had for a time been the regional head in Regional Board IX in East Java, was appointed as Chief of the Directorate, and Ir Srigati Santoso relinquished his post as Secretary General.

Directorate of Power, the PLN could only ask for subsidies to cover its operating costs. Further, the Directorate operated as a screening agency for the Minister, so he was no longer completely reliant upon the state enterprise itself for advice. Thus the PLN was more open to control by the Minister. On the other hand the accountability-autonomy problem was not brought any closer to a solution. The original objectives of efficiency and an economic surplus were still clearly implied in Government Regulation No. 19/1965,[1] while the enterprise was more tied than ever in its freedom to manoeuvre and achieve these objectives.

A third result was a reshuffle in personnel. The size of the Board of Directors of the PLN was reduced by one to four, and three of the former Directors were transferred to the Ministry. Ir Srigati Santoso stayed on as Acting President Director, and three new Acting Directors were appointed.[2] It is difficult to assess the full significance of the reshuffle of personnel. It seems likely that some changes were politically significant, while others were not. We will return to this question shortly.

Although the question of accountability for capital funds appeared to be solved for the present, most of the operating difficulties remained. The problem of adjusting tariffs to keep up with inflation was discussed, but was never satisfactorily solved. An official in the Directorate of Power described the position as follows:[3]

> "The tariff question was the basic problem ... The government agreed in principle to an increase in tariffs, but wanted an adjustable formula so that tariffs could be adjusted easily without discussions each time. The tariff problem was discussed through 1964 and into 1965 until the new change [in mid-1965]. Subsidies therefore continued to be made and increased, but often they were delayed. This led to a very severe financial situation for some branches of the PLN. Prices at

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1. Article 19 of the Regulation provided rules for distribution of the surplus, and was similar to the relevant article of Government Regulation No. 67/1961.
2. The three new Acting Directors were Ir Lim Tiauw Hing, Ir Abdul Kadir and R. Kresnoparmo. Prof. Sedijatmo, Ir Soedoro and Ir Saljo were appointed assistants to the Minister, as well as another experienced official with long service, Mr. S. Gondokoesoemo S.H., AFEN, 18 January 1965.
3. Interview with P, 13 January 1970.

> times were below the cost of oil - for example, in Nusatenggara at one stage the price of electricity was about Rp 1 per kWh, while the cost of fuel was about Rp 8 per kWh. This did not include other costs, such as labour, maintenance, and so on."

Further Changes

Just six months after the new organisation of the industry became officially operative, and only one month after Government Regulation No. 19/1965 was promulgated, another change was announced. In June 1965 there was a cabinet reshuffle, and a new Department of Electricity and Power was established under a new Minister, Ir Setiadi Reksoprodjo. This Department, set up within the "Compartment" of Public Works and Power, involved only some minor regroupings, and in effect was little more than the former Directorate of Power under a new name.[1] The change was part of a major reorganisation of cabinet portfolios and could, if desired, have been carried through without affecting the newly-established structure.[2]

From one point of view, the change was relatively unimportant since the internal structure of the PLN was unaltered. The regional boards remained in existence, with the heads of the boards retaining their direct responsibility to the President Director. But from another point of view the reorganisation was most significant - more significant, perhaps, than the changes of six months earlier. A further reshuffle of personnel was made, which represented a major shift in the balance of power within the industry towards the so-called left wing groups, and thus important changes of policy in the near future were foreshadowed. The question arises here of why was it that a second reorganisation

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1. For further details of the cabinet reorganisation, see the Bulletin of Indonesian Economic Studies, No. 1, June 1965, pp. 72 f.

2. The Department of Electricity and Power had three main subsections (the Directorate of Electricity, the Directorate of Gas and Natural Power, and the Power Research Institute) and supervised four state enterprises (PLN, PGN, PN Widjaja Karya and PN Indra Karya - the last two being construction enterprises). The PLN was by far the largest of these state enterprises. Information supplied by D_1, interviewed on 1 and 3 April 1970.

took place so soon after the first? What were the factors that led to the second change? To understand the significance of the changes of late 1964 and mid-1965 and the highly political nature of the latter, we must briefly retrace our steps.

Factors Behind the Changes[1]

We have already noted that during the early sixties there was strong competition within the industry between the left wing forces, who were comparatively influential, and their opponents. Clearly if left wing groups could gain control of the electricity utility, this would be a useful base for political operations and might even prove valuable if an armed clash with the military were to eventuate.[2] It should be remembered that throughout 1964 and 1965 there was mounting political tension in Djakarta as the struggle between the PKI and its opponents drew towards its dramatic close. In the competition within the PLN, we see a microcosm of what was occurring throughout the entire society.

The main conflict by about the end of 1964 appears to have been between the left wing sympathisers on one hand, and the older leaders holding positions of authority - the "establishment" of the industry - on the other.[3]

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1. The interpretation of events in this section especially is based upon interviews carried out in the post-1965 coup period. It should be borne in mind that it is likely that the strongly anti-communist atmosphere of the late sixties was reflected in the comments of the people whom I interviewed.

2. The ability to disconnect the power supply of important military installations at a crucial moment would obviously be extremely useful for left wing leaders. It has even been suggested, rather unreliably, that this occurred on 1 October 1965 in the Djakarta area. See Detektip & Romantika, No. 033, October 1969, p.40.

3. We saw earlier that there were two main divisions in the industry - by age and association with the Dutch, and by political attitudes. Here we see how these two divisions cut across each other. Although many of the left wing sympathisers were young, many others had long service. Likewise, there were young graduates who were hostile to the radicals and hoped that the "establishment" leaders would hold the left wing in place.

The former group was highly political, was closely associated with the militant trade unions, and was in favour of radical changes. The latter group, typified by Directors such as Srigati Santoso and Sedijatmo, was less overtly political and tended to think more (though no doubt not exclusively) in terms of technical criteria. These latter officials were often opposed to the promotion of employees whom the militant unions were supporting on the grounds (ostensibly, at least) that the trade union appointees were not as well qualified as others who were available. However the older leaders were forced to give ground in response to political pressure, both because their opponents were influential, and because some were technically qualified and had a right to promotion.

It is against this background that we should view the two reorganisations. There is general agreement that the factors which led to the dissolution of the BPU-PLN at the end of 1964 were relatively non-political, while in contrast, the mid-1965 change had strong political overtones.[1] The dissolution of the BPU-PLN was supported by many radicals, but probably just as much on non-ideological grounds as on political ones. From the radicals' point of view, the first change was useful in that it <u>weakened</u> the position of the "establishment" group, rather than actually <u>strengthening</u> the position of those on the left. One official interpreted the events of the period as follows:[2]

> "The demise of the BPU-PLN was associated with the ambition of the left. How closely different people were involved is not clear ... some people were used, and were not really aware of the overall political implications of the changes. There was probably also a genuine belief in the need for institutional changes. It was often said in certain quarters that if the PLN had its own Ministry (such as in the USSR or the UK), then it would be better. However, this was also linked with the desire of the left to create a large number of Ministers and to gain political power. Between about October 1964 and October 1965 there were many changes of personnel as the PKI pushed up. Ir Srigati remained head of the PLN for

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1. Interviews with P (13 January 1970), Z (5 March 1970), A_1 (16 March 1970) and E_1 (23 March 1970).
2. Interview with Z, 5 March 1970.

some time, but it was a demotion of sorts since he was under the Directorate for Power. Ir Soedoro and Ir Saljo became advisers to Major-General Suprajogi (the Minister for Public Works and Energy). Then there was a change in June 1965 when Ir Setiadi became Minister. Srigati, Soedoro and Saljo were really being promoted out of the way and replaced by more pro-PKI personnel."

The mid-1965 change marked the high peak of left wing influence in the industry. Ir Srigati relinquished his post as President Director, and the name of a left wing sympathiser was mentioned as his successor. However the left wing candidate was inexperienced and there was some delay. It appears that the matter was still unresolved when the events of September 30 took place and changed the entire picture.

The appointment of Ir Setiadi in June 1965 forecast significant changes in policy. Before 1965, the policy was that some private enterprise might be allowed to operate in the industry - perhaps in construction activity, but the policy was not clear. The Minister (then Suprajogi) is also reported as having been receptive to the idea that some rural co-operatives might be allowed to generate electricity, and that some regional governments might operate their own plants. There were, in fact, some discussions in the 1963-65 period with the regional governments who supported changes in this direction. But the new Minister strongly favoured state enterprise, so his appointment appeared to close off these directions of development.[1]

It should be emphasised that the situation was more complicated than the picture presented above may suggest. There were many officials who tried to avoid taking sides in the struggle for power, and some of these men were promoted to leadership positions in the industry. It cannot be concluded that because a particular person was promoted to an important post in this period that he was a left wing sympathiser. There were many officials holding key posts in the post-1966 period who had been promoted before the coup. A number of the "elder statesman" figures and their assistants remained in important positions throughout

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1. Interview with P, 13 January 1970.

the sixties, and were still relied upon in varying degrees for advice in 1970.

Effects of the Coup

The coup of 1965 altered the entire picture to an extent which it is difficult for any foreigner who was not involved in the events to comprehend. The events of 30 September and 1 October and of the days and months that followed shook Indonesian society to its very roots. Hundreds of thousands of people died or were imprisoned, and thousands more known PKI sympathisers who were spared this fate had their careers ruined and their jobs taken from them. The anti-communist purge was pursued in all institutions throughout the entire nation, and has continued to affect the affairs of the electricity industry ever since. This should be borne in mind in considering all events that occurred in the post-1965 period.

The effects of the coup were not immediately obvious in the industry, and Ir Setiadi continued to hold his post until the end of February 1966. He remained as Minister of Electricity and Energy Affairs in a cabinet reshuffle that month,[1] but very soon afterwards was arrested for suspected involvement in the coup and Ir Sutami took his place.[2] Shortly afterwards there were further cabinet reshuffles as the after effects of the coup continued, and control of the electricity and energy sector passed to a Deputy Minister Brigadier-General Hartono,[3] who remained in charge for only a few months until the dust settled and

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1. Warta Cafi [WC], No. 58, 11 March 1966, p. 511.
2. WC, No. 67, 22 March 1966, pp. 592-3. Ir Sutami later in 1966 became Minister for Public Works. Sutami had been associated with the Department for some years. He was appointed President Director of the Hutama Karya state enterprise in May 1961 (WC, No. 123, 3 June 1961, pp. 1077-81), and later worked closely with Major-General Suprajogi when the latter was Minister.
3. WC, No. 79, 6 April 1966, p.676. It was apparently at this stage that the number of "Ministers" was decreased, and the heads of units such as the electricity and energy sector were renamed "Deputy Ministers."

more permanent decisions could be taken.[1]

During the next few months the swing away from the economic irrationality of the pre-coup period gathered momentum[2] and was given official approval in Edict No. XXIII/MPRS/1966 of the Provisional People's Consultative Congress (MPRS) in mid-1966.[3] In July there were substantial and more permanent administrative changes. In a significant political move, the "Dwikora" cabinet was dissolved and replaced by the "Ampera" cabinet.[4] On the 1st August, a Directorate General of Power and Electricity (Direktorat Djendral Tenaga dan Listrik) was created to replace the former Department of Electricity and Power, and Ir Ahmad Mohammad Hoesni was appointed Director General.[5] At the same time the new Directorate was transferred from the Department of Public Works to the Department of Basic and Light Industries and Power under Minister Major-General Mohammed Jusuf. One day later, Ir Amir Hoesein replaced Ir Srigati Santoso as President Director of the PLN.

The reorganisation and appointment of new top officials in August 1966 proved to be more lasting than any of the changes introduced in the previous two years. The appointments of Ir Hoesni and Ir Amir Hoesein as Director General and President Director respectively were politically important, both because the appointments signified the defeat of the left wing sympathisers in the industry, and because

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1. Brigadier-General Hartono appears to have been merely a caretaker figurehead. Ir Srigati Santoso temporarily resumed the position of President Director of the PLN that he had relinquished some months before, and Hartono was assisted by such experienced officers as Mr Gondokoesoemo S.H., Ir Saljo and Ir Tjiptojuwono.
2. See "Survey of Recent Developments," Bulletin of Indonesian Economic Studies, No. 4, June 1966.
3. WC, No. 160, 17 July 1966, p. 1317.
4. WC, No. 166, 23 July 1966, p. 1361, and WC, No. 173 1 August 1966, p. 1413.
5. AFEN, 8 August 1966. This change was announced in Presidential Decree No. 170/1966.

these men represnted the younger generation of engineers. Thus the net result of the turmoil of mid-1964 to mid-1966 was that the older generation leaders finally did hand over to the younger men, but not to the leftist groups.[1] Most of the former Directors continued to play a small role and their advice was sought from time to time. The majority of the "post-coup" generation were educated in Indonesia, many at the prestigious ITB (Bandung Institute of Technology) in the late fifties. Further, they are comparatively young - often in their early forties - and thus the leadership group in the industry today is younger than one would normally find in most other countries.

The other important result of the changes was the transfer of the electricity sector to the Department of Basic and Light Industries and Power. No clear explanation for this transfer has been given, and it appears that this was yet another change that was made without much consideration of the basic problem that the industry was facing.[2] It is understandable that in the economic confusion of 1966, the question of which Department the Directorate General of Power and Electricity should be attached to seemed a secondary issue. From the point of view of the industry however, the change was of some importance because all changes are to some extent disruptive.

Two explanations have been suggested by officials close to the scene. One is that the move was an attempt to solve the fuel problem.[3] Fuel was under the control of the Department of Basic and Light Industries and Power, and the supply of fuel had been a big problem for the PLN.

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1. Apart from Amir and Hoesni, officials such as Ir Sufrani, Ir Andi Junde, Ir Tjiptojuwono, Ir Soenjoto, and Ir Abdul Kadir (later to become President Director of the PLN) became more important in the industry.

2. In discussions on most of the main reorganisations, there was a high degree of agreement between officials, at least on the broad outline of events and the underlying causes. But when questioned about the transfer to the Department of Basic and Light Industries and Power, officials were vague and unsure of the reasons for the shift.

3. Interview with P, 13 January 1970.

Some officials may have thought that if the fuel problems could be settled within one department rather than between departments, then some of the difficulties would disappear. A second suggestion is that it was felt that the power sector fitted in better with industry rather than with the more construction-oriented Public Works Department.[1]

In the event, the Directorate General of Power and Electricity only remained in the Department of Basic and Light Industries and Power until mid-1968. After the appointment of the new "Development" (Pembangunan) cabinet in June, the Directorate was returned to the Public Works Department[2] which was renamed the Department of Public Works and Electric Power (Departemen Pekerdjaan Umum dan Tenaga Listrik or DEPPUT).[3]

As with the earlier transfer, the reasons for the return of the Directorate to its former ministry are not clear. It has been suggested that considerations of size were the main factor. For some time after 1965, there were two departments in charge of industries - the Department of Basic and Light Industries and Power, and the Department of Textile and Small Scale Industries. These two Departments were merged when the formation of the Development cabinet was announced, and it was then felt that to include the Directorate General of Electricity and Power in the new Department would make the Department too large.[4]

PLN and "Gatrik"

Throughout all of the reorganisations from the end of 1964 to mid-1968, the relationship of the PLN to its parent Directorate appears to have remained substantially unaltered. The main functions of the Directorate General were to supervise large scale investment, to advise the Minister on tariff matters, and in general to supervise the activities of the PLN. In practice, there was usually very close co-operation between the Directorate and the PLN. Most of the important officials

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1. Interviews with W, 24 February 1970, and Z, 5 March 1970.
2. See Presidential Decree No. 184 1968.
3. Laporan Tahunan Djuli 1968-Maret 1970 [Annual Report July 1968-March 1970] of the Directorate General of Power and Electricity, mimeographed, n.d.
4. Interview with Z, 5 March 1970.

in the Directorate, at least in the post-1966 period, had served in the PLN and had been promoted "up through the ranks." Thus many of them had worked with officials who were still PLN employees, and with whom they had close personal contacts. Further, a number of middle-ranking officials working in the Directorate were actually on the payroll of the PLN, and had been seconded to the Directorate for various tasks.

Indeed the close relationship between the PLN and "Gatrik" (as the Directorate was often called[1]) led to criticism that the old relationship between the Department and the BPU-PLN had not really changed much because Gatrik was closer to the PLN than it was to the Minister.[2] That there was a good deal of truth in this criticism is most significant. What is striking about all of the administrative changes is how little impact they seem to have made on the problems of the PLN. We can note here that there were several influences which encouraged the close relationship between PLN and Gatrik. In retrospect we can see that considering that so little careful thought was given to the objectives of the administrative reforms, it is not surprising that the Gatrik-PLN organisation was comparatively self-contained.

In the first place, the shifts between departments can hardly have helped close links to develop between Gatrik and the parent department. The move to Basic and Light Industries meant that between August 1966 and June 1968, the industry was dealing with officials in a parent department who were relatively unfamiliar with the industry and its past difficulties. Just when sufficient time had passed for Gatrik and the PLN to have developed a satisfactory working relationship with the parent department, yet another change occurred.

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1. An abbreviation of "gas dan listrik."

2. This criticism was made forcefully during the attacks in the press, particularly Harian Kami, on the Director General (Ir Hoesni) and the President Director (Ir Amir Husein) over the "77 Employees Problem." (See Chapter 10.) Particularly significant however, was that this criticism was also made by some responsible officials; interviews with E_1 on 23 March 1970, and with A_1 on 24 March 1970.

It might be expected that a shift back to the original department would entail comparatively little disruption, but there were additional factors tending to prevent smooth re-integration. The Director General of Gatrik, Ir Hoesni, was a man of strong personality, and there is evidence to suggest that he and the Minister of Public Works and Electric Power, Ir Sutami, were not always on the best of terms.[1] As well as this, internal procedures within the two departments naturally varied somewhat, and it took some time for Gatrik and the PLN to adjust to the new arrangements.[2] Further, less than six months after the return to the Department of Public Works and Electric Power, a serious labour dispute (the problem of the "77 Employees") arose, and this was a source of considerable friction between Gatrik and the Department for most of 1969.

Although no clear evidence is available, we can surmise that there was another factor which tended to bind Gatrik and the PLN together and to separate them from the particular department that they were attached to: the technical and local expertise required in the Indonesian electricity industry. As we have seen, many of the high officials of the industry were among the first graduates from Indonesia's newly developed technical faculties, and they were proud of the particular part that they were expected to play as members of Indonesia's educated elite in their country's development. They were naturally aware of the vital role that electric

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1. This emerged during the events surrounding the "77 Employees Problem," and was mentioned by the two officials referred to in the previous footnote.

2. For example, in theory a special team to authorise departmental purchases of material existed in both departments. However the team in the Department of Basic and Light Industries and Power did not function well, and Gatrik and the PLN often adopted the practice of bypassing it and obtaining ministerial approval directly. In the Department of Public Works the team was operative, and Gatrik and the PLN were expected to follow stricter procedures. Interview with E_1, 23 March 1970. Differences in internal procedures, especially regarding the delegation of responsibility from the Minister to the Director General, are mentioned in the Laporan Tahunan Djuli 1968-Maret 1970, op.cit., p.2, as a difficulty after returning to the Department of Public Works.

power must play in the future and the need to develop the industry quickly. Further, they were conscious of being professionals, of having highly specialised knowledge in generation, transmission or distribution systems, or construction of electricity projects. We can appreciate that they would have felt that "outsiders" - people who were not engineers with experience in the industry - would not understand their problems.

There were certainly only a few officials in the Department of Basic and Light Industries and Power who had technical expertise in fields related to electric power, and to a lesser extent this was true of the Department of Public Works and Electric Power. In addition to the electricity sector, the Department of Public Works supervised irrigation and road construction, and the problems faced in both these sectors were rather different to those faced in electricity.

More than this - Indonesia's electricity industry faced special local problems, and the country's electrical elite had learnt how to deal with these through difficult personal experience. They often suggested that not only did other Indonesians not understand their problems, but neither did visiting foreign experts trained in appropriate technical fields but used to overseas standards and methods. It was all very well for foreigners to breeze in and discover that the PLN was not as efficient as it might be, that there was excess employment, and that there had been a misallocation of investment in the past. This was true - the Indonesians knew these things. However the visiting experts, even though technically qualified, didn't understand the special conditions in Indonesia and would not be so confident of their proposed solutions if they did.[1] This attitude was doubtless partly defensive,

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1. Indonesian nationalism made itself felt in the electricity industry as in other sectors of the economy. During interviews officials would mention that they appreciated that great improvements were needed, but pointed out that there were social and political goals to be met as well as economic ones. Reforms that ignored social and political constraints were unrealistic. "Agreed that six or seven thousand employees should be dismissed," officials would say, "but what about their families? These men must live." "It is true that prices should be increased, but the political opposition is still very strong."

partly an excuse for past mistakes, but there was truth in it too.[1] Thus officials of Gatrik and the PLN were drawn together by common experience and training, and this factor tended to isolate the two units from the department that they were attached to.

Conclusion

In reviewing the administrative reorganisations since 1957, two matters stand out - the relative lack of overt outside interference in the affairs of the industry, and the continually disturbed environment that the PLN operated in. Thus from one point of view the industry was left alone, while from another it was continually disrupted.

The various changes - the one in mid-1968 was the fifth since the beginning of the sixties - had little direct effect on internal operations.[2] As far as officials involved in day-to-day activities were concerned, changes could come and go in Djakarta, but electricity still had to be generated, bills sent out, machines repaired, and so on. Below the upper echelons of the PLN, the internal organisational structure remained fairly unchanged and many of the changes passed almost unnoticed by many PLN employees.[3] Neither did the changes have much effect on investment planning or construction. When the old planning division, Division I, was transferred from the BPU-PLN to the new Directorate of Power, the division shifted as a whole. Changes of personnel or internal procedures were few. Division I had always been somewhat separate from the BPU-PLN in any case, and project construction and planning cannot be turned on and off like a tap. Once contracts are arranged they are difficult to break. Once generation projects are begun, they must (sooner or later, and

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1. Officials of international corporations who had lived in Indonesia since the early sixties emphasised that considering all the difficulties, they felt that the performance of the industry and its managers was surprisingly good. Interviews with Q, 4 February 1970, and C_1, 18 March 1970.
2. This was agreed upon by all officials who commented on the matter.
3. The boundaries of some regional boards were redrawn, but this did not disrupt operations significantly.

preferably sooner) be completed. In other words, internal affairs were of necessity carried on largely uninterrupted because of the rigid technical requirements on the supply side of the industry.

Another notable feature of the internal affairs of the industry is the comparative absence of military managers. In sharp contrast to many other state enterprises, only one military man, Brigadier-General Hartono, has ever held a high management post, and then only for a short time as an emergency measure in the first half of 1966. What stands out is that the general practice has been to appoint experienced and well qualified men from within the industry to important posts. Why has this been so? No clear explanation is forthcoming, but several influences seem to have been at work.

First, there were comparatively few spoils in the offing which might have attracted the military to the electricity sector. There are only a few privileges (such as an increased supply of electricity) which can be easily dispensed from the PLN as rewards for supporters, but although the unsatisfied demand for electricity is large, conditions on the supply side closely limit the possible increases in service. In any case, a small amount of moral pressure on local PLN managers was sufficient to obtain most special services that a military (or other influential) official may have wanted. The opportunities for financial gain appear to have been small in comparison to other sectors also. At the operating level the electricity industry was, of course, starved for funds throughout the sixties. From time to time rumours of financial cuts being taken in connection with contracts for projects have circulated, but these have apparently often been arranged before the contract reaches the electricity officials. But a PLN manager had some prestige, political influence and the opportunity to create jobs, so other reasons must also be found to account for the absence of direct military interference.

A second factor was the technical expertise required. Since the elite of the industry was a comparatively highly trained group with many common experiences, a military appointee at a high level would have been conspicuous by his

ignorance. More technical knowledge was required to be an electricity manager than, for example, a manager in a state trading corporation.

But probably more important than either of these reasons was the tendency of the military to move into managerial posts where the sudden departure of Dutch personnel left a vacuum. The main leadership posts in the electricity industry were thoroughly Indonesianised by the end of 1957, and the final nationalisations caused no leadership crisis. Experienced men were already in control, who the armed forces would have had to push aside to occupy influential positions. Since there was no vacuum, the military tended to stay away.

It is when we turn to the external affairs of the industry - the wider environment of operations - that the effects of the reorganisations are more clearly seen. We noted above that ever since the first major discussions on the nationalisation of the industry in the early fifties, certain basic issues have been left undecided. Stated most broadly, the precise relationship between the industry and the government has never been clearly defined. More particularly, this indecision has manifested itself in confusion over the pricing policy to be followed and the surpluses to be aimed for, and in the accountability versus autonomy problem.

For almost twenty years now the industry has been in tight financial straits and dependent upon subsidies. Thus it has had a good deal of its autonomy effectively taken away. But the problems arising from financial dependence have been downgraded because of the failure to give clear thought to the accountability versus autonomy conflict. The cry has almost always been for more control over the state electricity enterprise, not less. To suggest that the electricity utility should have greater independence is to run in the face of strong public (and in many cases, official) opinion. Critics point to cases of arbitrary highhandedness in decision making, suggest that within the industry top officials have almost dictatorial power, and allege that corruption needs to be brought under control.

The answer appears to be that in some directions - notably financing and pricing - the industry needs more autonomy, while in others - particularly in providing public

information about its performance - more accountability is required. Throughout the period under review, there has never been a reasonable amount of information about the internal affairs of the PLN readily available to the public. There is as yet a general failure, by Western standards, on the part of Indonesian government institutions of accountability to the public and the parliament, and thus any criticism of the PLN alone on this count should be muted. In this, the PLN is probably no worse than many other state enterprises, and may even be better than most.

One of the main effects of the many reorganisations was to encourage the failure to consider the accountability-autonomy issue properly. For a large part of the 15 years from 1953 to 1968, the industry was in the actual process of being reorganised from one form to another. The BPU-PLN period was probably the most stable, and yet at the most the industry was allowed three years' stability before new plans were raised. With each reorganisation, the natural tendency of officials was to hope that <u>this</u> time things would be better. It seemed best to wait and see what changes the new arrangement introduced before worrying too much about past faults. Thus the symbolic action of reorganising the administrative structure seems to have become a substitute for dealing with the basic problems that remained unsolved throughout every change.

POSTSCRIPT

In July 1970, a further major reorganisation resulted in Gatrik being disbanded and its operating functions being transferred to the PLN, now apparently under the direct supervision of the Minister for Public Works and Electric Power.[1] A Bureau of Electric Power and Gas was set up within the Department, presumably to advise the Minister. It was expected that this reorganisation would give considerably more responsibility to the PLN, both for current operations and for the long-run planning of the development of the industry. The reason for this latest reorganisation is not known, but it appears to have been in part a consequence of the "77 Employees" labour dispute, and in part a result of recommendations made by management consultants appointed by the World Bank.

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1. Indonesia Raya, 11 June 1970, Kompas, 18 July 1970 and AFEN, 20 July 1970. The former Director General, Ir Hoesni, was appointed as advisor to the Minister, and the former President Director, Ir Amir, was replaced by Ir Abdul Kadir, formerly a Director of the PLN.

PART II

ECONOMIC PERFORMANCE UNDER NATIONALISATION

CHAPTER 5 Growth of Capacity and Output Since World War Two

Introduction

The production of electricity and its supply to consumers is a function of generating capacity and of the efficiency with which that capacity is used. The latter factor in turn must be studied from two points of view. A narrow definition of efficiency would deal only with use of capacity at the generating plant. A wider definition is important too - efficiency in the sense of the ability of the industry to deliver the generated electricity to consumers with a minimum of loss, and of the ability of the industry to encourage a balanced demand (implying a high load factor) on the available capacity. In other words, electricity managers must pay attention to distribution and demand as well as production, and since they can usually exercise varying degrees of control over all three, can be expected to do so. In this Chapter and the next, we will look at the effect of the technical performance of the industry on production and consumption.

This Chapter will deal with the supply side - problems of generation, transmission and distribution. Using the best data that are available and drawing on information from other ECAFE countries as a basis for comparison, we will survey rates of growth of capacity and production, and then disaggregate some of the data to see whether there are significant variations within Indonesia. After examining quantitative data on transmission and distribution, we will describe the operating conditions in different sectors in some detail. This discussion will throw light on the practical difficulties that PLN officials face, and will help explain the disappointing performance of the industry during the post-war years.

Definitions

The quantitative measurement of capital has always posed a problem for economists, and the electricity industry is no exception, even in something as apparently straightforward as physical capacity. The "total installed capacity" (often called "rated capacity") is usually taken to be the capacity

listed on the nameplate of a generator.[1] Two other measures of capacity are of interest to us here. First, at any given time a certain amount of capacity will be broken, sometimes permanently (in which case it would best be written off entirely, but apparently this is sometimes not done for a number of years), and often temporarily for lack of spare parts. The amount of capacity available after broken installed capacity has been allowed for is known as "operating installed capacity."

There are further adjustments that must be made before we have a figure which represents the actual capacity that is operable at any given time. Just as the financial value of capital should be regularly depreciated, so the physical capacity of an electric generating unit should be regularly derated, and an old plant (or, for that matter, a comparatively new plant that has been poorly maintained) may in fact be capable of bearing only half or less of its original nameplate load with safety. Further, the operable generating capacity of hydro plants particularly may be temporarily limited in Indonesia because of technical and administrative restrictions on the flow of water available to them. When these factors are allowed for, a third measure of capacity, which we will call "effective operating capacity," is arrived at.[2]

Size and Growth - International Comparisons

Information on the growth of total installed capacity and production for the post-war period is given in Table 5.1 and Figure 5.1. The data for the period up to 1960 are particularly unreliable and can be used for examining the overall trend only. There is disagreement between various sources on both the capacity and production figures in the immediate post-war

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1. For a discussion of the difficulty of defining capacity in the electricity industry in an underdeveloped country, see Yuan-Li Wu, Economic Development and the Use of Energy Resources in Communist China, New York, Frederick A. Praeger, 1963, p.11.

2. A fourth measure of capacity would allow for the fact that most generators can be overloaded, at the cost of a high rate of deterioration, for limited periods. Overloading occurs in Indonesia, but no figures are available. We will therefore ignore the issues that this measure of capacity raises.

years. Further, official figures for the entire period 1945-1959 (with the exception of 1947 and 1951) show consumption as a constant 80 percent of total production! It is not certain whether the consumption figures were derived from the production figures or vice versa, but it seems most likely that the former was the case. It is a simple process to measure production of kWh in a generating station, whilst the accurate measurement of consumption in Indonesia where a majority of consumers is unmetered is impossible. Thus the figures for production are probably more reliable than those for consumption.

Despite the statistical doubts, the overall trends are clear. Installed capacity in 1945 was considerably lower than in 1940, official data suggesting a fall from about 210 MW in 1940 to about 155 MW in 1945, which was about the 1929 level.[1] It is sometimes expected that after a slump caused by war or depression, economic recovery to at least the pre-slump level should be rapid. This was not the case in recovery of capacity, and it was not until about 1953 that the pre-war level of installed capacity was regained. Thereafter growth varied, depending as it did on decisions to invest in new capacity which will be discussed later. An average rate of growth of about 7.2 percent, which allows a doubling of capacity every ten years, was attained.

No figures are available for pre-war output, but the consumption figures (also charted in Figure 5.1) clearly imply that production in 1945 was greater than in 1940 by a small margin. In view of ANIEM's performance (see Chapter 2 above) and other evidence,[2] this seems most unlikely and casts

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1. Alternatively another source reports a fall from 171 MW in 1940 to 140 MW in 1949 in the public electricity sector; see Compact-Commission Eximbank-Loan, Paper-NR. 25, mimeo., Djakarta, April 14 1950.

2. The Eximbank source (ibid) reports consumption as 364.4 million kWh in 1940 (which tallies with the figures used earlier in this study - see Table 1.5) and 362 million kWh in 1949. These figures suggest, as seems likely, that consumption immediately after the war was down on the 1940 figure.

TABLE 5.1 Total Installed Capacity & Production in the Public Electricity Industry, 1945-1969[a]

Year	Installed Capacity (MW)	Production (million kWh)
1945	157	504
1946	157	504
1947	160	512
1948	160	512
1949[b]	163	523
1950	176	562
1951	179	614
1952	178	668
1953	201	809
1954	217	809
1955	258	900
1956	266	922
1957	257	939
1958	262	957
1959	277	969
1960	304	988
1961	310	1,082
1962	374	1,241
1963	398	1,294
1964	553	1,407
1965	559	1,513
1966	586	1,561
1967	589	1,607
1968	652	1,756
1969[c]	658	1,854

Source: 1945-1966: Ahmad M. Hoesni and A. Arismunandar, "Surveys and Planning for Development of Energy Resources in Indonesia," in Ahmad M. Hoesni et. al., Beberapa Aspek Persoalan2 Ketenagaan Negara2 ECAFE dalam Hubungannja dengan Indonesia, Djakarta, mimeo., Lembaga Masalah Ketenagaan, July 1968.

1967: supplied by the PLN.

1968-1969: PLN Annual Reports for 1968 and 1969.

Notes:

a. Except where noted otherwise, all figures in this study exclude capacity, production and consumption in "captive" plants (often called "self generating industries") where electricity is produced primarily for the users' own use. (See the Appendix to this Chapter for a note on captive plants in Indonesia.) Figures include Djatiluhur, which had a rated capacity of 100 MW in 1967 and 125 MW in 1968 and 1969.

b. An alternative source reports production in 1949 as 387 million kWh, which seems a more plausible figure than that given above. See Biro Perantjang Negara, Garis-Garis Besar Rentjana Pembangunan Lima Tahun, 1956-1960 [Broad Outlines of the Five Year Development Plan, 1956-1960], Djakarta, 1956, Chapter 4. This is roughly consistent with one report that consumption in that year was 362 million kWh (and not the 419 million kWh reported in official PLN figures). See note b. in Table 6.1.

c. Estimates.

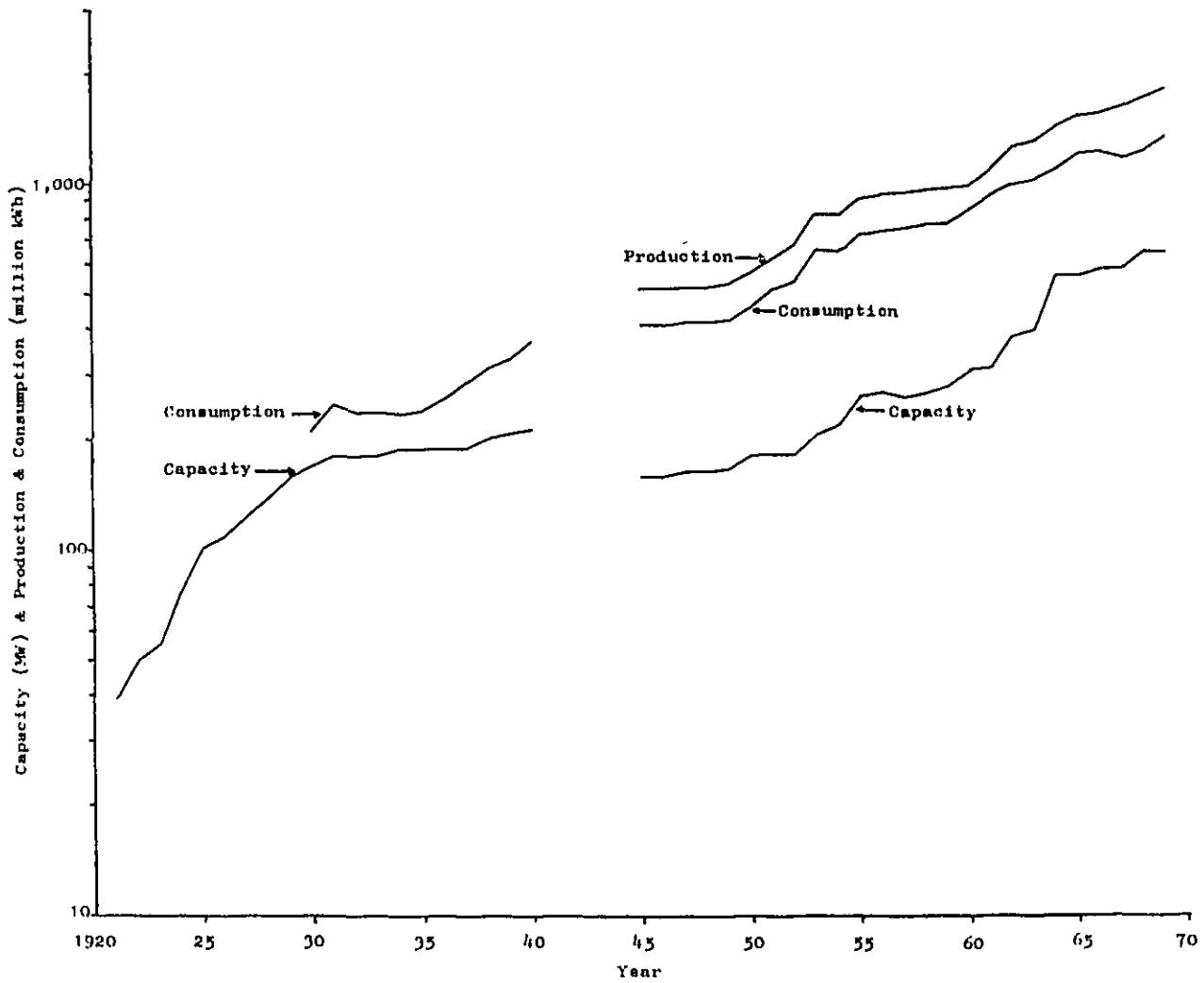
considerable doubt on the reliability of the PLN's official figures. In fact, the PLN's figures for production and consumption until 1959 are really estimates, and it is only from 1960 onwards that they can be relied upon. Taking all these factors into consideration, it seems likely that production since the war has grown by at least the same rate as capacity, and perhaps even slightly more.[1]

Indonesia's figures for capacity and production have more meaning when set in context by comparing them with the

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1. In 1969, according to official figures production was 1,854 million kWh. If production had grown at about the same rate as capacity (7.2 percent per annum) since the war, then production in 1945 would have been about 350 million kWh. This seems a far more credible figure than the official 504 million kWh, and in view of the dramatic drop in ANIEM's production between 1939 and 1947 (see Table 2.1 in Chapter 2), may still be too high. In addition, one source reports that by 1949 production was still only 387 million kWh (see note b. to Table 5.1). This reinforces the suspicion that production in 1945 was even less than 350 million kWh and that the average growth rate of production between 1945 and 1969 was somewhat higher than 7.2 percent per annum.

FIGURE 5.1 Capacity, Production and Consumption in the Public Electricity Sector in Indonesia, 1921-1969



Source: Capacity, 1921-1940: Table 1.3.
Consumption, 1930-1940: Table 1.5.
Capacity and Production, 1945-1969: Table 5.1.
Consumption, 1945-1969: Table 6.1.

relevant figures for other countries in the ECAFE region.[1] This is done in Figures 5.2 and 5.3. In both cases Indonesia's performance is seen to be disappointing. As can be seen from Figure 5.2, Indonesia's capacity in 1951 was considerably higher than that of Pakistan or Singapore (which in 1967 had a population equivalent to about 2 percent that in Indonesia). By 1967, capacity in Pakistan was well over double that in Indonesia, while Singapore's capacity was nearly 80 percent of Indonesia's. Data for the Phillipines is not given in the Figure, but at the beginning of the period capacity in Indonesia and the Philippines was about the same, while by 1967 the Philippines had about twice the capacity in Indonesia.

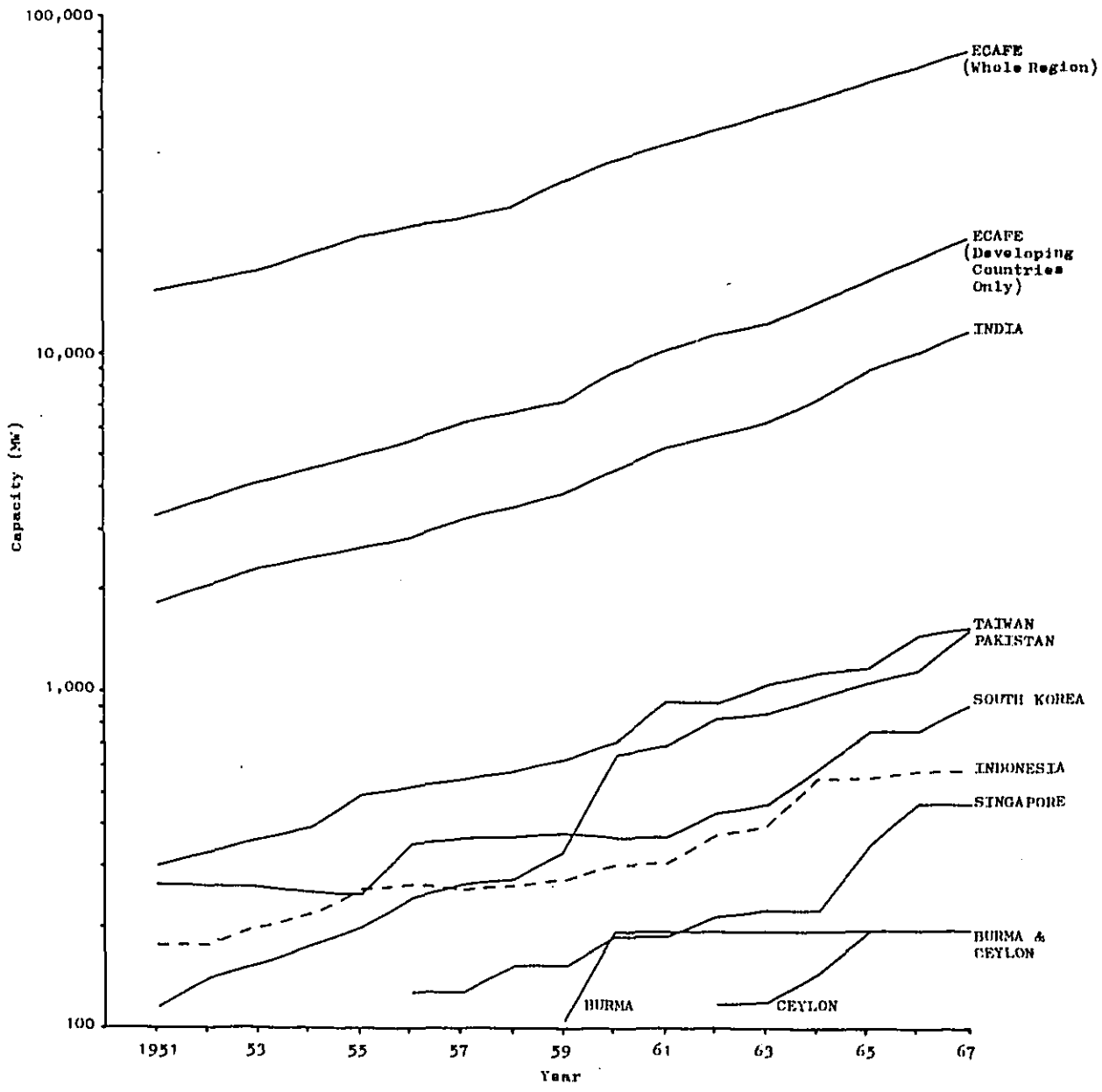
The comparative figures for production (Figure 5.3) tell much the same story. In 1951 output in the Philippines and Indonesia were almost equal, but by 1967 Philippine production had increased to over three times Indonesia's output. Hong Kong, South Korea and Pakistan began the period with production well below that in Indonesia, and by 1967 were well above. Once again Pakistan's performance is particularly noticeable; output in Pakistan in 1951 was only a little over one-third that in Indonesia, and by 1967 was about three and a half times the Indonesian figure. At the end of the period production in Singapore was only slightly below output in Indonesia.

The growth of capacity and production throughout the region illustrated in the two Figures is summarised in Table 5.2 for two periods, 1951 to 1967, and 1960 to 1967. For the sixteen year period 1951-1967, the average annual rate of growth of total installed capacity in Indonesia (7.7 percent) was the lowest of all the countries included, and was well below the average for the underdeveloped countries in

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1. Except where noted otherwise, all figures in this study exclude capacity, production and consumption in "captive" plants (often called "self generating industries") where electricity is produced primarily for the users' own use. (See the Appendix to this Chapter for a note on captive plants in Indonesia.)

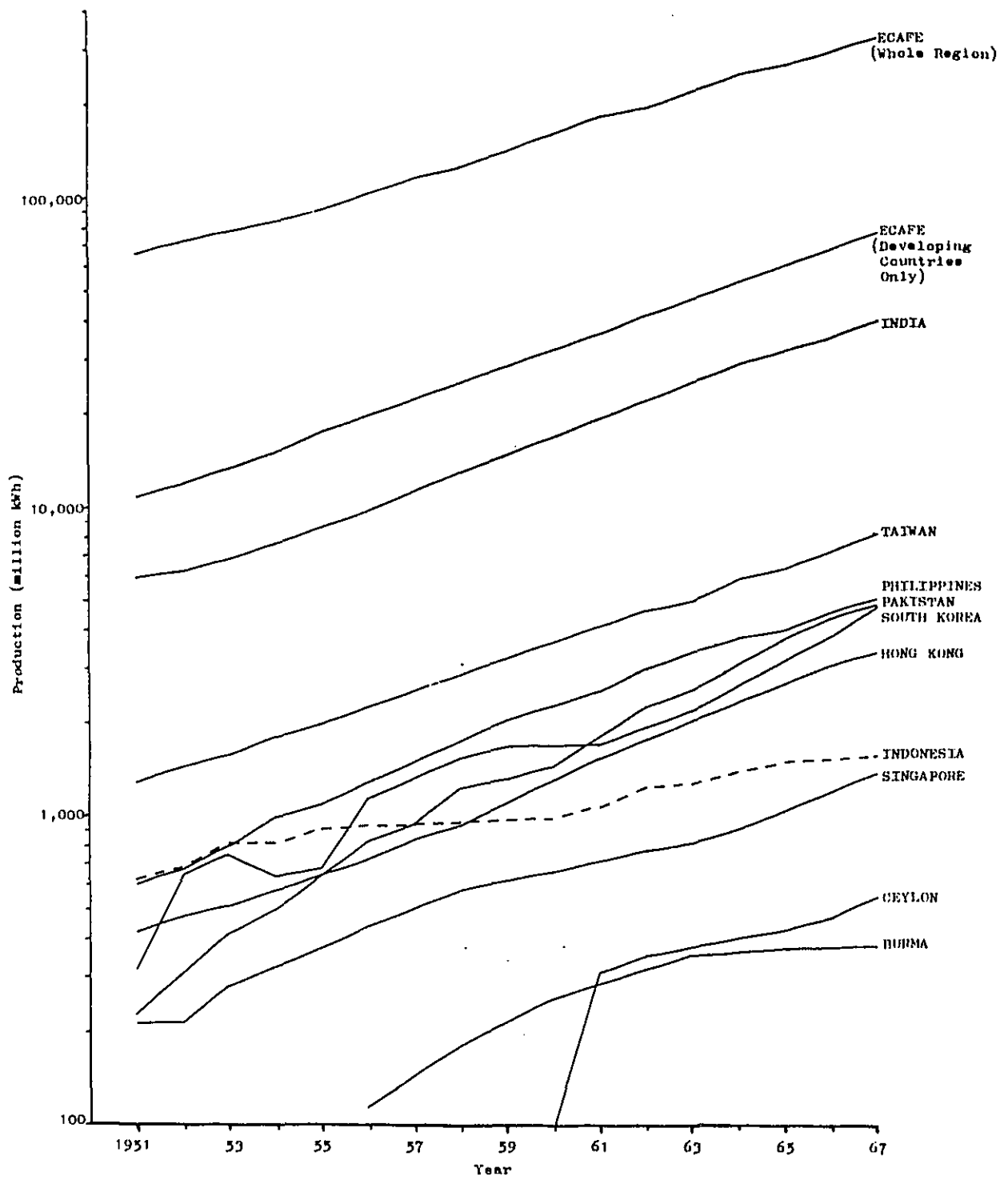
FIGURE 5.2 Capacity in the Public Electricity Sector in the ECAFE Region, 1951-1967



Source: All countries except Indonesia: Calculated from ECAFE bulletins on Electric Power in Asia and the Far East for the periods 1951 to 1955 (Bangkok, 1957), 1956 to 1960 (New York, 1962), 1961 to 1965 (New York, 1968), 1966 (New York, 1968), and 1967 (New York, 1969).

Indonesia: Table 5.1.

FIGURE 5.3 Production in the Public Electricity Sector in the ECAFE Region, 1951-1967



Source: As for Figure 5.2.

TABLE 5.2 Average Annual Rates of Growth of Total Installed Capacity and Production in Electricity Supply Industries in the ECAFE Region, 1951 - 1967

Country	Installed Capacity		Production	
	1951-1967	1960-1967	1951-1967	1960-1967
ECAFE (Whole Region)	10.8	11.6	10.9	11.3
ECAFE (Underdeveloped Countries)[a]	12.7	13.9	13.4	13.8
Burma	11.3	0.8	15.0	6.2
Ceylon	8.5	10.9	15.9	29.1
Hong Kong	13.7	14.6	14.3	15.0
India	12.4	14.6	13.0	13.6
INDONESIA	7.7	9.9	6.2	7.2
Malaysia (States of)	9.2	8.6	8.9	12.1
Pakistan	17.4	12.8	22.3	19.3
Philippines	13.1	10.5	14.4	12.3
Singapore	17.1	13.8	12.7	11.6
South Korea	7.9	14.0	18.7	16.4
Taiwan	10.8	12.1	12.5	12.8

Source: As for Figure 5.2.

Notes:

a. Excluding Australia, Japan and New Zealand.

the ECAFE region (12.7 percent).[1] After 1960, Indonesia's performance improved somewhat, but was still a full 4 percentage points below the average for all underdeveloped countries in the sample. The figures for growth of production are even less favourable. Over the whole of the period, Indonesia's output appears to have increased at a little over 6 percent per annum, with a slight improvement since 1960. By comparison, production has increased at over 13 percent per annum for the underdeveloped countries taken as a whole, while a number of countries have grown at over twice the rate achieved in Indonesia. It is thus clear that even if the base from which Indonesia started in 1945 is substantially overestimated (and the growth therefore underestimated), the growth of installed capacity and production has been disappointing.

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1. South Korea's growth rate was held down in the early part of the fifties by the Korean War.

When rates of growth are being compared between countries, it is useful to also bear in mind the absolute magnitudes involved. A low rate of growth from a high base may not be a matter for concern, since it may simply indicate that other sectors of the economy or other countries are making up lost ground. On the other hand, a low rate of growth from a low base is clearly an especially undesirable state of affairs. Tables 5.3 and 5.4 show that the latter has

TABLE 5.3 Total Installed Capacity and Production in the Public Electricity Supply Sector in the ECAFE Region, 1967

	Installed Capacity (MW)	Production (Million kWh)
ECAFE (Whole Region)	80,183	344,740
ECAFE (Underdeveloped Countries)[a]	22,355	80,296
Burma	200	385
Ceylon	185	561
Hong Kong	952	3,462
India	11,883	41,196
INDONESIA	589	1,607
Malaysia (Whole Territory)	595	2,532
Pakistan	1,525	4,991
Philippines	1,196	5,114
Singapore	464	1,424
South Korea	917	4,911
Taiwan	1,580	8,413

Source: As for Figure 5.2.

Notes:

a. Excluding Australia, Japan and New Zealand.

been the case in Indonesia, and that as a result the gap between Indonesia and neighbouring countries is widening. Table 5.3 shows that in 1967 in terms of capacity and output, Indonesia's electricity industry with about 590 MW and 1600 million kWh respectively was about the same size as the industry in Malaysia and Singapore, and considerably smaller

than in Hong Kong, Pakistan or the Philippines. As Table 5.4 shows, the difference in per capita terms is even more striking. In 1967 the size of the industry in Indonesia

TABLE 5.4 Per Capita Installed Capacity and Production in the Public Electricity Supply Sector in the ECAFE Region, 1955 and 1967[a]

	Watts per capita			kWh generated per capita		
	1955	1967	Increase[b] (%)	1955	1967	Increase[b] (%)
ECAFE (Whole Region)	n.a.	73.0	n.a.	n.a.	313.0	n.a.
ECAFE (Underdeveloped Countries)[c]	7.3	23.0	215	25.0	81.0	225.0
Burma	2.4	7.7	320	7.9	14.9	90.0
Ceylon	7.3	16.7	130	19.6	48.0	145.0
Hong Kong	75.0	248.0	230	273.0	911.0	235.0
India	7.1	23.0	225	22.0	80.0	265.0
INDONESIA	2.9	5.2	80	10.4	14.3	37.5
Malaysia (States of)	39.0	63.0	60	148.0	280.0	90.0
Pakistan	2.4	12.9	440	7.9	42.0	430.0
Philippines	13.4	35.0	160	49.0	148.0	200.0
Singapore	84.0	232.0	175	304.0	712.0	135.0
South Korea	11.6	31.0	165	41.0	165.0	300.0
Taiwan	56.0	121.0	115	221.0	642.0	190.0

Source: As for Figure 5.2.

Notes:

a. Most figures were rounded during calculations. Self generating industries are excluded.

b. Rounded to nearest 5.

c. Excluding Australia, Japan and New Zealand.

was the smallest for all of the countries included. With only 5.2 watts of capacity and only 14.3 kWh of output per capita, Indonesia's industry was one of the most poorly developed in the world and well below the average for the

underdeveloped countries in the ECAFE region of 23 watts and 81 kWh per capita respectively. In these terms, Indonesia is well behind India or Pakistan.[1]

The Industry within Indonesia

Tables 5.5 and 5.6 provide information on the size and growth of the industry in different areas within Indonesia. The overall impression, whether measured by installed capacity or by production is much the same. As one would expect, the industry is concentrated in Java, which has about 80 percent of installed capacity and slightly more of total production. Most of the remaining capacity and production is in Sumatra (somewhat over 10 percent in each case), with only a small amount of electricity in the other areas.[2] The concentration in Java and the relative scarcity in the other areas is shown more clearly in Table 5.7 which shows that even on a per capita basis, installed capacity and production are considerably higher in Java than in the Outer Islands.

The relatively constant shares of the different areas in total capacity and production, also shown in Tables 5.5 and 5.6, indicate that the geographical growth of the industry has been surprisingly balanced. The balanced expansion of capacity reflects one concern of the planners of the industry - an aspect that we will touch on in discussing investment in the industry later.

Tables 5.8 and 5.9 and Figures 5.4 and 5.5 present disaggregated data for capacity and production by "prime mover" (type of generator). It is useful to view electricity development from this standpoint, not only for the light that it will help throw on investment decisions later, but also because different types of plant pose different planning and operating problems. Diesel and thermal plants usually

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1. This is a little misleading because the share of capacity and production in the private sector is probably abnormally large in Indonesia. But even if allowance were made for this, Indonesia's relative position would be only marginally better.

2. Unless otherwise indicated, West Irian is excluded from all figures.

TABLE 5.5 Total Installed Capacity by Area, 1952-1969[a]

(MW)

Year	Java	(%)	Sumatra	(%)	Other	(%)	Total
1952	142	(78)	21	(12)	19	(10)	181
1953	169	(77)	30	(14)	21	(9)	220
1954	170	(79)	24	(11)	20	(9)	215
1955	196	(81)	26	(11)	19	(8)	242
1956	193	(75)	36	(14)	27	(11)	256
1957	207	(78)	37	(14)	21	(8)	266
1958	210	(79)	36	(14)	18	(7)	266
1959	216	(78)	37	(13)	24	(9)	276
1960	244	(79)	40	(13)	23	(8)	308
1961	249	(80)	39	(12)	25	(8)	313
1962	n.a.		n.a.		n.a.		374
1963	n.a.		n.a.		n.a.		398
1964	457	(83)	59	(11)	37	(7)	553
1965	458	(82)	62	(11)	39	(7)	559
1966	480	(82)	63	(11)	43	(7)	586
1967	480	(81)	64	(11)	45	(8)	589
1968	506	(78)	98	(15)	48	(7)	652
1969[b]	510	(78)	99	(15)	49	(7)	658

Notes:

a. Figures for total installed capacity vary here from other tables because of different sources. In some cases where tables overlap, there is considerable variation (frequently greater than 10 percent) for sub-totals.

b. Estimates.

Source: 1952-1961: Various issues of Indonesia, Biro Pusat Statistik, Perusahaan-perusahaan Industri dan Perusahaan[2] Listrik Umum dan Gas (Manufacturing Industries and Public Electric Light and Power Plants and Town Gas Works), Djakarta.
1962-64: Figures supplied by the PLN.
1965-67: Figures supplied by Gatrik.
1968-69: PLN Annual Reports for 1968 and 1969. (Djatiluhur also included).

TABLE 5.6 Production by Area, 1952-1969[a]
(million kWh)

Year	Java	(%)	Sumatra	(%)	Other	(%)	Total
1952	565	(81)	79	(11)	51	(7)	695
1953	593	(78)	102	(13)	60	(8)	756
1954	641	(81)	91	(11)	63	(8)	796
1955	686	(79)	106	(12)	72	(8)	863
1956	681	(76)	133	(15)	80	(9)	894
1957	766	(78)	145	(15)	73	(7)	983
1958	805	(80)	133	(13)	66	(7)	1,005
1959	842	(78)	146	(14)	94	(9)	1,081
1960	909	(78)	153	(13)	99	(9)	1,161
1961[b]	872	(81)	145	(13)	65	(6)	1,082
1962	1,004	(81)	159	(13)	78	(6)	1,241
1963	1,026	(79)	180	(14)	88	(7)	1,294
1964	1,121	(80)	182	(13)	104	(7)	1,407
1965	1,229	(81)	182	(12)	103	(7)	1,513
1966	1,297	(83)	176	(11)	89	(6)	1,561
1967	1,346	(84)	169	(11)	93	(6)	1,607
1968	1,452	(83)	200	(11)	104	(6)	1,756
1969[c]	1,515	(82)	220	(12)	119	(6)	1,854

Notes:

a. Figures vary here from some other tables because of different sources.

b. Alternative figures (from the same source as for 1952-1960) are 943, 161, 102 and 1,206 million kWh for Java, Sumatra, All Other and Total respectively. The figures given in the Table, however, are believed to be more reliable.

c. Estimates.

Source: 1952-1960: As for years 1952-1961 in Table 5.5.
1961-1964: Figures supplied by PLN.
1965-1967: Figures supplied by Gatrik.
1968-1969: Annual Reports of the PLN for 1968 and 1969 (including production from Djatiluhur).

TABLE 5.7 Total Installed Capacity and Production Per Capita, by Area, 1967[a]

Area	Per Capita Installed Capacity (watts)	Per Capita Production (kWh)
Java	6.6	18.5
Sumatra	3.5	9.2
All Other	2.1	4.4
Total Indonesia	5.2	14.3

Notes:

a. Population figures are only estimates and are projections from the 1961 Census. If, as seems quite possible, the rate of population growth has been underestimated, the above per capita figures are overestimated.

Source: Figures for installed capacity and production from the Annual Report of the PLN for 1967. Population estimates were taken from Nugroho, Indonesia Facts and Figures, op.cit.

have a considerably shorter life than hydro plants, and so replacements should be planned for earlier. On the operating side, one difference is that the logistics problem of supplying spare parts and fuel is usually more important for thermal and diesel plants than for hydro plants.

The tables and figures show that both for capacity and production, the post-war picture is dominated by the hydro sector which accounts for about half of the total capacity and generally rather more than half of total production. But the relative share of diesel capacity has declined since the early fifties, while the share of thermal plants has risen from about 10 percent to around 20 percent in the same period. A recent development has been the installation of about 40 MW of gas plant.

The contribution to output from the different sectors has not been exactly in proportion to capacity. The early part of the sixties was marked by a rapid rise in the share of thermal electricity, but from 1964 onwards hydro began to assume increasing importance again. While the propor-

TABLE 5.8 Total Installed Capacity by Prime Mover, 1952-1969
(MW)

Year	Diesel	(%)	Thermal	(%)	Hydro	(%)	Gas	(%)	Total
1952	56	(31)	24	(13)	101	(56)	-	-	181
1953	78	(35)	32	(15)	109	(50)	-	-	220
1954	90	(42)	22	(10)	103	(48)	-	-	215
1955	89	(37)	20	(8)	133	(55)	-	-	242
1956	100	(39)	30	(12)	126	(49)	-	-	256
1957	106	(40)	29	(11)	131	(49)	-	-	266
1958	109	(41)	25	(9)	132	(50)	-	-	266
1959	107	(39)	26	(9)	143	(52)	-	-	276
1960[a]	115	(38)	25	(8)	163	(54)	-	-	304
1961[a]	125	(40)	25	(8)	163	(53)	-	-	310
1962	149	(40)	50	(13)	175	(47)	-	-	374
1963	165	(41)	50	(13)	183	(46)	-	-	398
1964	171	(31)	125	(23)	258	(47)	-	-	553
1965	177	(32)	125	(22)	258	(47)	-	-	559
1966	178	(30)	125	(21)	283	(48)	-	-	586
1967	182	(31)	125	(21)	283	(48)	-	-	589
1968	192	(29)	109	(17)	310	(48)	42	(6)	652
1969[b]	193	(29)	113	(17)	310	(47)	42	(6)	658

Notes:

a. Slightly different estimates (from the same source as for 1952-59) are available, but are believed to be less reliable than those given above.

b. Estimates.

Source: 1952-1959: As for years 1952-1961 in Table 5.5.
1960-1967: Figures supplied by Gatrik.
1968-1969: Annual Reports of the PLN for 1968 and 1969 (Djatilur also included).

TABLE 5.9 Production by Prime Mover, 1961-1969

(million kWh)

Year	Diesel	(%)	Ther-mal	(%)	Hydro	(%)	Gas	(%)	Other[a]	(%)	Total
1961	438	(40)	34	(3)	605	(56)	-	-	5	(1)	1,082
1962	477	(38)	75	(6)	679	(55)	-	-	9	(1)	1,241
1963	490	(38)	147	(11)	649	(50)	-	-	9	(1)	1,294
1964	460	(33)	263	(19)	675	(48)	-	-	8	(1)	1,407
1965	424	(28)	326	(22)	758	(50)	-	-	5	(1)	1,513
1966	375	(24)	366	(23)	807	(52)	-	-	14	(1)	1,561
1967	332	(21)	338	(21)	917	(57)	-	-	21	(1)	1,607
1968	263	(15)	286	(16)	1,113	(63)	75	(4)	18	(1)	1,756
1969[a]	320	(17)	282	(15)	1,177	(63)	59	(3)	15	(1)	1,854

Notes:

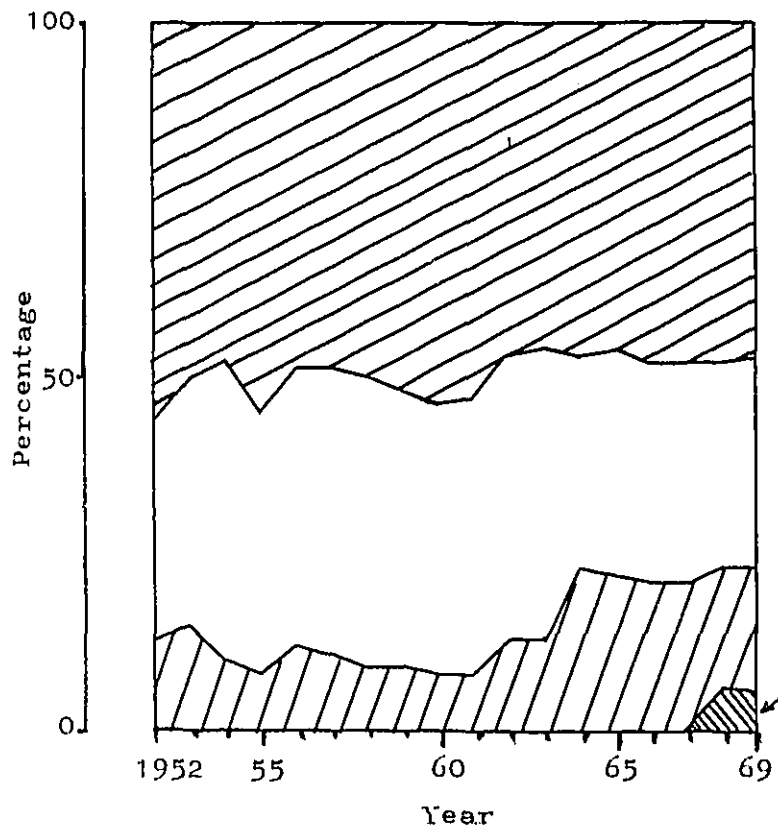
a. Purchased from outside the PLN, excluding purchases from Djatiluhur which are included in "hydro."

Source: 1961-1967: Figures supplied by Gatrik.
1968-1969: Annual Reports of the PLN for 1968 and 1969 (Djatiluhur also included).

tions of capacity in hydro and diesel plant have remained roughly constant since 1964, in the five years to 1969 their respective contributions to production have changed considerably. The share of hydroelectricity has risen from 48 to 63 percent, while that of diesel generated electricity has declined from 33 to 17 percent. The bulk of the remainder has come from thermal capacity.

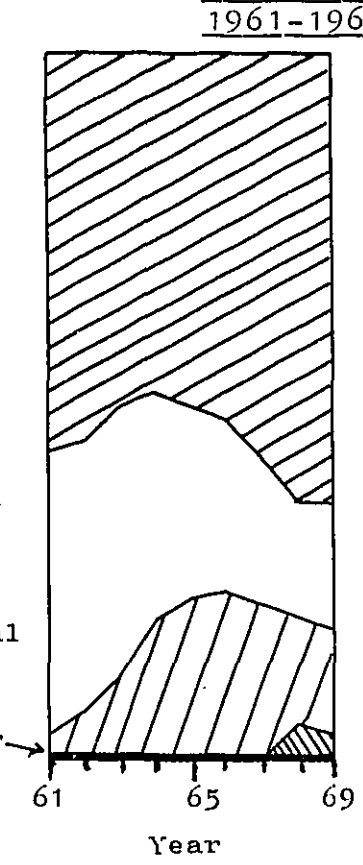
The lack of any clear trend in the relative proportions of the different generating sectors in capacity and production is noteworthy. In fact the shares have fluctuated widely. The proportion of thermal capacity rose sharply in the few years after 1961, largely at the expense of diesel, and then declined again. The same pattern was repeated, with a small lag, in the share of thermal in production.

FIGURE 5.4 Total Installed Capacity by Prime Mover, Percentage Distribution, 1952-1969



Source: Table 5.8.

FIGURE 5.5 Production by Prime Mover, Percentage Distribution 1961-1969



Source: Table 5.9.

Two comments can be made in explanation of the overall pattern. First, the tendency for the shares of different generating sectors to change quickly is due mainly to the size of the industry and partly (in production) to poor maintenance procedures. The small absolute size means that additions to capacity which are modest in international terms[1] have a large impact.[2] Between 1961 and 1964, 100 MW of thermal capacity was added, which lifted the share of thermal capacity from 8 percent to 23 percent of total capacity. These new plants were naturally brought into maximum operation as soon as possible, and after a lag because of initial difficulties, the share of thermal in production also rose. From the mid-sixties however, capacity from Djatiluhur became available in steps, and the contribution of hydro to production began to increase. Largely because of poor maintenance, troubles soon developed in the new thermal plants, and so the contribution of thermal to production, both relatively and absolutely, declined from 1966 onwards. Similar problems of maintenance in the diesel plants meant that the contribution of this sector fell also.

The second aspect of the overall pattern is that the picture is dominated by the industry in Java. If production and capacity figures are disaggregated by area and prime mover simultaneously (see Tables 5.10 to 5.13 and Figure 5.6), a striking contrast appears between Java and the Outer Islands. In Java, the pattern is much the same as for the whole of Indonesia. The hydro and thermal sectors dominate both capacity and output, with diesel accounting for only a small proportion and gas insignificant. In contrast, in the Outer Islands diesel dominates the picture, with gas plants responsible for most of the rest.

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1. Such as the 50 MW thermal plants at Tandjung Priok and Tandjung Perak, and the 125 MW Djatiluhur hydro plant.

2. For example, the introduction of the Tandjung Perak plant into the East Java system nearly doubled the total installed generating capacity, and more than quadrupled the dry season peaking potential.

TABLE 5.10 Total Installed Capacity by Prime Mover, Java, 1967-1969

(MW)

Year	Diesel	(%)	Thermal	(%)	Hydro	(%)	Gas	(%)	Total
1967	82	(17)	122	(25)	277	(58)	-	-	480
1968	81	(16)	108	(21)	304	(60)	14	(3)	506
1969[a]	80	(16)	112	(22)	304	(59)	14	(3)	510

Notes:

a. Estimates.

Source: Annual Reports of the PLN for 1967, 1968 and 1969.

TABLE 5.11 Total Installed Capacity by Prime Mover, Outer Islands, 1967-1969

(MW)

Year	Diesel	(%)	Thermal	(%)	Hydro	(%)	Gas	(%)	Total
1967	100	(92)	3	(3)	6	(6)	-	-	109
1968	111	(76)	1	(1)	6	(4)	28	(19)	146
1969[a]	113	(76)	1	(1)	6	(4)	28	(19)	148

Note:

a. Estimates.

Source: As for Table 5.10.

TABLE 5.12 Production by Prime Mover, Java, 1967-1969

(million kWh)

Year	Diesel	(%)	Thermal	(%)	Hydro	(%)	Gas	(%)	Total
1967[a]	116	(9)	288	(22)	935	(70)	-	-	1,339
1968	79	(5)	286	(20)	1,085	(75)	2	-	1,452
1969[a]	84	(6)	282	(19)	1,146	(76)	3	-	1,515

Note:

a. Estimates.

Source: As for Table 5.10.

TABLE 5.13 Production by Prime Mover, Outer Islands, 1967-1969
(million kWh)

Year	Diesel	(%)	Thermal	(%)	Hydro	(%)	Gas	(%)	Other	(%)	Total
1967[a]	203	(80)	3	(1)	27	(11)	-	-	21	(8)	254
1968	184	(61)	-	-	28	(9)	73	(24)	18	(6)	304
1969[a]	236	(70)	-	-	31	(9)	56	(17)	15	(4)	339

Note:
a. Estimates.

Source: As for Table 5.10.

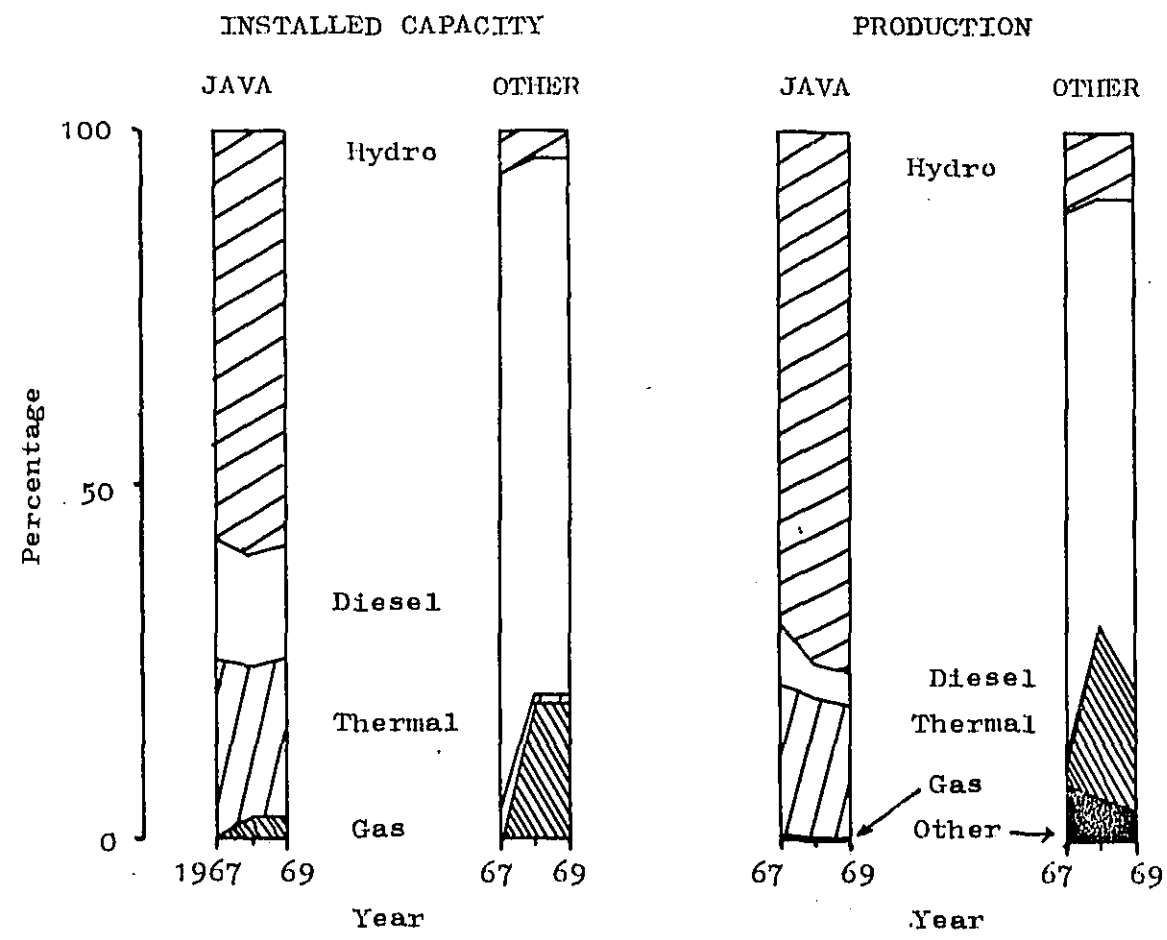
Table 5.14, which presents data on installed capacity by area, size and type of generator, provides a different perspective of the industry. The definitions of "centre" and "main" and "minor" plants are somewhat arbitrary, but it is clear that a high proportion (about 80 percent) of total capacity is concentrated in the larger plants, with the rest being spread over nearly 200 smaller plants scattered throughout Indonesia. All of the main plants listed on Java are connected to a transmission network, and they constitute the generation arm of the more well developed integrated sector. The "main" plants listed outside of Java are small by international standards, and have been included only so as not to distort the picture given in the minor plants sector. The minor plants sector consists in the main of isolated plants unconnected to the main network.[1] Most of these small plants are diesel (181 out of a total of 197), and their average capacity is low.

Transmission and Distribution Sectors

Tables 5.15 and 5.16 and Figure 5.7 provide information on the transmission and distribution sectors. Table 5.15 illustrates clearly the difference in physical structure between the integrated sector in Java and the dispersed sector, the latter mainly in the Outer Islands. In 1969, over 95 percent of the high voltage lines in Indonesia were in Java.

1. Although some of the smaller plants on Java are connected.

FIGURE 5.6 Installed Capacity and Production by Prime Mover, Java and the Outer Islands, 1967-1969



Source: Tables 5.10 to 5.13.

TABLE 5.14 Total Installed Capacity in Early 1968[a], by Size, Type and Area[b]

Area & Plant	Type[c]	Capacity (MW)		
MAIN PLANTS				
West Java				
Djatiluhur	H	100.0		
Tandjung Priok	T	50.0		
Lamadjan	H	19.2		
Tjikalong	H	19.2		
Ubrug	H	17.1		
Kratjak	H	16.6		
Gambir	T	12.7		
Kebajoran	D	12.6		
Antjol	D	12.0		
Karet	D	12.0		
Parakankondang	H	10.0		
Total West Java			281.4	(11 centres)
Central Java				
Djelok	H	20.5		
Timo	H	12.0		
Ketenger	H	7.0		
Total Central Java			39.5	(3 centres)
East Java				
Tandjung Perak	T	50.0		
Mendalan	H	23.0		
Siman	H	10.8		
Somampir	T	9.5		
Total East Java			93.3	(4 centres)
Sumatra				
Medan	G	14.0		
	D	16.2		
Palembang	D	14.1		
Total Sumatra			44.3	(2 centres)
Other				
Bandjarbaru	D	4.7		
Pontianak	D	2.8		
Makassar	D	13.2		
Tonsea Lama	H	4.4		
Ambon	D	3.0		
Djajapura (Sukarnopura)	D	3.1		
Total Other			31.2	(6 centres)
TOTAL MAIN PLANTS			489.7	(26 centres)
MINOR PLANTS				
Java				
48 centres	D	45.1		
11 centres	H	21.3		
Total Java			66.4	(59 centres)
Sumatra				
56 centres	D	29.9		
3 centres	H	1.5		
2 centres	T	2.3		
Total Sumatra			33.7	(61 centres)
All Other				
77 centres	D	23.3		
TOTAL MINOR PLANTS			123.4	(197 centres)
TOTAL INDONESIA			613.1	

Notes: a. The source states that the information is for the end of 1967, but it appears that some plants installed in 1968 are included.
b. All plants over 10 MW have been included as "main plants". However for the Outer Islands, some plants smaller than 10 MW have been included in the "main plants" section. This has been done where the inclusion of particular plants in the "minor plants" section would have distorted the overall picture for the area.
c. H = hydro; T = thermal; D = diesel.

Source: Calculated from information supplied by the Central Office of the PLN.

TABLE 5.15 High Voltage Transmission Lines in Indonesia, 1969
(km)

Area	Length			
	30 kV and less	70 kV	150 kV	Total
East Java	253	336	-	589
Central Java	632	-	-	632
West Java	1,000	407	150	1,557
TOTAL Java	1,885	743	150	2,779
South Sumatra[a]	101	-	-	101
TOTAL Outer Islands	101	-	-	101
TOTAL Indonesia	1,986	743	150	2,880

Source: PLN Annual Report for 1969.

Notes:

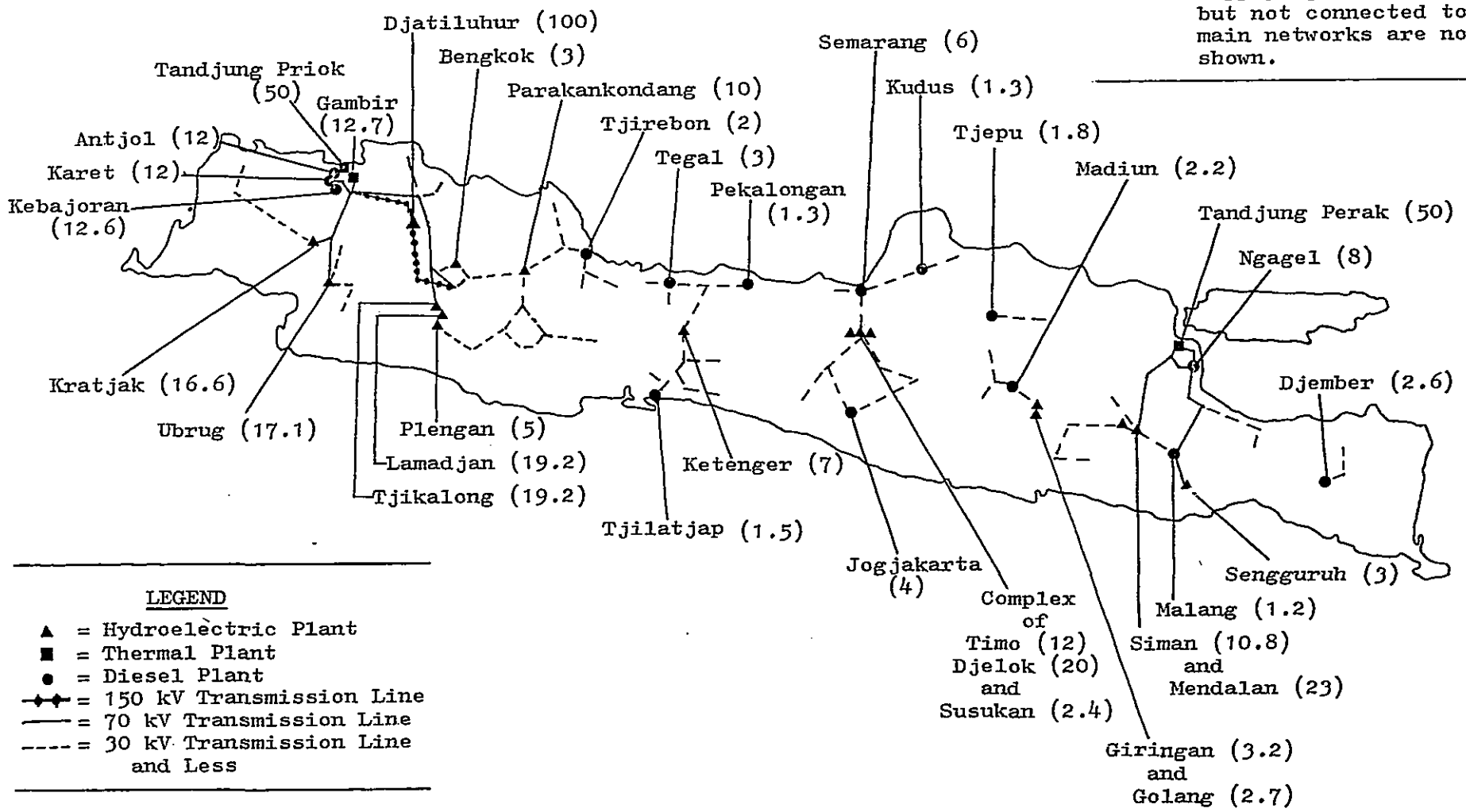
a. 1967 data only.

Both the transmission and distribution sectors, for reasons discussed later, have been comparatively neglected and this is reflected in the Table. A large proportion including the 101 km of transmission line in South Sumatra was 30 kV or less, the bulk of which was built before the Second World War, much of it probably during the twenties. Only a small section, 150 km of a 150 kV line connecting Djatiluhur to Bandung and Djakarta, approaches the voltages commonly used in developed countries for long distance transmission.[1]

Figure 5.7 is a simplified diagram of the transmission network in Java. The integrated sector consists of the four main networks established in pre-war days. In West Java the system approaches a modern grid, with a number of hydro plants (including the large Djatiluhur hydro plant) interconnected to the diesel and thermal based system in Djakarta. In Central Java there are two small networks - the Ketenger system to the west and the larger Tuntang system based on the Timo-

1. Voltages of 275 kV or more are common in the developed countries, and in the USSR and Canada transmission lines carrying over 700 kV are in operation.

FIGURE 5.7 Java Transmission Systems and Main Generating Plants in 1968



Note: Many small diesel plants supplying isolated areas but not connected to the main networks are not shown.

LEGEND

▲ = Hydroelectric Plant
■ = Thermal Plant
● = Diesel Plant
—♦—♦— = 150 kV Transmission Line
—— = 70 kV Transmission Line
---- = 30 kV Transmission Line and Less

Djelok-Susukan hydro complex south of Semarang. There are no transmission lines of more than 30 kV in either the Ketenger or Tuntang systems. In East Java there is a 70 kV network (often known as the Kali Konto system) based on the Siman-Mendalan hydro system linked to the Tandjung Perak thermal plant in Surabaja. From time to time the possibility of interconnections between the four main systems has been discussed. However apart from the very substantial capital costs involved, a grid system raises a wide variety of complex technical problems of its own, and considering the poor condition of much of the existing equipment, it seems unlikely that interconnection will be justified for some time to come.

Table 5.16 provides data on the distribution system. Of necessity the distribution network is more evenly spread throughout the country than the transmission network, since

TABLE 5.16 Distribution Lines in Indonesia, 1969[a]
(km)

Area	Length
East Java	2,477
Central Java	2,495
West Java	10,819
TOTAL Java	15,791
Sumatra[b]	3,257
All Other	1,669
TOTAL Indonesia	20,718

Source: PLN Annual Report for 1969.

Notes:

a. High tension (total of 4,989 km) and low tension (15,729 km) combined.

b. For some areas information available for 1967 only.

although many of the small generating plants need no transmission facilities, small lengths of distribution lines are needed to supply nearby consumers. Nevertheless just on 50 percent of the distribution lines are in West Java, presumably mainly in Djakarta and Bandung.

Survey of the Supply Side

We are now in a position to survey briefly the overall pattern on the supply side. There are two relatively distinct electricity sectors, which we can call the "integrated" and "dispersed" sectors. The integrated sector is wholly in Java while the dispersed sector is mainly in the Outer Islands. The technological division between the two does not coincide exactly with the geographical division between Java and the Outer Islands because there is a small amount of capacity on Java in isolated diesel and hydro plants (see Table 5.14) which properly belongs in the dispersed sector.[1]

In the integrated sector there are four small separate networks which together account for about 70 percent of total installed generating capacity,[2] and over 95 percent of total milage of high voltage transmission lines. All four systems have a considerable proportion of hydro capacity and diesel, and the two largest (West and East Java) each have a relatively new 50 MW thermal station in the network. Further, each of the systems is balanced, in the sense that the three sectors of generation, transmission and distribution are included. Some of the generating plants however are nearing the end of their useful lives, having been built before the Second World War. Only three recently completed plants, Djatiluhur, Tandjung Priok and Tandjung Perak, are of even moderate size by international standards.

In contrast, the dispersed sector is spread throughout the archipelago and consists of a large number of isolated plants having, apart from one exception, no transmission sector and only a modest distribution sector. Total

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1. This distinction between the integrated and dispersed sectors on Java does not coincide exactly with the distinction between the major and minor plants in Table 5.14 since some of the minor plants listed there appear to be connected to one of the main four systems.

2. 414 MW contained in the main plants on Java plus some of the capacity in the minor plants on Java (see Table 5.14)

installed capacity in the approximately 200 plants is around 150 MW (or somewhat less than 30 percent of the total), which implies an average size of 750 kW per plant. In fact many plants are much smaller - some being only 50 kW.

The distinction between the two sectors is important because the differences between them, in methods of operation and in the problems that they face, are sufficiently large to warrant separate discussion. One way of viewing the position is to regard the pattern as a form of dualism within one industry, with the dispersed sector being roughly equivalent to small scale industry and the integrated sector equivalent to large scale or heavy industry.

In the integrated sector, especially since there is a mix of different types of generating plant, the problems of operation are quite different and considerably more complicated than those faced by a manager of an isolated diesel plant. There are substantial technical and economic advantages to be gained in the electric power industry in an interconnected system, such as the more efficient use of base and peak load plants and the reduction of the amount of spare (emergency) capacity required.[1] Hydro plants particularly are often subject to strict technical constraints which may limit the total output available during the year, the season during which they can be used, or even the time

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1. For example, in England "The original grid, operating at 132 kV a.c., was constructed between 1928 and 1933. It was designed to interconnect selected generating stations, so that in each area spare plant could be pooled, and at all times the most efficient sets in the area could be used. Before the grid was established the amount of spare plant was about 70% and most of the power was generated by small, comparatively inefficient sets, while more efficient sets elsewhere were not fully used. By 1936, when the 132 kV grid had been in operation a few years, the installed capacity of spare generating plant had fallen from 70% to 26% and the average cost of generation from 0.42d/kWh to 0.19d/kWh. The grid contributed largely to these results by interconnecting generating stations within each area for the pooling of spare plant and concentration of generation at the more economical stations." E. Openshaw Taylor and G.A. Boal (ed.), Power System Economics, London, Edward Arnold, 1969, p. 80.

of day that they can be used.[1] In short, an interconnected system allows electricity controllers to choose simultaneously the most efficient mix of plants on the supply side and to deliver the electricity to wherever it is required. As the system peak is approached, plants can be called upon in a "merit order" so that the least efficient plants are the last to be called upon and the first to be laid off. Such an operation is technically complex and requires skilled operators, an efficient recording system, and a good communications network which ensures a continuous flow of information from operators in different parts of the grid to the chief system controllers.

In contrast, the operation of an isolated diesel station is comparatively simple. Often there is only one station to be operated within the system, and the problem of ensuring an optimum mix does not arise.[2] The demand on the system is comparatively simple too, being mainly for lighting from a few hundred nearby consumers.

Of course, the two sectors have much in common, operating as they do within the one state enterprise and in the same administrative, financial and economic environment, and having a high rate of transfer of personnel from one sector to the other. But it is the technical problems that we are stressing in this Chapter, and here it will be convenient to study the two sectors separately. To illustrate the problems in the integrated sector in greater detail, will first briefly survey the condition of the four main systems, and then discuss the problems of the generation, transmission and distribution sectors. There are unfortunately few detailed reports

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1. Amongst the constraints on hydro plants in Indonesia are: (a) many are mainly of the run-of-the-stream type and have only limited pondage available for storage; and (b) irrigation is often given priority over electricity generation in the case of multipurpose dams and thus water may be released when the demand for electricity from the hydro plant is low.

2. There may be a number of generators within one station, and a problem of optimum operation may arise in this way. But it is a comparatively simple matter to co-ordinate the operation of three or four generators in very close proximity.

available on this matter, so we will draw heavily on a survey conducted by an American team (DPCS) in 1963.[1] Although in some respects the report is now out of date, most of its observations are still appropriate. Indeed in some areas, conditions have deteriorated further since the survey was conducted.

The Integrated Sector: Main Systems

The West Java network, which is the most well developed system in Indonesia, serves Djakarta, Bogor, Bandung, and numerous nearby towns. As mentioned, it is the only network which uses a 150 kV transmission line. In 1963 the daily peak load in Djakarta was 45 MW, which was remarkably low for a city of about 3 million.[2] This was slightly less than half the total peak load in West Java that year of about 97 MW. Information on operating conditions throughout the network is not available, but in 1963 in the Djakarta area alone, of a total installed capacity of 76 MW, only 60 MW was operable (and of this 40 MW had been installed since 1960). Since then, the position has been improved somewhat by the commissioning of the Djatiluhur hydro plant. At present technical conditions are poor, with transmission and distribution facilities especially badly overloaded because of over-investment in the generation sector in the early sixties. The reasons for this imbalance will be discussed in later chapters. Poor planning which led to lack of standardisation of equipment has reduced the effective operating capacity in the transmission and distribution sectors unnecessarily. It was estimated in 1963 that about 65 percent of transformers

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1. Development Projects Consulting Service, Indonesia, "Electric Power Systems of East and Central Java," in their Pre-task Order Reports, [Washington], AID, 1964, Section B. Other surveys prepared by visiting American, French and ECAFE experts make much the same criticisms as those put forward by the DPCS team, but in less detail. The DPCS report is more useful from our point of view because of the many specific examples it gives to support its comments.

2. It is not unknown for a single large factory in developed countries to have a peak load of 45 MW.

and cables needed to be scrapped entirely and replaced.[1]

The Kali Konto system, which is the second largest system in Indonesia, serves Surabaja with its population of well over one million, and the towns of Malang, Kediri, Blitar and Modjokerto as well as the surrounding area. It is the only network apart from the West Java system which uses a transmission line voltage of 70 kV. Of the four main networks, technical conditions in the Kali Konto system are probably least serious. The severe and wasteful imbalance between sectors that has developed in West and Central Java does not exist in East Java. At least in the latter system, all facilities are uniformly overloaded! In November 1963 before the comparatively large 50 MW Tandjung Perak station was introduced into the system, total installed capacity was about 59 MW. However of this, only 34 MW (slightly under 60 percent) was physically capable of full or partial operation - and this degree of utilisation could be approached only during the wet season. Because of restrictions on the operations of hydro plants, in the dry season the capacity which could be called upon at peak load was reduced to about 15 MW, or about one-quarter of total installed capacity.[2]

The Tuntang system mainly serves Semarang, which takes about half of the power generated in the network, as well as Kudus, Magelang, Jogjakarta and Surakarta (Solo). Total installed capacity at the end of 1963 was reported as 46 MW, while peaking capacity was estimated at 21.5 MW in the wet season and only 9 MW in the dry season (or about 45 percent and 20 percent of installed capacity respectively.[3]

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1. Most of the information in this paragraph is from Government of the Republic of Indonesia, Department of Public Works and Power, Development of the Electrical Network of Djakarta-Raya and West-Java, 1963, [Report prepared by M. Bertoye for Cogelex, The Compagnie Generale D'Entreprises Electriques], p. 7.
2. Development Projects Consulting Service [DPCS], ibid., p.12.
3. Ibid., p.13.

The transmission system is very light, the highest voltage used being 30 kV. These facilities (and especially the low voltages) are not sufficient for the transmission distances involved, and may (because of the particular technical requirements of an integrated system) contribute to limiting the amount of generating capacity that can be used.[1]

The Ketenger network, taking most of its power from the hydroelectric plant of the same name, is relatively small. In late 1963, it had a total of about 11 MW of installed capacity. The main hydro plant primarily serves the nearby town of Purwokerto and two irrigation pumping stations, with a small amount of electricity being transmitted towards the south to Tjilatjap and Karanganjar. During the rainy season some surplus electricity is available which is transmitted to the north coast to Tegal and Pekalongan. However the capacity of the line to the north is very limited (1 to 2 MW) and the north coast towns must rely mainly on their own diesel plants. The reported peak load in 1961 varied from 6.2 to 7.2 MW (or up to 65 percent of installed capacity), and more recently has been reported as slightly higher. In both systems in Central Java, transmission losses are very high, amounting to perhaps 20 percent of production because of overloading of the transmission lines.[2]

The Integrated Sector: Generation

The Semampir thermal power plant, lately permanently closed down, in the early sixties was over 50 years old. The four generating units dated back to 1916, 1919, 1922 and 1925 respectively, and were housed in a plant in which

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1. The American team of electrical engineers reporting on the position at the end of 1963 commented that "Preliminary computations ... indicate that the transmission system is so light and ineffectual that it may well be the reason that the generation realisation never exceeds 46 percent of the installed capacity."
   Ibid., p.15.

2. M. Bertoye, report prepared for the Directorate General of Power and Electricity, Department of Public Works and Power, Republic of Indonesia, Development of Electrical Systems of Java, mimeo., July 1968, p.44-45.

there had been "apparently no attempts at modernisation."[1] In addition, the attached staff was considerable. Despite this, the plant made very little, if any, contribution towards production. Commenting caustically on the position, the DPCS engineers wrote:[2]

> "... In October 1963, at the time of the last visit and during a period of extremely low hydro-electric generation with serious power-rationing and daily blackouts, the Semampir steam-electric plant was totally inoperative. At the time of the visit, there was insufficient cooling water because the supply and storage bay was almost entirely silted, due to lack of channel maintenance and the extended period of low water. The old wooden building should be razed, the 10,864 KW of steam-electric generating equipment totally scrapped, and the large staff used at another location or released."

The hydro plants face different problems. Before the commissioning of the larger hydro and thermal plants in the sixties, the relatively small hydro installations were the backbone of the electric networks in Java. These plants are today restricted in their capacity and output because of poor construction design (by modern standards), bad selection of sites, and poor operations.

Design is often bad because most of the existing hydro plants, designed during the twenties, were built so as to require minimum amounts of capital.[3] They are run-of-the-stream types which tap only the small flow of water in the highest and steepest parts of the mountains. At the high levels where the plants are situated, natural storage basins for pondage are almost non-existent, and to add to the problems stream flows are highly variable because they depend

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1. DPCS Report, op.cit., p.27.
2. Ibid., p.27.
3. A notable exception is Djatiluhur.

largely upon rainwater.[1] The result of this arrangement, which has a high head of water but only a low volume, is that year-round use of installed equipment is relatively low, which means that the plants have a low load factor and that costs per kWh generated are pushed up. The DPCS team reported that in a number of cases, better design could have at least doubled the annual kWh generated, and that for some plants substantial increases could still be obtained with various alterations to existing designs. For example, speaking of the Mandalan-Siman hydro complex in East Java, the team commented:[2]

> "This type of design reduces the power generating potential to perhaps a third or less of what superior, modern design could achieve...Additional development of the site utilising modern engineering methods could increase generation of energy very considerably...construction of a high earth-fill dam at appropriate up-stream location would raise the water level and increase storage capacity, whereby annual KWH production could be doubled."

In the case of the Djelok-Timo-Susukan hydro complex which provides most of the supply for the Central Java system, the engineers observed:[3]

> "All three hydro-electric power plants are served from a large, shallow, swampy lake with an uncontrolled and unregulated outflow ... The swampy lake ... could readily be converted into large storage basins by construction of a 15 or 20 meter high earth-fill dam ... A larger quantity of higher pressure water could increase the annual KWH production rate by four to six times, at low cost consisting almost entirely of local currency."

The same was true of some hydro projects which were still under construction - at both the Ngebel plant near Madiun with a planned capacity of 2.2 MW, and the Garung plant

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1. If the hydro plants had been built at lower elevations, it would have been possible to construct substantial storage dams which would have been filled not only by the very seasonal rainwater, but also subterranean flows. Generation in hydro plants would not have been so dependent on seasonal influences, and a better load factor would have been possible.
2. DPCS report, op.cit., pp. 28,29.
3. Ibid., p.32.

(about 10 MW) in Central Java, the engineers mentioned that better design could probably raise output considerably.[1]

In addition to the problems arising from the general policy of using run-of-the-stream plants, other aspects of poor design further hampered efficiency. In 1963, two of the plants (Sengguruh and Giringen) had been subject to regular floodings which damaged plant as well as preventing their operation. In another case, the design of the Ketenger hydro plant was such that because of the restrictive penstock capacity, not more than 54 percent of total installed capacity could be used regardless of the amount of water available.

A further cause of difficulties which is not so much a result of poor construction design as bad forward planning, is the siting of hydro plants. In a number of cases there are long distances between points of production and consumption which as well as entailing high capital costs for transmission lines, leads to high transmission losses. In the case of the Garung hydro plant in mid-Java, which in the early sixties was planned to be about 10 MW, a 55 to 60 km transmission wire was required to transmit electricity to the nearest main load centre. It was estimated in 1963 that the capital cost of the transmission line alone would have been sufficient to build a modern thermal plant with a firm generating capacity of 10 MW at the point of actual use and in the latter case transmission losses would have been much lower.

Inefficiencies in operations also frequently contribute to high generation costs in hydro plants. In general, the plants operate at low load factors, which means that capital costs must be spread over a comparatively small number of kWh sent out. In addition, there is evidence to suggest

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1. Of Ngebel, the DPCS team found that in addition to delays in installation of electrical equipment which raised capital costs,

   "It is conservatively estimated that more than one-half of the natural potential of available head has been lost by an outmoded design. The overall design indicates that the remaining hydraulic potentials will not permit installation of more than 2250 KW of total generation. So small a power unit can seldom be economic where transmission lines are required."

   Ibid., p.39.

that optimum mix within power stations is often not attained. The DPCS engineers observed a number of cases where there were an excessive number of units running simultaneously at less than full power within one powerhouse. The example of Mendalan (total installed capacity 23 MW) is typical:[1]

> "The reported peak generation from this plant during the extreme run-off period is 18,700 KW or 81 percent of installed capacity. The duration of this peak period of generation is not known, except that records indicate it occurs during only one month of the year. In October 1963, one unit was idle and the remaining three were producing from 2,000 to 2,200 KW each for a total of 6384 KW at 5600 volts during the evening hours. It could not be determined why three instead of only two units were being operated to generate the load."

The same pattern was observed at the Siman plant (10.8 MW) and Djelok (which contained four generating units, each of 5.1 MW, and had a total installed capacity of 20.5 MW), of which the team reported:[2]

> "At the time of the latest visit in October, 1963, ... The daily average production rate, using two generators, was 1900 KW and ranged from a low rate of zero to a high generation rate of 3,000 KW. For several hours after midnight, the plant was idle ... Again, as with other plants, it could not be ascertained why only two turbine-generator units, each with a continuous rating of 5,120 KW, were being utilized to generate power not over 3000 KW. The average daily generation rate of 1900 KW at this time of year amounts to only nine percent of the potential of the installed equipment and reflects lack of water due to the absence of reservoir control and regulation measures."

Another operational problem that frequently occurred in the hydro sector was lack of adequate maintenance. For example, at the Giringen plant, the DPCS engineers noted that one of the units was overheating and[3]

> "... a 12-inch diameter oscillating electric-fan, placed on a chair, was cooling the bearing shell to prevent its immediate failure. Temperature warning relay wires had been disconnected to

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1. Ibid., pp. 28 and 29.
2. Ibid., pp. 32 and 33.
3. Ibid., pp. 30 and 31.

> silence the alarms. It appeared from a cursory examination that differential settlement of the generator or turbine, perhaps from the effects of recurring power-house flooding or more likely from improper consolidation of the foundation-fill, poor structural concrete, or both, has caused torsional bending in the drive shaft ... Unless proper diagnosis and remedial action is soon instituted, this unit will probably fail due to seizure of the bearing or breaking of the drive-shaft from repetitive overstressing. Both other units have been completely torn down, apparently for an extraordinarily long period of several years. There were no apparent indications of preparations for repairs at any time in the immediate future."

Poor maintenance procedures were reported from the Ketenger plant too. In addition to the difficulties caused by poor design of the penstock noted earlier, effective capacity was reduced even further by accumulated material within the penstock. The DPCS engineers commented:[1]

> "In the 25 year period since its activation, the penstock has probably received no interior cleaning or maintenance, and it is highly probable that the inner surface of the conduit is heavily encrusted with scale, tuberculation and possibly marine growth to the extent that turbulence now restricts the flow of water to approximately one-half of new condition conduit ... Of the three courses now open to gain a near maximal amount of power from this installation, two require little or no direct expenditure of foreign exchange but only the utilization of indigenous labor force available within the area ...
>
> Prior preparation and close scheduling should be made to shut down the plant during an extended period of low water in order to clean thoroughly the inside of the penstock with a large crew of laborers ..."

More than four years later at the beginning of 1968, the suggested repairs had still not been carried out.[2]

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1. Ibid., p.35.
2. Republic of Indonesia, Department of Basic, Light and Power Industries, Directorate General of Power and Electricity, Tuntang and Ketenger Electric Power Systems, mimeo., report prepared by Gibbs & Hill, Inc., New York, April, 1968. See also M. Bertoye, Development of Electrical Systems of Java, op.cit., p.44.

Other matters of operation commented on by the DPCS engineers were excessive staffing and the poor technical quality of current sent out from the plants. On the former matter a typical remark was:[1]

> "The excessive cost of power operation by this system [Giringen-Golang system near Madiun] is due, in no small measure, to the greatly oversized staff. The actual operating costs, including the pre-rated costs of capital investments and provisions for food, medicine, living quarters, transportation, offices, warehousing, entertainment, etc. for the excessive number of employees, are extremely high for the small amount of power produced. The Madiun System, with ... two small hydro plants, a small non-operative diesel plant and less than 44 kilometers of transmission line, employs between 600 and 1000 workers exclusively of construction forces. In October 1963, the average generation rate of the entire Madiun System was less than 1000 KW or little more than one KW for each employee during the dry season."

The team commented on the poor technical quality of the current sent out on a number of occasions in its report. We shall return to this again shortly.

In the diesel plants sector, failure to carry out proper maintenance and repairs is the most serious problem. The detailed criticisms of the DPCS engineers on this point are worth quoting at length, since they reflect criticisms made by numerous other observers over the years and because they are also representative of the conditions in the predominantly diesel sector in the Outer Islands:[2]

> "The diesel-electric power plants are extremely dark throughout all areas, mainly due to unwashed windows, inadequate lighting fixtures, missing lamp bulbs, and the black, oily surface of floors, wall, ceilings and equipment. Much of the present difficulty lies in poor-housekeeping.."
>
> Maintenance of diesel-electric generating units, as practised throughout the industralized world, is scarcely known in Indonesia.
>
> In view of the extraordinarily large resident staff at each power plant, both the house-keeping and the maintenance should be exceptional and outstanding.

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1. DPCS, op.cit., p.31.
2. Ibid., pp. 23 and 25.

However, as already indicated, grounds are unkempt, roads and parking areas are ill-drained and rutted, buildings are unpainted and dirty, and the machines are dripping or spewing out, under high pressure, grease, oil, water and exhaust fumes. Spray ponds often have nozzles plugged or missing and are covered with green algae. At certain sites there is no adequate supply of water to cool the units because the waterway supply channels have not been adequately maintained. Light bulbs are often missing from many of the already sparsely spread lighting fixtures, and the dirty windows reduce or restrict day-time lighting of operational areas.

The deficiencies in maintenance of the mechanical equipment are too extensive to be detailed in this preliminary report. However, the more obvious omissions are the following: generator bed-plates are not checked for alignment and shimmed up as required to prevent binding and ultimate failure of bearings and shafts; bolts are not checked for tightness; gaskets are not replaced when found to be leaking; fuel and oil filters are not serviced and replaced when required; fuel lines are not drained and blown out as required; instruments are not checked or calibrated periodically; bearings are not periodically checked and tightened; over-load and over-heat relay contacts are not connected to alarms or automatic shut-down devices; bulbs are not replaced in inspection and warning lights."

A second major cause of difficulty for diesel plants, as for hydro plants, results from poor design and construction. In many cases the buildings are too large, having been built to allow for installation of further units which has never taken place, and too closed in and too poorly ventilated for tropical conditions. A more modern design would provide for cheaper buildings with better cooling, lighting and operating conditions. Within the plants, the faults in design and construction have had more serious consequences:[1]

> "An uncommonly high number of instances has been noted wherein the foundation or base for the generating unit has failed, thereby causing destruction of the unit, mechanical failure, or restriction to a partial loading with intermittent 'cooling' periods... The failure of equipment foundations may well be the major cause of excessive 'derating' of generating capacity within the area, exceeded only by inadequate and improper methods of equipment repair."

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1. Ibid., p.24.

A third difficulty which plagues diesel plants in Java (and especially those in the Outer Islands as we will see shortly) is irregular supply of fuel. Conditions in this respect have improved in recent years. One contributing factor is that the capacity of fuel oil tanks at many diesel stations is inadequate for Indonesian conditions. As well, in the early and mid-sixties especially, transport and communication delays often meant that fuel oil supplies were not delivered on time. As a result, for most of the decade fuel problems have been one of the main reasons for restrictions on the operation of available diesel capacity.

The result of these various difficulties is that many diesel plants are operated for about seven or eight hours a day or less, often at only about 50 percent of capacity. Thus, measured in terms of hours of use per annum, utilisation of capacity and technical efficiency is exceptionally low.[1] The overall operation of the diesel plants sector was aptly summed up as follows:[2]

> "... An increasing number of plants within the area are fully staffed but remain essentially idle the year-round, existing primarily on a standby basis. It is often found that facilities in such plants have been allowed to deteriorate to the extent that the actual standby capacity is negligible and the entire facility is of no utility.
>
> Very generally, the diesel plants are operated only to complement the hydro plants and do not supply their fair share of firm power even during the dry season, when there is always a serious deficiency in hydro power production. A number of reasons have been advanced for this seemingly strange operational pattern: diesel-electric power as compared with hydro-electric power is too costly; the generator units are too old to operate at full name-plate rating; cooling water is not available in sufficient quantity; fuel-oil is not

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1. Table 13.17 below shows that each kW of diesel plant capacity supplied an average of 1,960, 1,370, and 1,660 kWh per year in 1967, 1968 and 1969 respectively. This would have been equivalent to operating at full capacity for about $5\frac{1}{2}$, $3\frac{3}{4}$, and $4\frac{1}{2}$ hours per day respectively during those years.

2. DPCS, op.cit., pp. 24 and 25.

> available; fuel-oil is in short supply; fuel-oil is available only at black-market prices; fuel-oil transfer pumps have inadequate capacity; fuel-oil transport cannot be arranged; no repair parts are on hand (or order); mechanics are no longer available; mechanics are no longer qualified; and so forth. However, it appears that the generally inadequate production of electric power by the diesel-plants is caused primarily by improper maintenance, sub-standard management, and inferior workmanship of repairs."

The Integrated Sector: Transmission

Poor technical conditions in a transmission network can lead to not only transmission losses and voltage drops, but may also reduce the effective capacity of generating equipment. Weaknesses in transmission can lead to what is known as a low "stability limit," which restricts the maximum amount of power that can be fed into a network. If the stability limit is exceeded, there is a risk of "instability" which eventually leads to power failures. Because of the technical complexity of the problem it was difficult to be certain of the position, but the DPCS team reported that it seemed most likely that many operational problems attributed to other causes were actually a manifestation of instability.[1] It is particularly important that the real faults be isolated in such cases, because some causes of instability can be corrected at little or no cost, leading to a higher supply of power through the network.

The main function of the four largest transmission networks on Java is to carry current from the hydro-electric generation plants to the main consumption centres. Because of the considerable distances which separate the

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1. "Random field reports have, in several cases, indicated that automatic voltage regulating equipment, was removed or bypassed because 'it caused blackouts'. This may well prove that the system was basically so unstable that the higher generation rate achieved by use of automatic controls caused a state of instability within the system resulting in frequent blackouts... In each case brought to light, the plant operators blamed the automatic voltage regulating equipment and were unaware that the instability of the system might be the defect needing correction." Ibid., pp. 41 and 42.

production and consumption centres, both low cost electricity at the power plant and a cheap, efficient transmission network is needed for this arrangement to be economic. Unfortunately in Indonesia neither of these conditions are fulfilled.

In the first instance, the capital cost of some of the transmission lines was probably higher than necessary. The use of underground cables for primary high voltage lines is not unusual in Indonesia, and is more expensive and less flexible than an overhead system. Further, some transmission towers have been fabricated locally and could probably have been imported at a lower cost. In other cases, indigenous materials have not been used as often as they might. In some instances iron-wood poles from Kalimantan or Java-grown teak could have been used for carrying 30 kV lines.

But losses and voltage drops are probably more important in raising transmission costs than excessive capital expenditure. Firstly, often the sending end voltage is considerably below the rated receiving end voltage for the network. It is common practice in most countries to increase the voltage at the sending end of a transmission line by about 10 percent or more above the rated voltage of the system so as to ensure a good quality supply at the receiving end. In Java a sending end voltage of as much as 20 percent below the rated voltage is not unknown, although the drop is usually not more than 10 percent. Since the voltage drop on the transmission wires is often another 5 percent or more, the receiving end voltage is often between 10 and 20 percent below the rated level.

Secondly, the poor condition and unsuitability of the equipment, particularly undersized conductors and faulty insulators, are major contributing factors to exceptionally high transmission losses. There is a particular difficulty in that accurate measurements cannot be made because the recording instruments themselves are só unreliable, many of them being in a poor state of repair and have not been

calibrated for many years.[1] Despite the impossibility of measuring transmission line losses precisely, it is certain that they are excessive - usually being over 20 percent, and sometimes over 30 percent, of kWh generated.[2]

The Integrated Sector: Subtransmission and Distribution

The subtransmission and distribution networks, which usually have a rated voltage of 6 kV and 127-220 volts respectively, are old fashioned, run down, and seriously overloaded. The high voltage transmission lines terminate in substations, many of which are typical of those installed in developed countries forty or fifty years ago. They are rarely near the load centres, usually being located at the edge of the towns which they serve and thereby requiring long low voltage lines to the main centres of consumption. This results in high initial capital costs, high losses on the low voltage distribution lines (in addition to the losses already incurred on the high voltage network), and poor regulation of voltage. The incoming voltage of 70, 30, 25 or 15 kV (normally received at a considerable undervoltage) is stepped down by transformers to a nominal 6 kV, which is usually only 4,900 to 5,800 volts as it leaves the substation on the subtransmission network. Some of these nominal 6 kV lines extend for up to 25 miles, and during periods of relatively high demand the voltage drop at the end of such long lines is inevitably very high.

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1. In some instances "the generator outputs are fluctuating so widely that the operator has a choice of readings. He may read the instantaneous low needle reading of 150 or the high of 300, or he may arrive at an average of 225. In such cases the readings may be in error by 50 to 100 percent. Inasmuch as doubt exists as to the quantity of energy entering and leaving a transmission line, the quantity lost in transit cannot be determined." Ibid., P.53. The position is still much the same today.

2. It should be remembered that losses of less than about 10 percent are technically difficult and expensive to avoid, and that a loss rate of roughly 10 percent is usually tolerated in developed countries.

Much the same faults as those that occur at the sub-transmission level are repeated in the low voltage sector. The nominally 6 kV sub-transmission lines terminate at transformers which are housed in small one or two story masonry structures. In contrast, world wide practice for many years has been to mount these transformers (which do not need shelter) on poles close to the load to be served. The use of pole-mounted transformers is cheaper and more efficient, allowing better regulation of voltage, the limiting of losses to the minimum, and expansion and replacement at minimum cost.[1]

Usually the 127-220 volt distribution wires are carried on round steel poles - wooden poles would be cheaper and quite suitable - for distances of up to several miles to serve a large number of limited demand (usually unmetered) residences. The delivered voltage, especially at the peak consumption period, is often well below 90 volts (which is 70 percent of the rated voltage). As well as causing dimming of lights, a drop in voltage of this magnitude quickly leads to breakdowns in electrical equipment driven by electric motors, such as refrigerators, air conditioners, and industrial machines.[2]

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1. "In some areas, the general practice as regards distribution transformers seems to be to house them in specially constructed buildings. This is, to say the least, an expensive arrangement and does not in any way add to the reliability and quality of supply. Pole-mounted transformers ... will be a satisfactory arrangement..." ECAFE, A Report by the Panel of Experts on Electric Power Development in Indonesia with Special Reference to Rural Electrification, Bangkok, mimeo., January 1963, p.29.

2. Describing the effects of the poor network, the DPCS team commented:
   "Entering zones of concentrated population between nine and ten o'clock in the evening, the first areas served by the 6 kV underground transmission lines were encountered about forty kilometers out and the lamps were observed to be of a light red to deep orange color. As the outskirts of the city were approached, a lamp color changed to a decided orange, followed by several shades of yellow, and as the city-centre was approached, the color of the lamps graduated to a certain shade of white."
   DPCS, op.cit., p.60.

The Integrated Sector: Conclusions

We are now in a position to summarise the overall situation in the integrated sector. In the first place, bad design and construction, as well as raising capital costs, has limited actual available capacity to a level well below total installed capacity, especially in the hydro sector. This is partly a result of antiquated Dutch techniques, adequate for pre-war times but now badly dated, and partly a result of poor post-war planning methods (discussed in detail later). Further, even when capacity is available, production is often limited in the hydro plants because of irregular water flows and such factors as regular flooding. In the diesel sector, faulty design and construction has led to the premature breakdown of plant.

Poor planning in transmission and distribution has led to similar effects in both sectors: expensive and unsuitable capital equipment, and long line distances which contribute to high losses and large voltage drops. Systems have been developed which tail off into "shoe string" lines with very weak voltages at the extremities. It is unlikely that the present networks could be successfully interconnected without substantial changes. In addition, geographical separation between the centres of hydro production and the main load centres has exacerbated the problems in the transmission sector.

A second main factor contributing to inefficiency is the failure to carry out regular and adequate repairs and maintenance, especially in the generation sector. Numerous examples have been given where better maintenance could have raised output considerably, often at little cost. Neither has this casual attitude been confined to generating plant and equipment, but other valuable and much needed capital was treated carelessly. At the Giringen hydro plant, "An almost new Chevrolet truck with all tyres removed and twenty to thirty large cases of new switchgear were stored on the floor of the operating room," and at the site of the Negebel plant, there were "... many almost new trucks sitting idle in the open site with wheels blocked up and all tyres removed, while new sedans and pickups were driving around the area."[1]

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1. Ibid., pp. 31 and 39.

Third, there are a series of lesser problems which hamper performance throughout the industry. Communication difficulties are compounded within the integrated sector by the absence of a reliable intra-network telephone system. For proper coordination of the separate subsystems in a high-voltage generation and transmission network, efficient telephone links between power plants, substations, headquarters and control centres are essential. Another drawback is that present standards, codes and regulations covering design, construction, operation, materials, safety, etc., were adopted in 1935 and have not been substantially revised since. These standards are inadequate for equipment, materials and techniques introduced since 1935. The Indonesian electricity industry is thus operating, in effect, without a set of modern standards or codes.[1] A further substantial barrier to efficient operations, already mentioned, is the unreliability of measuring and recording equipment. The real capacity of many machines, production, losses, consumption and so on, is unknown and many estimates are probably incorrect by a factor of at least 10 percent.

However set against this depressing list of faults, it must be remembered that many of them are an inheritance from the Dutch period, and that only a limited amount could be done to set them right without at least small amounts of money to do so. This is not to exonerate PLN officials from all blame, but it is important to distinguish here between measures that would have raised production capability and measures that would have increased sales. Better management could probably have led to a substantial improvement in the former, but it is hard to judge how much difference it would have made to the latter - in the integrated sector at least. For reasons which we will look into in Chapters 7 to 9, the transmission

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1. The ECAFE team which visited Indonesia in late 1962 took pains to stress that "... in Indonesia, the need to consider standardization on matters pertaining to electricity ... is particularly urgent." Op.cit., p. 18.

and distribution sectors have been badly neglected since the Second World War. To a large extent, the PLN managers probably cannot be held responsible for this imbalance. Large investments are now needed in transmission and distribution before any substantial increases in production in the generating sector can be actually delivered to final consumers.

Problems of the Dispersed Sector

There are special difficulties in the dispersed sector which differ from those faced in the integrated sector. Here we will mainly have in mind the extra difficulties faced in the Outer Islands, although much of the discussion holds true for the scattered diesel plants in Java. In addition, most of the criticisms of the diesel plants in the integrated sector listed above apply equally to the diesel plants in the dispersed sector.

The most important single technical problem is the regular supply of spare parts and fuel. In the case of spare parts, there are two problems - non-arrival or long delay in their supply, and the mixture of different types and makes of diesel generating units at one power plant.

Bottlenecks in the supply of spares can arise at a number of points. To start with, the required part must be specified by the local operators, and this in itself is often not easy. The original manual may be lost, or if it is available, it is almost certainly printed in English or German, and the local technicians may not understand the foreign language. When an order is prepared, it must be relayed through an unreliable communications and administrative system to the PLN Central Office in Djakarta. If the required part is on hand in the stores, it can be dispatched promptly. Often however the particular part is not on hand, and must be ordered from the manufacturers overseas.

At this point, throughout most of the sixties the serious bottleneck of funds arose. Foreign exchange was difficult to come by, and it was sometimes many months before the part could be ordered. More recently the PLN has been free to purchase foreign exchange on the open market, but shortage of domestic currency is also a problem, and sometimes the less

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urgent requests for spare parts must wait. One PLN official explained the steps that are usually followed and the reasons for delays in the supply of spare parts as follows:[1]

> "Old machines are a problem - it is sometimes difficult to identify the required part, especially if the equipment was installed before the war because manuals may have been lost. In the Sukarno era, government policies restricted our activities since we were not allowed to trade with the West, but only communist countries. We were isolated, since most of our spares were needed from the West.
>
> Many decisions about the ordering of spares are routine ... Recommendations are made [to a Director] on the basis of where the smallest expenditure will make the greatest contribution to production, although sometimes the government wants particular areas favoured. This doesn't happen very often now though, and less so than during the Old Order. In the Sukarno era, the Department of Home Affairs sometimes pressed for preference to be shown towards particular areas. At that time the PLN operated with a deficit, and since the government supplied the funds, it could pressure the PLN.
>
> There is more freedom about purchases now. The government prefers us to buy them from state enterprises if possible, but there is no compulsion. During the Sukarno era, we were compelled to purchase through the state enterprises."

Provided that the broken machine is not so old that the manufacturers themselves have trouble supplying the part, there is usually a delay of some months until the goods arrive. Sometimes further delays occur because of customs requirements. The PLN has on occasions been so short of money that payment of import duties has been difficult. Finally,[2]

> "... facilities for transport within Indonesia are an important bottleneck ... security is not a main problem, since the exploitasi [regional board] which is to receive the spare parts sends a guard to take care of the goods. Shortage of reliable ships is the problem. The PLN must use shipping firms which can be trusted, and often there are considerable delays until a suitable ship is going to the area. Garuda Airlines are sometimes used, but only for small equipment ..."

---

1. Interview with J, 30 August 1969 and 6 September 1969.
2. Interview with J, ibid.

A second factor which compounds the spare parts difficulty is the lack of standardisation of generating units used. It is very frequently the case that when more than one generating unit is installed at a centre, there is a mixture of sizes and makes. This limits interchangeability of spare parts since diesel generating units are comparatively specialised machines, and often parts cannot be interchanged between units of different makes or sizes. This is a serious disadvantage if a second unit fails at the same power plant. If there was more standardisation, one unit could be cannibalised to keep the second unit running. Under present circumstances, two small failures may put two units out of service rather than one.

Like many of the other problems the industry faces, the mixture of units is mainly the result of factors outside the control of the Indonesian electricity planners. The many political changes in Indonesia during the last half century have affected investment policies to no small degree. The Dutch utilities apparently made no attempt to coordinate either their investment policies or contracts with manufacturers, and as we shall see later, expansion since nationalisation has been carried out mainly with the help of foreign aid funds, most of which have been tied. It has therefore not been practical for planners to be too fussy in trying to standardise their equipment. Not only are the suppliers chosen nowadays often different from those which the Dutch utilities purchased from, but they vary depending on which country is providing the foreign aid.

In contrast to the position for the large 50 MW thermal plants at Tandjung Priok and Tandjung Perak, the supply of fuel was a major problem in the dispersed sector for reasons of both logistics and finance. In order to supply some remote areas in Kalimantan and Sumatra, it was necessary to transfer diesel oil from tankers into large drums which were carried by barge up shallow rivers. Sometimes a third stage of transport by truck was needed. In addition, as we have seen, the regional boards operated with considerable autonomy which sometimes even extended to the local branches.

Suppliers often required that local PLN offices pay on a cash-on-delivery basis, and this was sometimes impossible for local branches. One local official who had held a high position in outlying Atjeh in North Sumatra described the position during his period there as follows:[1]

> "We had four main problems in Atjeh. First, fuel and logistics. Fuel had to come from Port Belawan in Medan, and this usually took three or four days. We often had to stop the machines and impose blackouts because of shortage of fuel.
>
> Second, there was a shortage of skilled people.
>
> Third, costs were greater than revenue, partly because transport costs were very high and the cost of fuel in Atjeh was therefore three or four times the price in Djakarta. The fuel was bought on credit, and the Central Office of the PLN used to pay in Djakarta. However, sometimes the Central Office did not grant enough credit - probably the Central Office itself was short of money - and we had to pay for the costs of transport in fuel. For example, if we were being supplied with 150 barrels of fuel, we would only receive 100 and would hand over the other 50 as payment. Sometimes we would report this, and sometimes we might not.
>
> Fourth, communications were very bad. Reports from branches were often two or three months late, and usually it was either not possible to phone through to them, or phones were very bad. Telegrams often took two or three days to get through."

Since the mid-sixties, conditions in the Outer Islands have improved somewhat, but such problems will continue to hamper operations in outlying regions for some time to come yet.[2]

Summing Up of the Supply Side

It is clear from the foregoing tale of woe that figures of total installed capacity present an overoptimistic picture. Tables 5.17 to 5.22 supply additional information on broken and unavailable capacity which provide a reasonably accurate

---

1. Interview with L_1, 18 May 1970.
2. For example, a recent survey of South Kalimantan reported that in Bandjarmasin, "Petrol is always much more expensive than in Djakarta and over short periods rises up to four times the Djakarta price." Atje Partadiredja, "An Economic Survey of South Kalimantan," Bulletin of Indonesian Economic Studies, VI (2), July 1970, p.59.

overall picture of how much is actually available for use, and where the main deficiencies lie.

The difference in Table 5.17 between total installed capacity and operating installed capacity is accounted for by the amount that the PLN reports as broken. Some of the

TABLE 5.17 Total Installed Capacity and Operating Installed Capacity, 1960 - 1969

(MW)

	Total Installed Capacity				Operating Installed Capacity			
Year	Hydro	Ther-mal	Dies-el	Total	Hydro	Ther-mal	Dies-el	Total
1960	163	25	115	304	163	23	113	299
1961	163	25	120	310	163	23	118	305
1962	175	50	149	374	174	48	143	365
1963	183	50	165	398	182	44	150	376
1964	258	125	171	553	257	119	155	532
1965	258	125	177	559	257	116	151	524
1966	283	125	178	586	282	107	141	529
1967	283	125	182	589	282	107	137	526
1968	310	109	192	652[a]	297	109	152	600[a]
1969[b]	310	113	193	658[a]	300	108	154	604[a]

Source: 1960-1966: Information supplied by Gatrik.
1967-1969: PLN Annual Reports for 1967, 1968 and 1969.

Notes:

a. 42 MW in gas plants not shown separately since the plants were newly installed and capability was full rated capacity.

b. Estimates.

broken machines are old and seriously damaged, and should be written off entirely. However a good deal of the capacity reported as broken is only temporarily unusable and can be expected to be operable again as soon as spare parts are available.[1] The Table shows that the absolute amount of

1. Of the 54 MW reported as broken in 1969, 26 MW was considered not worth repairing. The other 28 MW was "in the process of being repaired." PLN Annual Report for 1969, p.10.

broken capacity appears to have risen from about 5 MW in 1960 to over 50 MW in 1969, or as Table 5.18 shows, from about 2 percent of total installed capacity to around 8 or 10 percent at the end of the decade.

TABLE 5.18 Operating Installed Capacity as a Proportion of Total Installed Capacity, 1960 - 1969

(%)

Year	Hydro	Thermal	Diesel	Total
1960	100	92	98	98
1961	100	92	98	98
1962	100	96	96	98
1963	100	88	91	95
1964	100	95	91	96
1965	100	93	85	94
1966	100	86	79	90
1967	100	86	75	89
1968	96	100	79	92
1969	97	96	80	92

Source: Calculated from Table 5.17.

In which sectors has the trouble occurred, and why has the increase taken place? Tables 5.19 and 5.20 taken together with the previous two tables clarify the position. Table 5.18 shows that for most of the sixties, it was the thermal and diesel sectors which caused most of the trouble.[1] Generally about 5 percent or slightly more of thermal capacity was broken, with as much as 14 percent in 1966 and 1967. The diesel plants have the worst performance however, with about 20 percent of capacity out of action in recent years.

In light of this distribution of broken capacity, it is not surprising to find in Tables 5.19 and 5.20 that in 1969 the percentage of broken capacity in the Outer Islands was generally higher than in Java. Table 5.19 provides detailed information for the main areas and shows that the situation in the Outer Islands was a good deal worse than the position in Java. Table 5.20 summarises the information in Table 5.19,

1. Figures for 42 MW of gas capacity installed in 1968 are not shown separately since the capability of the newly installed plants was full rated capacity.

TABLE 5.19 Total Installed Capacity and Operating Installed Capacity by Area, 1969[a]
(MW)

Area	Total Installed Capacity					Operating Installed Capacity				
	Hydro	Thermal	Diesel	Gas	Total	Hydro	Thermal	Diesel	Gas	Total
Java	304.0	112.2	79.7	14.0	509.8	294.0	107.5	66.7	14.0	482.1
Sumatra	1.5	0.8	68.3	28.0	98.7	1.5	0.8	50.0	28.0	80.3
Kalimantan	-	-	17.4	-	17.4	-	-	13.2	-	13.2
Sulawesi	4.4	-	17.3	-	21.7	4.4	-	15.2	-	19.7
All Other	-	-	10.4	-	10.4	-	-	8.5	-	8.5
Total	309.9	113.0	193.1	42.0	658.0	299.9	108.3	153.8	42.0	604.0

Notes: a. All figures estimates only.

Source: PLN Annual Report for 1969.

TABLE 5.20 Broken Capacity as a Proportion of Total Installed Capacity by Area, 1969

Area	Hydro	Thermal	Diesel	Gas	Total
Java	3	4	16	0	5
Other Islands	0	0	23	0	18
Total	3	4	20	0	8

Source: Calculated from Table 5.19.

and not only is the regional contrast clear, but the Table also shows that the diesel sector is entirely responsible for the difference.

The explanation for the increase in broken capacity lies mainly in the diesel sector. In the four years from 1960 to 1964, total installed capacity in the diesel sector increased by 50 percent. It appears that many of these plants began to give trouble shortly after they were installed, and the trouble came at a time of increasing financial difficulty for the PLN and increasing political tension in Indonesia. The financial difficulties, combined with political constraints on trade patterns, meant that the PLN was unable to supply the required spares. Although the earlier political constraints have been gradually relaxed since 1965, shortage of funds has continued to hamper the PLN's efforts at rehabilitation.

In addition to the allowance that we have made for broken capacity, there is a further adjustment that must be made before we arrive at what we earlier called "effective operating capacity" - that is, adjustments for deration of equipment and other restrictions on the use of generating units, particularly hydro units. Figures are provided in Tables 5.21 and 5.22 on effective operating capacity; in Table 5.21 details are given for different areas for one year (1966), while Table 5.22 shows the position for three separate years

TABLE 5.21 Total Installed Capacity, Operating Installed Capacity and Effective Operating Capacity, by Area, 1966

Area	Total Installed Capacity (MW)	Broken Capacity (MW)	Operating Installed Capacity		Effective Operating Capacity	
			(MW)	(% of Total)	(MW)	(% of Total)
Java	482.4	9.8	472.5	98	283.5	59
Sumatra	62.6	15.2	47.4	76	28.4	45
Kalimantan	11.5	3.3	8.2	71	4.8	42
Sulawesi	18.7	8.7	10.0	53	5.9	32
All Other	9.6	2.2	7.4	77	4.3	45
Total	584.8	39.2	545.6	93	326.9	56

Source: PLN Annual Report for 1966.

TABLE 5.22 Total Installed Capacity and Effective Operating Capacity, 1965 - 1967

(MW)

Area	Total Installed Capacity (1)			Effective Operating Capacity (2)			(2) as a % of (1)		
	1965	1966	1967	1965	1966	1967	1965	1966	1967
Java	457.9	480.4	480.5	303.1	323.4	344.3	66	67	72
Outer Islands	101.4	105.4	108.8	47.3	44.4	59.9	47	42	55
Total	559.3	585.8	589.3	350.4	367.8	404.2	63	63	69

Source: Bank Negara Indonesia (Unit 1) Laporan Tahun Pembukan 1966-1967 [1966-1967 Annual Report for the Bank Negara Indonesia (Unit 1)], Djakarta, P.N. Pertjetakan Negara, n.d., p.262.

from 1965 to 1967. Table 5.21 shows that effective operating capacity, at only 56 percent of total installed capacity in 1966, is much less than either total installed capacity or operating installed capacity. While only about 40 MW[1] (or 7 percent of total installed capacity) was out of action because of broken plant, another 220 MW (about 40 percent) was unusable for other reasons. Table 5.22, from another source, provides slightly different figures for 1966, and suggests that the situation is better than that shown in the previous Table. Nevertheless it seems clear that over 30 percent, and perhaps over 40 percent, of total installed capacity was out of action during the period, and most of it for reasons other than broken capacity. It is also clear that the position in the Outer Islands, with perhaps one-half of total installed capacity unusable, was considerably worse than that on Java where only about one-third was out of action.

We shall return to the economic effects of this extremely serious position in a later section. It is sufficient to note here that since the electricity industry is so capital intensive, capital costs such as depreciation and any other charges on capital (such as a rate of return) that might be required, make up a high percentage of total costs. If a high proportion of capital is lying idle, then this will have a very significant effect on costs of production.

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1. This figure is somewhat smaller than that given in Table 5.17, which is from a different source.

APPENDIX TO CHAPTER 5

A Note on Capacity and Output of Captive Plants[1]

We have so far ignored the non-public electricity sector, and will do so throughout most of the rest of the study, for two reasons. First, we are concerned mainly with the development of the public electricity supply industry, and second, almost no information is available about capacity or production in captive plants. Nevertheless, since this sector does appear to be especially significant in Indonesia, it is worthwhile examining the scanty data that do exist.

In most countries, the proportion of total installed capacity (public plus private) in captive plants is comparatively small - the average for the ECAFE region is about 10 percent.[2] If, as seems likely, Indonesia has an abnormally high proportion of capacity in this sector, the picture given in Chapter 5 above (and later chapters) probably exaggerates the shortage of electricity in Indonesia.

Unfortunately, no data on either capacity or production has been collected in Indonesia since the early sixties, nor are there figures on sales from captive plants to the public. According to information gathered by the Central Bureau of Statistics, the "capacity of equipment used to generate electricity for private consumption" in large manufacturing

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1. "Captive" plants are generating units intended primarily for the owner's own use. (Sometimes the capacity in this sector is classified as "self generating industries.") The plants are usually operated for production purposes, for example, in a factory or a plantation. If excess captive plant capacity is available, the surplus electricity may be sold to nearby consumers, especially if there is no public electricity supply. In Indonesia, the PLN sometimes buys small amounts of electricity generated in captive plants for resale through the public sector network.

2. Calculated from information in the ECAFE document Electric Power in Asia and the Far East 1967.

industries in 1962 was about 95 MW.[1] This apparently excludes capacity in medium and small industries and in estates, and may also exclude capacity in up to 20 percent of the large manufacturing sector.[2] Thus total capacity in captive plants in 1962 was probably considerably higher than 95 MW - perhaps even double that amount. Since the capacity in the public sector was about 400 MW (see Table 5.1), this would suggest that about one-third of the total installed generating capacity in Indonesia (private and public) at that time was in the captive sector.

Data on privately-generated electricity and purchases of power (presumably almost all from the PLN) for the period 1956-1963 are given in Table 5.23. These figures also relate to large manufacturing industry only, and probably to only 80 percent of the plants in this category. The Table shows that the total amount of electricity generated in captive plants increased over the period not only absolutely, but also as a share of total electricity consumed by large industries. In seven years, output from the large manufacturing industries' own plants rose from just over one-third to three-quarters of the total amount of electricity consumed by them. Unfortunately, this information sheds no light on what was happening in the medium and small scale sectors, or in the estate sector.

But this is only of very limited use in clarifying the situation towards the end of the decade. The truth is that nobody knows what the position was in the late sixties, and only rough guesses are available. A figure of "about 200 MW" has been mentioned as the capacity of captive plants in recent

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1. Nugroho, Indonesia Facts and Figures, mimeo., January 1967, p.351. Nugroho does not make it clear whether his figures are in horsepower or kilowatts, but they appear to be the former. This being the case, they have been converted above into megawatts.

2. The data appear to relate to only the 80 percent (approximately) of large manufacturing industries that returned the Central Bureau of Statistics' questionnaires. See the explanatory notes to the Perusahaan-Perusahaan Industri Besar [Large Manufacturing Industries] Statistical series.

TABLE 5.23 Privately-Generated Electricity and Purchases of Power by Large Manufacturing Industries, 1956-1963

(million kWh)

Year	Privately Generated (1)	Purchased[a] (2)	Total (3)	(1)/(3) %
1956	66	109	175	38
1957	94	113	207	45
1958	122	103	225	54
1959	132	109	241	55
1960	131	109	241	55
1961	148	115	263	56
1962	143	104	246	58
1963	236	78	314	75

Source: 1956-1962: Nugroho, Indonesia Facts and Figures, mimeo., January 1967, p.351.

1963: Biro Pusat Statistik, Statistik Indonesia Statistical Pocketbook of Indonesia 1964-1967, [Djakarta, January 1968], p.193.

Notes:

a. Presumably almost all from the PLN since 1958.

years, and this is the estimate given in Repelita.[1] Alternatively, one official with long experience in the industry, Dr F. Tambunan, has suggested that it was "about 50 percent" of the 557 MW (i.e. about 280 MW) existing within the PLN in early 1966.[2] This suggests that as a proportion of total installed generating capacity (public plus private) in Indonesia, captive plant-capacity has remained constant throughout the sixties at about one-third.

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1. Repelita is the acronym for Rentjana Pembangunan Lima Tahun [Five Year Development Plan].

2. F. Tambunan, Some Notes on the Electric Power Industry in Indonesia, Djakarta, typescript, 6 March 1967.

Information on output is even more scanty. A rough guess is that during the last few years, the PLN has been supplying perhaps one-quarter, perhaps less, of the total amount of electricity used by consumers who also rely on their own captive plants. This was the share to which PLN sales to large manufacturing enterprises had fallen by 1963 (see Table 5.23), and there is no reason to believe that it has risen since. The plausibility of this estimate is reinforced by the survey carried out by the DPCS team of engineers in late 1963 which found that[1]

> "Estimates indicate that the public electric power systems in East and Central Java now sell only 22 percent of the total electric power used by industry, including that for lighting of plant and grounds."

On the other hand, more recently, it has been reported from West Sumatra that[2]

> "The State Electricity Enterprise provides only 25 percent (5 MW) of all electric power generated in West Sumatra while the manufacturing industries generate the other 75 percent. The greater part of the non-PLN electric supply is produced by the Padang Cement Factory and the Ombilin Coal Mining Company."

If this were true for the whole of Indonesia - which it probably is not - this would suggest that at the end of the 1960's, the PLN supplied considerably less than one-quarter of the electric power used by manufacturing enterprises.

However the "guesstimate" that the PLN supplies about one-quarter of the total amount of electricity used by captive plant owners is roughly consistent with the figure suggested above for total installed capacity in this sector. In 1968, the PLN sold about 225 million kWh to industrial consumers (see Table 6.10 below). If this is one-quarter of the consumption of captive plant owners, then about 675 million kWh were generated in the 200 MW of captive capacity. This implies an average annual production of about 3375 kWh per KW of installed capacity, or a utilisation rate of about 43

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1. DPCS, op.cit., p. 5.
2. Hendra Esmara, "An Economic Survey of West Sumatra," Bulletin of Indonesian Economic Studies, VII(1), March 1971, p.50, [my emphasis].

percent. This seems comfortably within the likely range.[1]

If the PLN had supplied only one-sixth, output of captive plants would have to be put at 1125 million kWh. This would imply a utilisation rate of nearly 65 percent, which though not impossible, would be surprisingly high.[2]

Finally, these figures do not substantially affect any of the arguments advanced in Chapter 5. For example, the inclusion of the output from captive plants would lift generation per capita in Indonesia (shown earlier in Table 5.4) by perhaps fifty percent from around 14 kWh per annum to about 20 kWh per annum in 1967. But this would still be only one-quarter of the figure for the Indian public sector alone.[3] Thus even if the influence of captive plants had been considered in our study, the effect on any of our conclusions would have been marginal.

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1. For a comparison with the average kWh generated per kW in the public sector in Indonesia and throughout the ECAFE region, see Tables 13.15 and 13.16.

2. For 200 MW to produce 1125 million kWh of output, each kW of capacity would have to produce over 5600 kWh per annum (out of a theoretical maximum of 8760 kWh). Allowing for time required for maintenance, and for the fact that plant would probably not be running at peak capacity for more than short periods, an output of 5600 kWh per kW seems unduly high.

3. This, of course, is not allowing for the generating capacity in India that is in captive plants.

CHAPTER 6 The Demand for Electricity

Data Problems

There is always a difference between kWh produced (generated at the plant) and consumption (which is usually taken as kWh sold). The difference in most countries between these two is usually greater than 10 percent, and is accounted for in three ways: by consumption in the generating plants; by technically unavoidable losses in transmission and distribution; and by stealing, which is usually comparatively small. In Indonesia, however, losses due to stealing have been comparatively high, and in the last few years have probably been between 5 to 10 percent of all current generated, or around 10 percent of kWh listed as sold. While electricity stolen is a loss to the PLN, it is nevertheless consumed within Indonesia, and is not a loss to the society as a whole.

A further point to remember in examining the following data is that the large majority of consumers are unmetered. Their consumption is calculated and electricity bills are drawn up on the basis of assumptions about the average consumption per consumer in various consumption categories. Experienced observers suggest that the assumptions are too conservative, and recently the PLN has revised some of them upwards.[1]

The effect of these extra losses - be they from stealing or underestimation of legal consumption - is that true consumption in the public sector may be around 15 percent more than the sales figures listed. However this difference, provided it is borne in mind, need not be of real concern to

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1. In Indonesia recently it seems that between 25 and 30 percent of electricity generated is lost one way or another before it reaches consumers (see Table 13.16 below). If 10 to 15 percent are technical losses in transmission, (and in view of the poor condition of equipment technical losses may be even higher than this), then another 10 to 15 percent is "lost" either (a) because the PLN underestimates legal consumption, or (b) through stealing. This suggests that between 5 and 10 percent of production is stolen, since it seems likely that at least 5 percent is "lost" because of underestimation of consumption by the PLN. In the large cities total losses approach 40 percent, so the proportion of output stolen is probably rather higher than 10 percent.

us here, and we will equate consumption with kWh sold. It seems better to do this, leaving the reader to judge the sales figures for himself, than attempt to allow for the errors. The true position is so uncertain that a series of arbitrary adjustments might simply lead to further distortions in the picture. As will become clear, even if upward adjustments were made in our figures the overall patterns of consumption, both within Indonesia and between Indonesia and other ECAFE countries, would remain substantially unaltered.

International Comparisons

Information on growth of sales in Indonesia in the post-war period is provided in Figure 5.1 and Table 6.1. The figures for 1945 and 1959 are particularly unreliable since for the whole period, with the exceptions of 1947 and 1951, the kWh sold are a constant 80 percent of kWh produced.[1] There is also evidence to suggest that however the estimates of consumption were derived, they may be considerably over-estimated for the immediate post-war years. In the first place, it is difficult to believe that consumption in 1945 was greater than in 1940, as the official figures suggest (see Table 6.1). Secondly, an alternative estimate of the level of post-war consumption sets the figure at 362 million kWh in 1949, rather than the 419 million kWh reported in official figures.[2] If the level of sales in the immediate post-war period has been overestimated, then the rate of growth over the period is underestimated. Because of the unreliability of the data until 1960, it seems best to concentrate our discussion on developments during the sixties.

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1. In 1947 and 1951, consumption was 80.2 percent and 81.6 percent of production respectively. It seems quite likely that the variation from 80 percent for these two years is a calculation or printing error. It also seems extremely likely that one set of figures (for either consumption or production) was derived from the other, but it is not clear which set was the original. However for the reasons given in Chapter 5, the production figures are probably the original, although these too are most suspect.

2. See Compact-Commission Eximbank-Loan, op.cit., p. 5.

TABLE 6.1 Sales of Electricity in the Public Sector, 1940 and 1945-1969
(million kWh)

Year	kWh sold[a]
1940	364
1945	403
1946	403
1947	411
1948	410
1949[b]	419
1950	450
1951	501
1952	534
1953	648
1954	647
1955	720
1956	738
1957	751
1958	766
1959	776
1960	840
1961	930
1962	987
1963	1,021
1964	1,094
1965	1,204
1966	1,224
1967	1,194
1968	1,221
1969[c]	1,316

Notes:

a. From 1945 to 1959 with the exceptions of 1947 and 1951, according to P.L.N. figures kWh sold were equal to exactly 80 percent of kWh generated. For 1947 and 1951, the figure was 80.2 and 81.6 percent respectively, and one suspects that an error may be responsible for this apparent deviation. It seems likely that sales for this

period were estimated by simply assuming that they were a constant 80 percent of estimated production (i.e., generation). Since there is evidence to suggest that capacity and production figures for the first few post-war years are overestimated in official PLN statistics, sales may be overestimated also.

b. An alternative source reports sales in 1969 as 362 million kWh, which seems a more plausible figure than that given above. See Compact-Commission Eximbank-Loan, Paper-N.R. 25, mimeo., Djakarta, 14 April 1950. (See also note b. to Table 5.1).

c. Estimate.

Source: 1940: Table 1.4.
1945-1969: As for Table 5.1.

In the nine year period 1960-1969, sales increase by about 57 percent, or at an average annual growth rate of about 5.1. percent, which is a very indifferent performance by international standards. In many developed countries the demand for electricity doubles every decade, which implies an average annual rate of growth of 7.2 percent. It is clear from the earlier figures on production in the ECAFE region that in many Asian countries, electricity consumption must have increased at around 10 percent per annum or more.

Why have sales grown so slowly? We saw earlier that the average rate of growth of production over the 1960-67 period was about 7.2 percent, or about 2 percentage points higher that the growth in consumption. At first glance it might therefore appear that constraints on the supply side cannot have been the problem. We shall examine data on electricity losses in greater detail later, but it seems that the percentage of power lost in the transmission and distribution network has for various reasons been increasing over the period and that this accounts for the apparently higher rate of growth of production over consumption.[1] As we shall see below, electricity consumption per capita and per consumer in Indonesia are still low in comparison with most countries in the ECAFE region, and there is still strict quantitative rationing in many areas. The evidence suggests

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1. See Table 13.16 in Chapter 13 below.

that certainly at present prices, and probably at considerably higher prices, there is a large unsatisfied demand for electricity. The constraints on faster growth certainly appear to be on the supply side.[1]

In light of our earlier figures on production per capita in the ECAFE region, it is not surprising to turn to Table 6.2 and find that per capita consumption of electricity in Indonesia (in the public sector only) in 1967, at 10.6 kWh per annum, is one of the lowest in the region and well below the average for the area (public plus private sectors) of about 300 kWh. Even if we allow for generation in Indonesia in captive plants and set per capita consumption at (say) 20 kWh per annum (which is surely over-generous), the figure for Indonesia would still be only one-third that of India's modest level and one of the lowest in the world.

The structure of demand, for which information is provided in Table 6.3 and Figure 6.1 is an important factor

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1. Further evidence to suggest that there is a large gap between available supply and demand is provided in the study done by M. Bertoye, Development of Electrical Systems of Java, op.cit., pp. 5 and 6. On the basis of arbitrary but realistic assumptions, Bertoye tried to calculate a "probable load" for 1961, this load being the "... natural load as it might have existed if normal conditions [had] prevailed." He estimated that the total probable load for Java was 894 MW, which was almost six times the actual load in 1961 of 152 MW. Bertoye made no allowance for the price of electricity, but assumed a hypothetical load per consumer. Another estimate of the "potential" load (which also ignored price effects) was made for the Tuntang system in Central Java for December 1959. An American team of consultants estimated that if all demand had been met (presumably at the then prevailing prices), the peak load on the system would have risen from 19.7 MW to 39.1 MW. (This increase of 19.4 MW was made up as follows: 6.4 MW for restoration of normal voltage and frequency; 4 MW to supply 35 new industrial consumers; 2 MW for lifting restrictions on supply to existing consumers; and 7 MW for connecting new domestic consumers.) See the report prepared by Gibbs & Hill, Inc. for the Republic of Indonesia, Proposed Steam - Electric Power Plant and Electric System Reinforcements [in the Tuntang Generation System], New York, February 1961, p.18. More recently, in the third quarter of 1965, there were nearly 44,900 consumers waiting for an additional 20.7 MVA (equivalent to MW) of capacity to be connected (information from the Central Office of the PLN, Djakarta).

in influencing the problems that an electricity industry faces. Different consumer groups have different time patterns of demand, and impose their peak requirements (which in turn determine the demand for investment capacity) at different times of the day. A suitable combination of lighting demand (which usually peaks in early or mid-evening) and power demand (which, depending on the production patterns in the main power-using industries, tends to peak during the daylight hours) is necessary to ensure that there is a high system load factor so that capital is used efficiently.

Table 6.3 and Figure 6.1 show that the structure of demand that the industry faces in Indonesia differs markedly from that in all other countries for which data are provided. In Indonesia a very large proportion of electricity sales (about 80 percent in 1967) was to domestic and commercial consumers, mainly for lighting purposes. Only a small proportion, about 20 percent, was reported as being sold to industry, presumably mainly for power purposes. For the ECAFE region as a whole,[1] sales for domestic and commercial lighting and industrial power accounted for about 30 percent and 65 percent of total consumption respectively, with the rest being used for such purposes as agriculture and irrigation, and street lighting.

The unusual structure of demand is a reflection of two influences. In the first place, the pattern reflects the degree and type of industrial development that has taken place. Since the relative size of the industrial sector is significantly smaller in Indonesia than in most of the other main countries in the region, it is only to be expected that the demand from industry will be less important as a prop-

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1. Quite a few countries are not included; see the notes to Table 6.3.

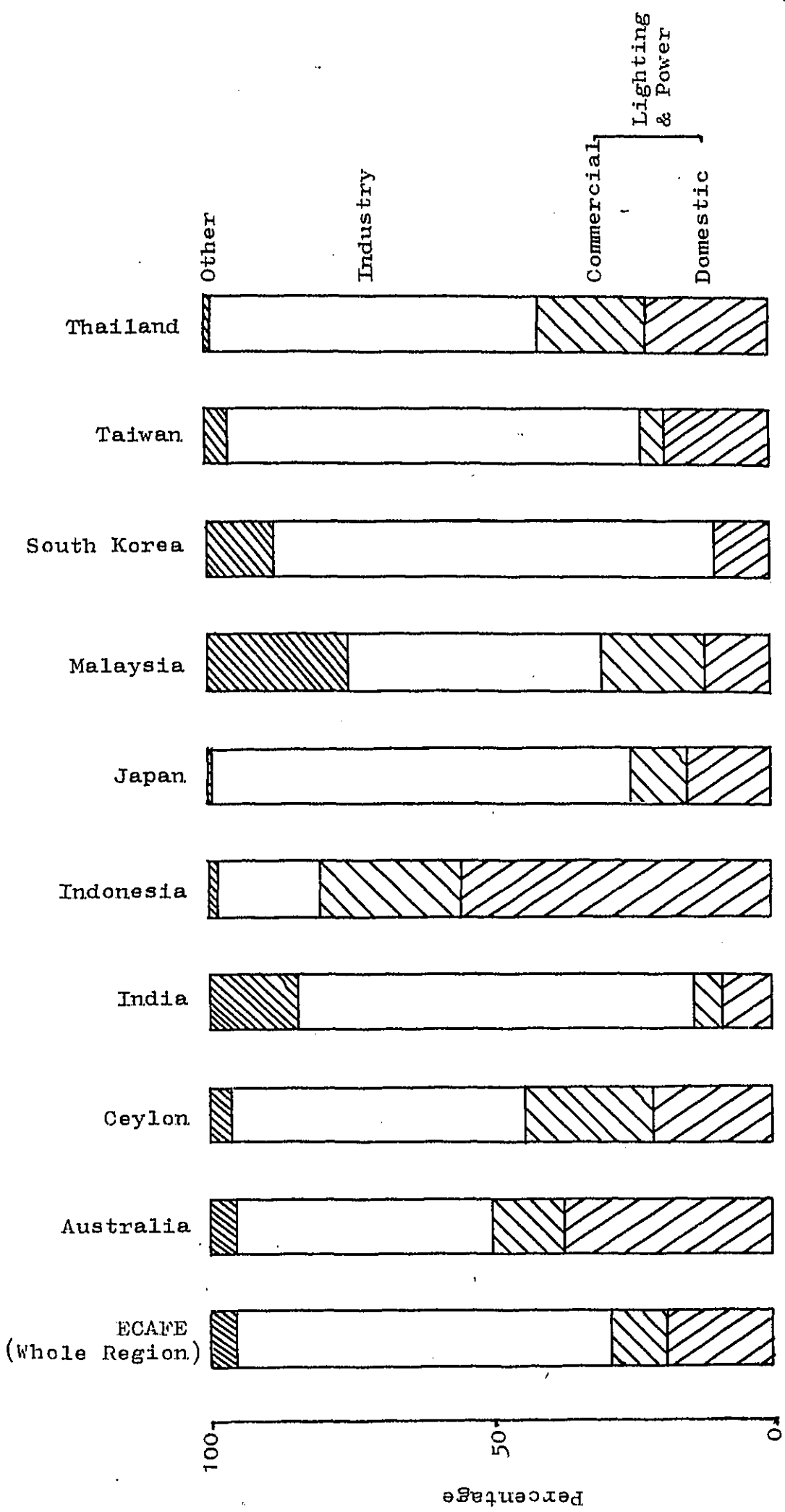


FIGURE 6.1 Electricity Sales by Public Electricity Utilities in Selected ECAFE Countries, Percentage Distribution by Class of Service, 1967

Source: Table 6.3.

ortion of total sales.[1] In addition, those industries which are connected to the public electricity supply are, in general, not power intensive and buy comparatively little power. This is no accident, because those industrial consumers who need a lot of power cannot afford to depend on the PLN's unreliable supply.

Nevertheless differences in industrial patterns alone are not sufficient to account for the structure of demand, and the second part of the explanation is provided by the tendency of power users to install their own generating plants. We estimated in the Appendix to Chapter 5 that at the end of the sixties, about 200 MW may have existed in captive plants in Indonesia. Compared with other countries in the ECAFE region, this appears to be a high proportion of total installed capacity (public and private) in Indonesia, and is therefore probably an important factor in explaining the low power demand from industry.[2]

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1. Recent data on national income by industrial structure for Indonesia and five other important ECAFE countries suggests that the manufacturing sector is comparatively small. Manufacturing accounted for about 8.5 percent of national income in Indonesia, compared with 9.4 percent for Malaysia, 11.0 for Pakistan, 12.6 for Thailand, 15.6 for India, and 18.5 percent for the Philippines. See H.W. Arndt and C. Ross, "The New National Income Estimates," Bulletin, VI(3), November 1970, p.49.

2. According to Nugroho's figures, Indonesia Facts and Figures, op.cit., there was a quite marked increase in the use of own generating units in the large manufacturing sector between 1956 and 1963. (See Table 5.23). During this period the proportion of electricity consumed which was provided by manufacturers' own generators rose from 38 percent of electricity consumption to 75 percent. These figures must be treated with caution however, since the data collection procedures are suspect. However apart from the figures, it does seem likely that the tendency for a wide range of institutions to install their own generating plants has increased. Most of the (few) main international standard hotels and embassies, and some diplomats' homes have their own generating plants, as well as most large factories. During the Dutch colonial era and until about the mid-fifties, the public electric power supply was more reliable and at least some of these institutions would not have considered it necessary to install their own plant.

TABLE 6.2 Per Capita Electricity Consumption in the ECAFE Region, 1967 (Public Electric Utilities plus Self Generating Industries).

Country	kWh consumed per capita
ECAFE (Whole Region)[a]	309
Australia	2,780
Burma	10.7
Ceylon	45
Hong Kong	788
India	64
INDONESIA[b]	10.6
Iran	140
Japan	1,880
Malaysia[c]	266
Pakistan[d]	26
Philippines[e]	160
Singapore	633
South Korea	131
Taiwan	569

Notes:

a. Some countries not included (see source).

b. For public electricity utility only. No data available for self generating industries.

c. States of Malaya only.

d. For 1965.

e. For 1966.

Source: All countries except Indonesia: ECAFE, Electric Power in Asia and the Far East for 1966 and 1967. Indonesia: information supplied by PLN.

Two factors seem to be important in explaining why a high proportion of enterprise managers prefer to use their own plant. First, in most countries power tariffs are considerably lower than lighting tariffs because the cost of supply to industrial enterprises is usually comparatively low. For reasons discussed in Chapter 13, electricity

TABLE 6.3 Electricity Sales by Public Electricity Utilities in Selected ECAFE Countries, Percentage Distribution by Class of Service, 1967

(%)

Area	Lighting and Power			Industry	Other	Total
	Domestic	Commercial	Total			
ECAFE (Whole Region)[a]	19	10	29	66	5	100
Australia	37	13	50	45	5	100
Ceylon	21	23	44	52	4	100
India	9	5	14	70	16	100
INDONESIA	55	25	80	19	2	100
Japan	15	10	25	73	1	100
Malaysia[b]	12	18	30	45	25	100
South Korea	10	c	10	78	12	100
Taiwan	19	4	23	73	4	100
Thailand	22	19	41	58	1	100

Notes:

a. Some countries not included (see source).

b. Whole country.

c. Presumably included elsewhere.

Source: As for Table 6.2.

prices in Indonesia over recent years have borne little relation to the cost of production, and industrial tariffs are as high and sometimes higher than lighting tariffs. Industrialists, faced with expensive power from the public electricity supply, have responded by installing their own plants.

Partly because of the distorted pricing system, it is not clear what the relationship between electricity industrial tariffs and the cost of generation in manufacturers' own captive plants really is. It certainly appears that industrialists and managers believe it is often cheaper to generate their own power, which is perhaps the important thing

in determining behaviour in any case, but whether it really is cheaper is a moot point. There is evidence to suggest that industrialists do not calculate the full costs of using their own generating plants. In particular, they often do not include depreciation when calculating the cost of producing their own power - frequently they only consider running costs. This may be correct marginal behaviour, but leads to uneconomic investment decisions later if no allowance is ever made for fixed costs.

Apart from price considerations, a second factor, the reliability of supply, is certainly important. For many years blackouts have been common in Indonesia, and the PLN now has a bad reputation. Unexpected involuntary stoppages due to blackouts or rationing, as well as voltage drops which damage equipment, can be expensive for industrialists, and as a result it has seemed the sensible thing to do to install one's own generator. Even if managers believed that it was cheaper to purchase PLN power than to generate their own, it seems likely that many would continue to install their own generating units - in the near future at least. The indications are that they would be prepared to pay a premium for security.

The Industry within Indonesia

Tables 6.4 and 6.5 provide information on absolute sales of electricity by area and on per capita consumption. Table 6.4 shows that about 80 percent of sales were on Java, which is slightly less than the proportion sold on Java before World War II. Since only about 65 percent of Indonesia's population live on Java, this distribution of sales implies that the per capita consumption in Java is higher than average. Table 6.5 shows that in per capita terms, Java (with 13.3 kWh sold per capita) is better supplied with electricity than the rest of Indonesia (Sumatra, 8.2 kWh, and All Other, 3.6 kWh).

Table 6.5 also reflects the very slow spread of electricity throughout Indonesia. Per capita consumption at 10.6 kWh per annum was only a little more than double the figure for the whole of the Netherlands East Indies (5.1 kWh)

at the end of the thirties.[1] During the same period per capita annual consumption in Australia, for example, increased by more than 300 percent from about 600 kWh to nearly 2800 kWh.

TABLE 6.4 Sales of Electricity, by Area, 1965-1969
(million kWh)

Year	Java	(%)	Sumatra	(%)	Other	(%)	Total
1965	969	(80)	151	(13)	83	(7)	1204
1966	1005	(82)	149	(12)	70	(6)	1224
1967	974	(82)	143	(12)	77	(6)	1194
1968	987	(81)	155	(13)	79	(6)	1221
1969[a]	1052	(80)	171	(13)	93	(7)	1316

Notes:
a. Estimates.

Source: Figures supplied by Gatrik.

TABLE 6.5 Sales of Electricity per Capita, by Area, 1968

Area	kWh per capita
Java	13.3
Sumatra	8.2
Other	3.6
Total	10.6

Source: Table 6.4 and population estimates from Nugroho, Indonesia Facts and Figures, op.cit.

However because electricity consumption is largely confined to a small minority, an urban elite, annual sales per capita is not a very useful way of looking at elec-

1. See Table 1.12.

tricity consumption.[1] Table 6.6. with comparative data for the ECAFE region shows that in Indonesia, far fewer people have electricity available to them than in most other Asian countries. In Indonesia in 1967, only 76 people per 10,000 were registered consumers, while in India

TABLE 6.6 Number of Customers per 10,000 Population in Selected ECAFE Countries, 1967

Country	Customers per 10,000
Afghanistan	32
Australia	3,280
Ceylon	147
Hong Kong	1,580
India	207
INDONESIA	76
Iran	302
Japan	3,100
Malaysia	502
Singapore	1,034
South Korea	512
Taiwan	1,410

Source: All countries except Indonesia: ECAFE, Electric Power in Asia and the Far East 1967.
Indonesia: Table 6.7.

the figure was over 200, over 500 in Malaysia, and over 3,000 in Australia and Japan. In Table 6.7 the average for Indonesia is disaggregated by area. The Table shows that the number of registered consumers, about 875,000 in 1968, is less than 1 percent of the population, and that the percentage varies quite widely between Java, Sumatra and the other islands - if variations at such a low level mean much at all. The average figure of less than 1 percent suggests that probably not more than 5 percent of the total population live in

1. The household of an average Australian family, for example, would often consume 13 kWh (the average annual per capita consumption in the public sector in Java) daily.

TABLE 6.7 Number of Registered Customers, and Number per 10,000 Population, by Area, 1961-1968

Year	Number of Registered Consumers ('000)				Number per 10,000 Population			
	Java	Sumatra	Other	Total	Java	Sumatra	Other	Total
1961	n.a.	n.a.	n.a.	741.2	n.a.	n.a.	n.a.	76
1962	n.a.	n.a.	n.a.	771.6	n.a.	n.a.	n.a.	77
1963	n.a.	n.a.	n.a.	790.9	n.a.	n.a.	n.a.	78
1964	n.a.	n.a.	n.a.	803.3	n.a.	n.a.	n.a.	77
1965	646.3	100.0	68.4	814.7	93	57	34	76
1966[a]	652.4	107.7	71.3	831.4	92	60	34	76
1967	664.0	118.6	68.5	850.2	91	65	32	76
1968	673.7	121.4	79.6	874.7	91	65	36	76

Notes:

a. Number of registered consumers in Other (and therefore Total) section are estimates.

Source: Figures for number of consumers supplied by PLN; population figures from Nugroho, Indonesia Facts and Figures, op.cit.

dwellings to which electricity is connected.[1]

Table 6.8 presents data on regional variations in the structure of demand for 1967 and 1968. The Table shows that the variations between Java and the Outer Islands are small. The proportion of electricity sold to industrial consumers appears to be somewhat lower in the Outer Islands than in Java, the proportion sold for domestic use perhaps slightly lower, and the proportion for commercial use rather higher. But the absolute smallness of sales in each category means that the relationship between different classes, especially in the Outer Islands, could change quickly within a few years, or be significantly distorted by statistical errors.

Since per capita sales are so low and such a small percentage of the total population is involved, it will give a clearer picture of patterns of consumption if we use figures on sales per consumer. Table 6.9 provides figures on this for selected ECAFE countries and once again the position in Indonesia is worse than that in most neighbouring countries. While each Indonesian consumer received on average about 1,360 kWh in 1967, the average for the area as a whole was over 5,200 kWh. It is thus clear that the low per capita consumption is caused not only by low proportions of consumers in the population, but also by the fact that the average Indonesian consumer used comparatively little electricity.

Information on growth in sales and number of consumers, disaggregated for the lighting and industrial groups is available, and is presented in Table 6.10. This Table is interesting for two reasons. In the first place, it shows how growth in total electricity consumption has been com-

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1. Even allowing for thefts of electricity, this is probably still true. In fact a good deal of stolen electricity is taken by registered consumers, who in one way or another manage to bypass their meters or automatic circuit breakers.

TABLE 6.8 Energy Sales in Indonesia, Percentage Distribution by Class of Service, 1967 and 1968

(%)

Class	1967			1968		
	Java	Other	Total	Java	Other	Total
Domestic Light & Power	55	53	55	57	54	57
Commercial Light & Power	24	30	25	22	30	23
Industry	20	14	19	20	15	19
Other[a]	1	2	2	2	2	2
Total	100	100	100	100	100	100

Notes:

a. Street lighting only.

Source: Calculated from figures supplied by PLN Central Office.

pounded of increases in both the number of consumers and in average consumption per consumer. It is noteworthy that average consumption per consumer was still as low as 1,380 kWh in 1968, since this means that in the 28-year period from 1940, the improvement has been only about 20 percent. The increase in sales of about 230 percent over the period has resulted mainly from an increase in the number of consumers of about 180 percent. The Table also suggests, though less strongly, that the same effect has operated in the eight years from 1960 to 1968. The increase in sales over the period was mainly accounted for by an increase in the number of consumers.

In the second place, the disaggregated figures show the changing pattern of demand from the different consumer groups over the eight years. It is surprising to find that the 40 percent growth in sales over the period was accounted for by a sharp rise of almost 70 percent in demand from the lighting sector and an actual fall of

TABLE 6.9 Average Annual Consumption per Consumer, Selected ECAFE Countries, 1967
(kWh per annum)

Area	Average Consumption
ECAFE (Whole Region)[a]	5,220
Australia	8,500
Ceylon	2,620
India	3,080
INDONESIA	1,360
Japan	5,600
Malaysia	4,720
South Korea	2,560
Taiwan	4,020

Notes:
a. Some countries not included (see source).
Source: As for Table 6.2.

about 16 percent in demand from industry! This, despite the fact that time and time again during the last decade policy makers have stressed the need to increase the share of sales going to industrial consumers. What is the explanation for this apparent change in the pattern of consumption, involving a fall in the proportion of sales to industry from about 30 percent in 1960 to about 20 percent eight years later?

Table 6.10 shows that both a fall in the number of industrial consumers and a fall in their average consumption contributed more or less equally to the drop in the industrial share. Because of the basic unreliability of the data, the possibility should be borne in mind that the figure given for sales to industry in the base year (1960) may be particularly unreliable.[1] This would naturally also affect the

1. Sales to industry fell from 262 million kWh in 1960 to 196 million kWh one year later, before rising to the 208 million kWh reported in Table 6.10. It seems unlikely that sales would fluctuate as widely as this, and so the data on which the Table is based may be suspect.

TABLE 6.10 Electricity Sales, Number of Consumers and Average Consumption, by Consumer Group, 1940 and 1960-68

Category	1940	1960	1962	1964	1966[a]	1968	% increase 1940-68	% increase 1960-68
SALES (million kWh)								
Lighting	n.a.	587	757	848	975	980	n.a.	+67
Industry	n.a.	262	208	221	220	224	n.a.	-16
Total	364	845	965	1,069	1,195	1,204	+231	+42
CONSUMERS (thousands)								
Lighting	n.a.	683.7	762.8	794.0	825.1	867.1	n.a.	+27
Industry	n.a.	8.2	8.8	9.3	7.5	7.6	n.a.	- 7
Total	315.7	691.9	771.6	803.3	832.6	874.7	+177	+26
AVERAGE (kWh/consumer)								
Lighting	n.a.	860	990	1070	1180	1130	n.a.	+31
Industry	n.a.	31,840	23,520	23,870	29,300	29,340	n.a.	- 8
Total	1,150	1,220	1,250	1,330	1,440	1,380	+20	+13

Notes:

a. Approximate.

Source: Figures for sales and number of consumers:

1940: Table 1.5.

1960-68: Figures supplied by PLN Central Office.

Average: calculated from other data in the Table.

average for that year. Nevertheless, even if this is so, the figures for the number of industrial consumers appear to be internally consistent, rising steadily between 1960 and 1964 before falling rapidly until 1966.[1] It seems clear that there has been an absolute as well as relative decline in the number of industrial consumers. This surprising phenomenon has to be accounted for.

The decline in the number of industrial consumers is rather difficult to explain. Sales to industry during the period after 1964 were more or less constant, so the decrease in the number of consumers implies a steady increase in the kWh sold per consumer. Perhaps power consumers who were disconnected were very small ones with a low average annual consumption. Alternatively, they were of at least average size, but as they left the consumption of other firms rose. Either explanation is plausible. All we know is that during the post-1964 period, over one-and-a-half thousand industrial consumers were disconnected, presumably because they were experiencing economic difficulties and closed down, or because they were installing their own plant.[2]

Table 6.11 contains more detailed information on consumption patterns within the electricity sector for 1968. It shows the number of consumers in each category, the amount of electricity that each group consumed, and their average consumption. In addition, the Table includes available information on V.A. per consumer, which is the maximum load (often expressed as watts)[3] that a consumer can demand at any time. Many consumers are limited to a low V.A. load, and if they exceed this amount, electricity is automatically cut off through the operation of a circuit breaker which has to

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1. Full data is not shown in the Table.
2. An alternative explanation is that industrial consumers were systematically reclassified into the lighting groups, perhaps in order to take advantage of the lower prices. There is no evidence to suggest that this occurred.
3. Watts = Volts (V) X Amps (A).

TABLE 6.11 Official Electricity Consumption in Indonesia, by Class of Service, 1968

Class	No. of Registered Consumers ('000)	(%)	Sales (million kWh)	(%)	VA/ Consumer	kWh/ Consumer
Small Domestic	644.7	74	413	34	140	640
Medium Domestic	136.0	16	200	17	840	1470
Large Domestic	7.1	1	41	3	4140	5860
Churches, Mosques, Etc.	5.3	1	27	2	2820	5180
Commercial	56.8	6	113	9	1340	1990
Public Uses	17.3	2	186	15	4030	10770
Industry[a]	7.6	1	224	19	15600	29300
All Indonesia	874.7	100	1204	100	680	1380

Notes:

a. Industry data not entirely complete.

Source: Figures supplied by the Central Office of the PLN.

be reset before they can receive electricity again.[1]

It is important to remember that because of strict rationing the level of sales does not reflect what consumers want so much as what is available. Changes in the pattern of sales are frequently caused by involuntary restrictions (such as blackouts) on the supply side. A further problem arises because of the very high proportion of unmetered consumers. The DPCS team reported that in 1963, in the Kali Konto system in East Java and in the Ketenger system in Central Java, over 80 percent of the total number of consumers were unmetered.[2] Consumption by unmetered consumers is estimated on the basis of arbitrary assumptions, and it is

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1. Limiting the amount of wattage (V.A.) available to a consumer is an unusual practice in most countries, since electricity companies are usually eager to encourage additional consumption. Further, the wattage available to many Indonesian consumers is exceptionally low - frequently 100 watts or less (this would be sufficient to light only four 25 watt bulbs). One of the most frequent methods of stealing electricity in Indonesia is for consumers with low wattages to require the connections to their houses. This simple operation can mean that all wattage restrictions on their consumption are removed, and that they can consume virtually as much electricity as they wish. Since most consumers with low wattages are unmetered and are simply charged a fixed monthly rate, the PLN has no way of telling (apart from a close examination of the customer's wiring system) that extra electricity is being consumed. The illegal connections might remain undiscovered for years.

2. The degree and pattern of use of meters is shown in the following example of the position in the Kali Konto System in 1963:

User Class	Number of Customers	Max. Use Limited to:	Average Hourly Use
Residences	51,000	30 to 75 watts	Unmetered
Residences	56,836	100 to 200 watts	Unmetered
Shops	20,873	250 to 1000 "	29 watts
Industries	1,847	Over 1500 "	3275 watts
Street Lighting	65	-	Unmetered

Source: DPCS report, op.cit., p.64.

quite possible that as a result of this practice, overall legal consumption is underestimated.

Table 6.11 shows that the vast majority of consumers (74 percent) are included in the "small domestic" category, and that the average maximum (legal) load available to this group is 140 V.A.[1] The average consumption of this group, limited as it is because of quantative rationing, is relatively low at 640 kWh per year. This means that the share of the "small domestic" group in total sales is lower than their numbers might imply.

The "medium domestic" group (containing 16 percent of consumers) possessed on average 840 watts, and being therefore comparatively well supplied had an average yearly consumption of about 1,470 kWh and consumed about 17 percent of total sales.[2] The "large domestic" section which contains only about 7,100 consumers is for a small elite with over 4,000 watts, enough to run an air conditioner as well as most other domestic appliances, and had an average annual consumption of 5,860 kWh.

The two other significant groups in terms of sales are the "public uses" and "industry" sections, receiving 15 percent and 19 percent respectively. The public uses category includes street lighting, government institutes and departments, as well as state enterprises (including banks), of which the second group consumes by far the most electricity.

The industry group also stands out as a large power user in the Indonesian context, although an industrial consumer of modest size in most countries of the world would use far more than 29,300 kWh per year, the Indonesian average for this group. By way of illustration, some examples of electricity consumption per unit of production in India in the early

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1. In practical terms this means that a house could simultaneously use, say, six 15 watt bulbs (90 watts) and a small radio requiring no more than 50 watts, giving a total at any particular time of 140 watts.

2. 840 watts would be sufficient to run a small refrigerator (150 watts to 200 watts), a small iron (500 watts) or a television set (150 watts), although clearly not all at the same time since the maximum load would exceed 840 watts.

sixties are presented in Table 6.12.[1] A consumption at the Indonesian level of, say, 30,000 kWh implies an annual production of about 500 tons of plastic or sugar, 250 tons of cement, or only 150 tons of soap. In each case, the output would be only a fraction of the output of a medium sized factory in most countries.[2]

But the figures in Table 6.11 give no indication of the variations between different areas. One wonders whether consumers in the Outer Islands are as well supplied as those in Java, and whether within Java there are significant differences. Table 6.13, which contains detailed data on sales per consumer throughout Indonesia, shows that the Western-West Java area (which includes Djakarta) is well above the all-Indonesia average and also above the average for the rest of Java for most types of consumption. The Table also shows that Java as a whole, mainly under the influence of Western-West Java, is slightly above the Outer Island averages.

Table 6.13 suggests that a more significant way of disaggregating consumption figures might be by rural and urban areas. Detailed figures are not available; but an attempt is made in Table 6.14. It emerges clearly that electricity consumption is mainly an urban phenomenon, since 52 percent of registered consumers and 64 percent of sales on Java are in five main towns, Djakarta, Bandung, Semarang, Surabaja, and Malang. Djakarta accounts for a very large total (84 percent) of sales in the Western-West Java area. If Bogor was included, the figure would probably rise to over 90 percent. Bandung accounts for just over half of the sales in the Eastern-West Java area, while the two cities of Surabaja and Malang together account for two-thirds of the sales in East Java. To the extent that thieving is higher in the

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1. These technical co-efficients vary considerably from country to country and according to the average size of factories, but they are sufficient for the purpose of illustration.

2. Small cement and soap plants normally would produce 50,000 tons of cement and over 1,000 tons of soap per year respectively.

TABLE 6.12 Electricity Consumption per Unit of Production in Some Selected Industries in India in the Early '60s

Industry	kWh/ton of production
Petroleum (refining)	35
Sugar	60
Bicycles (including small sector)	15
Cement	120
Soap (organised sector only)	200
Newsprint & security paper	650
Paper and paperboard	1,800
Fertilisers	
(a) nitrogenous (electrolytic process)	16,000
(b) phosphate	450
Alloy Steel	1,250
Copper	3,000

Source: ECAFE, The Role and Application of Electric Power in the Industrialization of Asia and the Far East, 1965, p.55.

cities - and there is some evidence to suggest that it is - the proportion of electricity actually consumed (as opposed to sold) in the cities would be still higher.[1]

1. That thieving is more common in the large cities tends to be supported by the fact that higher than average losses are recorded in the cities. A comparison between losses in Bandung alone and the whole of the Eastern-West Java Regional Board area for six months, April - September 1969 inclusive, is shown in the following Table:

Percentage losses in Eastern-West Java

	Bandung alone	Whole Area	Excess in Bandung
April	18.7	13.5	5.2
May	16.1	13.1	3.0
June	22.1	15.5	6.6
July	22.7	16.5	6.2
Aug.	19.7	13.7	6.0
Sept.	20.6	13.1	7.5

Source: Figures supplied by Central Office of the PLN.

TABLE 6.13 Official Consumption of Electricity per Consumer in Indonesia by Area and Class of Service, 1968 (kWh per annum)

Class	West West Java	East West Java	Central Java	East Java	Sumatra	Other	All Indonesia
Small Domestic	950	680	560	540	640	550	640
Medium Domestic	1,910	1,400	1,420	1,170	1,030	1,110	1,470
Large Domestic	5,480	5,660	10,210	6,440	4,050	5,310	5,860
Churches, Mosques, etc.	8,770	4,840	5,100	5,160	4,090	3,930	5,180
Commercial	3,680	1,960	1,680	2,520	1,260	1,070	1,990
Public Uses	20,490	13,070	9,140	12,180	7,680	6,660	10,770
Industry[a]	119,800	26,370	12,010	48,600	22,280	6,800	29,300
Total	2,290	1,320	1,020	1,260	1,310	1,040	1,380

Notes: a. Industry data not entirely complete.

Source: Calculated from figures supplied by PLN Central Office.

TABLE 6.14 Concentration of Consumption in Five Main Cities in Indonesia, Dec. 1968-Jan. 1969[a]

Area	Number of Consumers ('000)	(%)	kWh Sold (millions)	(%)
Djakarta	99.4	71	23.2	84
Whole of West-West Java	140.5	100	27.7	100
Bandung	72.7	44	20.1	52
Whole of East-West Java	163.9	100	10.4	100
Semarang	58.4	35	5.1	37
Whole of Central Java	165.4	100	13.8	100
Surabaja	82.5	41	11.9	50
Malang	37.6	19	3.8	16
Whole of East Java	202.9	100	23.7	100
Five Towns	350.7	52	54.4	64
All Java	672.7	100	85.3	100
Five Towns	350.7[b]	40	54.4	54
All Indonesia	874.7	100	101.5[c]	100

Notes:

a. For West-West Java region and Djakarta, figures are for December 1968. Other figures (except where noted) are for January 1969.

b. End of 1968.

c. Estimated sales for one month of 1968.

Source: Calculated from figures supplied by PLN Central Office.

Summary and Conclusions

Firstly, in international terms levels of per capita and per consumer consumption are very low - amongst the lowest in the world - and the rate of growth of consumption since 1950 has been very indifferent. It seems clear that this has been due to constraints on the supply side: the evidence is that even at higher prices, demand for electricity would be considerably higher were it not for the strict quantitative rationing that occurs through restrictions on new connections, limitations on the wattage available to customers, frequent

blackouts, and drops in voltage.[1]

Secondly, the structure of demand is most abnormal, with lighting making up a much higher proportion and industry a much smaller proportion than is usual in the public sector in other countries. One's first reaction to the pattern (and certainly a reaction which is implicit in public attitudes in Indonesia) might be that at least it reflects egalitarian principles, since small consumers make up a large percentage of the total number and receive one-third of all sales. But this would be a distortion of the picture because of the very small number of people in Indonesia to whom electricity is available. Even though the small consumers do receive a significant proportion, they are still only a small and privileged section of the total population. The vast majority of the Indonesian people at present receive little or no benefit from the existence of electricity in Indonesia.

The abnormal structure of demand has a number of important implications. One effect is that electricity produced in the public sector is mainly for immediate consumption. In most countries a good deal of the electricity generated in the public sector is used for productive purposes. The distinction is equivalent to that usually made between con-

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1. The effect of quantitative rationing is particularly clear in the small domestic group. The assumption used by the PLN that consumers take the maximum load available to them for 400 hours per month, or about 13 hours per day, which is probably a conservative one (and has recently been increased to 500 per month), suggests a particularly intensive use of available supply. The main demand from this category is for lighting purposes, and the figures imply that a large proportion of lights are left burning throughout the whole of the darkness hours and often during the day. That this is in fact so is obvious to casual visitors to Indonesia who often remark on the many lights on the outside of houses and buildings that one sees switched on during the day. Since the marginal cost to an unmetered consumer of taking additional electricity is zero, it is probably only the lack of consumer durables (such as radios), which are often used during the day that prevents the demand from unmetered groups from rising to an even higher level.

sumption and investment goods.[1] The problem of allocating available savings between investments in the consumption goods sector and in the producer goods sector is one that all governments must face. The danger that arises in Indonesia is that investments which are intended to expand the producer goods sector will lead to an expansion of what is, de facto, the consumer goods sector. In other words, economic planners may, because of ignorance about the structure of demand or (more likely) optimistic assumptions about future changes in the structure of demand assume that investments in electric power are mainly investments in the producer goods sector.

Indeed this has probably already occurred in Indonesia. Throughout the whole of the post-war period electricity policy makers have repeatedly declared that the share of electricity used for productive purposes must increase quickly. One argument advanced in favour of investment in electricity has been that it would encourage industrial development. Thus economic planners, assuming that expansion in the electricity sector would tend to benefit industry, have probably favoured electricity more than they otherwise would have done. As Table 6.10 showed, during the past decade the share of PLN sales going to industrial consumers has probably actually fallen from what was already a remarkably low level.

A further effect of the high proportion of electricity used for lighting, combined with the concentration of consumption in the towns, is that there is particularly strong social and political resistance to increases in electricity prices. The electricity industry can increase revenue at

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1. As Gunnar Myrdal points out, "... there is a serious conceptual problem with respect to government 'consumption' since there is little possibility of distinguishing clearly between consumption and investment expenditure in the budget of the public sector." Asian Drama: An Inquiry into the Poverty of Nations, Pantheon, 1968, p.532. Clearly electricity used for lighting is an important component of human investment if it is used, for example, in educational institutions. We will leave aside such complications in our discussion.

the expense of lighting (mainly household) consumers, or power (industry) consumers, or both. Certainly experience over the past decade suggests that power consumers are less politically effective in resisting price increases than lighting consumers, since it is the power consumers who have borne much of the brunt of increased prices until recently. But there is a limit to the extent that the small number of power consumers can be squeezed. Any substantial further increases in the average price of electricity will have to be borne by lighting consumers. As we shall see in Chapters 12 and 13, it has always been extremely difficult for the PLN to raise sufficient revenue, and the structure of demand has been a contributing factor.

Another consequence of the unusual structure of demand is that load factor problems are exacerbated. Principally because of the tendency to leave lights burning during the daylight hours, the load factor on powerplants is higher than one would expect with so imbalanced a structure of demand. Paradoxically this is not a satisfactory position, since the high load factor only occurs because electricity is being wasted during the day. In most countries electricity managers are constantly striving to increase load factors and thus improve utilisation of capacity. In contrast, in the short run a worsening of the load factor would be an improvement in Indonesia, since it would indicate that electricity was being used more economically during the day. If the practice of wasting electricity during daylight hours could be stamped out, the industry would then find itself faced with a particularly bad load factor, which could only be efficiently improved in the longer run by attracting more power-using consumers into the networks.

The final main observation we can make in reviewing developments on the demand side relates to the way that growth has taken place. Growth has been shared fairly equally between different areas. As a result, the lead that Java showed thirty years ago still remains today, and consumption per capita on Java is still well above that in the Outer Islands. The higher level on Java is mainly the result of a higher proportion of consumers in the population,

because within the industry there is only a small variation in average consumption per consumer between Java and the Outer Islands. It is somewhat surprising to find that over the past thirty years growth in sales has been caused mainly by an increase in the number of consumers. The average consumption per customer has risen only slightly. It is also clear that most of the increase has occurred in the main towns. Electricity consumption is mainly an urban phenomenon as far as the public electric supply sector is concerned, and in the rural areas very little electricity is available.

CHAPTER 7 Investment Planning and Implementation

Introduction

The problems of investment choice that the electric supply industry faces should be seen in the context of a wider series of investment choices that are made in all economies, one way or another. At the highest level, an allocation of currently available resources has to be fixed between investment and consumption purposes - i.e., the rate of capital accumulation must be decided upon. A further choice must be made about the allocation of capital resources between consumer, intermediate and capital goods industries. A third choice fixes the amount of capital that is made available to each industry within the broader categories.

Of course these subdivisions are oversimplified, since many industries are not obliging enough to fit nearly into these categories.[1] What is important to us here is that as a result of this series of decisions (however they are made), a certain amount of investible resources is made available to the decision makers in the electricity industry, and it is usually only at this lower level that the planners within the industry have a substantial say.

This is not to say that electricity planners in Indonesia do not try to influence the total amount of resources made available to them - they do, and an important part of the discussion in this and the following two Chapters will be about the efforts of the electricity planners to obtain additional capital. This issue is worth taking up since a discussion of the manner in which additional funds have been attracted to the electricity sector will throw light on the factors which have determined the overall allocation of investment within Indonesia during the past two decades, and especially during the sixties.

Since the following discussion will attempt to isolate the reasons for the particular investment pattern that came about, it is inevitable that we will touch on "non-

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1. For example, we saw in the previous Chapter that contrary to the position in most countries, the Indonesian electricity industry is mainly a consumer goods industry.

economic" issues. Indeed implicit in our discussion of investment policies will be the argument that investment in the industry has been more a function of such non-economic variables as domestic and foreign political influences, than of "normal" economic variables such as the rate of interest on borrowed capital and the expected future return on capital. We are a long way from the marginal efficiency of capital here! A narrower economic analysis would give higher priority to such issues as the important question of whether Indonesia has been justified in developing her electricity industry, or whether investment elsewhere would have been a wiser use of her scarce resources. The usual economic analysis would then attempt to measure whether the expansion of the industry has contributed to an increase in national wealth and GNP by comparing the rate of return earned in the industry and the rate of return earned by the most profitable extramarginal investment elsewhere. In the absence of sufficiently detailed and reliable figures on costs of investments and operation, and in the presence of strictly controlled prices, any such attempt to measure the rate of return on investment in the Indonesian electricity industry could be nothing more than a mathematical exercise.[1]

The following section, therefore, will first trace out the actual pattern of investment, and then analyse the factors that led to this pattern. After surveying the position in the early fifties when the industry was recovering from the effects of the war, we will turn to the various expansion plans that have been prepared, discuss the factors that influenced the drawing up of those plans, and the problems of implementation.

Post War Patterns of Investment

Table 7.1 and Figure 7.1 show the expansion of total installed capacity after the war. The Figure also provides data on expansion in the different generation sectors and shows net changes. Between 1953 (when the pre-war level of capacity was regained) and 1960, there was an

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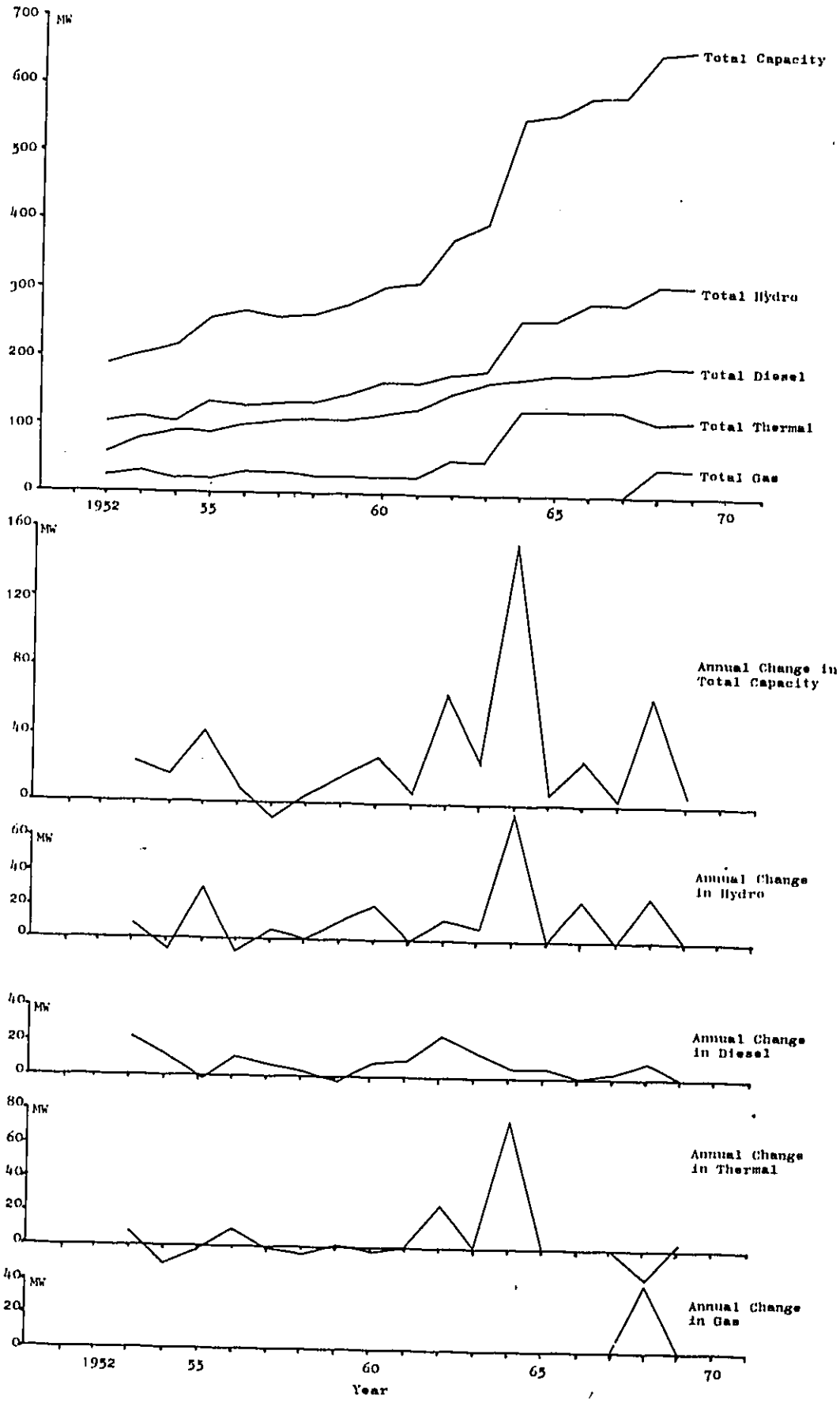
1. For an example of a worthwhile exercise of this kind, see William A. Johnson, The Steel Industry of India, Cambridge, Mass., Harvard U.P., 1966, Chapter 6.

TABLE 7.1 Changes in Total Installed Capacity in the Public Electricity Sector, 1946-1969

Year	Absolute Increase over Previous Year (MW)	Increase over Previous Year (%)
1946	0	0
1947	3	2
1948	0	0
1949	3	2
1950	13	8
1951	3	2
1952	-1	-1
1953	23	13
1954	16	8
1955	41	19
1956	8	3
1957	-9	-3
1958	5	2
1959	15	6
1960	27	10
1961	6	2
1962	64	21
1963	24	6
1964	155	39
1965	6	1
1966	27	5
1967	3	1
1968	63	11
1969	6	1

Source: Calculated from Table 5.1.

FIGURE 7.1 Total Installed Capacity and Annual Changes, by Prime Mover, 1952-1969[a]



Source: Total Capacity: Table 5.1.
Changes in Total Capacity: Table 7.1.
Capacity and Changes in Capacity by Prime Mover: Table 5.8.

Notes:

a. Figures for Total Capacity and for Capacity by Prime Mover are from different sources and do not tally exactly.

increase of about 50 percent in installed capacity. Almost all of the increase was in hydro and diesel capacity, and appears to have consisted mainly of a large number of small expansions and improvements to already existing plants. Until the end of the decade, the industry was still recovering from the events of the forties.

Because there is always a long gestation period between the initiation of a large electricity generation project and its completion, most sizable increases in capacity are the result of decisions taken perhaps five years earlier, or even more. The substantial increases in capacity that took place in Indonesia in the sixties were therefore the result of plans laid in the fifties. Work on the comparatively large 125 MW Djatiluhur hydro plant began in the fifties, and towards the end of the decade negotiations were opened for the construction of three substantial thermal plants near Djakarta, Semarang and Surabaja. Two aid schemes supported by America and Czechoslovakia involving the installation of numerous small diesel plants were also discussed. In the sixties some of these decisions came to fruition. As Table 7.2 shows, most of the expansion since 1960 has resulted from the completion of five main projects: Djatiluhur, the Tandjung Priok and Tandjung Perak thermal stations, the scattered diesel plants program, and the purchase of three gas plants. In this and the following two Chapters, we will therefore give special attention to the factors that led to the selection of these projects.

Since independence, three main long term development plans have been prepared by Indonesian governments. These three occasions each provided an opportunity for the preparation of a long term strategy for the development of the electricity industry. The relevant section of each of the Plan documents was drawn up on the basis of advice from the managers of the electricity sector. Thus these sections provide a summary, albeit rough, of what the officials were planning. It will be convenient to discuss their investment decisions by considering each of the development plans.

As we saw in Chapter 2, post-war recovery was sluggish. Until the preparation of the First Five Year Plan in the mid-

TABLE 7.2 Main Changes in Generating Capacity, 1960-1969[a]
(MW)

Year	Diesel	Thermal	Hydro	Gas	Total (excluding diesel)
1960	↑	-	-	-	-
1961		-	-	-	-
1962	Scattered Diesel Plants Project (ICA, Czech and Indonesian)	25 (Priok)	-	-	25
1963		-	-	-	-
1964		75 (Priok & Perak)	75 (Dj)	-	150
1965		-	-	-	-
1966		-	25	-	25
1967		-	-	-	-
1968	↓	-	25 (Dj)	42 (3 x 14)	67
1969		-	-	-	-
Total shown in Table	45	100	125	42	312[b]
Total over period[c]	86	87	167	42	382

Notes:

a. Dj = Djatiluhur; Priok = Tandjung Priok; Perak = Tandjung Perak.

b. Including 45 MW of diesel.

c. See Table 5.8.

Source: Table 5.8 and information supplied by the Central Office of PLN.

fifties, rehabilitation of old equipment was the chief concern. One or two studies were carried out in the early fifties by visiting foreign experts who put forward various obvious recommendations, but no long term plans were drawn up.[1] The most substantial of the recommendations was a report drawn up in 1950 for the Export-Import Bank which proposed a five year

1. See, for example, J.G. White Engineering Corp., Economic Report on the Economy of Indonesia, Djakarta, mimeo., 1953, p.106 f.

rehabilitation and development program for the period 1950-54.[1] But the report gave little thought to long term priorities, since it was concerned mainly with the immediate steps that should be taken to effect an improvement in the seriously run down position of the industry. It was really only a list of the most urgently needed improvements.

The Exim Bank report suggested that emphasis should be given to four categories: repairs and overdue maintenance; extension of the distribution systems; investment in new capacity with a short gestation period; and investment in new capacity with a long gestation period that would become operable after the end of the five year period (such as hydroelectric power plants). It did not set quantitative targets, so there was no indication of the rate of growth that the plan considered feasible. A clue to the relative priorities envisaged, however, can be obtained from the recommended allocation of foreign exchange: slightly less than 20 percent on repairs and maintenance; slightly less than 25 percent on both extension of distribution systems and investment in new capacity with a short gestation period; and about 35 percent in investment with a longer gestation period. A good deal of the investment in distribution was apparently planned for the expanding upper class satellite town of Kebajoran, a few miles south of Djakarta. The strategy proposed for generation was to make a start with the expansion of the hydro sector, but also to install a number of diesel units immediately since production in the new hydro plants would not begin for about five years. Extra sources of power were needed urgently, so expansion in the diesel sector was considered justified, even though the cost of diesel-generated electricity was often more than twice that supplied from hydro plants. The development of oil or coal fuel thermal stations was not considered.

The data presented in Figure 7.1 suggests that the broad development strategy proposed in the Exim Bank report was followed. Throughout the whole of the fifties, expansion was almost entirely in the diesel and hydro sectors. Capacity in

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1. Compact-Commission Eximbank-Loan, Paper - NR.25, op.cit.

thermal generating plant in 1960 was no higher than eight years earlier.[1] Most of the new investment expenditure carried out after about 1950, if not all, was provided by the Indonesian government. As we saw in Chapter 2, because nationalisation was imminent the Dutch-owned utilities were unwilling to provide funds for expansion. Other reports confirm that the government provided most of the funds.[2]

The First Five Year Plan

The Five Year Plan issued in 1956 represented the first serious attempt by an Indonesian government to embark on long term economic planning. Other "plans" had been prepared in the decade since independence, but they had of necessity been hastily drawn up by a few men working with poor data, and it was inevitable that they would come to little. In 1952 a team of foreign experts recruited and supplied by the United Nations began arriving in Indonesia, and in co-operation with Indonesian officials in the National Planning Bureau (Biro Perantjang Negara) began to prepare a development plan.[3] Partly because of the many difficulties in drawing up the Plan document, there was a four year delay before the Plan was finally issued in 1956. One of the most serious difficulties, and certainly one which imposed narrow constraints on the range of alternatives open to planners in the power sector, was the lack of data about natural resources. One observer close to the scene, commenting on the

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1. The J.G. White Engineering Corp. study, op.cit., paid some scant attention to the power situation by reviewing the position in West Java. The survey noted that "The present power facilities of the West Java power system, largely Government owned, are in a condition of obsolescence, inadequacy and physical decay. A rehabilitation program should be carried out expeditiously." It was suggested that (1) the Parakan run-of-the-river hydro plant should be expanded to a storage project and its capacity increased; (2) a study of the Tjitarum River area (later to become the site of the Djatiluhur Dam) should be prepared; and (3) a thermal power plant should be built at Tandjung Priok with an initial capacity of 40 MW and an eventual capacity of at least 120 MW.

2. Interview with S, 16 February 1970.

3. For further details, see Benjamin Higgins, Indonesia's Economic Stabilization and Development, New York, Institute of Pacific Relations, 1957, Chapter 2. Higgins was himself one of the team.

four year delay in the preparation of the Plan, explained[1]

> "Perhaps [the] most fundamental [reason for the delay] of all is the lack of detailed knowledge about the Indonesian resource pattern. . The Netherlands East Indies Government showed only limited interest in resources not being immediately exploited by Dutch capital. The resources of the outer islands are scarcely known, and even in Java and Sumatra information is incomplete...The chapter on Mineral Resources in the plan stresses the need for further research. Meanwhile, the collection of new information about Indonesian resources proceeds very slowly. Without knowing what the resource pattern is, and consequently without knowing what the development potential is, the preparation of a development plan is obviously extremely difficult."

Under these circumstances, electricity planners had little alternative but to fall back on whatever data were already available, and this meant relying mainly on surveys and plans carried out by the Dutch before the Second World War.[2]

The Five Year Plan document placed considerable emphasis on power, industry and mining. These sectors together accounted for almost 40 percent of total expenditure in the investment budget, and nearly 60 percent of foreign exchange. The power sector itself was allocated 14 percent of total investment expenditure, half of which was in foreign exchange

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1. Ibid., p.45.

2. The necessity to rely heavily on pre-war Dutch plans was confirmed by a PLN official who worked in the Planning Bureau during the execution of the Plan; interview with U, 19 February 1970. Even as recently as 1968, in a paper prepared for an ECAFE conference, two high PLN officials in speaking of the need for more survey work to be done wrote "Available data at present are mostly pre-war data which are not up-to-date." See Ahmad M. Hoesni and A. Arismunandar, "Surveys and Planning for Development of Energy Resources in Indonesia," in Ahmad M. Hoesni et al., Beberapa Aspek Persoalan[2] Ketenagaan Negara[2] E.C.A.F.E.dalam Hubungannja dengan Indonesia [Several Aspects of Power problems in E.C.A.F.E. Countries which are relevant to Indonesia], Djakarta, mimeo., monograph No. 02-EREP-68, from the Lembaga Masalah Ketenagaan, July 1968, p. 6.

(which was nearly 20 percent of all planned investment in foreign currency).[1] In physical terms, the Plan targets were that capacity in the public electricity sector should rise by 128 MW, from 247 MW to 375 MW, while production was expected to increase by over 400 million kWh from 890 to 1,300 million kWh (see Table 7.3). This implied an average annual rate of growth of about 8.7 percent in capacity and about 7.7 percent in production.

TABLE 7.3 Capacity and Production in 1955 and Targets set in the First Five Year Plan, and Cost of Expansion

Area	Cost (million Rp)		Capacity (MW)		Production (million kWh)	
	Total	Foreign Exchange[b]	1955 Actual	1960 Target	1955 Actual	1960 Target
W. Java[a]	566.5	645.0	101.5	129.5	391.9	541.8
Cent. & E. Java	770.0		94.0	154.0	316.4	448.0
Sumatra	290.0	152.0	27.0	42.0	110.4	155.0
All Other	123.0	82.5	22.5	37.5	72.6	143.0
Total	1749.5	879.5	245.0	363.0	891.3	1287.8
Increase				118.0 (48%)		396.5 (44.5%)

Notes:

a. Not including transmission costs.

b. Included in total.

Source: Compiled from information given in Garis-Garis Besar Rentjana Pembangunan Lima Tahun, 1956-1960, op.cit., Chapter 4.

1. Indonesia, Biro Perantjang Negara, Garis-Garis Besar Rentjana Pembangunan Lima Tahun, 1956-1960, [Broad Outlines of the Five Year Development Plan, 1956-1960] Djakarta, 1956. See also Higgins, op.cit., where considerable detail is provided on the Plan, and the same author's article "Indonesia's Development Plans and Problems," Pacific Affairs, XXIX(2), June 1956.

Closer examination of the Plan document suggests that the section on power, at least, was drawn up in a careless manner. In the first place, as Table 7.3 shows, the regional breakdown of planned capacity expansion added, inexplicably, to only 118 MW rather than the 128 MW stated in the Plan. Secondly and more importantly, although a list of projects was included and the emphasis was on construction of new plants and not merely rehabilitation, details were left surprisingly vague for a document which according to Higgins was drawn up with care. The simple truth seems to be that at that stage, the long term development of electricity had received very little thought.

What was needed was an appraisal of the existing power position, and the laying down of medium (five year) targets which were compatible with feasible long term goals chosen to allow a respectable long term growth rate. It would have been desirable to consider the various alternative broad lines of development open to the industry - i.e., how the proportion of total output from thermal, hydro and diesel plants should be varied over time.

In contrast to this sort of approach, no clue was given to the criteria applied in selecting the development projects. The impression is of a "shopping list" of projects, included because the Dutch had vague plans for their execution before the war, or because the planners hoped that they would appeal to foreign aid-givers. Certainly there is no indication that any serious study was undertaken of the economic costs and benefits of different projects.

The Plan was also vague about other matters, such as completion dates, which were set in some cases but not in others, and the investment program for associated transmission and distribution facilities. On the first point, most of the largest projects mentioned (the Djatiluhur, Kiara and Asahan hydro plants and a thermal plant at Semarang) were not expected to be completed until the Second Plan period. Apart from mentioning that funds were being set aside for these projects, no details were given. The failure to consider investment in transmission and distribution was particularly serious. Without suitable accom-

panying expansion in the other sectors, expansion in generation could only lead to a sectoral imbalance which would very probably limit the effective use that could be made of the new generating facilities. A rough rule of thumb sometimes used in the electricity industry is to allow $1 of investment in both the transmission and distribution sectors for each $1 in investment expenditure in generation, so the investment funds required for balanced expansion in transmission and distribution were considerable.

In the case of West Java, where only about 30 MW was expected to be added during the Plan period but where another 300 MW was expected to come into operation early in the sixties, no allowance at all appears to have been made for improvement in transmission or distribution facilities. A comparatively large amount of expenditure was set aside for an interconnected transmission system in East and Central Java, and it may be that part of this was planned for West Java also. Nevertheless, to leave the matter so vague did not augur well for the future.

In the event, the Plan had no perceptible effect on development in the power sector. According to official data, from the end of 1955 to the end of 1958 capacity hardly increased at all. In 1960, capacity had risen to 304 MW, an increase of only about 40 MW during the five year period, or about one-third of that planned for. The increase in production told a similar story. To all intents and purposes, the plans for the electricity sector appear to have been shelved shortly after they were announced.

In 1959, a report on progress of the Five Year Plan up to the end of the third year attempted to reconcile actual events with the original Plan. In fact, this review revealed very significant changes in the overall position.[1]

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1. Indonesia, Biro Perantjang Negara, Laporan Pelaksanaan Rentjana Pembangunan Lima Tahun 1956-1960 - Mengenai Tahun-Tahun 1956, 1957 and 1958 [Report on the Execution of the Five Year Development Plan 1956-1960 - for the years 1956, 1957 and 1958], Djakarta, 1959, Chapter VI.

In an important clarification, it was made clear that wherever possible, as a result of a preference expressed by the National Development Congress (Musjawarah Nasional Pembangunan, or Munap), future emphasis would be on the development of large scale hydro sources of power. This preference was reflected in the projects "which would be developed" (no time period was mentioned) - on Java, out of a proposed total increase of 460 MW, nearly 320 MW was to be in hydro.

Another important change, and one which clearly suggests that the original plans had fallen to pieces, was an announcement that of the total proposed original expenditure of Rp 1,750 million, over Rp 1,200 million would be spend on the Asahan project in North Sumatra. This, the report pointed out, meant that the proposed increase in capacity during the Plan period of 128 MW would have to be paid for out of the remaining Rp 545 million. The original Plan had proposed that less than Rp 300 million would be spent in Sumatra, that only Rp 150 million would be spent on the Asahan project, and that the project would not be completed until the Second Five Year Plan period. Considering that it was originally planned to spend over Rp 1,300 million in Java alone (See Table 7.3), to cut back all expenditure other than that on Asahan to Rp 545 million was a drastic revision indeed to the original Plan.

In what was in effect a third major change, the report admitted that the execution of many of the projects was not proceeding well and that only about one-third of the original planned expenditure had been realised. Nearly all of this was in domestic currency, because of the original total of Rp 880 million available in foreign exchange, only Rp 16 million had been spent. Further, the continuing inflation meant that even this modest record of achievement gave an overoptimistic picture of progress.[1] The report also gave prominence to a $7 million loan from the United States for the installation of about 30 MW in small isolated

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1. Domestic prices roughly doubled during the three years from the end of 1955 to the end of 1958.

then working in the Planning Bureau, and Prof. Sedijatmo, Head of the Planning and Construction Section of the PLN. It was an important document because it formed the basis of the plans which were subsequently included in the Eight Year Plan and which were partly implemented during the sixties. For the first time, an attempt was made to appraise the existing position and to specify medium and long term goals in the light of government policy about regional balance and about the emphasis to be given to different types of generating capacity.

The planners saw electricity as having an important social role, both in developing backward areas (especially in the Outer Islands) and in encouraging industrial development. One high official, closely involved in the preparation of long run electricity plans at the time, recalled that[1]

> "The two main plans in the period were (a) eventual integrated grid systems, and (b) pioneering schemes designed to stimulate development. It was hoped that there would be high external economies, such as industrial development, increased education since evening study would be possible, and social stability. It was not expected that either of the two main plans would pay in the short run."

Noting that although only about 65 percent of the population lived in Java about 75 percent of electricity production and capacity was in the island, the planners forecast that as a result of economic development in the Outer Islands, the population imbalance would diminish. They therefore suggested that a deliberate decision should be taken to change the regional balance within the industry also. The 1958 plan proposed that by 1980, about 45 percent of capacity should be in the Outer Islands, and argued that this would stimulate migration to these areas.

In urging that priority be given to meeting the needs of industry, the plan pointed out that in the existing circumstances the PLN supplied only about one-fifth of industry's electricity requirements. It was suggested that since electricity was a stimulus to industrial development, it should be provided ahead of demand in places where

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1. Interviews with U, 19 and 23 February 1970.

there was no industry. The target for 1980 was to have 70 percent of electricity sales made to industry and 30 percent to lighting and households.

With these principles in mind and considering the levels of electricity consumption in nearby countries, the plan set per capita targets of 30 watts of capacity and 117 kWh of production for 1980 (compared with 3 watts and 11 kWh per capita in 1958).[1] The planned increases in capacity are shown in Table 7.4. Production in 1980 was

TABLE 7.4 Broad Development Targets Laid Down in September 1958

Period	Capacity (MW)						Total Outlay ($ million)
	Java		Outer Islands		Total		
	Increase	Total	Increase	Total	Increase	Total	
1959-65	203	405	62	125	265	530	106
1965-70	405	810	150	275	555	1085	222
1970-75	568	1378	412	687	980	2065	392
1975-80	684	2062	1000	1687	1685	3750	674

Source: Biro Perantjang Negara dan Kementerian Pekerdjaan Umum dan Tenaga, Rentjana Djangka Pandjang Untuk Pembangunan Kelistrikan, op.cit.

expected to be about 14,675 million kWh assuming an output from each kW of capacity of 5,218 kWh per year.

Another issue on which there was a significant change of emphasis was that of the thermal versus hydro balance. Asserting that Indonesia had adequate stocks of coal and oil, and noting that thermal, diesel and gas power stations have shorter gestation periods than hydro plants, the plan proposed that non-hydro capacity be given preference. It was suggested that of the total planned capacity for 1980 of 3,750 MW, 70 percent be thermal, diesel or gas plants, and only 30 percent hydro. Not only was this policy

1. It was assumed, optimistically, that the rate of population growth would be only 1.7 percent annually.

decision taken on the basis on the superficial reasons listed above, but it was apparently made at about the same time that the progress report on the Five Year Plan mentioned earlier was prepared which, it will be recalled, stressed the development of hydro capacity. This is the more disconcerting since it seems likely that there was a substantial overlap of personnel between the officials preparing each of the two plans, since the number of Indonesians who had the technical expertise to draft these sections was small.

The plan also laid down a rough outline of the required investment expenditures. These were calculated by assuming an expenditure of $400 per installed kW (including associated expenditure in the transmission and distribution sectors), a figure settled upon by the simple method of taking the mean of the average cost per kW of thermal and hydro plants in advanced countries of $350 and $450 (including transmission and distribution).

In a further improvement on the earlier Five Year Plan, precise details of the projects intended to be implemented over the period 1959-1965 were included. These are summarised in Table 7.5. Of the total planned increase of 327 MW, four projects accounted for nearly 220 MW.[1] The scattered diesel

TABLE 7.5 Summary of Development Plan for 1959-1965
(MW)

	Java	Outer Islands	Total
Thermal and Diesel	90	55.4	145.4
Hydro	158.5	22.8	181.3
Total	248.5	78.2	326.7

Source: As for Table 7.4.

1. The Djatiluhur hydro plant (125 MW), the Surabaja (50 MW) and Semarang (25 MW) thermal power plants, and the Tjikalong hydro plant (19 MW).

power plants project accounted for about another 40 MW.[1] There were some significant differences between the list of projects proposed in the September 1958 draft document and the earlier lists appended to the Five Year Plan. The two most striking were the postponement of the Asahan project until the latter half of the sixties, and the disappearance of a large hydroelectric project (200 MW) at Kiara in West Java, for which very few details were ever supplied.

As it turned out, the September 1958 plan was not acceptable to the government. In December 1959 a revised and more modest version was issued which had been rewritten on the instructions of the Vice-Minister for Public Works and Power.[2] While no clear reasons were given for the rejection of the September 1958 plan, some factors underlying the revision were indicated. The plan was considered too ambitious since the expenditures required, especially in foreign exchange, were judged to be beyond the country's capacity. The program proposed for the first five year period until 1965 was accepted by the government, and a similar rate of expansion was acceptable until 1970. But the government hoped that by then the PLN would be able to provide substantial funds for further expansion from its own resources. The revised plan was adopted as the official long term program for the industry. In April 1960, Ir Dipokusumo, the Minister for Public Works and Power, outlined the plan at a seminar on electric power in Bandung.[3]

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1. The detailed list of projects allowed for a total increase in capacity of 327 MW, which was more than 60 MW above the targeted increase during the 1959-1965 period of 265 MW. The plan noted the difference and explained that some of the projects would be carried over and completed after 1965.

2. Tindjauan Kembali Rentjana Kelistrikan 20 Tahun 1960-1980 [A Revision of the 20 Year Plan for Electricity 1960-1980] Djakarta, mimeographed document, 24 December 1959.

3. Dipokusumo, "Perkembangan Teknik Tenaga Listrik di Indonesia" ["The Technical Development of Electric Power in Indonesia"], Prasaran^2 Seminar Pertama Teknik Tenaga Listrik [Working Papers of the First Technical Seminar on Electric Power], Bandung, 1960 [?].

Later, large sections of the December 1959 plan were included word for word in the Eight Year Plan document.

The main differences between the September 1958 plan and the revised version were two. First, the long term targets were scaled down to a more modest level (shown in Table 7.6).

TABLE 7.6 Revised Long Term Development Targets for Electricity included in The Eight Year Plan

Period	Total Capacity (MW)		Total Outlay (Rp billion)
	Increase	Total	
1960-1965	325	595	9.75
1965-1970	325	920	9.75
1970-1975	400	1320	10.0
1975-1980	500	1820	12.0

Source: Tindjauan Kembali Rentjana Kelistrikan 20 Tahun 1960-1980, op.cit., and Indonesia, Biro Perantjang Negara, Lampiran Ketetapan M.P.R.S. No.: 11/MPRS/1960. Garis-Garis Besar Pola Pembangunan Nasional-Semesta-Berentjana tahapan pertama 1961-1969, [Djakarta, 1960].

The earlier capacity target for 1980 of 3,750 MW was replaced by a much lower target of about 1,800 MW. In line with this, smaller additions to capacity were set for each of the five year periods.[1] Second, a more realistic approach was taken towards costing, and the expenditures allowed for per kW were increased substantially. In the first five year plan period (1960-1965) an expenditure of Rp 9.75 billion (about $215 million) was envisaged, or Rp 30,000 per kW (about $660).[2]

1. A perusal of Tables 7.4 and 7.6 might suggest that the target for expansion of capacity in the first five year period was raised from 265 MW in the September 1958 document to 325 MW in the December 1959 paper. In fact this was not so, because of the contradictions within the former plan on this point. As noted earlier, although the 1958 plan in one section set a targeted increase of 265 MW, in other sections of the plan projects were listed for completion during the period which totalled 327 MW. (See footnote 1. on p. 223.)

2. Including expenditure on transmission and distribution. (The official exchange rate of Rp 45 = $1 is being used here.)

It was expected that expenditure per kW would fall later - perhaps because of hoped for economies of scale, although this was not explained.

The Eight Year Plan

On 1 January 1961 the much-vaunted Eight Year Plan was inaugurated with sections on electricity based on the revised plan for electric power of December 1959. Out of a total planned expenditure of Rp 240 billion, Rp 14.15 billion (about 6 percent) was set aside for electric power (which was a substantial drop on the 14 percent share allocated for power in the 1956 Five Year Plan). As in the December 1959 plan, Rp 9.75 billion was planned for expenditure in the five years from 1961 to 1965. Most of the other broad targets either as set in the September 1958 plan or as revised in the 1959 plan were included unaltered. The detailed list of projects was the same (see Table 7.7), the decision to emphasise thermal and diesel plant for the 1961-1965 period remained

TABLE 7.7 Development Projects for the 1960-1965 Period (MW)

Type & Name	Area	Capacity
HYDRO		
Tjikalong	West Java	19.2
Djatiluhur	West Java	125.0
Timo	Cent. Java	12.0
Ngebel	East Java	2.25
Plengan & Sawitto	West Java	2.55
Total		161.0
THERMAL		
Surabaja	East Java	50.0
Semarang	Cent. Java	37.5
Tandjung Priok	West Java	50.0
Total		137.5
DIESEL		
Kebajoran	West Java	15.0
ICA Scheme	Scattered	22.6
Czech Scheme	Scattered	16.1
Total		53.7
TOTAL		352.2

Source: As for Table 7.6.

unaltered, and the goal of raising the share of sales to industry to 70 percent of total sales was restated.

In some ways, the sections on electric power were a very substantial improvement on earlier plans. A wide range of matters important for the development of the industry were discussed, though most of them briefly. For example, the question of skilled manpower was given some attention and an attempt was made to predict the industry's needs for skilled technical manpower during the first five year period. Rough guidelines specifying the number of engineers needed per unit of capacity in construction and production were laid down. The need for research into the special problems of the industry in Indonesia was given emphasis for the first time, and it was announced that an electrical research laboratory would be set up in Djakarta. Although it was technical matters that were stressed, study of recent developments in economics, law, labour relations and business management as they affected the industry was also called for. In addition, the need for adequately equipped research libraries and better contacts with domestic and foreign research institutes was mentioned. The Plan also pointed to the urgent need to standardise technical terms throughout the country so as to conform as much as possible with international conventions.

Another matter that had not been mentioned in any earlier plans was the high import content of expenditure in the industry. Economic planners had found it necessary to assume that 50 percent of expenditure in the electricity sector would be in foreign exchange, which made the industry one of the most intensive users of foreign exchange. The remedy suggested in the Eight Year Plan was obvious enough - develop domestic industries which could supply at least some of the electricity sector's simpler requirements - but was none the less welcome since it indicated that at last the planners in the industry were trying to see their problems in the perspective of the whole economy.

Yet another important issue that the Plan took up was the financial and tariff policies to be followed in the industry.

The desirability of charging a price sufficient to cover all costs, including maintenance and a reasonable allowance for reserves, was recognised - or at least stated! It was admitted that since nationalisation this had not been the case, which meant that taxpayers who did not consume electricity were subsidising electricity users since deficits in the industry were covered by government subsidies.

But despite these improvements, the electricity sections of the Eight Year Plan had a number of serious drawbacks. On various matters the relevant sections were carelessly prepared and unrealistically optimistic. In this, the sections reflected the faults of the Plan as a whole.[1] For example, in drawing attention to the large proportion of electricity sold to domestic consumers, the Plan predicted that by 1980 consumption by industry would rise to about 70 percent of sales in the public sector. Whilst this was a desirable goal, the Plan made no mention of the steps necessary to achieve it (such as tariff changes). Nor did it discuss the implicit conflict between this goal and other objectives (such as cheap electricity for domestic consumers) that the industry was, in practice, expected to pursue. In fact, it seems most likely (as Table 6.10 suggests) that for most of the sixties the proportion of sales to domestic consumers rose. The financial policies followed in the industry probably encouraged this trend. The electricity planners, understandably, may not have felt in a position to tackle the advocates of "cheap electricity for the people" in a head-on confrontation, but sweeping the whole issue under the carpet was no answer either. It is hard to believe that the electricity managers were expressing anything more than a vague hope in including this objective.

Although the targets for the sector had been scaled down from those presented in the December 1958 document, the Plan was optimistic on other matters. It was assumed that by 1980, average annual utilisation of a kW of capacity would rise to about 5,000 hours from the average at that time of

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1. For a survey and critique of the Plan, see Guy J. Pauker, "Indonesia's Eight-Year Development Plan," Pacific Affairs, XXXIV (2), Summer 1961.

about 3,600 hours. Although not an impossible goal, this would have represented an extremely good performance since the average for North America and Western Europe in 1964 was about 4,800 and 4,100 respectively.[1] In estimating national per capita consumption in 1980, an annual population growth rate of 1.7 percent was assumed (despite the fact that other sections of the Plan document assumed a more realistic rate of 2.3 percent).

There were surprising inconsistencies within the sections on electric power too. For example, although the increase in capacity in the first five year period was given as 325 MW, the total capacity of projects listed was 350 MW. In discussing labour requirements, in one place it was forecast that 880 high school graduates and 220 engineering graduates would be needed, and in another place the figures were given as 800 and 200 respectively. And while the average construction expenditure (including transmission and distribution) allowed for per kW of hydro capacity was Rp 23,000 (about $510) a comparable kW of thermal capacity was expected, inexplicably, to be substantially higher at Rp 30,000 (about $660). Since it would only be in the most unusual circumstances that the capital cost of a non-nuclear thermal plant would exceed that of a hydro plant, this was a surprising assumption to make.

In many ways, the sections on electric power were representative of the Eight Year Plan as a whole. The following comment, made by Pauker about the Plan document, is apposite to the plans for electricity:[2]

> "...the Plan...consists essentially of a 'shopping list' of projects...The planning effort of the 1952-1956 period is reflected in [the main projects]: In this respect, there is continuity between present and past intentions. It can be said that Indonesia, having lost several years owing to political convulsions, is

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1. N.B. Guyol, The World Electric Power Industry, Berkeley and Los Angeles, University of California Press, 1969, p.94. For a comparison with the performances in other countries in the ECAFE region, see Table 13.15 below.

2. Pauker, op.cit., pp. 119 and 125.

> still trying to carry out the program sketched in the 1950's. Comparing the allocation of resources to different sectors of the Plan, it appears that the emphasis in the plans for 1961-69 is about the same as in 1956-60 with the exception of research and public administration to which the earlier planners seemed oblivious..."

However these drawbacks of the Plan were not of immediate importance to the execution of electricity projects. It might be argued that it was reasonable to give high priority to progress on the technical side so that capacity and production would continue to expand. The important but postponable problems of recruitment of suitable administrative staff and the formulation of suitable tariffs, for example, could be solved a little later.

In retrospect, it is clear that administrative and financial difficulties turned out to be major problems for the industry. But leaving these aside and concentrating on the issues of immediate importance in the Plan which affected technical matters, there are three main criticisms that can be made of the Plan. In the first place, few details of the financing of particular projects were available. Second, the discussion of the alternative forms of generating capacity was superficial, and the decision to give preference to thermal and diesel over hydro in the first five year period appears to have been taken on flimsy grounds. Third, little more than lip service was paid to the need for associated expansion in the transmission and distribution sectors. These criticisms were true for the electricity proposals in the First Five Year Plan, and were carried through into the Eight Year Plan. The faults were closely interrelated, were in no small part a consequence of the way in which the plan for the electricity sector (and indeed the whole Eight Year Plan) was drawn up, and provide the key to the understanding of the way in which planning in the electricity industry was carried on in the late fifties.

On the matter of financing, apart from listing the total expenditure of Rp 9.75 billion (for the period up to 1965) and mentioning the cost of hydro and thermal generating capacity per kW, very little was explained. Since most projects listed

for completion in the 1960-65 period were already the subject of negotiations or were already underway, this probably did not seem an important omission to the framers of the plan. But it is precisely this point that is important - the so-called five year plan for electricity was basically no more than a list of generating projects (most of the more important of which were already off the ground) to which had been attached long term targets and a series of short essays on such diverse subjects as tariffs, the recruitment of skilled manpower, and the need for research.

Once this point is appreciated, the superficial discussion of choice of generating techniques and the lack of thought about expansion in the transmission and distribution sectors makes more sense. The function of these sections was really only to justify the list of projects that had already been largely settled some years before.

Investment Decisions Reviewed

What is striking about the three electricity planning documents issued in September 1958, December 1959 and the sections in the Eight Year Plan, is their essential similarity. Indeed in the basic list of projects, the later plans were only a slightly revised version of the 1956 document. Considering the haste with which the 1961 Plan was prepared, this was probably inevitable.[1] One PLN official who played a major part in electricity planning at the time described part of the process by which the sections on electric power in the Plan were drawn up:[2]

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1. "The Indonesian National Development Council...was sworn in on August 15, 1959, and instructed to draft a development plan in the shortest possible time...The 74 members of the Council were chosen by President Sukarno more on the basis of political considerations than on grounds of technical ability. When the list of members was announced in 1959, there was considerable skepticism in Djakarta that such a Council could produce a plan, but the group worked very fast, adopting a procedure of closure without voting after short debates, and by August 1960 the Eight-Year Plan had been drafted." Pauker, op.cit., p.115.

2. Interview with U, 19 February 1970.

> "Yamin [the Chairman of the National Development Council] gathered together a large number of politicians, and one man, an expert in a particular field, was chosen to address them on what the Plan should be in that field. The one man, Ir Hadinoto in the case of electric power, spoke for about half an hour and his talk was taped. He was then held responsible for that section of the Plan. (Other sections discussed were, for example, coal, oil, education and science, irrigation, and so on. Professor Sedijatmo talked about education and science, and Ir Harjasudirdja about irrigation. Neither of them spoke about electric power.)
>
> Ir Hadinoto recommended, in effect, an extension of the 1956 Plan in the absence of proper data or time to plan. He knew it was deficient in many ways, but given the situation, thought that this was the best thing to do."

Thus in order to explain the investment decisions that were implicit in the Eight Year Plan for the 1961-65 period, it is the list of ten or so projects that must be explained, and very little else. Why was it that these particular projects were selected in the first place? Why was it that so little attention was given to the choice of alternative generating techniques and the expansion of transmission and distribution facilities? If these questions are answered, then we will have gone a long way towards explaining the most important investment decisions that have been made in the industry in the last two decades.

The explanation for the ad hoc investment procedures is superficially quite simple - at no stage since the war has an integrated long term investment plan (covering both technical and financial matters) been prepared. There are three main reasons for this: first, the importance of preparing this kind of plan was never fully recognised; second, the preparation of such a plan is a particularly difficult job - it is much easier to draw up a list of projects; third, both domestic and foreign political preferences were for generation rather than transmission and distribution projects. It will be worthwhile to examine each of these reasons in some detail.

Failure to Recognise the Need for Long Term Planning

After independence there was a carry-over of personnel, attitudes and experience from the Dutch period, when the industry had been smaller and conditions of operation had been

quite different. Much of the capacity in the Dutch utilities, which in any case operated largely independently from each other, was in small isolated diesel units which are technically comparatively simple. A localised system which supplies only a small area is easy to plan for. Complicated transmission systems do not exist. Even the most sophisticated electrical system in Indonesia in the early fifties, that in West Java, was a small and simple network by international standards. Although one or two of the better trained engineers realised the qualitative difference that the introduction of plants as large as Djatiluhur, Tandjung Priok and Tandjung Perak would make, the full effect was not appreciated or foreseen by most managers in the industry.[1]

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1. For example, writing at the end of 1963, the team of engineers from the Development Projects Consulting Service who were surveying the electric power systems of East and Central Java were alarmed to find that in the main East Java network, adequate preparations had not been made for the introduction of the 50 MW Tandjung Perak plant in mid-1964:

> "A modern steam electric generating plant with a gross capacity of 54,400 KW is now being erected in Surabaja by American technicians; it is financed principally by an United States Export-Import Bank loan. Completion is estimated for mid-1964, at which time a major change will occur in the Kali Konto System. This plant will nearly double the total installed generating capacity, almost triple the total firm capability of the system, and more than quadruple the dry season peaking potential. Contracts with foreign firms provide for the furnishing of all equipment, instrumentation, switching, transformer capacity, and feeders to the several nearby substations, as well as training in the United States of a full cadre of operators. Still, the matter of handling 50,000 MW net of additional power past the several sub-stations has not been planned or provided for, with the consequence that the full benefit of this power may not be realised for many years after it is available."

See Developments Projects Consulting Service, op.cit., p.12 f. The lack of understanding of new methods that became necessary as the industry expanded was also referred to by a former Director of the BPU-PLN; interview with T, 18 February 1970. In the late fifties and early sixties there were many operators who had first learnt their skills under the Dutch, when the electrical systems were working well because blackouts were rare and facilities were adequate to meet the load.

When Djatiluhur and Tandjung Priok suddenly entered the system in West Java adding over 100 MW to the generating capacity in the grid of 1964, and when Tandjung Perak was commissioned in East Java, this was a dramatic break with the past. Large amounts of electricity were suddenly poured into a small and old transmission and distribution system.

Another factor contributing to the carry-over of Dutch attitudes and practices was that a number of the projects included in the successive electricity plans, including the impressive Djatiluhur and Asahan hydro projects, had originally been planned by the Dutch. For example, extensive studies of the Tjitarum River basin (the site of the Djatiluhur power project) were carried out by the Dutch before the Second World War, and plans for a multipurpose river project were drawn up in the late thirties. In the case of Asahan, interest was shown in the area as early as 1920 when it was estimated that at least 370 MW could be harnessed.[1] One of the smaller projects, the Batang Agam hydro plant in West Sumatra, also dates back to the late twenties. At that time, a survey is reported to have been initiated by the Electricity Division of the Department of Public Works of the Dutch colonial administration, although it was not until nearly ten years later that all of the necessary studies were completed.[2]

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1. See Chapter 1 above. It was apparently realised very early in the piece that a project of this size would be uneconomic unless an industrial complex was developed nearby to take the power, because by the mid-twenties there was talk of an associated aluminium plant. Before the Second World War a Dutch company connected with tin mining on Billiton Is., Billiton Co., carried out further surveys of the area and some preliminary work was even done on access roads and foundations. During the war the Japanese Nippon Koei Company showed interest in developing the project and apparently some further work was done. Later during the fifties, a stream of international developers from Canada, France, Sweden, America and finally Russia investigated the project. Information from Higgins, Indonesia's Economic Stabilization and Development, op.cit., pp.76-77, and interview with U, 19 February 1970.

2. Fahmi Mu'thi, "Batang Agam Hydro-electric Project," The Djakarta Times, 25 March 1970.

As we saw earlier, when the Indonesians came to prepare their own electricity schemes in the mid-fifties, they had few complete plans of their own. The sensible thing to do seemed to be to take over the Dutch plans. Since the Dutch planners themselves had often concentrated on preparing plans for the development of the generating sector and not reached the stage of planning expansion in transmission and distribution, there was a tendency for the Indonesians to overlook these latter aspects as well.

A second reason for the failure to appreciate the importance of integrated planning was that problems in generation seemed more urgent than those in the other two sectors, both for technical and for political reasons. Thus problems in the generation sector masked those in transmission and distribution. The urgency of the generation problems was closely linked to the relative scope for alternative action that was allowed by the different technologies of the three sectors. Albert O. Hirschman has recently coined the term "latitude" to cover this characteristic of projects, and in his terms while there was latitude for "overloadability" (the prolonged overloading of equipment) in transmission and distribution, there was no such latitude in generation.[1] Whilst in distribution and trans-

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1. Albert O. Hirschman, Development Projects Observed, Washington, Brookings Institution, 1967, Chapter 2, pp. 86 and 127:

   "I propose to designate by the term 'latitude' this characteristic of a project (or task) that permits the project planner and operator to mold it, or to let it slip, in one direction or another, regardless of outside occurrences...While lack of latitude retains the great advantage of determinateness, of preventing mere slippage, of accelerating decision making, and in general of providing project directors and managers with firm discipline and guideposts for action, the presence of latitude has in some situations been shown to foster training in rational decision making or the adaption of imported models of economic behavior to local conditions and requirements."

   Judith Tendler in her Electric Power in Brazil, op.cit., Chapter 3, has pointed to a number of latitudes that exist in distribution but not in generation. Much of her discussion is relevant to the Indonesian experience.

mission there is scope for a trade off between the overloading of equipment and investment in new capacity, in generation this trade off cannot take place since it is technically impossible to overload except for comparatively very short periods.[1] In generation, prolonged overloading of units soon leads to a complete breakdown of the plant.

In contrast, the transmission and distribution sectors in Indonesia have been overloaded to an extreme degree. While this has only been done at a high cost in terms of quality of current supplied and reliability of supply, a service of sorts has nevertheless been maintained. Thus highest priority has been given to the purchase of spare parts to repair old generating plants and the construction of new generating capacity, since this has been where the problems were most visible. In the day to day rush, the most urgent problems were treated first on an ad hoc basis. Overwhelmed by shortage of funds and other short term problems, the PLN was never able to consider development in the long term.

The pressure for ad hoc action arising from the technical problems in generation were reinforced by political pressures, especially in the early sixties. We shall shortly see that there was considerable political preference for investment in generation projects, but to a lesser extent this preference also applied to current expenditure. While a poor quality electricity service resulting from neglect of transmission and distribution was still a supply, the complete breakdown of a generating plant leading to widespread blackouts was an undisguisable failure. Especially in the politically sensitive city of Djakarta, but also in other areas, the managers of electricity plants

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1. Tendler, ibid., p.84, was mainly concerned with the contrasts between generation and distribution. Since we are here concerned with transmission also, the Indonesian experience is not exactly analogous. Nevertheless, three other latitudes which existed in distribution but not in generation in Brazil were probably also of some importance in Indonesia: "the relative brevity of the construction period, the substitutability of operation for construction activities, and the possibility of substituting consumer for company capital in extending the distribution net."

were under political pressure to keep up the daily supply. Outside Djakarta there was short-sighted pressure on officials to defer the closedown of plants for necessary maintenance. In Djakarta the PLN managers were under continual political pressure from President Sukarno, parliamentarians and influential military men to improve the electricity supply, and in particular to remove the need for quantitative rationing through blackouts. On some important occasions, such as sittings of parliament and during the Asian Games, pressure to maintain supply at almost all costs was intense.[1]

A third reason for the failure to recognise the need for integrated planning was lack of practical experience in working in an integrated system. This was reinforced by the relative isolation from conditions and progress made in developed countries from which almost all highly trained people suffer in Indonesia.[2] During the early fifties especially, relatively few Indonesians gained overseas experience. Those who did study overseas were mainly young men without experience at home, and when they returned to Indonesia in the mid and late fifties, they had good theoretical training but little practical experience. In theory they knew the importance of overall planning, but in practice they allowed it to be overshadowed by short term problems.

Difficulties of Drawing up an Integrated Plan

It is always more difficult to prepare an integrated plan for the joint expansion of all three sectors of an

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1. There are reports that sometimes there were suggestions that the army would move in to ensure that electricity production was continued. On one occasion during the Asian Games, the army insisted that the PLN keep generators running, even though it was technically dangerous. Interview with A, 10 May 1969.

2. The more experienced people in the industry could only be spared for short trips overseas, even when finance was available. Further, for reasons of finance and the unreliability of communications, often a skilled person in Indonesia does not see recent professional publications in his field for months on end.

electricity industry than to draw up a simple list of generation projects - and especially so in Indonesia. A comprehensive plan must take into account the future development of the society that is being serviced. A good knowledge of local demographic and industrial trends is needed. Because of this, it is easier in some ways to draw up a plan for a generation project than for a transmission and distribution network because less knowledge of future developments is needed. The construction of a generation plant is a clearly defined project with a beginning and an end. In contrast, expansion in distribution particularly, and to a less extent transmission, is (or should be) a process which has no clear beginning or end but which is continually taking place. Investment in these sectors is much more divisible than in generation, and should be constantly being extended geographically. It was precisely this form of continuous planning that was very difficult in Indonesian circumstances.

First, drawing up a good plan for the expansion of the transmission and distribution sectors would have compelled the planners to face squarely the gap between demand and available supply. To some extent, this problem could be ignored if a proper plan was not drawn up. There was and remains a great deal of unsatisfied demand for electricity and the danger of general overcapacity is no problem whatever for the present.[1] A fully integrated plan however would have required an open admission that for some years into the future supply would need to be rationed. Explicit decisions would have had to be made about priority categories of consumers and areas. Giving high priority to some consumers necessarily means giving low priority to others, and the PLN was naturally reluctant to announce a firm policy that would lead to political criticisms. Far easier to leave the matter vague.

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1. Although, of course, the problem of overcapacity within particular sectors of the industry did occur.

A second difficulty was insufficient information on such matters as plans for the expansion of urban areas like Djakarta or plans for industrial development. A Djakarta master plan, for example, had been drawn up but was very rough. The two economic plans did provide some guidelines to suggest where further development should take place, but as we have seen these plans were too vague to be relied upon.

But a further problem that the PLN would have had to face up to in drawing up a complete plan was the need for ready cooperation from local authorities on such matters as the right to resume land for transmission facilities and to install distribution equipment in streets and houses. In Indonesia, this is no simple matter. This problem, too, was much less serious in the generation sector since investments in generation usually took place within a restricted area and often (in the case of hydro plants) at remote sites.

Fourth, it would have been necessary to make firmer decisions about the location of plants. During the fifties, the different leaders of the industry had different tentative plans. For example, when the first comprehensive plan for the development of the West Java electricity system was prepared in 1963 by a visiting French engineer,[1] after discussions with PLN officials it was assumed that a large thermal power station would eventually be constructed to the east of the Tandjung Priok plant. Plans for the development of the transmission network were drawn up accordingly. By 1968 when the same French engineer returned to prepare a second plan for the whole of Java,[2] the PLN authorities had changed their mind and the development of the transmission system had to be reviewed. If the Indonesian planners themselves had drawn up a plan in the late fifties, the necessary effort to sort out the diff-

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1. Report prepared by M. Bertoye for the government of the Republic of Indonesia, Development of the Electrical Network of Djakarta-Raya and West-Java, op.cit.
2. Report prepared by M. Bertoye, Development of Electrical Systems of Java, op.cit.

erent schemes would inevitably have given rise to conflict. It is true that a tentative list of projects for the 1965-70 period was drawn up in about 1959, and this list necessarily gave preference to some projects over others. But since the list was tentative it could easily be argued that no really final decisions had been taken. Thus nobody's pet projects had been finally ruled out, and open conflict was avoided.

In contrast to this conflict-avoiding situation which left most options open, the preparation of an integrated plan would have required commitment to a particular sequence of projects. While it is quite possible to make substantial revisions to an integrated plan, the projected sequence of investments is clearer and more open to view and discussion. Just as importantly, the sequence of investments is self-reinforcing since the development, for example, of a particular set of transmission facilities today is deliberately given preference because of the proposed development of a particular generation project tomorrow.

Political Preference for Generation

Even if the full importance of long run planning had been appreciated, and even if it had been possible for the planners to prepare a plan with the few resources available to them, the overriding importance of political considerations would have made it very difficult to stick to any plan. Both foreign and domestic political factors, which interacted with each other, played a most important part determining the allocation of available funds. Mainly because of the preference for visible prestige projects, political pressure at both levels was in favour of investment in generation.

The availability of foreign exchange from foreign aid was a crucial factor in determining whether or not a project went ahead.[1] The ICA scattered diesel plants project suddenly appeared in planning documents halfway through the First Five Year Plan period for one simple reason--aid was available for

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1. Numerous officials in both the PLN and in foreign consulting firms mentioned the central role that the availability of foreign exchange played in affecting the investment decisions made in the PLN.

such a project. All large electricity projects that have been carried out in Indonesia since the war have been executed with foreign aid. Indeed, it is not stating the case too strongly to say that one of the major objectives of planners in the industry during the late fifties and early sixties was to maximize the supply of foreign aid.

The need for foreign exchange had side effects on the projects that the PLN chose to support and on the way they were executed. For example, PLN Directors knowing that the Minister for Public Works would have to propose projects which would attract foreign aid-givers' attention, themselves tended to suggest projects in the generation sector. Another side effect was that foreign contractors and governments were closely involved in the projects and often wanted to influence their execution, sometimes not in the most desirable way (as the case of the ICA scattered diesel projects, discussed below, shows). The problems that reliance on foreign aid caused were summarised by a former employee who worked for two years in the Planning Division of the PLN:[1]

> "Apart from domestic political pressures, the need for foreign aid was a key factor in investment decisions. The phrase 'rupiahs are nothing' was common. What was meant was that if the foreign component of financing requirements was forthcoming, there wouldn't be trouble over obtaining the rupiah component. PLN planners aimed to obtain the most foreign exchange that they could. The project that was most likely to attract foreign exchange was chosen, not the cheapest or the most technically desirable.
>
> The foreign contractors helped this process along too. The PLN was not good at drawing up project requests, so the contractors would offer advice and in effect, have a large say. Knowing that the finance was coming from foreign aid, they wouldn't stint themselves."

Among domestic political pressures which favoured expansion in generation rather than transmission and distribution were a general preference for prestige projects (of which Djatiluhur is a good example) and the shortage of generation capacity in the politically important area of West Java. As the same person explained:[2]

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1. Interview with A, 10 May 1969.
2. Ibid.

"At the beginning of the sixties the position was the opposite of that now - there was a shortage of generation capacity in West Java. President Sukarno demanded that there be expansion in generation. The goal in the PLN therefore became simply to expand the generation sector as rapidly as possible. Little or no thought was given to the optimum balance between generation, transmission and distribution, or to different types of generating capacity, or to economies of scale.

When the construction of Djatiluhur began to fall behind schedule, a series of ad hoc decisions followed. Tandjung Priok was decided upon. As Tandjung Priok fell behind schedule, it was feared that the Asian Games [held in 1962] would be plagued by blackouts, so a diesel set was installed at Senajan [close to the Asian Games Stadium near Kebajoran].

There was great nervousness in the PLN that there would be a blackout while President Sukarno was speaking."

Progress During the Sixties

Since the electricity sections of the Eight Year Plan document were largely based on schemes which were already underway, it is not surprising that the projects went ahead more successfully than earlier plans. To evaluate progress during the sixties properly, more information is needed than is available. Ideally one would like to have complete details of both planned and realised rupiah and foreign exchange expenditure on capital investment in the industry made by the Central Office of the PLN and at all regional levels, preferably disaggregated in various way - including by project and (in the case of foreign exchange) by donor country. In addition, an appropriate index for deflating the rupiah expenditure to real terms would be useful.

Such information would make it possible to build up a picture of the investment pattern over time, to see at which levels different types of investment expenditure were made and where the funds came from, and to probe into the factors which determined the direction of investment expenditure. For example, details of planned and realised expenditure by project would throw light on investment priorities which other evidence shows to have varied erratically from year to year. Interviews with PLN officials and other reports suggest that regional boards and possibly even local branches

of the PLN made expenditures on transmission and particularly distribution equipment without reporting the matter to the Central Office in Djakarta, but no precise details are available.[1]

In the absence of such information it is necessary to fall back on the rough data presented in Table 7.2, which shows the main changes in the generating sector in physical terms, and Tables 7.8 and 7.9 which present information on the main foreign credits granted to Indonesia for new capital expenditure in the electricity sector (apparently excluding Japanese financing) in the period 1957-1968.[2] While Table 7.2 contains information for generation only, Tables 7.8 and 7.9 also contain information on the small amount of foreign credit granted for transmission. In using the tables as a guide to the main investment committed over the period, a few points should be borne in mind. First, the source on which Tables 7.8 and 7.9 is based is somewhat suspect, since some errors were found upon close examination.[3] Second, expen-

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1. See the comments made by the ECAFE survey team in 1963 on p. 86 above. For example, the ECAFE team reported that "Extensions to the distribution systems within a given region, other necessary modifications and purchases of materials are all undertaken by the regional Exploitations concerned without any effective control by the headquarters." Op. cit.

2. The data on which the tables are based appears to exclude entirely the probably small amounts of foreign credits granted from time to time to the PLN for the purchase of spare parts.

3. For example the original data supplied by Gatrik omitted any reference to the ICA loan for approximately $7 million for the scattered diesel plants project, which should have been included. In addition, the Yugoslav loan for the 25 MW thermal power plant granted in 1963 according to Gatrik data was for £3,221,948, while according to the PLN's Laporan Tahunan 1968 [Annual Report] the loan was for £3,331,948. Obviously a copying error had been made somewhere, but it is not clear which figure is correct. Further, the total Czech loan shown in the Gatrik figures for the Czech part of the scattered diesel plants scheme, at £733,000 seems small, and it may be that a mistake has been made. A more important omission is war reparations paid by Japan. Presumably Indonesia does not recognise these payments as aid, which would explain why they were not included in the data on which the tables are based, but for our purposes it should be remembered that a sizable amount of Japanese foreign exchange was used in the electricity industry.

TABLE 7.8 Main Foreign Credits Supplied for Electric Power (apparently excluding Japanese financing) by Projects, 1957-1968

($ million)

Project	Type		Amount
Generation			
Djatiluhur[a]	H		97.15
Tg. Priok	T		12.8
Tg. Perak	T		14.35
Makassar[b]	T		9.65
Palembang[b]	T		9.0
Scattered Diesel Plants	D		9.05
Other:			8.75
Three Gas Units	G	4.0	
Asahan Survey	H	2.7	
Kebajoran	D	1.6	
Timo	H	0.45	
Transmission			
West Java			9.16
East Java			4.0
Total			173.91

Notes:

a. Djatiluhur is a multipurpose project and perhaps one-third, perhaps even more, of the credit was for work not necessary for the electricity project (See note a. to Table 7.10 in the Appendix to this Chapter).

b. Still unfinished in December 1969.

Source: Table 7.10.

diture in transmission and distribution is underrepresented. No information about these sectors is contained in Table 7.2, and the credits shown in Tables 7.8 and 7.9 were doubtless arranged through the Central Office of the PLN and the Department of Public Works and probably do not include any of the expenditures made by regional boards or local PLN branches on new capital equipment. So there was probably more expenditure in the transmission and generation sectors than the tables imply.

However treated with some caution, the tables probably give a reasonable picture of capital expenditure during the

TABLE 7.9 Main Foreign Credits Supplied for Electric Power (apparently excluding Japanese financing), by Country of Contractor, 1957-1968

($ million)

Country of Contractor	Amount
France (inc. Italy)[a]	104.85
Yugoslavia	22.65
U.S.A.	21.35
West Germany	18.4
Russia	2.7
Czechoslovakia	2.5
Hungary	1.46
Total	173.91

Notes:

a. A small amount, less than $10 million and quite likely less than $5 million, went to an Italian firm.

Source: Table 7.10.

sixties. Table 7.2 shows that in the ten-year period 1960-1969, of the total increase in generating capacity of 383 MW, five projects (Djatiluhur, Tandjung Priok, Tandjung Perak, the scattered diesel plants project, and three gas plants) made up over 310 MW (or over 80 percent) of the total increase. Table 7.8, which shows that the very great bulk of foreign credits was used for these five projects, reinforces the impression given by the physical data and also indicates that the credits obtained for transmission (about 1.3 $ million) were small compared with generation (which received about $160 million.[1] It is most significant that no foreign credits at all were obtained for distribution.

Strictly speaking, Table 7.9 shows which countries the available foreign credits were spent in. Because nearly all credits were tied however, the Table provides a good

1. See note a. to Table 7.8.

guide to the source of foreign aid. Four countries, France (including Italy), Yugoslavia, USA and West Germany, accounted for nearly all credits granted, of which France was by far the most important. This pattern mainly reflects the progress of projects supported by these countries. For example, France's large share is entirely due to its commitment to the Djatiluhur project, while the contributions of the USA would have been much larger had not the Semarang thermal plant fallen through for political reasons.

Even allowing for the unknown amounts of capital expenditure by regional boards and local PLN branches, the credits listed in Tables 7.8 and 7.9 probably account for over 80 percent, and possibly more than 90 percent, of the foreign exchange component of new capital investment.[1] Investment in the electricity industry in Indonesia has an especially high foreign exchange component, and most expenditures in foreign exchange were dependent upon the availability of foreign credits. It is certain that no large expenditures could have taken place in either transmission or distribution without showing up in the Tables. Thus it is clear that the process of expansion foreshadowed in the Eight Year Plan (see Table 7.7) for the 1961-65 period was largely carried out, albeit with some delays. The neglect of the transmission and distribution sectors evident in the Plan document was also borne out in practice.

However the execution of the projects was by no means a straightforward matter, and in some cases there were long delays. It is useful to distinguish between the larger prestige projects on Java, which on the whole progressed quite well, and various small projects, mainly on the Outer Islands, which fell badly behind schedule. Because of the problems they suffered, it will be worthwhile to give special attention to the latter group. Satisfactory economic development on the Outer Islands is a *sine qua non* of the economic development of Indonesia as a whole. The particular difficulties of these projects point up nicely some of the most important problems that will have to be faced in developing the Outer Islands, not only in the

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1. Excluding Japanese financing.

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1. Excluding Japanese financing.

electricity industry but in other industrial development schemes as well.

But there were certainly delays in the three large projects successfully completed. Djatiluhur took a long time to build, since preliminary work apparently commenced in 1953[1] and it was not until 1964 that production began.[2] Tandjung Priok and Tandjung Perak also suffered some delays, though not serious ones. On the other hand, the proposed thermal plant of 37.5 MW at Semarang which was to be financed with a loan from the Exim Bank of the United States finally fell through entirely because of the deteriorating political situation.[3] On the other hand some of the smaller projects did not do so well. The 19 MW Tjikalong hydro plant in West Java was begun in 1952, but was not completed until 1960 (and was therefore included in the Eight Year Plan as one of the projects!). It was originally expected that the scattered diesel plants project (about 46 MW) would be completed in 1963.

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1. This date is given in the Laporan Pelaksanaan Rentjana Pembangunan Lima Tahun 1956-1960 - Mengenai Tahun 1956, 1957 and 1958, op.cit., p.220.

2. The implied time span of 11 years gives an unduely bad impression. The project did not get seriously underway until 1957, and considering the difficulties of executing a project in Indonesia, the length of time taken for construction was satisfactory.

3. Alexander Shakow has provided the following details on the Semarang power plant:

> "In 1955 General Electric was approached and given a letter of intent for this large project, yet little was heard from them thereafter. In 1959 they were again approached, but still no word. Exim had already been contacted and apparently tentative approval had been given for a $11.5 million loan for the 37,500 kw capacity station. But still little was accomplished, and the State Electricity Company (PLN) became increasingly upset, and was in fact prepared to switch the project to another country - probably Hungary - if it could obtain no response from GE. Apparently this had results, for an October 4, 1961, news report mentioned a meeting held on October 3 between the PLN, the state company Nindja Karja, and GE to arrange the plans for the project."

See Shakow's Foreign Economic Assistance in Indonesia 1950 - 1961, [Tokyo], Economic Cooperation Bureau, Ministry of Foreign Affairs, 1964, p.312.

This scheme, too, suffered numerous delays. The 5 MW Tonsea Lama hydro plant in South Sulawesi has been in construction for a remarkably long time. The project was first started in the early fifties, and the most recent forecast was that it would be completed during 1971, giving this minor plant a construction time of nearly twenty years.[1] The small Ngebel hydro project in East Java is a particularly bad example of costly delays in construction. After most of the civil engineering work was complete, a good deal of which was in domestic currency, the project remained in mothballs for some years simply waiting for generators and other electrical equipment (most of which had to be bought in foreign currency) to become available.

Three other projects which have been under construction for an abnormally long time now are the 10 MW Batang Agam hydro plant in West Sumatra, and the two 25 MW thermal plants planned for Palembang and Makassar. These three projects were not included in the Eight Year Plan, and were apparently initiated for ad hoc reasons, such as the political desirability of favouring the Outer Islands or because a creditor country was prepared to provide foreign exchange. Work began on the Batang Agam plant in 1952 and the original plan was that it would be finished by 1966. By 1964 shortage of funds had seriously slowed down the project, and in 1966 only about 14 percent of work had been completed. By March 1970, the proportion of work completed had still reached only 25 percent. Recently the schedule for the project was entirely revised and the target date for completion was set as 1973.[2]

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1. The Laporan Pelaksanaan Rentjana Pembangunan Lima Tahun 1956-1960 - Mengenai Tahun[2] 1956, 1957 and 1958 lists it as having been started in 1951 and expected that it would be completed by 1959, op.cit., p.224. The PLN's Lampiran-Lampiran Laporan Tahunan Tahun 1969 [Appendices to the 1969 Annual Report], [Djakarta], mimeo., January 1970, gives 1952 and 1971 as the starting and completion dates respectively; see Appendix 2.5.4.a. in the Report.

2. Details from Fahmi Mu'thi, "Batang Agam Hydro-electric Project," The Djakarta Times, 25 March 1970.

Another report suggests that it may even have been put back until 1974.[1] In the case of the thermal plant at Palembang and Makassar, two contracts for about $9 million each were let to Yugoslav contractors in 1963. At the end of 1969 it was expected that the first of the two 12.5 MW units in the Makassar plant would finally be ready in April 1970, and that the second unit would be available towards the end of the year. The final completion date for the Palembang plant had not at that stage been set, which made it certain that well over seven years would elapse between the letting of the contract and the beginning of production.

In addition, by 1963 the consequences of the failure to prepare a long term plan and the earlier neglect of transmission and distribution, especially in West Java, were beginning to show. The series of ad hoc decisions in favour of expansion of generation in West Java had led to a bad imbalance between the three sectors of the industry. There was an excessive amount of generating capacity which often could not be put to good use because of the poor transmission and distribution systems. Writing in early 1963, an ECAFE team commented on the position:[2]

> "There is a paradoxical situation today in Djakarta: while industries operate their own power plant because PLN is unable to extend supplies to them, there is a sizable surplus generating capacity not being used at present, particularly in the new 15,000 KW diesel station installed at Kebajoran. In fact, this station is being used even now to light up the whole area of the area recently used for the Asian Games, probably because there is so much surplus capacity."

With the introduction of further large amounts of generating capacity into the system from Djatiluhur and Tandjung Priok in 1964, the imbalance became much worse.

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1. See the PLN's Lampiran-Lampiran Laporan Tahunan Tahun 1969, op.cit., Appendix 2.5.4.a.
2. ECAFE, A Report by the Panel of Experts on Rural Electrification on Electric Power Development in Indonesia with Special Reference to Rural Electrification, op.cit., p.24.

Most of the problems that beset these delayed projects are well illustrated by the history of the scattered diesel plants project carried out with American and Czech aid during the sixties. We will therefore now turn to consider the project in some detail, particularly that part carried out with American aid which ran into more difficulties than that executed with Czech assistance. This case study will yield useful insights into the practical difficulties of project implementation in the electric power industry since the Second World War.

APPENDIX TO CHAPTER 7

TABLE 7.10 Main Foreign Credits Supplied for Electricity Projects (apparently excluding Japanese financing), 1957-1968[a]

Year in which contract was granted[e]	Project	Type[b]	Country of Contractor[c]	Amount (million)[d] Credit granted	US $ million
1957	Djatiluhur	H	France	$ 9.7	9.7
	ICA Scattered	Diesel	USA	$ 7.0	7.0
Total					16.7
1958	Timo	H	Czechoslovakia	£ 0.16	0.45
1959	Djatiluhur	H	France	$ 6.9	6.9
1960	Djatiluhur	H	France/Italy	$ 5.5	5.5
	Djatiluhur	H	France	$ 15.0	15.0
	Tg. Priok	T	W. Germany	DM 32.2	7.7
	Scattered Diesel		Czechoslovakia	£ 0.66	1.85
	Kebajoran	D	W. Germany	DM 6.7	1.6
	Tg. Perak	T	USA	$ 14.35	14.35
Total					46.0
1961	Tg. Priok	T	W. Germany	DM 16.1	4.0
	Djatiluhur	Trnsm	Hungary	£ 0.27	0.76
Total					4.76
1962	Djatiluhur	H	France	$ 5.5	5.5
1963	Djatiluhur	H	France	$ 23.0	23.0
	Djatiluhur	H	France	FF 50.0	10.2
	W. Java	Trnsm	Hungary	£ 0.26	0.7
	Makassar	T	Yugoslavia	£ 3.4	9.65
	Palembang	T	Yugoslavia	£ 3.2	9.0
Total					52.55
1964	Djatiluhur	H	France/Italy	$ 0.8	0.8
	Djatiluhur	H	France/Italy	$ 3.2	3.2
	Djatiluhur	H	France	FF 30.8	6.3
	Tg. Priok	T	W. Germany	DM 4.0	1.1
	W. Java	Trnsm	France	FF 5.5	1.2
	Scattered Diesel		Czechoslovakia	£ 0.07	0.2
Total					12.8
1965	Djatiluhur	H	France	FF 24.5	5.0
	W. Java	Trnsm	France	FF 11.0	2.2
	W. Java	Trnsm	France	FF 11.0	2.2
	Medan, Palembang, Semarang	G	W. Germany	DM 16.0	4.0
	E. Java	Trnsm	Yugoslavia	£ 0.9	2.5
Total					15.9
1966	Djatiluhur	H	France	FF 30.0	6.05
	E. Java	Trnsm	Yugoslavia	£ 0.5	1.5
Total					7.55
1967	-	-	-	-	-
1968	W. Java	Trnsm	France	FF 10.0	2.1
Date not given	Asahan	H	Russia	$ 2.7	2.7
TOTAL					173.91

Notes:

a. No information on Japanese grants or credits was supplied in the source. A sizable amount of Japanese foreign exchange has been used in the industry. Conditions under which Japanese funds were supplied are not clear, but it may be that most payments were war reparations and are therefore neither repayable to Japan nor recognised as aid by the Indonesian government. Note also that Djatiluhur is a multipurpose dam. It seems likely that perhaps one-third of these credits, perhaps even more, was for work which cannot properly be allocated to the electricity sector.

b. H = hydro; T = thermal; D = diesel; G = gas; Trnsm = transmission.

c. Information on which country supplied the credits was not given. In most cases, aid would have been tied to contractors in the aid-giving country.

d. Conversion to $US made at the exchange rate for that year as shown in IMF, International Financial Statistics.

e. The data provided here sheds little light on the question of when the credits granted were actually used. In some cases, the credits were still being drawn on more than five years after the credit was originally extended.

Source: Based on data supplied by Gatrik.

CHAPTER 8 The Scattered Diesel Plants Project.[1]

Preliminaries

Although the First Five Year Plan made no mention of the scattered diesel plants project, within months of the Plan's release in 1956 preliminary discussions had been held. Eventually, the project was made up of three distinct parts. The largest part was the International Co-operation Administration (later called Agency for International Development) scheme, with a total capacity of 22.8 MW, with units ranging from 50 to 2,700 kW at 40 separate sites, mostly on Sumatra and Kalimantan. Second, the Czech scheme with units ranging between 50 and 500 kW had a total capacity of over 15.3 MW, to be installed at 54 sites mainly in the eastern part of Indonesia. Finally, the PLN itself executed a smaller (7.8 MW) diesel scheme with units of between 150 and 250 kW. The units in the PLN scheme were German made, and paid for in cash by the Indonesian government.[2] Unfortunately almost no information is available about the latter two schemes, so we will concentrate almost entirely on the American program.

The very fact that the Indonesians began considering a proposed American loan for the diesel plants so soon after the release of the First Five Year Plan is significant - it highlights one theme of our study of investment policies: that the formal plan documents were of slight importance compared to domestic political factors and the availability of foreign exchange. During the mid-fifties, there was

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1. Under the contract terms, the Ralph M. Parsons Company of Los Angeles (the American contracting firm) was required to prepare a large number of progress reports. The monthly progress reports were particularly useful in writing this section, as well as other Reports of Surveys of particular plants. Both PLN officials and the Ralph M. Parsons Company kindly provided valuable information. Neither company, of course, is responsible for any of interpretations that I have placed on the data.

2. Details of the three schemes from F. Tambunan, The Diesel Electrification Project and Its Problems, Djakarta, typescript, 10 February 1967, p.1.

increasing dissatisfaction in the Outer Islands which finally culminated in the serious rebellion of 1957-58. The central government was therefore under strong political pressure to come up with some proof of its concern for the outlying regions. In Alexander Shakow's view, the scattered diesel plants scheme was largely in response to this political imperative:[1]

> "As originally discussed in 1956 [the diesel electrification] proposal bore no direct resemblance to electric power policy outlined in the Five Year Development Plan. This project seeks to electrify a number of small sites throughout the outer islands for the expressed political purpose of lighting and government control. The USOM [United States Operations Mission] noted that 'the widespread impact of this programme will have a very positive impact in the economy of the outlying areas of Indonesia. These areas need help and need it quickly and this project is designed for quick implementation.'"

A Soviet aid proposal was also in the pipeline, so the Americans were particularly keen to counter any propaganda gains that the USSR might make. In Shakow's words, the American loan was "a salvo in the Western reply to the USSR credit challenge."[2]

The 1956 discussions resulted in the signing of an agreement on 30 April 1957 for an American loan to Indonesia

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1. Alexander Shakow, Foreign Economic Assistance in Indonesia 1950-1961, [Tokyo], Economic Co-operation Bureau, Ministry of Foreign Affairs, 1964, p.321-2.
2. Ibid., p.317.

of $15 million.[1] One notable feature of the loan was that it was repayable in local currency, which was especially welcome to Indonesia. In the earliest stage, it was proposed that the project would involve the installation of 99 generators in 61 towns mostly outside of Java,[2] and that it would be completed by December 1958.[3] Before long however, the plans were scaled down to cover 47 generators in 33 towns involving a total capacity of slightly over 30 MW.[4]

After the signing of the agreement in April 1957, there followed a long delay. The loan was not ratified by the Indonesian parliament until early 1958, and it was not until October 1958 that the Ralph M. Parsons Company of Los Angeles was selected to negotiate a contract to provide engineering advice, and to arrange procurement of materials, training, and other services.[5] A complete summary of the suggested plan of approach was prepared by Parsons and submitted to

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1. The agreement was signed between the Indonesian government and the Exim Bank, which was acting on behalf of the International Cooperation Administration (ICA). Although the loan was provided by Exim, arrangements were made through ICA because the latter was able to allow softer loan terms. The conditions of the ICA loan were that $8 million was for roads, and $7 million for the diesel electrification program. Repayment was to be over 40 years, an interest holiday of three years from the time of the first credit was allowed, and the interest rate was to be 3 percent if repayments were in dollars (4 percent if repayments were in rupiahs). Details of the loan agreement are from Shakow, ibid., p.317 f., and Warta Cafi, Circular Letters No. 1622 (17 May 1958) and No. 1636 (18 June 1958). The latter references contain the texts of the loan agreement and of Law No. 15/1958 which ratified the loan.
2. Warta Cafi, Circular Letter No. 1622 (17 May 1958).
3. Shakow, op.cit., p.332.
4. Warta Cafi, Circular Letter No. 1636 (18 June 1958).
5. Parsons was selected by ICA on behalf of the Indonesian Ministry of Public Works and Energy.

ICA in late November.[1] There followed a protracted series of discussions between ICA and Parsons which was not complete until the end of July 1959. After a further short delay while the Indonesian party reviewed the draft agreement, the final contract between the Indonesian Department of Public Works and Power and the Ralph M. Parsons Company was signed on 28 August 1959,[2]

> "...three years after the project was conceived, 28 months following the loan agreement and 18 months subsequent to Parliamentary approval of the loan."

Thus it was not until the end of September 1959 that the first two members of Parsons' staff arrived in Djakarta to start work.

The Program Outlined

The final contract, which differed considerably from the original proposals, covered the installation of 62 generating units totalling about 23 MW (instead of over 30 MW as earlier suggested). Parsons' proposal for a total of 35 field staff working for 992 man months in Indonesia was cut drastically too, being reduced to 14 personnel and 236 man months. The completion date was set for 31 May 1961. Amongst other things, Parsons was required to prepare surveys of local conditions and a technical analysis with an economic justification for each proposed plant as well as draw up

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1. Parsons proposed, *inter alia*, a 36 month program with a peak of 35 field personnel and a total time of 1,202 man months (including home office support) for the completion of the project.
2. Shakow, *op.cit.*, p.332.

estimates of the expected financial position.[1]

Basic responsibility for carrying out the project was divided between six main organisations. We will see later that this turned out to be one of the main faults with the ICA scheme. In the first place there was the PLN itself, which took responsibility for most local tasks, such as erecting foundations, supplying buildings, arranging inter-island transport and storage of equipment, and for providing skilled and unskilled labour for the erection of the engines and electrical equipment. A complicating factor was that although the PLN was the main Indonesian agency involved, the Department of Public Works and Power itself was inevitably often drawn in. Parsons' contract was, in fact, with the Department. Within the Construction Division of the PLN, a special group known as BAPEDI (Badan Pelaksana Elektrifikasi Diesel, or the Agency for the Execution of Diesel Electrification) was established to oversee the project.

Three official American agencies were involved. The central ICA office in Washington (ICA/Washington) was responsible for the final approval of all work, while the ICA

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1. The contract covered, inter alia:

"1. The assembling of existing surveys and reports from Government files in Djakarta and other sources, and the preparation of Reports of Survey for each proposed plant.

2. Utilizing the assembled data in making a technical feasibility analysis of each plant and, as a separate section, a statement on the economic justification for the plant. Estimates of future power demands and load factors over a period of as many years as data could reasonably be extended were to be included in the report.

3. Additional information in terms of costs, both in U.S. dollars and in local currency; estimates of fixed charges on plant investments including interest, depreciation, etc; estimates of annual operating costs including fuel, labor and administrative costs; and estimates of the total revenue and net income were also required."

Details from the Final Report, submitted by the Ralph M. Parsons Company, Los Angeles, mimeo., 10 July 1963.

mission in Indonesia (ICA/Djakarta, often known as as USOM, or the United States Operations Mission) was responsible for coordination of the overall project. The third agency was the General Services Administration (GSA), which was in charge of most procurement. The Parsons Company itself was a fifth party to the contract. Finally, the equipment manufacturers' representatives (usually engineers) also visited Indonesia, sometimes for lengthy periods, and were responsible for the erection and assembly of the engines and the electrical equipment. As Parsons themselves, with the benefit of hindsight, commented in their Final Report in July 1963,[1]

> "It is apparent ... that certain areas of overlapping authority and responsibility existed."

Early Frustrations

Within six weeks of the arrival of Parsons' first field officers in Djakarta, some of the basic practical problems that plague all projects in Indonesia had begun to make themselves felt. In its very first monthly report (for October 1959 submitted in mid-November), Parsons commented on the difficulties. Communications, both within Indonesia and between Indonesia and overseas countries, was a major concern. For example, details of final shipping schedules had not been received from many overseas manufacturers and this was holding up the preparation of construction plans. Some manufacturers had also failed to supply other information needed for forward planning, and this was already causing "serious and costly delays."

Within Indonesia, Parsons' officers soon found that even very basic data essential for the preparation of preliminary plans were unavailable in Djakarta. Although men could hardly be spared for the laborious task, it appeared that visits to a large number of the planned sites would be necessary to gather the data for the "Reports of Survey" required of Parsons. Another difficulty was the lack of suitable office space. As well as being too small, Parsons' office was a considerable distance away from some of the assisting Indo-

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1. Ralph M. Parsons Co., Final Report, op.cit.

nesian staff. Communications problems being what they are in Djakarta, with unreliable telephones, serious traffic delays and language barriers for foreigners, this simple factor of geographical separation was a source of much irritation and delay.

By the end of the following month, disagreement had begun to develop between Parsons and the PLN. In what was to become a recurrent theme and source of constant friction, Parsons was drawing attention to the need for more foreign personnel and pressed the Department of Public Works to agree to the addition of more American staff. Disagreement had also developed over a completion schedule drawn up by BAPEDI. The latter body, perhaps in an attempt to hurry the project along, had independently drawn up a detailed chart showing the anticipated completion dates for each stage of each plant, but Parsons was not willing to endorse the schedule.

There were actually good reasons on Parsons' part for refusing to commit itself to a progress schedule at that stage. The only argument in favour of a schedule was that the target dates were a commitment of sorts and were therefore an incentive to more rapid progress. On the other hand, because of the uncertainties that still existed it was unrealistic to think that firm dates could be set. It could be argued that a progress schedule that was a farce was worse than no schedule at all. Parsons concluded that the schedule[1]

> "... could well lead to unjustified optimism on the part of those who have occasion to follow this project."

By January 1960 when the third monthly report (for December 1959) was submitted, Parsons' local Project Manager had become very concerned about the numerous delays. In the covering letter sent with the report to the Minister of Public Works and Energy, Ir Dipokusumo, he wrote:[2]

> "We feel sure that your Excellency will share our concern over the rate of progress which we report. A large amount of equipment will be received within the next few weeks. Unless more rapid strides are made in engineering, specifications, purchasing, and preparations for

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1. Ralph M. Parsons Co., Second Monthly Report, November 1959.
2. Letter of Transmittal, 19 January, 1960.

> construction, it will be many months before any of it is placed in operation.
>
> We would welcome the opportunity to contribute more substantially to the advancement and success of this project and suggest a review of work arrangements by Ministry as the first move towards our more effective participation."

The most urgent delays were in arranging surveys of sites, preparation of plans, and procurement of electrical equipment. The three main difficulties holding up progress in these areas were shortage of skilled manpower and problems of transport and communications, compounded by somewhat less than complete harmony between Parsons and the Indonesian authorities. The case of the Reports of Surveys is a good example of how these practical difficulties arose.

Problems with the Reports of Surveys

During the first three months, Parsons managed to assemble only a small amount of data towards the preliminary Reports of Surveys, a mandatory item under the contract. In the case of the three largest plants which together accounted for 10.1 MW (about 43 percent of the total capacity of the ICA project),[1] it was necessary for one of Parsons' staff to visit the sites. In the case of 20 other sites where only extensions to existing plant were involved, the Department of Public Works itself possessed sufficient data in Djakarta. There were, however, 19 other sites (for which generators had already been purchased) about which no information was available. There seemed no alternative but to visit each site. In all, at that stage several months of concentrated effort by a substantially increased staff appeared necessary to complete these mandatory surveys.

Parsons was unhappy with the progress made on the Reports of Surveys for a number of reasons. In the first place, Parsons felt that because of the way the project had developed, the need for the surveys as originally envisaged had diminished somewhat. The original plan[2] had been that an engineer would survey all sites, report on technical and economic

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1. These being at Medan (5.4. MW), Palembang (2.7 MW) and Makassar (2 MW).
2. See footnote 1 on p.255.

aspects, and make recommendations and prepare plans for each installation. This plan had not been followed - apparently to Parsons' annoyance - and the Indonesian Department of Public Works had selected the sites and generator sizes from its own knowledge of needs and conditions. ICA had then made arrangements for the preparation of technical specifications, and GSA had carried out the purchasing. Parsons had not really become involved until the output of all prime units had been fixed and the units had been specified and purchased. Since these basic decisions had already been made, Parsons felt that the Reports of Surveys were no longer so important.

Further, after some months' field experience, Parsons felt that the planned economic feasibility reports for each site were not needed either. For one thing, it seemed wasteful to use expensive foreign personnel for this task since Indonesian staff could do a satisfactory job. For another, the company was sceptical of the value of preparing any economic analysis of the plants at all, since the Indonesians themselves clearly placed a high value on the political benefits of the project and were apparently not particularly interested in the economic aspects. Parsons argued that given the paucity of accurate data, it was not possible to predict what the impact of an increased supply of electricity would be in most cases, but that the plants would[1]

> "... inevitably yield future economic betterment to a degree not practicable to assess at the time of installation."

Parsons therefore felt that priority should be given to the installation of the generating units over the completion of Reports of Surveys.

However the decision on the matter was effectively taken out of Parsons' hands. Preparation of the Reports was mandatory so Parsons was obliged to press on with them. But here was the rub: although the Indonesians were holding Parsons to the Reports of Surveys, the Department of Public Works, in various ways, was itself making completion of the

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1. Ralph M. Parsons Co., Third Monthly Report, December 1959.

Reports difficult! Parsons wanted extra office space, but for the time being none was available; Parsons was pressing for more staff, but permission from the Department and ICA was not forthcoming; and the Department had given higher priority (which it was entitled to do under the contract) to certain design work, which could only be done by foreign personnel and which therefore further hampered the completion of the Reports of Surveys.

Because of these contradictions, Parsons complained that the Department had not made its position clear, and that at the existing rate of progress only about 15 percent of work would be finished within the contract time. Parsons hoped[1]

> "... that this report will result in a review of project planning by Ministry, USOM and ICA and more effective future utilization of available services."

Friction Grows

During the first half of 1960, these basic problems continued despite attempts to improve the position, particularly the strained relationship between Parsons and the Indonesian authorities. In January 1960, the Letter of Transmittal attached to the monthly report again drew the attention of the Minister of Public Works to the slow progress:[2]

> "You will note that [the Report] states that circumstances which were related in the report for the preceding month have not changed."

Parsons' staff shortage continued, since the Department of Public Works had not agreed to the recruitment of additional personnel although approval had been sought for four extra staff some months earlier. Parsons argued that the position was particularly pressing since in their view (which may have been inflated for tactical reasons) a total of 16 extra staff were needed (eight foreign and eight Indonesian) to complete the mandatory work alone.

By February, broad agreement had been reached on a rearrangement of responsibilities which it was hoped would lead to improvements. The three regional sections of the PLN known as PLN-Djakarta, PLN-Distribution and PLN-Surabaja,

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1. Ralph M. Parsons Co., Third Monthly Report, December 1959.
2. Letter of Transmittal, 18 February 1960.

were each given a considerable amount of responsibility for work at specified sites, while BAPEDI was responsible for overall supervision and co-ordination. Parsons' work load was lightened because responsibility for preparing the troublesome Reports of Survey was transferred to the three PLN sections, and Parsons was only responsible for checking the completed reports. Even this was not entirely satisfactory for Parsons' however, since the changes were not incorporated in the contract and strictly speaking the company was still legally bound to complete the Surveys.

But in practice the reorganisation made only a small difference. Transport problems, which had not been of major importance in the first six months, were becoming serious as equipment began to arrive at Indonesian ports. In mid-April, in his covering letter to the sixth monthly report, Parsons' Project Manager expressed his dissatisfaction:[1]

> "Again we point out that the rate of progress continues to be unfavourable. Although in the previous month initial moves were made to put greater impetus behind the work, these moves have not been followed up. It must be said that accomplishments by PLN during the six months since our arrival in Indonesia have been less than could reasonably have been expected.
>
> Some four million dollars worth of project electric equipment has arrived or is enroute to Indonesia. Steps taken by Ministry to date to receive it, protect it and install it have been inadequate. This is very disturbing when one considers that the project was activated two years ago and the arrival of the equipment and the need to install it does not come unexpectedly. Other aspects of the work indicate similar unpreparedness..."

The three interrelated problems of shortage of skilled manpower, friction between Parsons and the Indonesian authorities, and transport and communications difficulties, all became more acute in March and April. Because of the lack of harmony between Parsons and the Indonesians, Parsons was unsure as to what precisely would be required of it. The company was concerned since a considerable amount of work was mandatory, and after a few months experience it became clear

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1. Letter of Transmittal, 11 April 1960.

that some of the compulsory tasks would be more difficult to carry out than Parsons had originally anticipated. In addition, the Department of Public Works was entitled to ask for Parsons' help in other matters if it wished.

In practice, the Department of Public Works could exercise wide discretion about which matters it wanted Parsons to give priority to. The Indonesian project managers tended to operate in a more ad hoc fashion than the Americans, and were not particularly worried when one section of the contract had to be neglected in order to pay attention to another more pressing matter. In contrast, Parsons were more legalistic and felt that the written clauses had to be obeyed. Parsons continued to harp on the fact that the Reports of Surveys were not complete, pressed the Indonesians to supply adequate data (which under the contract the Indonesians were obliged to do), and when the Indonesians did not oblige applied for permission (which the Indonesians withheld) to visit sites to gather data. Parsons was also concerned about the total amount of work that it would be required to perform, and pressed the Department of Public Works to clarify the matter. The Indonesians in turn felt that given the uncertainties, rigidity was undesirable in these matters and were irritated by Parsons' insistence. By March and April, this friction was openly reflected in the monthly reports:[1]

> "With six months having passed since [Parsons] started work on the project in Indonesia, it is considered that the time when such basic problems should have been settled is long past and the case is here restated with the anticipation that it will receive attention at a level of authority which will evoke definite action."

One month later Parsons complained sharply about the refusals to provide data for the Reports of Surveys. With ill concealed irritation, the company announced that it would simply have to complete them as best it could:[2]

> "PLN's delay in filling [Parsons'] request for data [continues]. These cover operating costs, revenue, and net income for existing stations, and estimates

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1. Ralph M. Parsons Co., Sixth Monthly Report, March 1960.
2. Ralph M. Parsons Co., Seventh Monthly Report, April 1960.

of local currency costs for station enlargements and additions to distribution systems.

> In discussions of this subject with BAPEDI, [Parsons] has been made aware that PLN does not publish profit and loss statements and holds as confidential information from which net income can be computed ... [Parsons] does not feel justified in deferring longer the discharge of the first obligation of the contract."

Parsons' concern about the Reports of Surveys was reinforced by the delay to other work caused by the confusion. Plans which had to be completed before final orders could be placed were being held up because the Department wanted higher priority given to other work. Parsons warned that these ad hoc changes would have bad consequences:[1]

> "The lag in purchasing will soon become apparent. Delays in designs and specifications will push the arrival of essential imported equipment and material further and further into the future."

A number of attempts were made to resolve the continuing issue of the clear allocation of responsibilities between Parsons and the Indonesian authorities. As a result, after discussions during April between BAPEDI, PLN, Parsons and USOM, a revised "Scope of Services" document was drawn up which included changes in the tasks required of Parsons. BAPEDI was asked to work out a clear program so that Parsons would know where it stood.[2]

In addition, transport difficulties worsened. By the end of April well over 80 percent of the purchased equipment

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1. Ibid.

2. This request was contained in letter No. II/3338 from the USOM in Indonesia, sent on 21 April 1960. BAPEDI was asked to prepare estimates and timing for (a) permissive services to be provided by Parsons; (b) a detailed and firm schedule of mandatory work (e.g., design, construction and installation); (c) and to give necessary basic reports, surveys and other data required to prepare Reports of Surveys to Parsons. USOM was particularly concerned that the Reports of Surveys should be dealt with:

   > "Because the Reports of Survey aspect of the work to date is one of the most unsatisfactory elements in the Project, I cannot emphasis too strongly the need to give careful attention to this portion in making your estimates."

had arrived at Indonesian ports. Various problems soon arose. Inevitably, some equipment was stolen, and this had serious consequences since there were frequently long delays before spares could be obtained. Shipping documents often went astray, which meant that the goods covered by the documents were (in effect) lost, sometimes for several months. The goods were usually not found until the port authorities (who have never been known for their efficiency) notified the PLN of their arrival, or until they were accidentally discovered by PLN officials on the wharves. In the case of one of the largest units where the shipping documents were lost, although the equipment arrived at the end of February, it was not found until the end of April when PLN personnel turned them up in a Djakarta warehouse. In other cases, because of a shortage of suitable storage space, equipment was stored in up to four separate places after arrival in Tandjung Priok while awaiting trans-shipment, Sometimes apparent losses could not be checked because the appropriate documents had not arrived.

Relations Improve

Following the deterioration in relations in March and April, there was an improvement in the following few months. In the Letters of Transmittal to the May and June reports, Parsons noted that[1]

> "... encouraging progress was made during the month and we have confidence that it will continue..."

and that[2]

> "Reports from several plant sites indicate that progress upon which we commented last month continues and may be expected to accelerate in months to come."

Some additional foreign personnel arrived, construction and preparations for installation of the first units were well in hand, and progress was made on the controversial survey reports.

Nevertheless the basic problems were little improved, and the somewhat better cooperation that apparently developed between Parsons and the Indonesians was probably more due to

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1. Letter of Transmittal, 17 June 1960.
2. Letter of Transmittal, 15 July 1960.

a reluctant philosophical acceptance of the position on Parsons' part than a disappearance of the original causes of conflict. By towards the end of 1960, it must have become quite clear to the Americans that there was no hope at all of the project being completed by the end of May 1961 when the original contract period expired. After further lengthy discussions in September and October 1960 of the causes of delay, the tone of Parsons' monthly reports changed entirely. From the beginning of 1961 until the final completion of the contract in 1963, there were comparatively few references to the problems that were discussed in such detail earlier, and most of the reports merely briefly outlined activities during the month.

Substantial progress was made during August and September. Additional personnel were approved for Parsons in mid-August, and the first two Reports of Survey were (at last) completed and accepted during September after being rejected by the Indonesians in July. A landmark was passed on 25 September when the first two engines to be installed were put in place at Patjitan in East Java. Further discussions were held between the various parties about the precise nature of Parsons' responsibilities, and following an important meeting between BAPEDI and Parsons on 8 August, a definite understanding which was acceptable to both parties was reached. In the monthly report for the period July-September 1960, Parsons was able to state that[1]

> "In view of subsequent events the proposals [for a modification of the present contract conditions discussed in the letter of 21 April 1960] are no longer valid; its inclusion ... in the Seventh Monthly Report, together with statements in preceding reports which led to its inclusion, was premature. Later consultations between Ministry, USOM, and [Parsons] culminating in clarifications of contract intent as supplied by ICA Washington eliminated the necessity for a modification of the present contract. These events, together with a greater understanding of work requirements and responsibilities, enable [Parsons] to foresee the ultimate solution of all problems within the scope of the present contract."

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1. Ralph M. Parsons Co., Tenth, Eleventh and Twelfth Monthly Reports, July, August and September 1960. For details of the letter of 21 April 1960 mentioned in the quote, see footnote 2 on page 263.

But even though agreement had been reached, an unpleasant taste was left in the mouths of those concerned; most unfortunately, the meeting on 8 August was less than completely amicable throughout, and later that day Parsons' Project Manager, Mr. Ray Barnett, died suddenly.[1]

Despite the clarification of responsibilities, overall progress was slow. At the end of October about 26 percent of the project was complete, but because of technical mistakes progress had dropped back to about 22.5 percent two months later. Transport and storage difficulties increased in importance as the preparations for installation work at some sites neared completion. In mid-September, the PLN Board of Directors agreed to give special attention to the question of transport, but it proved impossible to obtain space on either government or privately-owned ships.[2] In exasperation, Parsons urged that if all else failed the Indonesian armed forces should be called upon to move the equipment. The undesirability of transport delays was compounded by bad storage facilities. Although the Department of Public Works was responsible for providing storage facilities, Parsons noted that[3]

> "A great number of boxes containing ... equipment have been unprotected from the elements for a period of several months in Djakarta harbor. This has never been a good condition for expensive mechanical and electrical equipment to be in and the boxes were never intended to provide protection from this type of storage. With the rainy season now starting great damage to equipment will result."

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1. Report of the meeting provided during a interview with U, 19 February 1970. U was closely involved in the project.

2. During the six weeks up to the end of October, not one diesel engine left Tandjung Priok harbour. (Ralph M. Parsons Co., Thirteenth Monthly Report, October 1960). At the time, there were still 52 engines remaining in Djakarta awaiting transport - the first of which had arrived in Indonesia eight months earlier.

3. Ibid.

The small amount of time that Parsons had been able to spend on survey work[1] also reinforced the transport problem:[2]

> "The fact of totally inadequate time spent in site investigation points out a serious problem facing the diesel project. Advice obtained from competent shipping authorities and substantiated by other reliable sources indicates that many diesel engines may never reach their final site location because of the extreme difficulties of transportation. Very little definite information is available on some locations. To ship heavy diesel equipment to such locations without adequate knowledge and preparation is an extremely hazardous venture. [Parsons], in August 1960, asked for six additional men, two of which would be used for survey work. Six were approved but only four for immediate work while two were approved for training starting in January. The two men requested for survey work were not approved.
>
> [Parsons] believes that when the shipping problem is solved, shipment should be made only to such sites where surveys have been made covering the feasibility and methods of transport, not only to the principal harbors of specific areas, but also to the plant site of individual diesel engine installations. Proposals now advocated to ship all diesels under control of PLN Surabaja for later trans-shipment to other islands, or to ship to Pontianak for later shipment up inland rivers, merely avoid the foregoing problem. Such proposals are half-way measures which in many cases will leave expensive diesel equipment in hazardous storage areas for the possibility of several years duration.
>
> [Parsons] suggests that additional manpower be approved immediately for survey work in order that adequate plant sites and shipping difficulties be resolved before May 30, 1961. This work cannot be accomplished with existing personnel unless all design and procurement now being accomplished is abandoned."

As a result of these continuing troubles, Parsons was extremely unhappy. The best that the company could report thirteen months after the first staff arrived in Indonesia, and only seven months before the contract expired was[3]

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1. To the end of October, Parsons estimated that only seven percent of the total time spent by officers in Indonesia was spent by technical staff on field work. Parsons blamed shortage of manpower (because of refusals by the Department of Public Works to approve additional staff) for this "totally inadequate amount of time devoted to field investigations..." Ibid.
2. Ibid.
3. Ibid.

> "Overall project completion was not substantial during October but reports of preliminary activity at several plant sites indicate that significant progress could be established in the near future.
>
> [There are]... serious problems which, developing for several months, are now definitely retarding the progress of the diesel electrification program. Unless vital action is taken to solve these difficulties, the entire diesel project will soon lose all significance as a contribution to the future electrification of Indonesia."

The Project Drags On

Throughout the following months, the same problems dogged the project. In February 1961, Parsons' suggestion that the armed forces be asked to assist with transport was taken up, and the Army Chief of Staff, General Nasution, appointed a transport committee to deal with the matter. In the same month, Parsons opened a Diesel Operators' Training School in Djakarta with 36 students. By this time Parsons was confining itself, to terse matter-of-fact reports, and while continuing to apply for additional personnel, submitted a simple protest at restrictions by noting drily that[1]

> "As a matter of information, we have never exceeded nine persons since inception of the job."

In March Parsons' third Project Manager, a Mr. Webb, took over, replacing one Mr. Serle.

By the end of May 1961 when the original contract period ran out, only about 34 percent of the project was complete. An extension was agreed upon until the end of August. This was the first of a series of four extensions. A second extension later gave Parsons until the end of October 1961, then a third added another thirteen months to November 1962, and finally the contract was extended until the end of May 1963.

At the beginning of September 1961, nearly 50 percent of the project was complete, and work at 36 out of 40 sites was well in hand or completed. For the time being, work at the other four sites, which were in remote locations, had been stopped and work was to be resumed "at some later date."

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1. Ralph M. Parsons Co., Eighteenth Monthly Report, March 1961.

In effect, work on these four sites had been deferred indefinitely. Three months later at the end of November, 32 Indonesians graduated from the Diesel Training School.

Slow but steady progress continued throughout 1962. By the end of the year nearly 85 percent of the work was completed. Transport was always a difficulty, and there were often cases of cargo going astray. There were no reserve supplies of equipment to rely on, and a shortage of some key items sometimes led to delays of several months until the item was purchased and shipped from the United States. Parsons felt the transport problem at almost every step:[1]

> "Delays occur in clearing the materials from the major ports and again at the ports adjacent to the jobsites. Land transportation facilities are often inadequate and introduce time consuming problems. Custom clearances are an additional source of delay. Communications are not dependable and Bills of Lading are late in delivery to Customs. Cargo is often lost or damaged after arrival at the major ports. The tracing of lost items is time consuming and the replacement of damaged material and equipment requires many months. The movement of personnel from one site to another is slow due to necessary clearances and a low air priority."

Indeed as late as February 1963, only three months before the expiration of the contract, equipment bound for the Outer Islands was still stranded at Surabaja and Tandjung Priok awaiting transshipment.[2] At the end of November 1962, another 36 students graduated from the Diesel Training School.

Towards the end of 1962, a new problem became serious - that of shortage of funds, especially foreign exchange. It appears that shortage of rupiahs had always been something of a bottleneck, and that the financial squeeze got worse as inflation increased throughout 1961 and 1962. But by hook or by crook, and especially with some pushing from the American sponsors of the scheme, a sufficient flow of rupiahs continued to keep work moving. But additional grants of foreign aid were not so easy to come by. It became necessary to apply to AID in Washington for additional funds in order to complete five of the larger plants, but approval was not readily forth-

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1. Ralph M. Parsons Co., Thirty Third Monthly Report, June 1962.

2. Ralph M. Parsons Co., Forty First Monthly Report, January 1963.

coming. Throughout the final quarter of 1962, Parsons drew attention to the urgent need for the funds to be released so that the parts could be ordered and delivered before the contract expired. Because of the lag of over six months between purchase and final installation, when the additional funds had not been approved by December, Parsons reported that[1]

> "The release of funds now will not permit sufficient time to purchase, ship and install needed items before the contract time expires."

On the 27 March 1963, PLN formally notified Parsons that it was not interested in a further extension of the contract, so the Americans began winding up operations. By the end of May nearly all of Parsons' staff had left Indonesia. At that stage 85 percent of the total planned capacity (at 31 sites) had been installed, but of this, only 65 percent (at 26 sites) had been accepted by the PLN. The other 20 percent, which Parsons regarded as complete, had not undergone final tests for one reason or another, and indeed had been the source of some further friction since Parsons felt that PLN was being too finicky.[2] At nine of the forty sites

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1. Ralph M. Parsons Co., Thirty Ninth Monthly Report, December 1962.

2. For example, the 275 kW plant at Kotabaru was completed and tested by Parsons personnel on 9 March 1963, but apparently no representative of the manufacturers was present. In their Forty Second Monthly Report for March 1963, Parsons commented irritably on the matter:

   > "After the tests were completed the PLN representatives who witnessed the tests did not feel they had authority to sign the test forms. The installation is complete, the test run, and no one has accepted it."

   Another view of this particular incident was given during an interview with B_1 on 25 March 1970 (B_1 is a PLN official who was involved in the scheme).

   > "A Parsons engineer came back to Bandjarmasin from Kotabaru and claimed that the machines were inadequately installed. He wanted me to sign approval without inspecting them myself. I refused, and this led to ill feeling. Later the manufacturer's engineer visited Kotabaru and agreed that in fact the job was unsatisfactory and should not be accepted."

(which accounted for the remaining 15 percent of total planned capacity), no generating units had been installed at all. In some cases neither foundations nor buildings had even been finished.

It is clear, then, that the project was far from being an unqualified success. We are probably justified in feeling that Parsons' claims that[1]

> "...it was successful and of great use and benefit to the Indonesian people"

and[2]

> "...a noteworthy and rewarding project."

were a little overdone. Under the terms of the original contract, Parsons had agreed to install units at 41 sites within a period of about 1 year 8 months. After a period of 3 years 8 months, work was completely finished at only 26 sites, while one site had been apparently dropped entirely and work at nine others was in most cases well away from completion.

Conclusions

What lessons emerge from the experience of this project, and to what extent did similar problems delay the other electricity projects that lagged behind schedule during the sixties? Before turning to consider the second question in more detail in the following Chapter, it will be useful to consider the first, drawing on the experience of the other parts of the scattered diesel plants project.

In the first place, little forethought was given to any of the separate programs in the scheme. Certainly almost no thought was given at all to the economic pros and cons, and the clause requiring Parsons to prepare an economic justification for each plant went by the board.[3] It may have been the original intention that plants which showed up as extremely economic would be rejected, but in practice this never occurred. In this, we can agree with Shakow's conclusions about the scheme:[4]

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1. Letter of Transmittal of the Final Report, 23 August 1963.
2. Ralph M. Parsons Co., Final Report, 10 July 1963.
3. See footnote 1 on p. 255.
4. Shakow, op.cit., pp. 324 and 325.

"The project is for the most part clearly political. As an ICA report puts it, the project 'will contribute a great deal to political unity within the country.' Furthermore, several of the engineering firms' reports contain passages such as the following; The project at Patjitan, East Java, is technically feasible, but 'its cost is not economically justified from the standpoint of return on invested capital.' Or the letter of the project director in accepting the firm's report on the Tandjung Pinang diesel plant - 'The report indicates that there will be a loss of revenue ... We had anticipated such a loss; however it is our considered judgement that economic justification is more than compensated for by the beneficial influence of a more general use of power.'

Thus, another aspect of the contradictory nature of American policy is illustrated by its demands for strict economic justifications and the required surveys for determination of site suitability, yet the discovery of non-economic factors does not hinder the project at all. The economic justification appears to be a useless facade that delays rather than contributes towards successful project completion ..."

But in one sense, since the Indonesian government was firmly committed to the scheme and any major changes would probably have been politically unacceptable, the failure to carry out economic analyses was not particularly serious. From the point of view of successful completion, far more serious was the failure to carry out prior technical feasibility surveys. The difficulties that this led to have been outlined by the official who served as chairman of BAPEDI from 1960 to 1964 and his colourful report is worth quoting at length.[1]

"Out of one hundred and more places, only a few were surveyed prior to the signing of the contracts. For a number of existing stations we relied on old data, which later appeared to be no longer up to date. For the rest we depended on good luck. Consequently in

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1. Tambunan, op.cit., pp. 2-3. In a personal interview, Dr. Tambunan provided further details of how plans were prepared:

"Planning was done in Djakarta, and local information was mainly gathered from local officials... Naturally local officials were very reluctant to discourage any plans to install equipment, and would not supply full information if it discouraged the project. They were afraid of losing the project."

making up the specifications to be attached to the contracts, certain types and models of engines were designated to localities which were practically unknown to us, with the result that later too much time and money were spent to go through with the original plans. To mention a few cases for the purpose of illustration:

For Gunung Sitoli, on the island of Nias, about one hundred kilometers off the shore of Sibolga, on the west coast of North Sumatra, two Waukesha units of 100 kw each were designated. No survey was ever made for that town, even after the cargo had arrived in Belawan [the port of Medan]. According to the original plan the crates, two pieces of 4 tons each, would be transported by trucks to Sibolga. From there by boat to Gunung Sitoli would present no problem. However the last checking disclosed that there were no conceivable means in Sibolga to do the job. What to do? For we were already committed to send these units to that island. There was no alternative and no way to abandon that plan,...Good luck came to the rescue. Towards the end of 1961, more than a year later, a new shipping line was opened between Balawan and Gunung Sitoli, whose agency was willing to carry our cargo, but on our risk, for there were no adequate means in Gunung Sitoli to receive it. The final story was: after arrival in the port, the crates were unloaded on two hastily made rafts, a few hundred meters off the shore, one of which capsized dropping its cargo. Fortunately hundreds of human hands with manilla ropes pulled the engine ashore after being submerged for about 24 hours. The story has a happy ending however, for the engine is still running in Gunung Sitoli.

Another story is the case of Kendari, on the coast at the toe of the southeastern leg of Sulawesi. To begin with there were no data available on that town, when a Skoda unit of 150 kw was designated for it. A late survey revealed that the town is only accessible from the sea.

Furthermore building materials like gravel and sand are not found locally. Besides suitable water for mixing concrete is only available during a few months of the year. As to the situation of the project in Kendari, ... it has just been finished, six years after the arrival of the engine from Czechoslovakia.

Instances of inadequate surveys are numerous. Roads that were once there according to the available maps were found later to be nothing but trails, sometimes not much different from muddy abandoned river beds.

Bridges that were once there, have been replaced by shaky wooden structures, or were missing completely. Piers that were once there were missing or could not be used, having been weakened by natural causes and neglect."

Another instance of poor planning was the failure to allow for investment in distribution facilities early in the piece. At the end of 1961 the ICA project was actually being slowed down so as not to end up with units in place and no distribution facilities.[1] In spite of this, there were cases where plants were completed for more than a year before production could begin for want of distribution facilities.[2]

Secondly, even though the scattered diesel plants project was especially vulnerable to transport delays, the case study dramatically illustrates the difficulties that transport and communications pose for development projects in Indonesia. Common problems were mistakes in transport administration, shortage of available cargo space, no regular shipping services to suitable ports, shortage of heavy loading facilities such as forklifts, shortage of appropriate storage space, and absence of trailers and heavy trucks for land transportation from local ports. As a result, instances of mishaps and accidents were numerous, and led to months of delay. Further, even air transport for personnel was often unreliable. Cases of highly trained personnel waiting around for up to ten days were common.

Political pressures were a third major constraint, not only in influencing the selection of the project in the first place,[3] but also important in determining details. Thus since one of the main aims of the project was to help pacify the Outer Islands, the advice and support of the military was sought in selecting sites.[4] The influence of the military is reported to have been especially responsible for placing some units close to the Malaysian border during the period of confrontation. The PLN encouraged some links with the armed

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1. Shakow, op.cit., p.324.
2. Tambunan, op.cit., p. 4.
3. See Shakow's comments quoted on p.253 above. One of the main Indonesian officials connected with the project, D, confirmed this during interviews by pointing to the 1957-58 rebellion as an important factor which influenced the selection of the project. Interview, 1 April 1970.
4. Interview with U, 23 February 1970.

forces for two reasons: because they were able to give useful logistical help from time to time, as was the case with the ICA project in early 1961; and because it was useful from the political point of view to be able to point to co-operation with the armed forces. For example, when applying to the government for additional funds, there was worthwhile political leverage to be gained from pointing to the contribution that PLN's program was making to national security and foreign policy goals.

But there is a fourth major lesson to be learnt from the experience of the ICA project, which is perhaps the most striking conclusion to be drawn of all; the importance of personalities, and of the ability of visiting foreigners and foreign institutions to adjust their modes of work and expectations to local conditions which may be very different from those in their home countries. That misunderstanding and frustration because of the culture gap are often the cause of disappointing results in underdeveloped countries is well known, so we will discuss them here only to the extent that they gave rise to difficulties in the scattered diesel plants project.[1]

Personal factors caused much resentment during the course of the ICA project. In some cases personal relations between American and Indonesian staff were openly bad. Even when relations were superficially satisfactory, there was often dissatisfaction on both sides below the surface. On the Indonesian side, the irritation towards the impatience and the apparent lack of understanding of local problems that some of the American staff showed was voiced during interviews with two officials who were involved in the project:[2]

> "In the first place, they seemed to come here expecting that we didn't know anything. Both sides were responsible for bad feelings. The Americans were not used to the country at all, and we Indonesians sometimes failed to fulfil our obligations, which upset

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1. See Dudley Seers, "Why Visiting Economists Fail," The Journal of Political Economy, LXX (4), August 1962. That many of the comments that Seers makes, although it is mainly economists he has in mind, apply to experts from other disciplines too (such as engineers) is borne out by the experience of the ICA project.

2. Interview with B_1, 25 March 1970.

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2. Interview with B_1, 25 March 1970.

There is no evidence available to support this suspicion, but the very fact that it existed indicates how little trust there was between Parsons and the PLN.

On the other hand, from the Americans' point of view there was inefficiency and broken promises on every side. They arrived to find that the original terms of reference for the survey work were no longer fully appropriate, since important decisions about types of plant and location had already been made. Extra staff, urgently needed if agreements were to be fulfilled, were not approved for months on end, and time after time the Indonesians were casual about contract arrangements and let things slide.

Indeed, the difference in attitudes between the Indonesians and the Americans - Parsons in particular - as revealed in the different approaches each party showed towards the contract clauses is most significant. Indonesia is famous for its red tape. Government officials cannot afford to worry too much about the precise letter of the law, regulation, or contract. Indonesian officials well understand the maxim "Rules are made to be broken." They are used to exercising their kebidjaksanaan.[1] In contrast, Parsons was "very contract conscious" and "constantly hid behind details or insisted on American standards."[2] The company's monthly reports contain numerous references to the obligations of each party under the contract, but in fairness it should be said that the Parsons Company itself certainly tried to fulfil each of the tasks set for it under the agreement. The recurring conflict arising over contract details during 1960 was a symptom of a deeper conflict - a

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1. On the phenomenon of kebidjaksanaan, see David Mitchell, "Wanokalada: A Case Study in Local Administration," Bulletin of Indonesian Economic Studies, VI (2), July 1970, p. 79 f.

   > "The freedom of an official to interpret or vary a regulation is known as his kebidjaksanaan. The general meaning of this word is wisdom; its meaning in administrative contexts is discretion. 'Yes, of course', one says to the powerful official, 'I admit my request is slightly irregular, but I'll leave it up to your kebidjaksanaan, Sir.'"

2. Shakow, op.cit., p.323.

clash of cultures, which could not be solved as easily as altering the contract slightly.

The stifling effect of the Indonesian bureaucracy from Parsons' point of view was mirrored from the PLN's standpoint by the bureaucratic multiplicity of private and public institutions on the American side. Inevitably, with four American parties involved as well as the various manufacturers' representatives, it was a strain on the Indonesian officials just to meet the administrative requirements of the Americans. It was to satisfy ICA requirements, for example, that the troublesome Reports of Surveys were prepared, and yet Shakow concluded that[1]

> "... the reports ... are of little use for the needs of the moment ... they are more of a time consuming hindrance than anything else, for the installation of numerous small diesels ... The material being compiled in the firm's reports is generally known by the PLN anyway, either by their earlier work or by generalisation from experience in Indonesia ... The investment cost per kw becomes much higher when these preliminary investigations are added in."

But a more serious result of the insistence of ICA that its own procedures be followed was the selection of a number of diesel engines which were most unsuitable for Indonesian conditions.[2] The PLN was originally keen to obtain General Electric diesels, which were well-known in Indonesia and had proved reliable. However ICA insisted that bids be called for, and then chose four types, none from General Electric. Some of the machines (including the largest ones) were of a high speed type which while technically efficient and comparatively economic, was also far more sensitive and needed higher quality fuels and more maintenance than low speed diesels. The high speed machines are quick to fail unless a skilled worker is in control. Thus even though the PLN realised that low speed machines were less efficient technically, it preferred them because of their sturdiness and reliability.

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1. Shakow, op.cit., p.323.
2. Details from Shakow, op.cit., p.332, and from interviews with U (23 February 1970), B, (25 March 1970) and with another official (April 1970).

The few details available suggest that in contrast to the ICA scheme, the Indonesians were comparatively satisfied with the Czech project. This was probably in no small degree due to the different expectations that they had of the latter program. The big difference between the two was that the Czech scheme was a purely commercial venture so the Czechs accepted whatever was suggested by the Indonesians in choice of sites, machines, and so on, without argument.[1] Relations were directly with Skoda, the manufacturer, and dealings with the local Czech embassy were minimal. From reports of officials involved in the Czech scheme it is clear that it also suffered from long delays for much the same reasons that the ICA scheme did. Although the Czech program began in early 1961 and was planned for completion in 1964, in early 1967 there were still 20 sites out of the original 54 where work had not been finished, and in some cases had not even started.[2] A few plants were not completed until 1970.

Included in the Czech loan which totalled over $2 million were the services of two engineers who supervised the erection and testing of units of over 500 kW. The Indonesians themselves handled the smaller units. Writing at an early stage of the project, Shakow reported that[3]

> "In late 1961 the Indonesians were pleased with the Czech project as it had so far caused little difficulty, was efficient on the Czech side and much cheaper than the ICA project, the saving resulting mainly in the much reduced fees for the Czech experts. While the US programme requires a separate contract for experts, the Czechs are paid in the price of the machine which is still cheaper than the comparable US machine."

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1. For details of the terms of the Czech agreement, see Shakow, op.cit., p. 290. The Czech scheme was discussed at some length during the interviews with officials referred to in the preceding footnote.
2. F. Tambunan, op.cit., p.2.
3. Shakow, op.cit., pp. 290-1.

PLN officials admit that the Czech scheme was inferior to the American one in some ways, and do not feel that either program was unequivocally better than the other. The Czech advisors were less efficient as managers than the Americans, and consequently the flow of Czech materials was more disorganised. The American aid scheme also included two years schooling for diesel operators, which was a most successful part of the program. Paradoxically, some of the operators trained in the American school were finally sent to supervise the Czech plants! In addition, in terms of the proportion of total sites completed within a reasonable time, the Americans seem to have done better than the Czechs. Thus since we have such meagre information, we are in the same position as the PLN officials - it is not possible to decide unequivocally that either program was the better.

CHAPTER 9 A Review of Investment During the Sixties

The Early Sixties

As we saw in Chapter 7, the scattered diesel plants scheme was not only the project which suffered numerous delays. The main prestige generation plants apart, most other projects have had particularly long gestation periods. The comparative success of the larger projects is easy to explain: they were glamorous turnkey projects which attracted sufficient support from both foreign and domestic sources to ensure that neither foreign exchange nor domestic financing was a real bottleneck. Further, their domestic political importance meant that red tape could be by-passed without too much difficulty, and since they were all situated in Java close to main ports, transport was not a major difficulty.

However a balanced program of development in the electricity sector in the future cannot consist of a few specially favoured turnkey projects, but must include a number of plants of different sizes scattered throughout the archipelago, probably mostly constructed by the Indonesians themselves. Therefore a knowledge of the problems that the less successful geographically dispersed smaller plants ran into is very relevant when considering the prospects for future expansion in the industry. Two questions are worth looking at together: to what extent did the factors that impeded the scattered diesel plants project also affect the execution of other projects? ; and the related question of what were the factors that determined which projects went ahead, and which were delayed?

We identified four main problems in discussing the ICA part of the scattered diesel plants program: lack of planning; transport and communication difficulties; the influence of domestic and foreign political pressures; and poor relations between Parsons and the Indonesian authorities. Unfortunately reliable details of the progress of other projects are hard to come by, but discussions with industry officials indicate that the second and third of these four problems were the cause of many delays in other slow moving projects.

But for the majority of the smaller projects, the most important problem of all was the irregular supply of finance, a problem that was exacebated by the politics of the day.

That transport and communications were bottlenecks is readily understandable from the account of the ICA project. Even the Djatiluhur scheme suffered because of transport difficulties. One representative of a contracting firm closely involved in the construction of the dam, in comparing the progress at Djatiluhur with that usually made at similar sites in other countries explained:[1]

> "It was a difficult project since <u>everything</u> from hammers up had to be imported. This led to delays, especially in the civil engineering work where large earthmoving equipment lay idle for a long time because of shortage of spares."

This being the case with the favoured Djatiluhur project close to Djakarta, the position was a good deal worse for smaller projects.

However it was the other two main causes of delay, irregular supplies of finance and political interference (which were closely interrelated) that were the major problems. During interviews, official after official connected with the planning and execution of projects mentioned these two factors as their main concern during the early sixties. The remark that "rupiah financing was our biggest problem" was common. It seems that the ICA diesel scheme was more fortunate in this respect than most other small projects, perhaps because of the American interest in seeing the project completed.

In the supply of domestic currency especially, there were two sources of trouble. In the first place, quite frequently bureaucratic holdups delayed the release of government funds which had already been agreed upon. A more important difficulty, however, was inflation which became progressively worse after 1960. The effect of inflation was that rupiah budgets were often exhausted well before the end of the financial year, and to make matters worse the administrative machinery which arranged the necessary revisions

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1. Interview with Q, 4 February 1970.

to project budgets was poorly developed. At times the position was so serious that the procurement of additional funds through visits to Djakarta and the lobbying of appropriate powerful officials became one of the major tasks that project managers had to carry out.

Thus inflation had a crucial effect on the decision making process: decisions which had been formally arrived at in a time consuming way through the proper administrative channels (such as the authorisation of the annual investment program for the electricity sector) became largely out of date and therefore less important, while the power of influential officials and politicians who could make ad hoc decisions (about such matters as the allocation of extra funds) increased. The consequences were described by an important official in the Planning Division of the PLN as follows:[1]

> "The influence of project managers' personalities was very important in obtaining funds for particular projects. A lot of politicking was required at times - seeing the Directors of the PLN, the Minister, and perhaps even the Ambassador of the particular country which was supplying the foreign aid. [If the Ambassador could be convinced that the project was languishing for want of rupiah financing, he might be prepared to press the Indonesian government to give higher priority to the project.]
>
> Some project managers were better at this than others. For example, the project manager at [one site begun in the early sixties and not yet completed] was young and did not fight to see the Minister. He just sent off letters and waited. Thus little was done."

As a result the way was open for political pressures to change the picture. In the end some projects were even taken to the President for special support. From time to time Sukarno issued a Projek Mandataris, which was a statement ordering that priority be given to a particular project. Speaking of the early sixties, the same official explained that:

> "Overall national priorities were not constant, either between sectors, or within one sector. There were changes in priorities between sectors, and even within the electricity sector itself.

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1. Interview with U, 23 February 1970.

> The Asian Games, for example, led to concern with the generation sector for Djakarta ... the Department of Finance was concerned with plan priorities, but Sukarno kept changing them. Sukarno's Projek Mandataris became the highest order. Tandjung Priok was given very high priority before the Asian Games. It was a case of politics over economics."

Planning and Investment After 1965

Table 7.1 and Figure 7.1 showed that since the end of 1965 the rate of expansion of capacity in the industry has fallen off dramatically. In the five year period 1960-64, the average annual rate of growth was about 14.8 percent, whilst in the following five year period 1965-69 the average rate fell to about 3.5 percent. As Table 7.2 showed, much of the investment that did occur during the latter half of the sixties was actually the completion of projects such as the Djatiluhur dam, the two large thermal plants, and the scattered diesel plants project which had been begun years ealier. The only other substantial addition to capacity in the period was 42 MW in three 14 MW gas plants in Medan, Palembang and Semarang, which were purchased from the West German company AEG with the aid of German credit under a contract agreed upon in April 1965. The purchase of these plants was really an ad hoc emergency step taken in response to the serious shortage of electricity that developed in these important towns when other projects which were expected to relieve the position were delayed.

Just as the rapid expansion of the 1960-64 period was mainly a result of agreements and plans made in the late fifties, so the sharp fall in the growth rate after 1965 was a result of the failure to conclude new project agreements in the first half of the decade. The poor performance in the latter part of the period, then, should not be seen as a result of the 1965 attempted coup, but should be attributed to events before 1965. As we saw earlier, the availability of foreign credits has been a necessary condition for the initiation of large scale projects. The fact was that in the increasingly chaotic and anti-Western period leading up to 1965, few nations were willing to sign long

term aid agreements. The USSR was showing considerable interest in the Asahan hydro project in North Sumatra, but it never got past a preliminary stage.[1] Although by as early as the end of 1961 the Planning Division of the PLN had drawn up relatively firm plans for about 280 MW of expansion in hydro capacity in the 1965-67 period (see Table 9.1), most of the projects did not progress very far.

TABLE 9.1 Hydro Electricity Projects in the Stage of Preparation in late 1961

Project	Area	Capacity (MW)	Planned Completion Date
Asahan (Sigura[2])	N. Sumatra	120	1966
Karang Kates	E. Java	60	1965
Wlingi	E. Java	30	1967
Riam Kanan	S. Kalimantan	30	1966
Garung	Cent. Java	10.5	1965
Kali Konto[a]	E. Java	10	1967
Batang Agam	W. Sumatra	10	1965
Tes	Bengkulu	2.4	1964
Ketenger	Cent. Java	1.0	1963

Notes: a. Sometimes known as the Seloredjo Dam: The Kali Konto project will be a multipurpose scheme.

Source: Departemen Pekerdjaan Umum dan Tenaga, Buku Laporan Hasil Pelaksanaan Pembangunan Departemen P.U. dan T. Tahun Kerdja 1961 [Report of the Results of Development carried out by the Department of Public Works and Power 1961], Djakarta, n.d.

- even by the end of the sixties.

This is not to say that discussions with foreign aid givers ceased. Indeed quite a few preliminary surveys and reports were prepared at different times throughout the period, but because of the uncertainties and long delays,

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1. In 1965 there was talk of the supply to Indonesia of about 100 Societ experts and a large amount of equipment to help with the Asahan project. (See Antara Financial and Economic News, 10 June 1965). But apparently nothing came of the plans.

progress towards agreement was very slow. For example by March 1962 discussions between the PLN and the International General Electric Company of the United States on the construction of the 37.5 MW thermal plant at Semarang had reached a comparatively advanced stage, and an agreement had even been signed. Little further progress was made however, and the project lapsed.

The Japanese, too, kept up an interest in developments. The Nippon Koei Company prepared many technical reports and preliminary project surveys. The Company was particularly interested in the "3-K" hydro projects (Riam Kanan, Karang Kates and Kali Konto) and the Wlingi hydro plant, which were being carried out mainly with Japanese war reparations. Although the details of these projects have undergone alterations from time to time,[1] apparently work on them never entirely ceased. They are now expected to be completed during the course of Repelita (Rentjana Pembangunan Lima Tahun, or the Five Year Development Plan). Another Japanese firm, Sumitomo, signed a contract in 1965 to add two more generating units to the Tandjung Priok thermal power station, but this lapsed too.

The effects of the September 1965 attempted coup and particularly the administrative confusion that followed further delayed both those few projects for which foreign credits had been found and also the small projects which the Indonesians were carrying out themselves. The raging inflation of 1966 during which prices rose by over 600 percent made nonsense of budgets within weeks, and additional financing was even harder to arrange than previously since the system of political patronage was passing through a period of great flux. Moreover the stringent stabilisation policy announced in the 1966 budget practically stopped work on electricity projects. Government policy was that development projects that could not be finished in 1966

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1. For example, in different documents issued by the Department of Public Works and Power in 1961, the proposed size of the Karang Kates project was listed in one as 75 MW and in another as 60 MW.

were to be slowed down or stopped. The squeeze on funds continued into 1967.[1] The execution of the scattered diesel plants project was held up because of a shortage of finance, while the two 25 MW thermal plants in Makassar and Palembang and the East Java Transmission Network (all of which were being carried out with Yugoslav aid) slowed down too. Each of these three latter projects was plagued by familiar problems: delays in the arrival of goods from overseas and a shortage of rupiah financing.[2]

As a result of the troubles of the day and particularly the severe budgetary restrictions, throughout most of 1966 and 1967 few new plans were made. By 1968 when the shortage of funds was still holding up projects which had already been decided upon, priorities were being reexamined in preparation for Repelita.[3]

Repelita

In the four months November 1967 to February 1968 confidence in the new Suharto government was badly shaken by an unexpected and severe burst of inflation. Between August 1967 and February 1968 the Djakarta retail price of rice rose from Rp 11 to Rp 65 per litre, while the exchange rate (general BE) deteriorated from about Rp 140 to about Rp 275 per dollar.[4] Throughout most of 1967 prices had been

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1. For details, see the various "Survey of Recent Developments" articles in the Bulletin of Indonesian Economic Studies in 1966 and 1967.

2. Departemen Pekerdjaan Umum dan Tenaga Listrik, Direktorat Djendral Tenaga dan Listrik, Laporan Tahunan Djuli 1968 - Maret 1970 [Annual Report for July 1968 - March 1970], [Djakarta], mimeo., [1970], pp. 56-57.

3. For example, both extensions to the Tandjung Priok power plant and work planned on the Karang Kates hydro plant for 1968 had to be postponed until 1969 because of shortage of funds. Information provided by the Directorate General for Power and Electricity.

4. H.W. Arndt, "Survey of Recent Developments," Bulletin of Indonesian Economic Studies, No. 10, June 1968, p. 2.

relatively stable, especially in comparison with the chaos of 1966, so the economic crisis which burst forth in late 1967 was all the more dramatic because it occurred just as it appeared that the government's deflationary policies were at last taking effect. Throughout the rest of 1968 and especially as the danger period at the end of the year drew nearer, the government pursued a cautious economic policy in an attempt to ensure that the inflationary burst was not repeated.

The caution paid off. Confidence in the government's economic competence was boosted when the danger period passed without any serious upward pressure on prices. Thus on the eve of Repelita which began on 1 April 1969, Indonesian economists for the first time for many years were modestly optimistic about the future. This gradual overall improvement in the investment climate - a growing confidence that worthwhile progress could be made given time - was one of the most encouraging features of the late sixties on the economic front.

Whilst there was also growing confidence about the future within the electricity industry, not much tangible progress had been made by the time that Repelita began. The plan document contained a section on electric power laying out the broad outlines of development over the period 1969-74. Details are summarised in Tables 9.2 and 9.3. Table 9.2 shows the five point plan for rehabilitation and expansion that the Plan emphasised and indicates the priorities that were attached to each of the five points by showing planned expenditure under each heading.

The electricity planners very sensibly gave high priority to rehabilitation and the need to eliminate the imbalance between the generation sector and the transmission and distribution sectors. The Plan itself stressed the urgent need for rehabilitation by pointing out that of the 586 MW of installed capacity at the end of 1966, only 51 percent was operable "because of major damage, obsolesence,

TABLE 9.2 Planned Expenditure during Repelita (1969-74) in the Electricity Sector

Item	Amount	
	Rp billion	$ million[a]
1. Rehabilitation, expansion of transmission and distribution facilities	40.5	124
2. Rehabilitation and construction of power plants.	46.1	141
3. Preparation for the scattered power plants program	5.8	18
4. Efforts to improve efficiency	0.3	1
5. Survey, feasibility studies, research	7.3	22
Total	100.0	307

Notes: a. $1 = Rp 326.

Source: Republic of Indonesia, Department of Information, The First Five-Year Development Plan (1969/70-1973/74), Volume 2B, op.cit., p.87.

or the lack of spare parts."[1] In addition, much greater emphasis was given to the transmission and distribution sectors than in any earlier plans - 40 percent of total planned expenditure over the five years period was expected to be in these sectors.

As well as rehabilitation of existing generating plants, plans were included for the construction of new ones. These are shown in Table 9.3. As with the plans

1. Republic of Indonesia, Department of Information, The First Five-Year Development Plan (1969/70-1973/74), Volume 2B, mimeo., [1969 (?)], p.70. Note that this percentage is larger than that shown in Tables 5.21 and 5.22. Presumably the difference arises because of recording procedures. It was hoped that as a result of rehabilitation efforts during 1967 to 1968, by the end of 1968 the effective capacity would be increased to 80 percent. No up to date figures are available to show whether this goal was in fact achieved.

TABLE 9.3 Main Generation Projects Listed for Consideration[a] in Repelita, 1969-74

Project	Type	Area	Capacity (MW)
Asahan	H	N. Sumatra	160 or 460
Tg. Priok extension	T	W. Java	100
Karang Kates	H	E. Java	70
Semarang	T	Cent. Java	60
Palembang	T	S. Sumatra	25
Makassar	T	S. Sulawesi	25
Medan	T	N. Sumatra	25
Garung	H	Cent. Java	20
Riam Kanan	H	S. Kalimantan	20
Batang Agam	H	W. Sumatra	10
Tonsea Lama	H	N. Sulawesi	5
Kali Konto[b]	H	E. Java	4.8
Ngebel[b]	H	Cent. Java	2.25
Isolated Plants	H/D	Scattered	n.a.
Total (excluding Isolated Plants)			527 or 827

Notes: a. Some of plants are not planned for completion until after 1974.

b. The English version of the Plan shows the Negbel project as 50 MW (2 x 25 MW) in what is obviously a translator's error. The Kali Konto (or Seleredjo) project is shown as 30 MW in the English version and this may also be a translator's mistake.

Source: As for Table 9.2.

of the late fifties, the list of projects contained little that was new and was mainly projects which were already underway or had been under consideration for many years. This fact is driven forcibly home by the close similarity between the list of hydro projects "in preparation" in 1961 (see Table 9.1) and those "for consideration" in 1969. The other plants were a continuation of old plans too: the extensions to Tandjung Priok had been mooted for a long time: the

Semarang plant (now upgraded to 60 MW) was originally discussed seriously in the late fifties; the Palembang and Makassar plants had been dragging on since the mid-sixties; and the isolated plants program, which included a number of experimental micro-hydro plants, was an extension of the earlier program. In 1969 in fact, only a small amount of headway had been made in the planning techniques used in the industry over the methods of nearly eight years earlier.

This being the case, it is not surprising that many of the faults of earlier planning were repeated. In the first place, the published "plan" for electricity still hinged on the "shopping list" of well-known generating projects. The prominence given to rehabilitation and the transmission and distribution sectors did not represent a new and broader approach to planning methods so that the need for associated expansion in all three main sectors was recognised. It was more a recognition of a very obvious need to make up for past neglect.

A second mistake that was repeated was the failure to discuss either the financing of the projects in any detail, or the wider question of the financial policies to be followed in the industry. Technical matters took prominence. The neglect of this aspect is most significant, because it reflects (and perhaps is even one direct result of) the basic dilemma that the industry has been faced with for the past decade: the absence of a sufficient degree of financial independence - a problem which is part of the wider failure to resolve the "accountability versus autonomy" conflict referred to earlier in our study.

The lack of sufficient financial independence has had an important effect upon investment policies. Since the planners have not had independence, they have been in a continual state of uncertainty about the resources that would be made available to them in the near future. Of course investment planners in any industry in all countries face problems of uncertainty, but in Indonesia the uncertainty has been particularly acute. Even the minimum degree of confidence that important investment programs once embarked upon will be carried through

without extended delays has been absent for most of the sixties. This appears to have encouraged officials to plan with relatively short time horisons - or at least to behave as if they had short time horisons. Since there is no reliable guarantee that a sufficient and continuing flow of funds will be available for long term balanced expansion, planners have taken a piecemeal approach. They have naturally put forward the projects that have been most likely to attract funds.

Thus the process of planning in the industry has been stood on its head. Instead of beginning with demand factors and deriving the required supply facilities, the planning officials have tended to begin with the supply side (and have emphasised only one sector of the supply side at that) and have paid almost no attention at all to demand. This mistake was made in the early sixties, and it was repeated to a less extent in the Repelita plan document. Given the present financial policies that the industry is obliged to follow, even if the planners were in a position to introduce integrated planning methods, there is little incentive for them to do so.

Fortunately because of the greatly increased confidence of aid-giving nations in Indonesia's future, this haphazard method of planning has turned out to be quite successful over the past few years. Since Repelita was inaugurated, the electricity sector has attracted a considerable flow of aid. Although the benefits are not yet obvious because of the gestation periods of projects, there is now far more activity in the industry than there has been for many years. Pre-investment surveys and a number of long term plans (of varying utility) have been prepared by foreign advisers. The position in mid-1970 is summarised in Table 9.4. Since then, more

TABLE 9.4 Status of Some Main Electricity Projects executed with Foreign Aid in Indonesia, Mid 1970

Type of Project	Area or Place	Aid-giving Agency/a Country	Amount ($ million)
UNDER EXAMINATION			
1. Generation (Tjirebon-Bandung-Djatiluhur)	W. Java	AID	30
2. n.a.	W. Sumatra	ADB	15
3. Distribution	W. Java	n.a.	12
4. Distribution (Ketenger)	Cent. Java	AID	12
5. n.a.	W. Kalimantan	ADB	10
6. Generation (geothermal)	Cent. Java	AID	9.5
7. Distribution	S. Sumatra	ADB	4
8. Distribution	S. Sulawesi	ADB	4
9. Distribution	N. Sulawesi	ADB	4
NEGOTIATIONS IN PROGRESS			
1. Rehabilitation	N. Sumatra	America	16
2. Distribution	E. Java	Japan	8
3. Distribution	S. Kalimantan	Japan	4
AGREED UPON			
1. Rehabilitation	Cent. Java	AID	22.2
2. Distribution	Djakarta	World Bank	15
3. Generation	Tandjung Priok	Japan	12
4. Generation (Karang Kates)	E. Java	Japan	10.7
5. Generation (Riam Kanan	S. Kalimantan	Japan	10.5
6. Transmission	W. Java	France	3.75
7. Rehabilitation (Ketenger)	Cent. Java	W. Germany	2.5
8. Generation (Kali Konto	E. Java	Japan	1
9. Generation (Asahan)	N. Sumatra	Japan	0.8

Notes: a. AID = United States Agency for International Development.

Notes: (contd.) ADB = Asian Development Bank.

Source: Business News, 24 July 1970.

agreements have been signed.[1]

But in commenting on the two main drawbacks of the electricity section in Repelita - the tendency to rely on a "shopping list" of projects and the neglect of financial aspects - it should be made clear that in some directions there have been improvements. On the first matter, the plan document was a substantial advance over earlier plans:[2]

> "To avoid past mistakes, the size of the distribution and transmission networks must be much greater than the additional capacity of new installations. In other words, the construction of networks must keep ahead of increasing capacity ... The main investment objective in the distribution and transmission networks is to maintain a balance between the capacity of electric generating units and the capacity of distribution, so that full use can be made of the generated power."

On the second matter recent developments have been less encouraging. On one hand, considerable fuss was made of the need to take more cognizance of economic considerations in selection of projects than in the past:[3]

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1. For example, in October 1970 a survey contract was signed with a French company (Antara Financial and Economic News [AFEN], 26 October 1971). In June 1971 an American company was awarded a $350,000 contract (made possible by an IDA loan) for a survey and feasibility study in West Java (Antara Commercial, 25 June 1971). At the end of July 1971, two more contracts were arranged with French and German firms for work in East Java and Djakarta respectively (AFEN, 2 August 1971). These were financed out of West German and World Bank loans. In August 1971 another American company received a contract paid for out of an US Agency for International Development loan to improve the distribution network in the Medan area (AFEN, 21 August 1971). Japanese contractors have won contracts for work at a number of sites too, including Asahan (see AFEN, 26 August 1971).

2. Republic of Indonesia, Department of Information, The First Five-Year Development Plan (1969/70 - 1973/74), op.cit., p.75

3. Ibid., p.77.

> "Construction of new power plants will be undertaken only after intense studies of possible alternatives have been made. If such studies indicate that the development of a certain power plant cannot be economically and technically justified (e.g. because there are better alternatives) the project will automatically be cancelled. This is crucial, as the cost of developing power plants is extremely high."

On the other hand, the question of formulating a sensible tariff policy received only passing mention. The casual approach to financial affairs is one of the most disturbing features of present government policies towards the industry. Amongst other things, it has left electricity planners no way out but to rely very largely on the availability of foreign aid and this has inevitably strongly influenced their approach to planning. Further, until tariff policies are rationalised, it seems unlikely that many new industrial consumers will be induced to rely on the public supply. The implication of this is that the benefits of the new investments made possible by foreign aid will go mainly to lighting consumers for consumption purposes, and will do little to stimulate new industrial consumption. We shall discuss the financial policies of the industry at length in Chapters 12 and 13 so it is sufficient to note here that as yet, only very tentative moves have been made towards a reasonable degree of financial independence in the last few years.

CHAPTER 10 The Work Force and Its Institutions

This Chapter and the next will discuss labour relations and wages in the electricity industry since the Second World War. Like most other areas of Indonesian economic studies, comparatively little research has been carried out into labour matters in Indonesia.[1] In addition, not only is a good deal of the research that has been done unavailable in English, but much of the material presently accessible to Western readers consists largely of surveys of the institutional background to labour affairs. There are very few detailed studies which analyse the operations of these institutions. For example, although some information is available on the establishment of the enterprise councils (Dewan Perusahaan) in the state enterprises we know little about how they operated in practice. For these reasons a survey which sheds light on the position in one industry is useful. Further, since the experience of the PLN appears in many respects to have paralleled developments in other parts of the public sector, the study is not as limited as it might seem. Through a study of the affairs of the PLN, we will obtain a better picture than is presently available (albeit still sketchy) of labour matters in the public sector as a whole since independence.

The Work Force

The size and quality of the work force are important for any industry. Table 10.1 contains an indication of the size of the work force in the electricity industry since 1952. For the years before 1963 the main series of estimates is particularly unreliable since the source does not properly explain the coverage. It seems likely that the central administrative offices and construction projects are excluded

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1. This, as Bruce Glassburner puts it, simply reflects "the minor role to which the economics profession of the world has relegated Indonesia..." Glassburner (ed.), The Economy of Indonesia: Selected Readings, Ithaca, Cornell University Press, 1971, p.vii.

TABLE 10.1 Estimates of Employment in the Public Electricity Supply Industry, 1952-1969

Year	Number[a]	Alternative Estimate
1952	10,610	
1953	11,065	
1954	11,500	
1955	11,690	
1956	12,120	
1957	12,000	
1958	12,000	
1959	12,830	
1960	12,930	
1961	13,370	18,554
1962	n.a.	19,421
1963	17,950	22,835
1964	n.a.	23,186
1965	18,180	19,453
1966	18,370	18,370
1967	18,540	18,570
1968	18,390	
1969	17,870	

Notes: a. Including privately-owned utilities serving the public. Excluding the administrative section of the industry that was a Directorate of the Ministry of Public Works. (For example, employees of the PLN Central Office included, but excluding Gatrik employees. Note that only the electricity section of the BPU-PLN appears to be included.) Most figures are apparently for the end of the year, but especially for 1963 onwards, some of the reporting units did not provide end of the year data when the total for that year was compiled.

Source: 1952-61: As for years 1952-61 in Table 5.5.

1963 & 1965: Perusahaan Listrik Negara Lampiran Laporan Inventarisasi [Appendix to the Inventory Report of the PLN], Typescript, prepared in July 1966 and supplied by the Department of Public Works and Power.
1966, 1968 & 1969: Annual Reports of the PLN for 1966, 1968 and 1969, mimeo., supplied by the PLN.

1967: Perusahaan Listrik Negara Laporan Tengah Tahun Pertama 1968 [First Half Yearly Report for the PLN 1968], mimeo., supplied by the PLN.

Alternative Estimate, 1961-67: Beberapa Pendjelasan Mengenai Penjesuaian Tarip Dasar Listrik Tahun 1968 [Some Notes on the Alterations to the Basic Electricity Tariff in 1968], mimeo., Djakarta, 29 April 1968, issued with the May 1968 tariff revisions, reprinted in Warta Cafi, No. 113, 21 May 1968, p.504 f.

from the pre-1963 data, while these sections are included from 1963 onwards. Even since 1963 the data should be treated with care, since it is sometimes unclear whether probationary employees (tjalon) and employees temporarily seconded to other offices but still on the PLN's payroll are included.[1] It is therefore not surprising that different sources provide different totals. For as recently as 1967 for example, the available figures very between 17,325 and 18,740.[2] In addition, also included in the Table is an alternative series of estimates from a document issued by the Department of Public Works. It seems likely that the second series is more accurate than the first. This reinforces our doubts about the reliability of the data until 1963, and suggests that the estimates in the main series for 1963 and 1965 are understated also.

With these qualifications, Table 10.1 can be taken as reflecting the broad trend with reasonable accuracy. Interviews with officials confirm that the sharp jump indicated in the Table in the early sixties did occur, and that there were two main contributing reasons for this.[3] Following upon the formation of the BPU-PLN, regional head offices were

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1. A further complication is that the position of harian tetap (daily) workers is not clear. Strictly speaking, these people are not "on probation," but in practice they probably are because of the strong aversion in Indonesia to dismissals of any sort. In fact, it appears that over recent years daily workers have been listed in the PLN's Annual Report as tjalon, thus implying that they will eventually be taken onto the permanent staff.

2. It is clear that the former figure excludes the tjalon group. There is nothing, however, in the original source to indicate this.

3. Further evidence to suggest that there was a rapid expansion in the work force in the early sixties is provided by scanty data from one office in the Outer Islands for 1966. Of the total of 137 employees, only 9 had entered the industry before 1940, 13 between 1940-49, 43 between 1950-59 and 72 in 1960 or later.

given the authority to employ additional workers in the lower ranks. This had unforeseen results, as one former Director explained:[1]

> "When the number of sub-head offices increased from three to fourteen, they were able to employ additional people. Perhaps we were not diligent enough in policing this, but the problem of management control and co-ordination was relevant here. We knew that too many people were being employed, but a number of different enterprises had been put together and this particular issue was out of control."

A second factor was that the PLN was under political pressure to complete the construction projects quickly, so extra employees were hired to push things along. At first, many of the extra workers were appointed as temporary day labourers, but once they were on the payroll there was strong opposition from the trade unions to their dismissal which amounted to featherbedding:[2]

> "There was strong pressure, especially from PKI supporters, to employ more people. This occurred at Asahan, where there was a dispute about whether day labourers should become regulars, and at Djatiluhur."

As a result of these pressures, employment in the industry rose quite rapidly during the first half of the decade and peaked in about 1964 or perhaps a year or so later.

One of the aftereffects of the 1965 attempted coup was that by mid-1966 over 1,200 employees had been dismissed.[3] This is reflected in the "alternative" series of estimates, but not in the main series. Whatever the precise figures for 1965 and 1966, the Table shows that since 1967 the government's policy of slowly reducing the number of public

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1. Interview with Z, 5 March 1970.
2. Interview with A_1, 24 March 1970. The same phenomenon occurred during the construction of the Gresik cement plant (East Java) in the mid-fifties. See Everett D. Hawkins, "Labor in Developing Countries: Indonesia," in Bruce Glassburner (ed.), op.cit., p.233.
3. Reported in the Perusahaan Listrik Negara Lampiran Laporan Inventarisasi, op.cit., Table 7.5.

sector employees has had a small effect in the PLN. There are reports that the policy is being hampered by the recruitment of temporary employees as permanent ones retire - a substantial rise in the number of "probationary" employees gives substance to these reports.[1]

To what extent, if at all, is the PLN overstaffed? Some indication can be obtained from the data on productivity per employee which is given in Tables 10.2 and 10.3. Table 10.2 shows that since the early fifties, labour productivity

TABLE 10.2 Rough Estimates of Labour Productivity in the Public Electricity Supply Industry, 1952-1968

(Thousand kWh generated per Employee)

Year	Labour Productivity	Alternative Estimate
1952	63	
1953	73	
1954	70	
1955	77	
1956	76	
1957	77	
1958	80	
1959	76	
1960	76	
1961	81	58
1962	n.a.	64
1963	72	57
1964	n.a.	61
1965	83	78
1966	85	85
1967	87	87
1968	95	
1969	104	

Source: Calculated from the production figures in Table 5.1 and the employment figures in Table 10.1.

measured in physical terms (kWh generated per employee) has been rising slowly, especially since about 1966 as employment in the industry has been reduced. This is an encouraging

1. Between 1967 and 1969, although total employment in the PLN fell the number of tjalon (probationary) employees rose from about 980 to about 1600. (Information from the appendices to the PLN Annual Reports for 1967 and 1969).

sign, but it provides no indication of what labour productivity might be if the PLN was close to optimum efficiency. The comparative data for the ECAFE region presented in Table 10.3 shed some light on this. Because of differences in institutional arrangements, the figures

TABLE 10.3 Labour Productivity (kWh Generated per Employee) in the Public Electricity Supply Industry in Selected Countries in the ECAFE Area

Country	Year	Number of Employees[a]	kWh Generated (million)	kWh/employee (thousand)
Australia	1969[b]	52,004	45,476	874
Ceylon	1967-68	5,868[c]	626	107
Hong Kong[d]	1969	4,400	3,198	727
INDONESIA[e]	1969	17,210	1,854	108
Japan[f]	1969	134,408	258,559	1,924
New Zealand	1969	12,166	12,185	1,002
Papua New Guinea[g]	1968[b]	857	110	128
	1969[b]	1,311	131	100
Philippines[h]	1968	5,744	3,799	661
Singapore	1968	3,778[i]	1,639	434
Taiwan	1969	10,526	11,119	1,056

Notes:

a. As far as was possible, employees involved in new construction and not with the operation of the existing systems were excluded.

b. Year ended 30 June.

c. Apparently includes staff employed in new construction.

d. China Light and Power Co. Ltd. only. This company produced about 70 percent of the electricity generated in Hong Kong in 1967.

e. The staff listed as employed on construction projects have been excluded. (This explains the difference between the figure given above and that given in Table 10.2.) Some other staff working in the PLN's Central Office were employed only in planning for new projects, and they should therefore be excluded also. On the other hand, production from the separate Djatiluhur dam state enterprise has been included in the production figures, while the staff at Djatiluhur have not been included.

f. Nine main electricity companies only.

g. Data for two years are shown for Papua New Guinea because the 1969 data is misleadingly low. There was a sudden jump in the workforce of about 50 percent during the 1968-69 period.

h. Manila Electricity Company only.

i. Number employed in the Electricity Department of the Public Utility Board (3,284) plus an appropriate share (45 percent) of the staff of the supervisory Service Departments. It seems likely that this total includes workers employed on new construction.

Source: Australia and Papua New Guinea: Electricity Supply Association of Australia, The Electricity Supply Industry in Australia Year 1968-69, Melbourne, May 1970.

Ceylon: Administration Report of the General Manager, Department of Government Electrical Undertakings for 1967-68, [Colombo (?)], July 1970.

Hong Kong: China Light and Power Company Ltd., Annual Report 1969, [Hong Kong, 1970].

Indonesia: Appendix to the PLN Annual Report for 1969.

Japan: Public Utilities Research Section, Public Utilities Bureau, Ministry of International Trade and Industry, Electric Energy Statistics for 1969, mimeo., August 1970.

New Zealand: Annual Statistics in Relation to Electric Power Development and Operation Year Ended 31 March 1969, Wellington, Government Printer, 1969.

Philippines: Manila Electric Company, Annual Report 1968, [Manila (?), 1969 (?)].

Singapore: Public Utilities Board, Singapore, Annual Report 1968, Singapore, [1969 (?)].

Taiwan: Taiwan Power Company, Taipower 1969, Taiwan, [1970].

are not exactly comparable but the overall pattern is clear. Productivity in Indonesia is well below that in nearly all other countries for which figures are available, and less than one-tenth of the level in some countries. Even in the fledgling industry in Papua New Guinea productivity is significantly above that in Indonesia, while the figure for

Ceylon appears to be misleadingly low because of limitations of the data.[1]

There are reasons for expecting labour productivity in the electricity industry in Indonesia to be comparatively low. Economies of scale are important - which probably explains why labour productivity in Singapore is low. The structure of demand is a second factor. It does not matter whether it is domestic or industrial consumers that are being served - the total number of workers required by an electricity utility is roughly the same. However the average consumption of an industrial consumer is far higher than that of a domestic (lighting) consumer, so all other things being equal, labour productivity can be expected to increase as the share of sales to industry rises. As we saw in Chapter 6, in Indonesia sales to industry are only a small proportion of total sales, so the structure of demand partly accounts for low labour productivity. Further, geographical dispersion and poor communications justify a higher labour force than would otherwise be the case. A fourth factor is that some substitutability of labour for capital is possible and seems justified, particularly in administration and menial jobs. Nevertheless after allowing for all these influences, the conclusion seems inescapable that on efficiency criteria there is excess employment. Just how much is hard to say - perhaps of the order of 50 percent, if not more.[2]

Data on the composition of the work force by rank and area for 1969 are given in Table 10.4. Nearly 10 percent of employees were in the "probationary" group, and a further 70 percent were in Division I, many of whom have achieved only a low standard of schooling. According to PLN officials, the most serious shortage is of semi-skilled staff in Division II. Divisions III and IV together account for fewer than 3 percent

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1. See footnote c. in Table 10.3.

2. This "guesstimate" was arrived at by comparing the labour productivity in various countries as shown in Table 10.3. If employment in the Indonesian electricity industry was halved (and it should be noted that there is no liklihood that it will be), then labour productivity would rise from about 108 kWh generated per annum to about 220 kWh per annum. This would still be only half that in Singapore.

TABLE 10.4 Composition of the Work Force in the Public Electricity Supply Industry by Rank and Area, 1969[a]

Area	Divisions[b]					Total
	Probationary	I	II	III	IV	
Regional Boards in:						
Java	770	8,080	1,980	220	9	11,050
Sumatra	400	2,140	540	47	3	3,140
Kalimantan	38	410	110	18	2	580
Sulawesi	73	560	230	29	1	890
Other[c]	130	520	100	20	2	780
Total	1,420	11,705	2,970	330	17	16,440
Construction Projects in:						
Java	140	300	140	21	3	610
Sumatra	32	9	8	3	-	52
Total	180	310	150	24	3	660
Central Office	2	360	310	84	17	770
Total	1,600	12,370	3,430	440	37	17,870
(%)	(8.9)	(69.2)	(19.2)	(2.5)	(0.2)	(100)

Notes: a. Most figures are for the end of the year, but in some cases only data for the first or second quarter were available.

b. Until a change in 1968, there were only three main classifications of employees. The usual level of education required for each of the existing four groups is as follows:

(1) Division I: employees must be at least literate, and includes new recruits with a level of education up to a Junior High School Certificate.

(2) Division II: A Senior High School Certificate or Sardjana Muda (which is granted after three years of successful university study and is roughly equivalent to a bachelors degree).

(3) Division III: At least a Sardjana Muda and preferably a Sardjana, (which is attained after five years at university and is roughly equivalent to a masters degree).

(4) Division IV: Sardjana Muda or above.

In each case there is room for discretion, and a person who does not have the formal qualifications but who has sufficient practical experience and knowledge can be appointed to an appropriate position. (Details are from Peraturan Menteri Pekerdjaan Umum dan Tenaga Listrik Nomor: 4/PRT/1969 [Regulation No. 4/PRT/1968 of the Minister for Public Works and Electric Power on Wages in Power and Electricity State Enterprises in the Ministry of Public Works and Power], 14 October 1968).

c. Including Maluku, Nusantara, and a workshop in Djakarta, but excluding West Irian (for which data were unavailable).

Source: 1969 Lampiran-Lampiran Laporan Tahunan Perusahaan Listrik Negara [Appendices to the 1969 Annual Report of the PLN], mimeo., 1970, Appendix 2.2.3.

of the total. In terms of employment about 70 percent of the industry is on Java, with a further 18 percent in Sumatra. The work force is fairly homogeneous in racial composition, unlike some state enterprises,[1] although from time to time ethnic differences between a branch manager and local townsfolk have exacerbated dissatisfaction with the PLN's service. Class divisions certainly exist, since there is a large gap in living standards between the upper elite in Divisions III and IV and lower-ranking workers. The most significant divisions, however, have been by age and politics. As we saw in Chapter 4, many of the oldest employees have been suspected of "pro-Dutch" sympathies by younger men. Cutting across this division were political affiliations, which have had a major influence on labour activities and the role of trade unions since World War Two. It is to a consideration of these that we now turn.

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1. M.A. Jaspan, "Indonesian Workers' Attitudes in Nationalized Industry," Science and Society, 26(2), Summer 1962, p.257-75, discusses the friction between Sudanese lower-ranking workers and Javanese managers in a quinine factory near Bandung.,

Labour Relations before 1957

Different writers on Indonesian labour relations have pointed to the close links between labour organisations and political parties and have emphasised that in Indonesia especially, labour relations cannot be studies apart from the political, social and economic environment.[1] Labour relations in the electricity industry since the Second World War have passed through three distinct periods: first, the nationalist period; then the rapidly increasing politicization of Indonesian society until the events of September 1965; and finally the influence of the post-coup period.

The brief details of the immediate post-war period that are available have already been presented in Chapter 2. We saw that the actions and attitudes of electricity workers closely paralleled those in many other Dutch-owned industries. The gas and electricity employees were one of the first imported worker groups to form a trade union after independence. At the end of September 1945 they responded to nationalist leaders' calls to take over the former Dutch-owned utilities. In this, both the ordinary workers and Indonesian managerial staff were united.

The main trade union at that stage was apparently the Barisan Boeroeh Djawatan Listrik dan Gas Indonesia which held its first congress in Jogjakarta in late November 1945. From the time of its formation until nationalisation was completed over a decade later, the union (which later changed its name to Serekat Buruh Listrik dan Gas Indonesia, or SBLGI) consistently demanded that full nationalisation be carried

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1. See Iskandar Tedjasukmana, The Political Character of the Indonesian Trade Union Movement, Ithaca, Cornell Uni., Modern Indonesia Project, 1959; Everett D. Hawkins, "Labour Relations in Indonesia," United Asia, 12(6), June 1960 and "Labor in Transition," in Ruth T. McVey (ed.), Indonesia, New Haven, Conn., HRAF Press, 1963; see also Hawkins in Glassburner, op.cit.; Justus M. van der Kroef, "Indonesia's Labour Movement: Its Development and Prospects;" United Asia 5(4), August 1953; J. Henry Richardson, "Indonesian Labor Relations in their Political Setting," Industrial and Labor Relations Review, 12 (1958); John E. Moes, "Trade Unionism in Indonesia," Far Eastern Survey, 28(2), February 1959.

out immediately.

Because of the widespread hostility towards them, the Dutch utilities were in a difficult position in the early fifties. There was widespread sympathy for the demands that they be nationalised, and trade union action against these "exploiting" companies had solid public support. If the record of ANIEM is representative, then the Dutch managers strove to maintain good relations with Indonesian personnel. Attempts were made to recruit additional Indonesian managerial staff, training courses for Indonesian workers were arranged, and pensions and wages were increased.

But the attitudes of the unions throughout the period of post-war Dutch management and gradual nationalisation were only a curtain-raiser to the post-nationalisation developments. In the period up to 1957, important changes were occurring which were to have an important influence after nationalisation. First, as in so many other Indonesian trade unions and in reflection of the unstable political situation, splits and realignments occurred within the labour movement in the electricity industry.[1] It seems that in the early fifties a second electricity union was established, which was affiliated to the pro-communist trade union federation SOBSI and therefore became known as the SBLG-SOBSI.[2] A few years later, in 1955 or 1956, the older SBLGI split into two unions, one leaning towards the PNI's Marhaenist philosophy

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1. It was not possible to obtain written records of the changes in the industry's trade union structure during the period. The following information is based mainly on interviews with Z, 5 March 1970, and U, 19 February 1970.

2. Serikat Buruh Listrik Dan Gas - SOBSI, or the SOBSI Electricity and Gas Trade Union. SOBSI was the Sentral Organisasi Buruh Seluruh Indonesia or the All-Indonesian Central Labour Organisation. For more information about SOBSI see Tedjasukmana, op.cit. Tedjasukmana lists 19 important unions which were affiliated with SOBSI in 1957, but makes no mention of the SBLG-SOBSI which, according to all reports, certainly existed by 1957. This is perhaps because the SBLG-SOBSI was probably still small in comparison with many other unions affiliated with SOBSI.

and the other maintaining a more neutral position.[1] These became known as the "SBLGI-Marhaenis" and the "SBLGI non-vaksentral" (or the "independent SBLGI") respectively - although these may not have been their official names. Thus by the late fifties there were three different electricity trade unions, one associated with the PKI, one with the PNI, and one taking a distinctly less radical position.

In retrospect, it was to be expected that such divisions would occur since the important political changes on the national scene were everywhere reflected in the trade union movement. Each main political party had taken pains to establish an affiliated trade union movement, and the sympathisers of these parties within the industry supported the establishment of a trade union linked to their favourite party. Two issues arose within the industry: whether trade unions should be closely linked to a political party at all, and if so, which party. These controversial issues had caused splits in the Indonesian labour movement as far back as the early twenties[2] and they were burning issues in the post-independence period. It was only a matter of time before they came into the open in the electricity industry.

A second development during the fifties was that firm restrictions on the right to strike became institutionalised. The trade union movement had played an important part in the struggle for independence, and all Indonesian governments had paid lip service to the ideals of upholding workers' rights. Workers therefore confidently expected post-independence governments to allow such freedoms as the right to strike as a matter of course. Indeed the right to strike had even been included in Article 21 of the provisional constitution adopted in 1950. It came as a shock to the unions to find that this freedom was soon restricted and

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1. It may have been in 1956 that the union split since Tedjasukmana, ibid., p.39, notes that the SBLGI was still registered with the Ministry of Labour in 1956 with a declared membership of over 8,800 members. This is not conclusive however since registering procedures were loose.

2. See Tedjasukmana, ibid. p.10.

later almost completely removed.[1] The different measures restricting the right to strike were of special relevance to the electricity industry because in certain "vital enterprises" such as electricity enterprises strikes were forbidden completely. The restrictions, first introduced in February 1951, have remained in force ever since despite trade union protests. Thus since 1951 the most important weapon available to the labour movement in developed countries has been denied to unions in the Indonesian electricity industry. As a result they have been obliged to find other ways of supporting their demands. This has had a major influence on the system of industrial relations.

A third development that took place from the mid-fifties onwards was a change in the composition of the managerial elite of the industry. These changes did not have an immediate impact on labour relations, but strains developed which were of long term significance, and which appear to have been a factor in the "77 Employees" dispute that occurred in 1968. There was an influx of young university graduates with high formal qualifications who were rapidly promoted. This led to resentment from older employees who were in turn considered conservative by the new recruits. The result of this complex interplay of rivalries and resentments was that factions developed. The absence of a particular change in the managerial elite was also important: in many other state enterprises military officers moved into managerial positions after 1957. This sometimes had quite far reaching effects on social relationships within the nationalised enterprises - not all of which were good.[2] The absence of ex-military managers in the PLN had an important influence on the course of labour relations in the first half of the sixties.

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1. Tedjasukmana, ibid., p.113 f.; Hawkins in McVey, op.cit., p.264 f.; and Warta Cafi Circular No.43, 26 July 1961 and Circular No.56, 10 July 1963.

2. See M.A. Jaspan's account, op.cit., of employees' attitudes in the nationalised Bandung Quinine Factory in 1960 and of the friction between the newly appointed general manager, formerly a colonel, and the civilian employees. See also Hawkins, "Labor in Transition," op.cit., p.267 f.

The Effects of Nationalisation

The nationalisation measures of 1957 and 1958 had only a small influence on the daily internal affairs of the industry because by that time transfer to state ownership was all but complete. But there were both short and long term effects. In the short run, any quick moves that might have occurred towards workers' participation in management and improved wages and working conditions were probably delayed by the wholesale nationalisation. The government suddenly found itself with many business enterprises of different types, all nominally in the public sector. Administrative confusion reigned. It became necessary to lay down broad guidelines on such matters as organisational structure, pricing and investment policies, and labour affairs. The drafting of these guidelines was difficult and took time. Until these broad guidelines had been issued, the managers of the PLN could implement only minor changes. It would not have been sensible to embark upon sweeping reforms until government policy was clear.

A change of longer term consequence was that the relationship between the trade unions and the government changed fundamentally. Before nationalisation, attacks on the Dutch managers of the electricity enterprises had been demonstrations of patriotism as well as being in the workers' own interests. After nationalisation, the interests of the unions and the government diverged. The government - at least in official prouncements, if not in practice - placed high priority on industrial order and raising output and expressed its willingness to back state enterprise managements to achieve these goals.[1] Thus employees in state enterprises were expected to reverse their previous

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1. The problem that arises when the interests of the government and trade unions begin to diverge is a common phenomenon in underdeveloped countries. See Felicia J. Deyrup, "Organised Labor and Government in Underdeveloped Countries: Sources of Conflict," Industrial and Labor Relations Review, 12 (1958), p.104 f.

attitudes and co-operate harmoniously with management.[1] One reason that they were prepared to reluctantly accept this change was that it had been widely assumed for a long time that nationalisation would lead to worker participation in management.[2]

Worker Participation in Management - The Enterprise Councils

It was not until towards the end of 1960 that the broad outlines of the institutional structure which the trade unions would have to operate within became clear. In numerous government documents and ministerial statements issued after 1957 the government naturally emphasised that good relations were needed between management and workers in the new state enterprises.[3] The government's solution to the problem of encouraging worker commitment and participation in management was the "enterprise councils" (Dewan Perusahaan) which were small committees set up to advise management. The establishment of the councils was reportedly inspired by the record of the Yugoslav workers councils, although in practice there was little similarity. Their formation was advocated by President Sukarno in his Independence Day speech in August 1960 when

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1. See the statement by the Minister for Labour issued in October 1961 criticising strikes in state enterprises and suggesting guidelines to be followed by employees: Warta Cafi, No.243, 25 October 1961. See also Awaludin Djamin's comments, op.cit. p.287.

2. This was assumed, for example, during the 1950 parliamentary debates on electricity price increases. One motion proposed, inter alia, that the enterprises would be "democratised" (i.e. that labour would have a voice in production policy). See Sutter, op.cit., p.872. Jaspan records that in Bandung

> "The workers had anticipated that the national revolution would alter the pattern of social relations in the factory. In this they were disillusioned... The management ... is disappointed at the failure of the workers to respond spontaneously or adequately to its expressed wishes. It was hoped that following nationalization the workers would feel that the factory was theirs, and no longer the property of foreign capitalists. The workers have not felt this however."

M.A. Jaspan, op.cit., pp.269 and 273.

3. See Government Regulations No. 2 and No. 3 of 1959, issued on 23 February 1959.

he declared that they would lead to improvements in the quality and quantity of production. In addition, he said, they would place restrictions on people who wanted to enrich themselves. Two months later in October, Government Regulation in Lieu of Act No. 45/1960 was issued which laid down outlines for the proposed councils.[1]

The Regulation stipulated that the councils should be set up at two levels: at the BPU (General Management Board) level where a "central enterprise council" (Dewan Perusahaan Pusat) should be established, and at a lower level where an ordinary enterprise council (Dewan Perusahaan) should be formed.[2] Second, the two main parties involved were to be the management (represented by a top executive) and the trade unions. In theory, a trade union became eligible for representation only when its membership was at least 30 percent of the total work force in the state enterprise involved.[3] In addition, a peasants' representative, a member from the locality of the enterprise and a suitable "expert" could be appointed. The councils were to be small - total membership was not to exceed seven,

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1. See the text of the Government Regulation which was issued on 29 October 1960. Also J. Panglaykim, "Indonesian State Enterprises and Worker-Management Councils (Dewan Perusahaan)," Asian Survey 3(6), June 1963, and his article "Worker-Management Councils in Indonesia," World Politics, XVII (2), 1965.

2. To be precise, Government Regulation No. 45/1960 stipulated that enterprise councils should be formed in the separate "state enterprises" under the control of each BPU, because the usual administrative structure was to have a number of separate state enterprises grouped under one BPU. As we saw in Chapter 3, the structure of the BPU-PLN was slightly different. The separate regional boards grouped under the BPU of the industry were not separate state enterprises at all, but branches of the one state enterprise known as the BPU-PLN. However Government Regulation No. 45/1960 was later broadened. It was explained that enterprise councils could be formed in "units of production of distribution" within a state enterprise if it was appropriate. The regional boards were considered to be "units."

3. This was not explained in Government Regulation No. 45/1960, but was clarified by Goverment Regulation No. 232/1961 "Concerning the Implementation of Act No. 45/1960," promulgated on 12 October 1961, the text of which is in Warta Cafi Circular No. H 410, 20 November 1961.

and more often about five.[1] Third, the responsibilities of the councils were laid down. Broadly, they were to discuss production plans and the achievement of targets set for the enterprise by the government, the management and "smooth operation" of the enterprise, improvements in efficiency, and co-operation between managers and workers "based on the gotong rojong principle."[2] None of this was very specific, but it is clear that while labour relations were within the councils' ambit, their discussions were expected to cover a much wider field than employees' direct concerns alone.

But Government Regulation No. 45/1960 was only the beginning because many practical details remained to be settled: which organisations were to be represented on the councils?; what qualifications would be required of the members?; how were members to be selected?; who would bear the costs involved?; these issues had to be decided before the councils could be established, and it all took time. To take just one issue: the suggestion that only trade unions representing at least 30 percent of workers should have a member on the council suited the large unions like SOBSI, but was vigorously opposed by the smaller unions which faced exclusion. And in some cases when there was no trade union which could satisfy the 30 percent requirement, special exceptions had to be considered.

It was not until a year after Regulation No. 45/1960 was issued that these details were settled. In October 1961 broad rules covering the appointment of members to the councils were set down,[3] but these rules in turn required that bureaucratic machinery be set up to

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1. Seven was the maximum size allowed in central enterprise councils, while no more than five were permitted for the ordinary enterprise councils.
2. See the articles by Panglaykim, op.cit., or Government Regulation No. 45/1960 itself.
3. By Government Regulation No. 232/1961 dated 12 October 1961.

implement them. The following month, a cumbersome "Ministerial Committee for Enterprise Councils" with its own secretariat was established.[1] In December rules for the operation of the councils were published.[2] During the first few months of 1962, the Ministerial Committee prepared, issued and later collected and considered detailed application forms for membership. Finally, nearly 18 months after Government Regulation No. 45/1960 was issued, on 12 April 1962 the first enterprise council to operate in Indonesia was established - and as it happened it was in the PLN. Soon after, enterprise councils were organised in the plantation sector, and during the next two years the system was extended. By 1 June 1964, 21 central enterprise councils and over 600 ordinary councils had been formed. They were dominated by labour representatives who made up about 60 percent of the total membership. Management contributed another quarter of the members, with representatives of the peasant organisations accounting for most of the remainder.[3]

But this account provides only the bare bones of the picture - how did the councils operate in practice? What were the attitudes of the managers and employees towards them? Did they provide an adequate outlet for workers' demands, or were they only political forums? How much influence did the councils really exercise? An

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1. The main function of the Ministerial Committee was to decide upon and administer a selection system and appoint representatives to the councils. The Committee was established by Decree of the First Minister No. 434/1961, 20 November 1961. It was an extraordinarily high-level committee composed of the Minister for Labour, the Minister of the National Front, the Minister from the department concerned, and a member of the Supreme Advisory Council. See Warta Cafi Circular No. H 419, 21 February 1962.

2. Regulation of the First Minister No. 02/M.P./1961 "Concerning the Discipline and Working Scheme of the Enterprise Councils and Central Enterprise Councils," 30 December 1961, contained in Warta Cafi Circular No. H 419, 21 February 1962.

3. Panglaykim, "Worker-Management Councils in Indonesia," op.cit., p.248.

examination of their history in the PLN will help throw light on these questions. However the fate of the councils cannot be separated from the role of the trade unions, so the activities of the councils will be best seen in context by surveying the overall picture of labour relations within the industry.

Labour Relations Until 1965[1]

Enterprise councils were established within most (though not all) PLN regional boards and in the central office in Djakarta, which meant that a total of about 13 councils eventually existed. Membership was composed entirely of PLN employees. The first chairman of the central enterprise council was one of the Directors, Ir Harjasudirdja, who was later replaced by the President-Director himself, Ir Srigati Santoso.

Although in theory trade union representation was confined to powerful unions - which meant that in most areas only the SBLG-SOBSI and SBLGI-Marhaenis were entitled to representation - this rule was not strictly adhered to. After the introduction of Guided Democracy, the growing influence of the PKI and the PNI meant that the strength of the two militant electricity unions grew also. Many PLN managers did not welcome the trend and were keen to keep the unions in their place if possible. Various stratagems were used, one of which was to exercise loose powers of "managerial discretion" by including a de facto representative of the more conservative SBLGI non-vaksentral on the council.

The original intention that the councils should participate substantially in management was never achieved. One former Director explained:[2]

> "The councils were originally supposed to participate in management and make management a success, but the representatives on the council had no real experience of management. The councils became mainly a forum for the discussion of labour matters."

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1. Much of the information in this section is drawn from interviews with PLN officials. Particular sources will be given only where officials are quoted. It was unfortunately not possible to interview trade union leaders who were active during the period or who were members of the councils. Thus most informants represented the "management" point of view.

2. Interview with Z, 5 March 1970.

Thus their main concerns were wages, employment, extra allowances and clothing, and so on. According to all reports, the trade union representatives took little interest in measures to increase productivity or in the affairs of the PLN as a whole. Another Director summarised the unions' position:[1]

> "The councils were opposed to increases in tariffs. They said that tariffs were already unbearable for consumers and that it would be disastrous to raise prices. They went to see the Minister each time the matter was put forward. The question of tariffs cropped up when wages were discussed. The council was really mainly concerned with workers' affairs. They pressed for increased benefits and said that they should be paid for by increased subsidies from the government."

In confining their attention mainly to labour matters the unions were probably serving the interests of their supporters well. It is difficult to see why they should have been at all concerned with wider issues. On the question of productivity for example, there was no reason to expect that the benefits of improvements would be passed on to the workers. According to the wage regulations, an annual bonus was to be paid to employees depending on the profits of the state enterprise, but in practice there was little connection between the bonuses paid and the financial performance of the PLN. Neither were wages and other emoluments much affected by the fortunes of the industry, as we shall see in the following Chapter.

This being the case, why did workers bother to support the unions? There were several advantages to be derived from union connections. For one thing the unions strongly advocated employment creation measures. This was a general policy that had a strong appeal to workers in the industry even though the jobs of most of them were secure.[2] Secondly,

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1. Interview with E_1, 7 April 1970.
2. Trade unions in Indonesia are more "job conscious" than "wage conscious." See Hawkins, "Labour Relations in Indonesia," op.cit., p.226, and his article "Job Inflation in Indonesia," Asian Survey, 6 (5), May 1966.

the unions provided support to members seeking promotion or additional benefits, and the only real protection against dismissal, whatever the cause. One official in charge of a construction project during the early sixties explained:[1]

> "Unions were a source of strength for ordinary workers - for promotion, for pilfering, for employment. Sometimes corruption and pilfering were supposedly carried out for the union (at least, this was the justification put forward), and it was very difficult to dismiss these people. Witnesses would be produced to say the man was somewhere else. Proof was needed, which was difficult.
>
> Unions supported members looking for promotion or employment too. There were temporary day labourers [at my project site] and the SOBSI union applied pressure to have them made permanent. The regulations from the government were not clear, but implied support for increased employment. The Department of Labour was in favour of increased employment. I partly gave in to this, so there were some political appointees. Of course, I also appointed those who were more sympathetic to me."

Third, union membership was a form of political involvement. The atmosphere throughout the nation in the early sixties and particularly in 1964 and 1965 was highly political. As the same official said:[2]

> "The attitude that was common was that 'problems must be solved politically."

For example, students entering university were under strong pressure to join political and religious groups. Often they were vaguely sympathetic towards the organisations that they joined without being deeply committed. Later when they entered the PLN, they tended to continue their association with their former friends and social group by joining the appropriate union or graduate association.[3] Similarly, ordinary workers supported political organisations by joining trade unions.

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1. Interview with R, 7 February, 1970. Similar statements were made by other PLN officials.
2. Ibid.
3. Two well known organisations leaning towards the PKI which graduates in the PLN joined were the HSI (Himpunan Sardjana Indonesia, or the Indonesian Scholars Association) and the CGMI (Concentrasi Gerakan Mahasiswa Indonesia, or the Federation of Indonesian Student Movements).

There is dispute as to how strong the trade unions really were in the industry in the pre-coup period, and in what sense they were strong. In terms of membership and ability to exert influence, the strength of the unions varied from area to area and through time. Few data are available for the fifties and for the period immediately after nationalisation, but there is general agreement that the fortunes of the electricity unions were directly linked to the success of the main political parties.[1] As the PKI and the militant wing of the PNI gained strength nationally, so the strength of the SBLG-SOBSI and SBLG-Marhaenis increased. Further, as the PKI and PNI drew closer together, so the two militant electricity unions co-operated more often. By 1965, from the management's point of view there was not much difference between the two. One former PLN Director saw developments in the following terms:[2]

> "In the beginning [the mid-fifties], the SBLG-SOBSI was not so strong. By 1960, it was perhaps fifty-fifty between the SOBSI and PNI union. These unions professed unity on the surface, and were in fact required to show unity. Below the surface there was more competition, and later the PNI was infiltrated by the PKI. The two 'political' unions were better organised than the non-vaksentral union."

Membership figures are unavailable, but according to most reports, by 1965 around 70 percent and perhaps more of the employees supported left-wing unions.[3]

The true strength of the unions can be partly gauged from the attitude of managers towards them and in the operations of the enterprise councils. One difficulty facing union representatives on the councils was that the

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1. For example, interviews with U, 19 February 1970, and A_1, 24 March 1970.
2. Interview with Z, 5 March 1970.
3. Data on membership figures for Indonesian trade unions are most unreliable. Membership was not compulsory, and plural membership (with an employee belonging to more than one trade union) was not uncommon. Further, trade union leaders (who themselves often did not know the precise membership of their unions) tended to inflate membership figures. For a discussion of these points, see Hawkins in Glassburner, op.cit. esp. p.208 f.

chairman, usually either a Director of the PLN (in the case of the central enterprise council) or the Head of a regional board, held considerable de facto power. Although in theory ordinary members could themselves initiate discussion on a particular issue, in practice this power was limited. In a significant expression of opinion, a former influential chairman of one of the more important councils explained the position as it was in 1962 and 1963:[1]

> "The chairman held a lot of control of the meeting. He also had prestige, since he was a member of the management. I don't think the councils were very powerful then. Later [another manager] became chairman, and the council probably increased in authority because the militant unions became stronger. When I was chairman it made recommendations on labour matters, but it became more political towards the end.
>
> To understand the strength of the councils, we have to understand the position of the unions, which was really weak...Many people saw them as strong, but in fact they were not... I felt free to go along with the union representatives but to refuse their wishes when necessary. No open votes were taken. The musjawarah system was used, and this gave me power. Sometimes I would say 'yes' when the answer was really 'no'...
>
> I believe in a good link between management and labour, but the enterprise councils did not provide a good link, partly because the trade union leaders were not necessarily very close to the rank and file. I used to try to discuss things directly with the employees."

Another former manager summed up his view:[2]

> "The enterprise councils had no formal power, and if the Board of Directors ignored them there was little that they could do. Of course, personal relations might not be good with the union representatives on the council!"

But these statements, although interesting in revealing the attitudes of some managers, do not represent a balanced picture. It is true that in the short run a manager could stall the unions off and that it was difficult for the unions to actually force through a policy that they supported.

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1. Interview with T, 18 February 1970.
2. Interview with Z, 5 March 1970.

However given time, union leaders could usually make life hard for a recalcitrant manager. Most managers paid attention to the unions' requests and tried to co-operate with them. For one thing, there was the risk of being labelled as anti-labour. One official recalled:[1]

> "The labour and mass organisations held a lot of power in the 1960-65 era. It was extremely difficult to refuse their demands. There was the fear of being called 'anti-communist,' which was as serious a charge then as being accused of having 'pro-communist' ideas today."

The unions also used specific tactics to apply pressure: they could bypass the local manager and go directly to the Board of Directors or the Minister; or they could instigate illegal strikes, go-slow campaigns, and perhaps even minor acts of sabotage within plants. For example, one official reported that in Central Java,[2]

> "Trade unions used [the enterprise council] to increase their influence. Unions were often pro-PKI in matters of promotion and wages. The council's power was only advisory, but it could make it difficult for the manager of the exploitasi. Trouble and non-co-operation could be stirred up among the rank and file, and pressure brought to bear in Djakarta. Complaints would be lodged about the hostility of the exploitasi Head."

Another manager explained the position in the central enterprise council:[3]

> "Perhaps Ir Srigati Santoso [the chairman] was not firm enough, but then again it was very hard to refuse labour's demands. The most a manager could do was to avoid discussing the issue with labour representatives. I cannot imagine that a labour leader would have been refused an important request outright. If Ir Srigati Santoso had not co-operated, then they would have brought a lot of pressure to bear on the Minister. He would have been dismissed years ago."

The explanation for the apparent paradox that some managers thought the unions weak while others saw them as strong is that it depends on the issues being discussed,

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1. Interview with A_1, 24 March 1970.
2. Interview with B, 23 February 1970.
3. Interview with A_1, 24 March 1970.

the period referred to, and the area of operations. The strength of the unions in the PLN varied from place to place, depending upon local circumstances and particularly upon the influence of countervailing social forces. In areas where the military was especially strong or where there were strong conservative religious organisations, the militant unions were comparatively weak. The relative strength or weakness of the militant unions in an area was usually reflected in the relative influence of the enterprise council. For example, one manager who worked in both East Java where the PKI was strong, and South Sumatra where the military was strong, found that labour problems posed far less trouble for him in the latter area.[1] In another area where the armed forces were very influential, the regional Head was able to avoid installing an enterprise council at all during his period of service:[2]

> "There were two main unions - the SOBSI affiliate and the other, the SBLGI, which was anti-communist. At the beginning, labour problems were important because labour was aggressive, but the military helped against militant groups. It was useful that the SBLGI was strong because I was able to place these people in key positions and prevent sabotage. I followed a deliberate policy of putting SBLGI people in key positions. From time to time there would be people who were promoted though who had unknown PKI sympathies.
>
> An enterprise council was never established while I was [there], even though there was an instruction from the Minister and the Board of Directors in Djakarta. I avoided setting one up because I didn't like the idea. If you were a manager, would you like it?... It was easy for me to do that [there], but in Surabaja, for example, it would not have been possible to ignore the direction from the BPU-PLN. The PKI was unhappy about what I did, but with military support I could resist them."

In some state enterprises, pro-military groups went even further than simply relying on outside army support and set up "Karyawan Organisations" which later united (apparently in 1961) into a Persatuan Karyawan Perusahaan Negara (Association of Employees of State Enterprises).

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1. Interview with F_1, 15 April 1970.
2. Interview with J, 18 May 1970.

One of the main intentions of the supporters of this association was to encourage all state enterprise employees to belong to the one trade union (which, incidentally, would have had the fortuitous effect from their point of view of weakening SOBSI's influence).[1] In December 1962, the association changed its name to SOKSI.[2] However the original aim was never fulfilled. Within the electricity industry the association was never a significant force.

After the Coup

As the militant unions benefited from the rise of the left wing parties, so they suffered from their fall. The SBLG-SOBSI soon disappeared, and the power of other "old order" groups rapidly declined. By November 1965 SBLG-SOBSI branches were being dissolved as former members condemned the coup in an effort to save themselves from the consequences of its failure.[3] The PNI-oriented union survived the changes and continued to exist as the Kesatuan Buruh Listrik dan Gas Indonesia (Indonesian and Gas Workers Association), sometimes called the Kesatuan Buruh Marhaenis (Marhaenist Workers Association). The more conservative SBLG non-vaksentral apparently divided and formed two separate organisations, one retaining the name SBLGI non-vaksentral, and the other aligning itself with the Nahdatul Ulama-oriented SARBUMUSI.[4] The

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1. See Hawkins, "Labor in Transition," op.cit., p.269. For further details on the association, see Warta Cafi Circulars C.W. No.37, 15 March 1961, and C.W. No. 41, 30 June 1961, and also Warta Cafi No. 163, 21 July 1961, See also Awaludin Djamin, op.cit., pp.292 f.
2. Sentral Organisasi Karya Sosialis Indonesia, or the Central Organisation of Indonesian Socialist Workers.
3. Antara Financial and Economic News, 13 November 1965, carried a report of the self-dissolution of the Palembang branch of the SBLG-SOBSI.
4. Sarekat Buruh Muslimin Indonesia or the Indonesian Moslem Workers Union. The Nahdatul Ulama is the tradition-oriented Moslem Scholars Party. In the PLN the SARBUMUSI union is sometimes called the SBLGI-Agama, (or the Religious SBLGI).

enterprise councils were another casualty of the coup, connected as they were with the activities of the old order unions:[1]

> "[After the coup] people were afraid to link themselves in any way with the old order ideas. The enterprise councils were rapidly forgotten, and people didn't want to publicize their former identification with them."

Thus the councils simply ceased to exist.

Since the end of 1965, the activities of the trade unions in the industry have been very limited. The only serious dispute that has occurred has been within the managerial elite itself. Trade unions have confined themselves mainly to arranging social activities and organising delegations to the management to discuss particular matters of concern.

It is impossible to judge how well these functions have been carried out. Most militant old order leaders were dismissed after the coup, and any activists that remain have doubtless feared to show their heads for fear of suffering a similar fate. Thus complaints are not quickly heard. For example, in late 1968 a group of senior officials became so frustrated with certain aspects of the management of the industry that they submitted a petition to the PLN Directors and the Director General asking for discussions on the matter. The Director General responded with comparatively harsh disciplinary measures, and the bitter dispute that developed became known as the "77 Employees" affair.[2] The disciplinary steps taken by the top management during the affair can hardly have encouraged other dissatisfied and lower-ranking employees to voice their complaints. The unions have been rendered largely ineffective by their inability to apply meaningful sanctions. The right to strike still does not exist, neither do the enterprise councils, and the type of

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1. Interview with A_1, 31 March 1970.
2. For a detailed account of the "77 Employees" affair, see the Appendix to the Chapter.

political leverage that could be brought to bear some years earlier is no longer effective. Most managers within the PLN (naturally) profess their willingness to discuss matters with union representatives, and no doubt this is true. But in the final analysis, when faced with an impasse there is little that the unions can do.

APPENDIX TO CHAPTER 10

The "77 Employees Problem"

In late 1968 a dispute developed within the electricity industry that became known as the "77 Employees Problem." The dispute, which attracted a good deal of publicity and comment in Indonesian-language newspapers in Djakarta, was significant for a number of reasons, not least because it revealed considerable dissatisfaction in the upper echelons of the PLN with the top management and appears to have eventually contributed to the replacement in mid-1970 of the President Director of the PLN and the Director General of Power and Electricity. The affair is interestion both as a case study of an Indonesian labour dispute in the late sixties, and for the light that it sheds on relationships within the industry between managers and staff.

First Developments

In August 1968 the Directors of the PLN decided to move against what appeared to be corruption in the employees' medical benefits scheme. Several employees were questioned, including an office holder in the SARBUMUSI-affiliated trade union. As a result, the Board of Directors took two decisions. First, it suspended the right of PLN central office employees to use external medical facilities and later receive reimbursement. Instead, they were required to use the PLN's own internal service.[1] Second, the Director General of Power and Electricity, Ir Hoesni, was asked to form a team to investigate the matter.

But some employee organisations were dissatisfied with these decisions. After an unsuccessful approach to Hoesni to urge that he take over the issue himself, in early September three associations (KASI-Gatrik/PLN,SARBUMUSI, and

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1. Decree of the Board of Directors No. 023/PST/68, dated 26 August 1968.

SBLGI non-vaksentral)[1] sent a letter directly to the Minister for Public Works and Electric Power detailing their objections.[2]

This letter was ostensibly concerned with the actions of the PLN management, but it raised a number of issues which had been simmering within the industry for some time. One matter mentioned - which was soon to become important - was the "misuse of authority" by top PLN officials. A series of points were alluded to in a way that amounted to a vague but pointed criticism of the PLN management. The letter referred to rumours of corruption within the PLN that had been reported in newspapers, and claimed that the Directors' actions were a de facto admission that there was something in the rumours. According to the letter the immediate charge certainly had to be investigated, but it was unfair and only "taking the easy way out" to restrict employees' usual medical concessions simply because a few suspects were under investigation. Further, if a "proper system of administration and supervision by honest and responsible officials" existed in the PLN (a phrase which obviously implied that such a system did not exist), then such irregularities would be minimized. The signatories, who charged that the most flagrant cases of irregularities at high levels were being covered up, called for a wide investigation by impartial authorities such as the police into the whole question of irregularities within the PLN. Finally, the letter suggested that it was "not impossible" that PKI elements were trying to "obstruct the government's economic program."

Not content with this, the three associations added insult to injury by distributing copies of the letter to officials outside the Department of Public Works, including

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1. KASI-Gatrik/PLN was a branch of KASI (Kesatuan Aksi Sardjana Indonesia, or the Indonesian Graduates Action Association). As the name implies, KASI was an action-oriented association which took it upon itself to take up political issues, comment upon them, and perhaps lend support with professional (especially legal) advice.

2. Letter to the Minister dated 8 September 1968.

the Attorney General, the Djakarta Regional Police Commander, and the Djakarta Regional Board of the security agency Kopkamtib.[1] This provocative political move can hardly have endeared the sponsors of the letter to either the Minister for Public Works or other officials such as Hoesni and Ir Amir (President Director of the PLN). Despite the protest, on September 9 Hoesni appointed an investigating team, which later found evidence that two office bearers of the electricity branch of SARBUMUSI were involved in the irregularities.[2]

The three employee groups involved were not prepared to take Hoesni's decision lying down. A week later they counter-attacked with a "Joint Declaration about Irregularities and Criminal Actions carried out by Officials within the PLN and the Directorate General for Power and Electricity" which as before they circulated widely - but this time adding the press to their distribution list.[3] The document was an undisguised and aggressive attack on Hoesni and the managers of the PLN. It spoke of "scandals" and "criminal actions" inside the industry; it pointed out that Hoesni's decision to appoint an investigating team was in "direct contradiction to the intention and sense" of their earlier letter; the composition of the investigating team was criticised; and it charged that although irregularities had been committed by high PLN and Gatrik officials which were possibly connected with an attempted comeback by the PKI in the forthcoming general elections, Hoesni and Amir were washing their hands of the matter. The document called on the "appropriate authorities" (and especially the Minister for Public Works) to move against the irregularities and against the management of the PLN

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1. Kopkamtib is the Komando Operasi Pemulihan Keamanan dan Ketertiban (the Command for the Restoration of Peace and Order).
2. The team was established by Decree of the Director General of Power and Electricity No. 21/K/68 dated 9 September 1968.
3. Pernjataan Bersama Tentang Penjelewengan/Perbuatan Pidana jang dilakukan oleh Pedjabat[2]/Oknum[2] PLN dan Direktorat Djenderal Tenaga & Listrik, mimeo., dated 16 September 1968.

and Gatrik if necessary; for the police to investigate the charges; for Hoesni's decisions to be withdrawn; and for the suspension of particular officials in the central office of the PLN, including any Directors who were under suspicion. Altogether, the "Joint Declaration" amounted to a highly offensive series of criticisms of the most senior officials in the industry.

Although these attacks did not attract as much publicity as later events, they aroused the interest of the Chief Public Prosecutor's Office which sent four officials to interview Amir a few days after the declaration was issued. For various reasons, Amir was at that stage reluctant to cooperate with investigations carried out from outside the PLN. However he later arranged for the police to take over.

The October Letter

This was only the beginning of the affair. The dissatisfaction that clearly existed within the upper echelons of Gatrik and the PLN had in no way been assuaged. On the 8 October a letter signed by over 40 senior employees in the PLN's Central Office, many of them graduates in responsible posts, was sent to the Board of Directors. This letter was modelled on the previous statements and contained some of the main complaints voiced earlier, but differed in three important respects. For one thing, it was much milder in tone that the earlier attacks, being mainly concerned with the return to normal procedures in the health benefits scheme in the PLN Central Office. There were no strong criticisms of the internal administration of the industry. Further, the circulation of the letter was restricted - no copies were distributed outside of the Public Works Department. Thirdly, only one of the three signatories to the ealier statements, the chairman of KASI-Gatrik/ PLN, signed the letter. This is rather peculiar, and may indicate that differences existed as to how far and in what manner the attack on the management should be pressed. On the other hand, one of the two signatories - the spokesman for the SARBUMUSI affiliated trade union - was later found

to be involved in the medical frauds, so it may simply be that he decided to give up his prominent role in the dispute.

As with the previous appeals to the managers, this letter had little effect. But there is no evidence to suggest that the Directors of the PLN viewed it as a hostile move. One official later explained that it was partly the response to the October joint letter that led to later developments.[1]

The "77" Letter

On October 26th a ceremony held to mark "Electricity and Gas Day" was addressed by Ir Sutami, the Minister for Public Works, who spoke on the need for unity within the industry and free discussion to encourage initiative. Whether Sutami expected to be taken literally or not is doubtful, but in any case a group of employees did. A letter (later to become knows as the "77" letter) expressing concern about management practices was quickly drawn up and passed around the main electricity offices in Djakarta. Early in November it was sent to Hoesni and the PLN Directors with copies to Sutami and two other important officials in the Public Works Department.[2]

The letter was notable both for its contents, and for the support it received. While not nearly as aggressive as the earlier "Declaration," the letter was firm in tone. It spoke of "several problems which have no place in Gatrik and the PLN," saying that it was the responsibility of the management to deal with them. Perhaps unfortunately, it was mentioned that Gatrik and the PLN were state-owned and therefore "not the property of a group of officials" - an allusion which implied support for previous newspaper charges that the PLN-Gatrik complex was run by a "power-hungry clique" outside Sutami's control. The letter went on to outline "matters and a situation which cannot be

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1. Interview with D_1, 3 April 1970.

2. The letter is dated 5 November 1968. Copies were sent to Sutami, and the Inspector General and the Secretary General of the Department.

permitted to continue": there was restlessness and rivalry rather than co-operation amongst employees; there was lack of confidence and respect for the management; and employees needed an assurance that the management would try to improve the position quickly. The signatories proposed that a "forum" be arranged where workers and higher officials could discuss these things with the management, and also where the managers could be asked to explain their policy in certain matters concerning "budgeting, personnel, and improvements in salary and other fair benefits." This request, the signatories claimed, was in line with the Minister's own proposals outlined on Electricity Day. It is notable that there was no call for any of the managers to resign, and there was no mention of PKI sympathisers.

The letter received significant support from industry officials, mainly in the PLN's Central Office and the Directorate General, but also in other PLN offices in Djakarta.[1] In all, 62 officials signed (and 15 refused), 43 of them being graduates. Quite a few were heads of bureaus or sections, which meant that many officials working quite closely with top level management had joined in the criticism. Most surprising of all was the appearance of the names of Dr Ir F. Tambunan and Mr S. Gondokoesoemo S.H., who were themselves counted as amongst the most senior men in the industry. Tambunan was a Director in the Directorate General, just below Hoesni himself in rank, while Gondokoesoemo was a legal expert with long service. As a group, the signatories to the letter constituted an impressive group of officials whose discontent was an ominous sign. A statement of concern from this level could hardly be ignored. As one official commented later, "If these people don't know what is going on, who does?"[2]

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1. Although the names of 76 officials were listed, in the event not all of them signed, and one extra official signed whose name was not included in the original list.
2. Interview with U, 23 February 1970.

The Background to the Letter

The matter was particularly sensitive because there was more to the 77 letter than met the eye. Coming as it did within weeks of the earlier attacks, Hoesni and the Directors of the PLN cannot but have seen it as at least partially linked to the previous criticisms. Further, a demand for more information from such a group as the "77" (as they came to be known) reinforced the charges that the PLN-Gatrik management was a "clique." This was a sore point with those involved because they believed it was untrue. Third, there had in fact been growing criticisms of the management for a year or more within the industry, and some of the strongest complaints concerned precisely "budgeting" and "personnel" issues. Hoesni and Amir may well have felt - with some justification - that an open discussion which would have doubtless been leaked to the press was not the best way to settle the problems and could only bring further attacks on themselves.

The main criticisms made of the top managers were that they were bad administrators, that personnel policies were unsatisfactory, and that they had been involved in corruption. The chief complaint about administration methods was that decision making was too centralised because the highest officials did not delegate duties properly - important decisions were not widely discussed and only a few people at the top were really involved. Two important cases, discussed below, were the "Consulting and Contracting Scheme" and the purchase of expensive mobile diesel generators. There were also complaints over long range planning. Some engineers were disturbed by rumours of plans for a proposed high tension transmission line from Sumatra to India (sic) and for the development of nuclear plants. Another criticism was that the top level managers spent too much time on trivial tasks such as personally checking on minor matters. Their assistants felt that this was both inefficient and implied that the Directors lacked confidence in them.

There was much dissatisfaction with promotion and other personnel procedures, even though reforms had been introduced since about 1967. This was a complex problem, affected by the rapid promotion of relatively young graduates, the imperfect administration system, and political suspicions. Once the older generation of managers had stepped aside, there was a group of younger men who felt that important positions of leadership were their due. Inevitably some were frustrated. As one former PLN Director put it in discussing the problem:[1]

> "Hoesni and Amir are now facing their equals in age. Formerly, we [the former Directors] could be <u>bapaks</u> to our employees, because we had far more practical experience and were older. With people like Tambunan and Gondokoesoemo leveling criticisms, it makes it very difficult for Hoesni. He cannot <u>bapak</u> these men!"

The resentment about promotion procedures varied amongst the 77. For some, it was a minor factor, but the following blunt statement (which is an extreme view) shows how strongly others felt:[2]

> "There has been and still is dissatisfaction over promotion procedures. Which university you went to is not important, but how well known you are, geographical location and your connections <u>are</u>. These are connected to each other.
>
> The effects of the present promotion system are unsatisfactory. Certainly inefficient and bad officials have been promoted over the heads of better men. This is partly because there is still no well defined promotion scheme.
>
> There are men in the higher ranks of the PLN who have had as much - or more - experience than the present managers. I have, for example ... Now there is dissatisfaction, both in the regional and the central offices, about rates of promotion and about why people like Hoesni got promoted while others didn't. The trouble ... has been predetermined partly by the influx of men 10 and 15 years ago. Now the results are becoming clear ...The 77 incident is a result of the problem."

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1. Interview with Z, 5 March 1970.
2. Interview with B_1, 25 March 1970.

Mistakes in the administrative system sometimes led to unequal treatment since administrators frequently had to rely upon their personal judgements rather than well established rules. This led to complaints of favouritism. Underlying this were political suspicions that Hoesni and his associated were less than sympathetic to the "new order."

One particular incident that was resented was the attempt to set up a keluarga Gatrik (a "Gatrik family"). This was a form of organised social activity, involving more or less obligatory gatherings of the families of Gatrik officials. Paradoxically it was an attempt to improve personal relations. Hoesni supported the scheme, but some officials resented it, seeing it as an intrusion into their private lives. One official said that he[1]

> "... saw it as a form of fascism ... like the army way of life where business relations extend to private life. It seemed para-military. I opposed it privately, and later found that others were opposed to it too. The meetings were held in private homes. One meeting was held in the home of an ex-communist, and this brought much opposition."

Some officials saw it as another sign that PLN-Gatrik was being turned into a private "empire."

But it seems to have been the suggestions of corruption that caused the most concern. These were not mentioned explicitly in the 77 letter, but the rumours were so widely known that the request for a forum on budgeting was almost a direct request that they be openly discussed. Three separate matters were involved: the Consulting and Contracting Scheme; the purchase of some mobile diesel plants; and the circumstances surrounding Hoesni's use of a house at Bogor.

The "C and C" Scheme, which by an instruction of the Board of Directors was established in all regional boards, was introduced in 1966. The scheme involved the use of PLN facilities to supply extra services to the public on a fee-charging basis in order to earn extra revenue. The most common service was the installation of extra wiring in

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1. Interview with D_1, 3 April 1970.

a house or an increase in the available wattage. It was originally explained that the extra funds would be used for "employees' welfare," it being left to the managers of each regional board to fix local prices. In practice, the use to which the additional funds were put is far from clear. Even officials working at a high level in Gatrik were in the dark, as one of them explained:[1]

> "Officially, some of the money should have gone to the employees, but for two years employees didn't see any of it, Rp 100 was charged for each connection [per watt in Djakarta] - this included equipment and labour. A lot of the equipment was received free from the government.
>
> The use of the money has never been satisfactorily explained. I pressed for information on this, but people refused to tell me. Probably it was used for trips overseas for officials of the Department. This is probably semi-legal. The top officials probably don't steal it, but they may use it to start businesses and return it later. They might have deposited it in banks for their own purposes.
>
> There were also suggestions of cuts for Presidential advisors such as Sudjono Humardhani."

Sometimes it appears that even the Directors of the PLN themselves did not know how the income from the C and C scheme was being used since details were not always forwarded to the Central Office. Regional Board XII, based in Djakarta, was alleged to be one such case, although because of great confusion after the introduction of experimental changes in the Board's administrative system, it is quite possible - even likely - that the local accounting officials did not know what the true financial position was.

The mystery surrounding the C and C funds was particularly serious because of the potentially large sums of money involved if, as was the practice in Djakarta, the price for new connections or extensions was Rp 100 per watt. Supporters of the 77 were at one stage arguing that in 1967, up to Rp 800 million was unaccounted for in the Djakarta Regional Board alone. Since the total income of the Board in 1967 from electricity sales was only about Rp 750 million,

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1. Interview with D_1, 3 April 1970.

the charge was not to be taken lightly. The charges were almost certainly exaggerated, but if the scheme actually operated throughout the whole of the country (and there is some doubt as to whether it did), then a conservative estimate would be that about one-tenth of the PLN's total income in 1967 and 1968 was from charges for C and C.

The possibility of corruption in the purchase of some mobile diesel units in 1967 arose because of the haste with which the details were arranged and the bypassing of the usual time consuming purchasing methods. There had been talk of a "crash-program" involving the expenditure of some two or three million dollars. It was in this context that the choice of mobile diesel units seemed sensible because they could be constructed quickly. One official recalled:[1]

> "The Dirdjen [Hoesni] wanted them finished by Christmas or at least Lebaran. The Dirdjen claimed he wanted them for political reasons, but I heard it rumoured that there were commissions involved. In theory [one official]should have been the last man to consider the purchase, but in fact the contract was signed very quickly. Later [the official] was unhappy with the signed contract and found mistakes totalling about $80,000. [He] later protested about the signing of the contract, but was overruled by the Dirdjen who took responsibility."

Technically, one of the three sets purchased was unsuitable and modifications were necessary. It was later argued that *the whole deal could have been arranged more cheaply.*

On the third matter, very little information was ever produced to support allegations of corruption carried out by Hoesni in his use of a house in Bogor. There were nevertheless widespread suspicions held in the PLN and Gatrik. The suggestion was that Hoesni had used funds from the Perusahaan Gas Negara, of which he was formerly President Director, to purchase a house at Bogor in his own name and had only subsequently been forced to return the ownership to the PGN. These suspicions may well have been completely unjustified, but their existence was sufficient to give rise to much discontent.

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1. Interview with D_1, 3 April 1970.

First Reactions

The letter was not seen by Hoesni until about 16 November. For a few days he considered the matter. After discussing it with other officials in Gatrik and with the Minister for Public Works, who according to reliable reports was angered by the letter and ordered him to take firm action, on 19 November Hoesni decided upon (but did not yet announce) a series of measures: a few of the signatories would be dismissed; others would be transferred, either to a position of little authority which would be almost equivalent to suspension, or to unpopular posts in Atjeh or Irian Barat (West Irian); and the majority would be given warnings of varying degrees of severity. Besides these "repressive" actions, as Hoesni called them, he planned to introduce "preventative" measures to improve the morale and conditions of employees.

The 77 group presumably got wind of these decisions, because during the next few weeks developments took place quickly - both sides hardened in their positions and new actors entered upon the scene. On 23 November in a letter to Hoesni and the PLN Board of Directors, the 77 appointed five people as their spokesmen.[1] A few days later, with the support of one Col. Soekarno, an army security officer who was also a Gatrik official and a Director of the Indra Karva state-owned construction company, Hoesni issued a compulsory questionnaire to all of the 77 which contained questions clearly designed to sort out the ringleaders. Soon after, representatives of the 77 approached Inspector General of Police Ostenrik, who was then acting as the Inspector General of the Department of Public Works, and explained the position to him in a successful attempt to

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1. Reported in Press Release Tentang Masalah Persoalan Gatrik/PLN oleh Inspektur-Djenderal Departemen Pekerdjaan Umum dan Tenaga Listrik [Press Release about the Gatrik/PLN Problem issued by the Inspector-General of the Department of Public Works], dated 9 September 1969.

obtain his support.[1] Thus the position stood at the end of November.

On 2 December the first news report about the 77 letter appeared when Kompas carried a story sympathetic to the 77. This was almost certainly leaked by the 77 in a further move to enlist support. Hoesni's decisions had still not been announced, and the story simply reported the contents of the letter, the status of the signatories, their desire to co-operate in the smooth running of the industry, and their regret at the "negative" response that it had received so far. Three days later Hoesni's decisions were made public. About twenty officials were seriously dealt with, two being dismissed outright, and the rest being transferred, some to outlying posts. Various reasons were given for the changes. Apart from the need for a reorganisation to improve the administration, mention was made of "subordination, lack of discipline, bad intentions," and links with the PKI. Gondokoesoemo and Tambunan were transferred from Gatrik to the main office of the Department of Public Works. Although a press release from the Department on 9 December denied that the transfer of these two officials was connected with the 77 affair, in fact it seems clear that they were moved as a punishment for their part in it.

The harshness of these measures came as a shock to most of the 77. One of them later described the position:[2]

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1. The Inspector General of a government department is expected to maintain a watching brief on the affairs of the department, to investigate problems that arise within the department, and to take whatever action he sees fit. It is a position of some independence, the extent of which varies depending upon the personality of the individual involved and the support he can count on if a controversy arises. Often, as was apparently the case with Ostenrik, he is an army or police officer seconded to the department. Sometimes conflicts of duty can arise, when the Inspector General himself must decide whether his prime duty is to the Minister or to his armed forces superior. This later became an important element of the 77 dispute.

2. Interview with B_1, 25 March 1970.

> "The reaction of the Dirdjen and the PLN's Directors surprised us. I was out of Djakarta for two months ... and came back to find the turmoil. They took this as a direct criticism, although it was not intended to be. Perhaps they were afraid that their room to manoeuvre would be limited ... Only some of the 77 were dealt with. This dealing with only some of us gave rise to further difficulties. Surely all of us were wrong, or none at all."

Hoesni's decisions were quickly attacked. The Djakarta branch of KASI came out in support of the 77 when the chairman, well-known lawyer Adnan Bujung Nasution, issued a press statement claining that the "irregularities" in Gatrik/PLN were a result of earlier incidents which had occurred up to eighteen months before. Nasution criticised the management for failing to carry out the purge of anti-communists and old order supporters which student and graduate organisations had demanded.[1]

Newspapers, too, came out against the decision, two main critics being the well-regarded dailies Kompas and Harian Kami. Kompas emphasised the reasonableness of the 77's request, explaining that they originally had no desire for publicity and were keen to settle the trouble entirely within the industry - they had only publicised the "tragic incident" nearly a month after the letter was sent because of the "intimidatory" tactics used by the management.[2] Kompas lamented the prospects for development while the managers of state enterprises frustrated employees' attempts at improvement in this way. In a common tactic of the Indonesian press, the newspaper refrained from directly criticising the Minister, Sutami, but suggested that his assistants were probably secretly sympathetic to the old order and had been giving their Minister bad advice.

Harian Kami, which has close links with KASI and student activist groups, was more outspoken.[3] In a

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1. Kompas, 7 December 1968.
2. Kompas, 7 December 1968.
3. Harian Kami, 9 December 1968.

dramatic editorial entitled "Gatrik/PLN Launches a Counter Offensive Against the New Order," it outlined the political aspects as KASI saw them - and so ensured that the dispute would become a controversial political issue:

> "The problems of conflict within the Gatrik/PLN between the Kesatuan Aksi [KASI] which opposes vested interests, the old order and Gestapu/PKI supporters in key positions, is not a new problem. It is already more than one year old, and possibly three ... Gatrik/PLN is a test case for the old order, the victory of the new order or its defeat in Gatrik/PLN will have a decisive quality ...
>
> We don't agree with 'witch hunting' practices towards G30S/PKI supporters, and have never agreed with a policy that equates everything that is fishy with the PKI ... But we oppose a policy that places former members of the PKI or its mass organisations in key positions as has been carried out in Gatrik/PLN ... We will oppose it to the last now that Gatrik/PLN has begun its counter-offensive towards the new order, because some time ago Gatrik/PLN began to eliminate KASI from within the enterprise. The tragedy has already occurred, the PKI has been retained in key position, Kesatuan Aksi has been dismissed ... was it this that the 5th Djakarta Regional Military Commander called the 'iceberg' tactic of the PKI? Who are the real leaders of Gatrik/PLN?"

Harian Kami urged the management to reconsider and called for investigations by the security-oriented Central Examination Team and the Military Police. Never one to conceal its feelings, on the same day the newspaper carried a news report of Hoesni's decisions which spoke of the "audacity of the Dirdjen" in dealing with these important people in the PLN who had been amongst the most active supporters of the campaign to clean out the PKI.[1]

Meanwhile the Minister himself was under pressure from both sides. On 8 December Soekarno sent a letter to Sutami which supported Hoesni's decisions. Soekarno recommended that firm action be taken against the signatories because of their "insubordination" - and because of the influence of former communist supporters within their ranks! At the same time, Soekarno submitted to

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1. Harian Kami, 9 December 1968.

Sutami a survey of previous developments which tended to support Hoesni's position.[1] The survey reported that for up to two years there had been friction between Hoesni and Amir on one hand, and certain members of employee groups - KASI and SABUMUSI in particular - on the other, because Hoesni and Amir had refused to grant them favours that they had asked for.[2]

At the same time Sutami was under pressure to overrule Hoesni, even from within his own department. One official went so far as to issue a press release criticising Hoesni as arbitrary and rash, saying that he was acting outside of Sutami's policies. The official promised to urge the Minister to take over the problem.[3] On the morning of 9 December, Adnan Bujung Nasution in his capacity as Chairman of the Djakarta Branch of KASI met the Minister and also urged him to take charge of the dispute.[4]

The Minister Steps In

In the face of this rapidly developing crisis the Minister decided to take over. On the same day that Adnan Bujung Nasution approached him, he issued an important Letter of Command (No. 85/SPRIN/M/1968) which transferred responsibility for the dispute from Hoesni and Amir to Ostenrik, Inspector General of the Department.[5]

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1. Note prepared by Soekarno dated 6 December 1968 and entitled Flash Back Sebagai Analysa dengan Adanja Petisi jang diadakan oleh beberapa Pedjabat Gatrik/PLN jang didalamnja Oknum-Oknum tergolong beberapa Ormas [Flash Back as an Analysis of the existence of the Petition which was prepared by Several Officials of Gatrik/PLN who include Members of several Mass Organisations]. The text of this "Flash Back" is reproduced in Detektip & Romantika, No. 042, 23 January 1970, p.35.
2. Suluh Marhaen, 18 December 1968. See also the criticisms of Suluh Marhaen's story in Harian Kami, 19 December 1968.
3. Press circular issued by Drs Soedardji Martosudirdjo on 7 December 1968; details in Kompas, 9 December 1968.
4. Berita Yudha, 10 December 1968.
5. Letter of Command No. 85/SPRIN/M/1968 issued by the Minister of Public Works and Electric Power, dated 9 December 1968. See also a press release dealing with the dispute issued by the Publicity Section of the Department, 9 December 1968.

Hoesni and Amir were ordered to cease any current activities connected with the dispute and to postpone execution of their earlier decisions. Ostenrik was to arrange an investigation and report his findings as soon as possible.[1] Ostenrik quickly formed an investigating team known as "Team SPRIN 85" which spent the following two months gathering evidence on the administrative, political and criminal aspects of the affair.

The decision to hand over the dispute to Ostenrik was not discussed with Hoesni beforehand, who accepted the fait accompli reluctantly since he apparently saw it as an indication that the Minister lacked confidence in him. He was also unhappy with Ostenrik's approach to the matter, and as time passed became increasingly disturbed by the team's methods of investigations which included, for example, discussing management practices in the industry with some of the 77. Hoesni's view was that junior officials had no right to be consulted about the performance of their superiors in this way.

After the formation of Team SPRIN 85, the tension relaxed for a time although reports were carried occasionally in the newspapers. Throughout December and into January, hostility simmered on whilst both sides awaited further developments. Most newspapers continued to be critical of Hoesni and Amir, but there are few indications that they bothered to try to find out the management's point of view. For example, on December 12 Harian Kami in its best Don Quixote style drew a series of sweeping principles from the dispute, declaring that KASI must go on to obtain further victories. The Indonesian Engineers Association[2] supported the 77 by expressing concern for the fate of Repelita (due to begin three months later) if such important officials were dealt with in such a summary fashion. There were also unconfirmed reports that Hoesni and Amir were dragging their heels in obeying

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1. See Harian Kami and Kompas of 11 December 1968, and a news report and editorial in Harian Kami of 12 December 1968.
2. Persatuan Insinjur Indonesia, or PII.

their Minister.[1] In other developments, Sutami discussed the affair with President Suharto,[2] and the KBLGI trade union - which had played almost no part in the dispute to that stage - sent a letter to Sutami suggesting a meeting of employees to settle the matter internally.[3] Early in January, the charges that the Minister's instructions were being ignored were repeated,[4] while later in the month the political angle was emphasised by reports of Gatrik officials' views that the current problems were a legacy of the left wing Minister Setiadi's period in office.[5]

In mid-January a series of closed meetings were held at a high level within the Public Works Department in an attempt to reach a settlement. By that time, a clear division had developed between Hoesni, who was committed to his earlier decisions and was hostile towards any further investigations, and Police Inspector General Ostenrik, who wanted a wide ranging investigation into the political and possibly illegal aspects. The net result of these meetings was a victory for Hoesni. His policies were endorsed, and it was agreed that as soon as Ostenrik's report (which was due any day) was ready the work of Team SPRIN 85 would be wound up. These decisions, which were leaked to the press, drew an attack from Harian Kami.[6]

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1. See Kompas and Harian Kami of 14 December 1968, and Kompas of 16 December 1968.
2. Nusantara, 17 December 1968.
3. Suluh Marhaen, 20 December 1968.
4. Kompas and Harian Kami, 3 January 1969, In these reports, a Public Works official, Drs Soedardji Martosoedirdjo, called for the resignations of Hoesni and Amir for disobeying the Minister. Harian Kami included a second news report, strategically placed next to the first, dealing with expenditures from the C and C fund and hinting that there was something most improper about it all.
5. Kompas, 20 January 1969.
6. Harian Kami, 18 January 1969.

In late January, Team SPRIN 85 sent a report to the Minister as well as forwarding copies to security and police organisations.[1] It is not clear whether any of these organisations was directly involved in the investigations at that stage - they certainly were later - but despite the earlier decisions to wind up Team SPRIN 85, Ostenrik was keeping them in close touch with the political and legal aspects of the problem. The Team's recommendations are not known, but a spokesman for the 77 later claimed in a widely circulated document that the Team had supported the 77 and was critical of Hoesni and Amir, as well as pointing to "political" and "criminal" problems in Gatrik and the PLN.[2]

Although a clear line of action had been agreed upon in mid-January, the Minister delayed announcing his decisions until the details were settled. Sporadic reports still appeared in the press which were generally favourable towards the 77.[3] On 13 February, after one last meeting between top officials in seclusion at a hill resort south of Djakarta, the decisions reached nearly one month earlier were agreed to.[4]

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1. Information from a mimeographed document prepared by the 77 called Apa jang disebut Persoalan "Karyawan 77" di Dit. Djen. Gatrik/PLN [The Affair known as the "77 Employees" Problem in the Gatrik Directorate/PLN]. See also the press release issued by Ostenrik on 9 September 1969, op.cit.
2. Letter dated 27 February 1969, signed by Ir Sunardi, and mimeographed statement about Masalah Direktorat Djenderal Tenaga dan Listrik/PLN dalam Hubungan dengan Surat dari 77 Karyawan [Problems in the Directorate General of Power and Electricity/PLN in connection with the Letter from the 77 Employees].
3. See, for example, Kompas, 17 February 1969.
4. See the press release issued by Ostenrik, 9 September 1969.

Attacks on the Minister

The Minister's decions were released on 21 February.[1] Not surprisingly, the verdict was not popular amongst the 77 who retaliated within a week with a statement entitled Masalah Direktorat Djenderal Tenaga dan Listrik/PLN dalam Hubungan dengan Surat 77 Karyawan [Problems in the Directorate General of Power and Electricity/PLN in connection with the Letter from the 77 Employees] which was signed by Ir Sunardi, the main spokesman for the 77.[2] This document was circulated widely, being sent to the President, parliament, ministers, army and police commanders, as well as the security agency Kopkamtib and the press. In addition to repeating their earlier concern about mismanagement, they now explicitly mentioned continuing communist influence and the poor service that society and consumers were getting from the PLN, two issues that were sure to attract popular support.

But the main thrust of the statement was in the uncompromising call for a reconsideration of the problem. According to the document the basic problems remained unsettled. Since the Minister's staff had drawn up their recommendations before Ostenrik's report was ready, the 77 still hoped that the Minister would review the position in the light of "more objective opinions" than had hitherto been considered. Sunardi went further - if the Minister was not prepared to reconsider the matter, then the whole question of public servants' rights was at issue. There was still no court which Indonesian public servants could appeal to in such cases; was it really the case, Sunardi asked, that there was no other body which could settle the dispute? The

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1. The decisions were contained in Regulation of the Minister for Public Works and Electric Power [Peraturan Menteri Pekerdjaan Umum dan Tenaga Listrik] No. 02/PRT/1969 dated 20 February 1969, and various decrees of the Minister [Keputusan] numbered 40/KPTS/1969, 41/KPTS/1969, 42/KPTS/1969, 43/KPTS/1969 and 44/KPTS/1969, all dated 21 February 1969, and in Decree No. 45/KPTS/1969, dated 22 February 1969.

2. Letter dated 27 February 1969, signed by Ir Sunardi, with attached statement, op.cit. See also Kompas, 26 February 1969.

statement appealed for support from other government institutions and from the public, concluding that if the problem was not settled with justice, they held out no hope for "the rule of law" in Indonesia!

In a further act of defiance the employees directly affected declared they would not obey the Minister until he replied to their protest. Three reasons were given; the original request for a forum had been entirely within their rights; the Minister's actions were "in direct contradiction" to the report of Team SPRIN 85; and in any case the decisions had not been issued in accordance with the rules governing the position of public servants.[1]

At this stage a stalemate developed. As a result of the publicity and representations from the 77, members of parliament took up the dispute and had several discussions with Sutami.[2] This provided the 77 with a further excuse for refusing to obey Sutami's directions, which they did. In his discussions with the MPs, Sutami took a moderate stand towards the 77. In particular, he emphasised that his decisions were not meant to punish those involved, and that he knew that the 77 had never harboured bad intentions. His final decisions, he explained, were merely designed to improve the position and were based on the principles of "management," "organisation" and "leadership." It is unlikely that anybody took the latter claim too literally, but the Minister was nevertheless trying to maintain a bridge of contact with the 77.[3]

The results of Team SPRIN 85's work became more widely known too. They supported the allegations of pro-communist

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1. Apa jang disebut Persoalan "Karyawan 77" di Dit. Djen. Gatrik/PLN, op.cit., p. 4.
2. In early March a delegation from the 77 discussed the affair with the Chairman of Parliament, H. Achmad Sjaichu; Kompas, 12 March 1969.
3. Sutami met Commissions VIII and X on 26 March and 12 April to discuss the dispute. See the press release issued by the Minister on 3 September 1969, and Kompas, 6 September 1969.

activities and mismanagement verging on criminal negligence. This put Hoesni - and also the Minister since he had supported Hoesni - in a difficult position. The situation became even more embarrassing when suspicion focused on Col. Soekarno, who was (inter alia) chairman of the security Screening Team in the electricity industry which had been responsible after the 1965 coup for checking employees' former links with communist organisations.[1] Soekarno had advised and supported Hoesni during the 77 dispute, so when he was relieved of his duties in May, it was a serious set-back for Hoesni.

Police Investigations

During May the Minister met representatives from the 77 and instructed the Secretary General of the Department to have further discussions with them in an attempt to reach a settlement by the end of June. But there was little progress. On 30 May a new series of developments was set in motion. Ostenrik signed an order for the police to make further investigations into the "criminal" aspects of the internal affairs of Gatrik and the PLN, apparently on his own initiative and without the Minister's prior approval.[2] In effect, Ostenrik was arranging for some aspects of the work of Team SPRIN 85 to be continued - a move that was bound to be resented by Hoesni. At this stage however, it was difficult for Hoesni to stop Ostenrik since the Inspector General was acting in his capacity as a police investigator.

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1. Soekarno had held various influential positions since 1965 in Gatrik. In 1968 he was a Director of the Indra Karya state construction enterprise, as well as Chairman of the Gatrik Team Chusus Penelitian dan Penertiban Personil (TCP3, or Special Team for Screening and Control of Personnel), often known simply as the "Screening Team." This team had been in charge of the politically sensitive job of sifting through the backgrounds of all employees and isolating the communist sympathisers so that appropriate measures could be taken against them.

2. Letter of Command No. 060/SPRIN/I.D./1969 dated 30 May 1969, issued in the name of the Minister but signed by Ostenrik.

The police pursued their investigations into the corruption charges by interviewing top PLN officials. The President Director himself was summoned to police headquarters to answer questions. He was alarmed by the manner of the summons and was reluctant to obey, apparently turning to Sutami for support. Details are not clear, but it seems that Sutami personally took up the matter at the highest level in two private meetings[1] with the Indonesian Chief of Police, Commissioner General Drs Hugeng. Sutami asked Hugeng to instruct Ostenrik to suspend police inquiries on the grounds that it would stir up far less trouble if the matter were handled internally by Public Works Department officials. Hugeng agreed, perhaps as a personal favour to Sutami, and immediately ordered that the police activities be temporarily stopped. In addition, on 26 June (the day following his second discussion with Sutami) Hugeng sent a letter to Ostenrik with instructions to meet Sutami "as soon as possible" to settle the manner in which any further investigations were to be conducted.[2] It later became common knowledge that Amir obtained some photocopies of this letter, presumably for self protection.

Hugeng's instruction to Ostenrik did not have the desired effect, because nearly two weeks later (on 8 July) Sutami found it necessary to send a personal note to Ostenrik reinforcing Hugeng's earlier letter. What is peculiar about Sutami's instruction to Ostenrik on 8 July is that it was hand written immediately below Hugeng's letter to Ostenrik of 26 June. It appears that Sutami must have endorsed one of the various copies of Hugeng's letter that existed at that time.[3] Some time later - precisely when it is not

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1. On 20 and 25 June 1969.

2. Details from Hugeng's letter, which was reproduced in Detektip & Romantika, Numbers 42 (23 January 1970) and 43 (30 January 1970), pp. 9 and 4 respectively.

3. It is clear from details provided in Detektip & Romantika, ibid., that Sutami was given a copy of Hugeng's letter by Hugeng himself. In addition, Amir also had some photocopies of Hugeng's letter. Sutami's endorsement of Hugeng's original instruction could have been written on any of the three or four copies that existed.

clear - Hugeng's intercession in response to Sutami's request became widely known. The embarrassing stage was reached where facsimilies of his letter were even reproduced in a remarkable series of articles in Detektip & Romantika, a Djakarta yellow press magazine specialising in scandals.[1] Presumably even as hardy a gentleman as the Indonesian Chief Commissioner of Police must have found all of this publicity with its suggestions of personal favours somewhat less than welcome.

The Arrest of Soekarno

Shortly after mid-August, the news broke that at the end of July Col. Soekarno, the officer formerly in charge of investigating communist influence in Gatrik and the PLN, had himself been arrested and charged with involvement in the 1965 attempted coup![2] This changed the position entirely. The 77's criticisms of the political position in Gatrik were apparently confirmed since it had been on Soekarno's advice that some of the 77 were accused of being former communist sympathisers after Soekarno had investigated the 77 letter in November 1968. If Soekarno's reports were suspect, then Hoesni's position was much weakened.

Soekarno's arrest raised the whole issue of the position of the 77 employees again. There were strong demands from Harian Kami that the employees be rehabilitated and that the other 12,000 (sic) communist sympathisers that Harian Kami claimed were still employed be rooted out.[3] The Minister and his assistants, now under strong political pressure, had little alternative but to make it clear that they would not shelter any known communist sympathisers. On 23 August Sutami established a new Screening Team for

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1. See Detektip & Romantika, issues numbers 31 to 47 published between October 1969 and 27 February 1970.
2. Soekarno was arrested on 27 July. Kompas, 21 August 1969 and Harian Kami, 22 August 1969.
3. See the Djakarta newspapers for the period, especially Harian Kami (25 August, 26 August, 27 August), Berita Yudha (25 August, 26 August), and Suluh Marhaen (26 August).

Gatrik and the PLN to replace the one formerly headed by Soekarno.[1] Ten days later he took the sweeping step of ordering Ostenrik, in his capacity as chairman of the Screening Team for the whole of the Public Works Department, to arrange a "total review" of all previous screening carried out within the Gatrik Directorate General. Ostenrik was also authorised to get in touch with national security organisations.[2] In addition, the Minister issued a press release drawing attention to his earlier statements of March and April to parliament when he explained that his decisions were not intended to punish the 77 but rather to improve internal conditions in the industry. He clearly foreshadowed a policy change by pointing out that "any actions which do not conform with or are in opposition to the spirit of the statement" would have to be changed. The press release also explicitly stated that the actions of the 77 in asking for a forum were definitely "not wrong."[3]

Meanwhile Ostenrik pressed ahead with preparations for the "total review" of political screening. Although a screening team already existed within the industry which had been reformed by Sutami as recently as the 23 August, Ostenrik formed a separate group for the purpose - perhaps because he feared that the Gatrik team would be under Hoesni's influence. On 6 September, Ostenrik issued an order for the establishment of his own screening team, known as "Team Force Tening Gatrik."[4] Thus by mid-September, there existed two

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1. Decree of the Minister of Public Works and Electric Power No. 168/KPTS/1969 dated 23 August. See also Harian Kami, 4 September 1969.

2. Letter of Command No. 97/SPRIN/M/1969, issued by the Minister for Public Works dated 2 September 1969.

3. Pernjataan Menteri Pekerdjaan Umum dan Tenaga Listrik tentang Masalah/Persoalan 77 Karyawan Gatrik/PLN [Statement by the Minister for Public Works and Electric Power on the Problem of the 77 Employees in Gatrik and the PLN], dated 3 September 1969. Reports of the statement were carried in Harian Kami, 5 September 1969, and Kompas, 6 September 1969.

4. Decree of the Minister of Public Works and Electric Power No. 178/KPTS/1969, dated 6 September 1969. "Task Force Tening Gatrik" is an abbreviation of Task Force Team Screening Gatrik. See also Kompas and Harian Kami of 16 September 1969.

screening teams within the Public Works Department to examine the political position in the electricity industry!

After these dramatic developments, a period of apparent calm prevailed. Nearly two months later at the end of October 1969, in an editorial on Electricity Day Harian Kami commented drily that[1]

> "Excitement about the problem of Gatrik and the PLN has long since subsided ... there is almost no spectacular news any more in our world of electricity."

But the calm was only superficial. It is clear that behind the scenes the struggle was continuing. In early September there were unconfirmed stories that police headquarters had refused Hoesni permission to proceed to a World Bank meeting in the United States because he was wanted for questioning.[2] Even more significantly, there are reliable reports that the influential Aspri, personal assistants to President Suharto, were taking a close interest.[3] In mid-September, Brigadier General Sudjono Humardhani visited Gatrik for discussions about the dispute, and the following month General Ali Moertopo (also an Aspri) was involved in further talks. While these officers may have simply been keeping President Suharto abreast of developments, it was nevertheless widely believed that the Aspri had taken Hoesni's part in the dispute (perhaps, it was suggested, in exchange for contributions from PLN funds to military or other accounts). These rumours were rarely discussed openly and their truth has never been proved, but their very existence added to the air of intrigue and further

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1. Harian Kami, 29 October 1969.
2. Harian Kami, 3 and 4 October 1969.
3. Aspri, or Assisten Pridadi (Personal Assistants), work closely with President Suharto, advising him on a wide range of matters. Sudjono Humardhani's interest was referred to in Indonesia Raya, 11 June 1970, and discussed at some length with N_1, 19 May 1970.

damaged morale.

Throughout September and October there were numerous meetings between Sutami's assistants and officials from Gatrik and the PLN. Both sides were under pressure. Hoesni and Amir apparently felt that after the savage criticisms that the 77 had made, the rehabilitation of the ringleaders was unacceptable for reasons of personal prestige. But by delaying rehabilitation Sutami was laying himself open to the very damaging political charge of "sheltering communists," and he probably felt that whatever the feelings of Hoesni and Amir, a settlement had to be reached. The photostat incident was a complicating factor. After learning that Amir had made copies of his letter, Hugeng had demanded that the President Director be disciplined. Thus Sutami was under pressure from two quarters to stand up to the "Gatrik-PLN group." In the event, in early November Sutami decided to restore the 77 to their previous positions, although the decision was not made public until nearly two weeks later.[1] For Hoesni, the news was a bitter set-back.

The Aftermath

Although the fate of the employees most affected had been settled, the political implications had not. During Ostenrik's investigation which lasted into 1970, employees in Gatrik and the main state enterprises under its control were required to fill in a very detailed questionnaire on their past political activities and other affiliations so they could be given a new security classification. Many employees - even those with nothing to hide - resented this searching investigation connected with bitter events that had occurred more than four years earlier. But they were in no position to protest.

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1. By Decree of the Minister of Public Works and Electric Power No. 216/KPTS/1969 dated 8 November 1969, the appropriate earlier orders were withdrawn or declared invalid. A series of decisions issued by the Minister on 20, 21 and 22 November further clarified the position, by providing that some of the 77 be transferred to new posts, but without any loss to themselves. See also Nusantara, 22 November 1969, which reported the rehabilitation of the employees.

The results, released on 1 March 1970, were staggering.[1] Soekarno's earlier screening investigations had, in the words of The Djakarta Times, "netted only 3,265 communist elements" out of the total of about 20,000 examined. Ostenrik's new search revealed 8,459 "communist elements," most of whom had not been closely enough involved in communist activities to be dismissed but who would have to be kept under observation.[2]

A second result of the 77 problem appears to have been the eventual discreet removal of Amir and Hoesni from their positions. Again details are not clear, but it seems that mainly as a result of pressure from Hugeng, President Suharto set up an investigating committee. In early March Amir was temporarily suspended as President Director while his case was considered and another Director, Ir Abdul Kadir, was installed as "caretaker President Director."[3] The final decision of the committee set up by the President is not known. A few months later in a reorganisation of Gatrik and the PLN, Hoesni's post was abolished and Abdul Kadir was confirmed as President Director of the PLN with increased power.[4]

By March 1970 the issue of "criminal mismanagement of finances" was well on the way to being settled too.[5] Ostenrik announced that he had not been able to find anything illegal in the use of the "C and C" funds, so as far as he was concerned any further disputes about their allocation were an internal matter. The original cases of fraud in the

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1. See Kompas, 2 March 1970, and The Djakarta Times, 3 March 1970.
2. By Instruction of the Minister of Public Works and Electric Power No. 24/A/INST/70 dated 19 March 1970, Sutami ordered that some communist sympathisers be dismissed, and that the remainder be dealt with by less sévere methods.
3. Letter of Command No. 20/SPRIN/M/1970 issued by the Minister for Public Works dated 12 March 1970.
4. See the Postcript to Chapter 4 above.
5. Kompas, 2 March 1970.

medical clinic of the PLN's Central Office had been settled in the courts. The two other charges of corruption involving Hoesni's house at Bogor and the mobile diesel units had been turned over to the police for investigation.

The Dispute in Retrospect

It was often mentioned throughout the dispute that there were three distinct aspects - administrative, political and criminal - that had to be settled. We will look at each aspect briefly and then review some wider implications of the dispute.

The 77 letter originally emphasised administrative issues, which concerned mainly management policies towards labour relations and working conditions. Hoesni overreacted badly to the letter, because much of the problem could probably have been nipped in the bud by conciliatory discussions with the signatories. Many of the signatories would have been mollified by genuine signs of concern, while the more determined critics would have been isolated. Even from a purely pragmatic point of view, repression was not the right way to deal with the issue. This should have been especially clear to the management because of the widespread and high-level support for the letter.

Why did Hoesni overreact? One reason was that Sutami, a hard pressed and busy Minister who may not have appreciated all the implications, reportedly instructed Hoesni to be very firm. Another was probably Hoesni's personality. He was known as a hard working official who was determined to improve the operations of his Directorate, but who was also sometimes autocractic, knew his own mind and took a "no nonsense" attitude towards subordinates. A third factor was doubtless the undisguisedly hostile statements which had been issued in the previous few months by the three employee organisations. These appeared to be related to the medical fraud that was being investigated, and Hoesni suspected that the 77 letter was an attempt by a group of ringleaders to stir up trouble to divert attention from their own criminal wrongdoings. A fourth possible reason, discussed below, was that the political accusations and charges of corruption

levelled at Hoesni were true and that he was trying to cover up.

The introduction of the political charge that communist elements were being protected ensured that the dispute became an explosive public issue. The cavalier way in which these extremely serious accusations were first introduced (in the "Joint Declaration" issued in mid-September 1968) and later widely publicised was one of the most distasteful aspects of the whole affair. Lists containing dozens of names of employees who had former links with the PKI or one of its mass organisations were drawn up and circulated.[1] For nearly three months the weekly scandal magazine Detektip & Romantika carried articles on the affair, much of them occupied with details of PKI activities entirely unrelated to events in the PLN. It was certainly true that many former communist sympathisers were still employed - but they were so numerous that it would have been impossible to dismiss but a small fraction without doing great harm to the industry. It was also almost certainly true as the 77 alleged that some former communist sympathisers who were highly qualified had been dismissed for six months or more but later reemployed and promoted to responsible positions. However the skills of these men, many of who had been only marginally connected with PKI mass organisations, were urgently needed. Further, their reemployment in most cases was quite legal.[2]

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1. Two roneoed sheets of this character were Fakta[2] Mengenai Terlibatnja Pimpinan Dit. Djen. Gatrik/PLN dalam Bidang Politis Orla dan G-30-S/PKI [Facts about the Involvement of the Management of the Gatrik Directorate General and the PLN in the G-30-S/PKI and Old Order Politics] and Laporan Singkatan Mengenai Masaalah2 Serta Perkembangannja di Direktorat Djendral Tenaga dan Listrik/P.L.N. [Brief Report about the Development of the Problems in the Directorate General of Power and Electricity and the P.L.N.], both mimeo., undated and unsigned.

2. The punishment for being connected to the PKI varied depending upon the security classification that a person was given. The vast majority of employees were given low risk ratings and received comparatively mild punishments.

In fact, Hoesni and the PLN Directors were probably well aware that former communist sympathisers were being rehabilitated, but were less concerned than were the 77 because of a basic difference in attitudes. Other than the actual charges made during the 77 dispute, there is no indication that either Hoesni or Amir had ever been sympathetic to the PKI, or were "old order" officials. It seems likely, rather, that they simply did not view the rehabilitation of a former PKI sympathiser as a matter to be deplored in itself. One explanation offered by an official in Gatrik who was not involved in the dispute was that[1]

> "There is still an In group and an Out group [in the industry]. The Out group still thinks very much in political terms and seems genuinely afraid of the resurgence of the PKI. The In group are mainly technocrats, and therefore are technically minded."

According to this explanation, the technocrats were prepared to promote a qualified man despite an adverse political history because he was needed. To some of the 77, this was an ominous sign that the PKI were gaining ground once more and had to be opposed.

It is impossible on the available information to evaluate the charges of corruption. However it is important to note that the behaviour of Hoesni and other Directors of the PLN was not at all incompatible with honesty. For one thing, the accounting system within the PLN is still very bad, administered as it is by hundreds of poorly trained officials working in difficult conditions. Often the accounting managers of the regional offices - and therefore the Central Office - simply do not really know the true financial position. This was particularly true for the Djakarta Regional Board when it was the main target of criticism over the C and C allegations. The administrative system has been hopelessly overloaded in Djakarta, and when an attempt to computerise the billing system in 1967-68 failed, utter confusion reigned for

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1. Interview with A_1, 24 March 1970.

months. It is hardly surprising then that when called upon to account for the use of the C and C funds, the Directors of the PLN could not do so.

In addition, even if the selection of the mobile diesel units and expenditure of the C and C funds was not done through the usual channels, this may well have been "irregular" but not necessarily actually illegal. Attempts to bypass the usual time consuming administrative channels are common in Indonesia. The difficulty with such a system is that it can work well only so long as it is not seriously questioned, as one former high official of the industry explained:[1]

> "There are three types of operations in the PLN: quite legal; illegal; and not quite legal. Examples of each of these are supplying power; medical corruption; and the Consulting and Contracting Scheme respectively. The third type of operation gives rise to great problems. There must be a consensus within the enterprise if an activity is semi-legal, and in the case of the PLN there was not a consensus.
>
> There were various C and C groups established in Djakarta and in other towns. Separate accounts were kept, and the transactions were not entered into the accounts of the PLN ... There were only a few people closely connected with the C and C, and this secret position led to a lot of dissatisfaction. This was probably the real reason for the suspension of Amir: the lack of open management and secrecy."

In other words, it may have been a tahu-sama-tahu system that broke down,[2] or it may have simply been a result of a confused administrative system combined with an honest attempt by determined managers to cut through the choking

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1. Interview with U, 15 May 1970.

2. "This adage, best translated as know together know, implies reciprocal knowledge and mutual exoneration of unlawful or immoral behaviour. The principle operates to provide a common denominator of tolerance for crimes of convenience, including embezzlement of public funds, resources and time; illegally commandeering and manipulating sandang pangan (basic food and clothing) rations; and operating election procedures and government agencies as though they were private prerogatives." M.A. Jaspan, "Tolerance and Rejection of Cultural Impediments to Economic Growth: The South Sumatran Case," Bulletin of Indonesian Economic Studies, No. 7, June 1967, p.43.

red tape.[1]

Thus viewing the behaviour of all parties generously, the picture that emerges is one of confusion and mistrust on both sides. Hoesni believed that a small group of disenchanted and somewhat imcompetent officials were mischievously stirring up trouble just as the industry's prospects were beginning to improve. He saw the political issue as a red herring designed merely to muster popular support. The leaders of the 77 were concerned about the issues that they raised, believing that they had the right - indeed the duty - to have them clarified. They interpreted Hoesni's determination to settle the matter "internally" as an autocratic attempt to suppress discussion. The later arrest of Soekarno and growing dissatisfaction with Amir, which were probably unexpected by Hoesni, tended to confirm the 77 in their beliefs. The early involvement of the KASI-Gatrik and the later support from the Djakarta branch of KASI and Harian Kami were significant. This group, closely linked to the "66 Generation" of activist students which played a crucial role in bringing down Sukarno in 1966, saw itself as a new wave of young graduates having a militantly crusading role in Indonesia. Their self-assigned task was that of fearless criticism of old methods, corruption, and especially communist elements. They willingly seized the challenge in the Gatrik/PLN dispute.

It is important to distinguish between the activists in the 77 (most of them linked with KASI) and the majority of the signatories. The latter group was prepared to sign the comparatively mild 77 letter, having no idea that it would be taken so seriously. As the dispute developed, the activists, who tended to be the ones most directly affected, naturally moved into the limelight. Most of the other signatories were happy to have their connection with the affair forgotten.

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1. For example, one official believed that "[The managers] try to follow the 'rules of the game,' but the 'rules' are still not perfectly satisfactory and [they] are sometimes forced into breaking them." Interview with A_1, 24 March 1970.

Two questions arise. Why did such a complicated problem develop and take so long to be settled? Are the factors that led to the 77 dispute likely to contribute to further labour disputes? To the extent that the personalities of Hoesni and Amir contributed to the repressive response to the 77 letter, the present managers will probably learn the lesson and move more carefully. But it is clear that there were two institutional factors which allowed the dispute to develop and militated against a quick solution.

In the first place, the absence of effective machinery <u>within</u> the PLN to serve as an outlet for employees' discontent was an important element of the problem. Employee discontent had been bottled up for a year or more before the letter was sent. There was no enterprise council where complaints could be raised, and the trade unions had been innocuous since the attempted coup. This meant that until the employees could organise themselves into a group to act, they could do little about the contentious issues but grumble amongst themselves. Further, some of the matters that they wanted discussed were rather sensitive, so it was especially difficult for individual employees to raise them with the managers privately.

A second difficulty was the absense of satisfactory institutional means of settling such disputes once they arose. There was, for example, no industrial court to turn to, so the malcontents quickly turned to organisations <u>outside</u> the industry for support, thus ensuring that a number of different bodies other than the parties directly affected felt that they had an interest in the final settlement. Further, the extra-industry organisations involved were not institutions experienced in settling labour disputes, and while tending to specialise in the particular aspect of the affair which concerned them also supported other organisations on the same "side."

Thus these two institutional factors - absence of effective employee-management communications, and absence of effective machinery for settling such disputes - contributed to the development of the dispute and hindered its settlement. It is as yet too early to say whether the phasing out of Amir and Hoesni combined with the recent administrative reorganisation of the industry will improve the position. It is safe to predict however, that so long as these institutional factors are neglected, employee morale will remain at a low level.

CHAPTER 11 Wages During the Sixties

Introduction

Average wage levels and wage differentials between industries and between people of different skills are crucial variables in any economy. Despite the key role that wages have for living standards, cost levels in individual sectors, the international competitiveness of export industries, and in encouraging workers to raise productivity, only scanty research has been carried out into the subject for Indonesia.[1] The complexity of forms of cash wage payment, allowances in kind and fringe benefits, along with the variations in attitudes, living habits, consumption patterns, composition of the labour force, and price levels between geographical areas and industries, turn average wage levels and differentials into a veritable maze. We need far more detailed research into all of these subjects before we can confidently predict what the consequence of any particular wage policy in Indonesia will be. In this Chapter an attempt will be made to sketch out as completely as the extremely rough data will allow a picture of the wage patterns in the PLN since 1960, and to discuss the policies behind the patterns as well as some of the more important implications.

The difficulties of defining "wages" are well-known. A firm's total labour costs include not only cash payments made to employees, but also the costs of payments in kind such as food allowances, clothing, medical services, transport allowances, housing costs, annual bonuses, and so on. In Indonesia payments in kind have been particularly important,

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1. Short sections on wages are included in three of the articles on labour in Indonesia by Everett D. Hawkins cited in Chapter 10: "Labor in Transition," "Labor in Developing Countries: Indonesia," and "Job Inflation in Indonesia." See also Donald J. Blake, "Labour Shortage and Unemployment in Northeast Sumatra," The Malayan Economic Review, VII (2), October 1962, and Edgar C. McVoy, "A Wage Policy for Indonesia," Ekonomi dan Keuangan Indonesia, 8(12), December 1955.

which partly explains the difficulty of quantifying either average wage levels or differentials. Not only are the available figures for these additional expenses very unreliable because of the industry's reporting procedures, but it seems certain that the accounting prices used to value the services were often well below their private cost to the PLN (let alone their social cost to the nation). A second difficulty that would arise if the data were more reliable would be the definition of the average wage level. Is it, for example, average earnings per week or month, or is it average hourly earnings? We will be spared the need to consider such niceties here.

The Background to the 1960 Wage Scale

Available data do not allow worthwhile comparisons of wages in the industry before and after the Second World War. The 1951 Annual Report of ANIEM records that because of inflation, even though wages had recently been increased, in real terms they were still below pre-war levels. Some PLN employees who first joined the industry before the war also claim that conditions deteriorated.

It appears that during the interim period between the first nationalisations in the early fifties and the drastic measures of 1957-58, wage regulations remained largely unaltered from the Dutch systems.[1] Thus when the different sections of the industry - formerly different Dutch enterprises - were amalgamated, there were five main wage systems within the one unit. Although this was clearly unsatisfactory, the PLN was only one of dozens of new state enterprises and was bound by general government policies. The government had foreshadowed new broad policy statements to provide guidelines for all state enterprises, so during 1958 and 1959 the old wage regulations remained in force.

It was not until November 1959 on the advice of BANAS (the Nationalisation Board) that First Minister Djuanda issued a Decree (No. 559/MP/1959) clarifying government policy

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1. Details are not available, but presumably there were wage increases from time to time to compensate for rises in the cost of living.

on salaries in the formerly Dutch-owned enterprises.[1] This Decree was apparently only an interim measure, because in 1962 a Government Regulation was issued on the same subject. The Decree was nevertheless an important one because in effect, it was the government's first clear policy statement on wages in the newly nationalised state enterprises. The general principles it laid down strongly influenced wage policies in the electricity industry.

First, uniformity within the state enterprise sector was seen as a desirable goal. Second, this principle did not apply between the state enterprises and the rest of the Public Service. In view of the "commercial nature" of the state enterprises, it was considered necessary to offer more attractive conditions to employees of the enterprises than to other Public Service employees. Third, a scale of suggested basic salary rates was provided. An elaborate system of allowances was built onto these basic salaries, the main ones being adjustments for the size of an employee's family, for inflation, and for regional variations in living costs. Such matters as compensation for travel costs were provided for, as well as fringe benefits of medical treatment for the employee and his family, generous leave conditions, and old age and death allowances. Further, an incentive payment in the form of an annual bonus out of net profits was suggested. Finally, it was realistically recognised that some state enterprises would not be able to afford the wage levels and benefits suggested, so President Directors were authorised to pay less if necessary. This was "to avoid the Government having to supply further injections of funds."

The Decree opened the way for the rationalisation of the PLN's wage system, although the position was still uncertain since a general law on state enterprises was being prepared which might further alter the picture.[2]

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1. Decree of the First Minister No. 559/MP/1959 dated 14 November 1959, reprinted in Warta Cafi Circular CW No. 20, 12 December 1959.

2. Later issued as Government Regulation in Lieu of Act No. 19/1960. See Chapter 3 above, p.67 f.

Nevertheless in March 1960 the wage regulations formerly followed in the Dutch utility GEBEO were adopted for the whole of the PLN,[1] and in May a new set of wage regulations (known as Peraturan Gadji Perusahaan Listrik Negara 1960, or PGPLN 1960) was issued for the whole of the industry.[2] We shall examine this set of regulations in some detail, because although there were many later changes, some small and some substantial, wht wage pattern laid down in 1960 does not appear to have been altered drastically - in real terms - throughout the decade. This is a controversial assertion to make. Later we will try to justify it as best we can by tracing out the changes made to the industry's wage pattern during the sixties. A second and more practical reason for concentrating on PGPLN 1960 is that more data are available concerning these regulations than for later revisions. A third reason is that the position in 1960 represents a wage level and structure that the industry and government officials regarded as temporarily acceptable, if not entirely satisfactory. It represents a position of quasi-equilibrium. For much of the period since, adjustments to wage regulations have been made in hurried attempts to maintain (in real terms) the status quo in the face of accelerating inflation. Because of this, it is reasonable to view PGPLN 1960 as a standard of sorts, and to examine critically the implications of the wage levels and structure that were set.

Before turning to PGPLN 1960, it should be noted that the lack of any information on wage rates before 1960 is an unfortunate gap in our analysis. In some state enterprises, average real wages fell quite sharply in the late fifties, and apparently wage differentials were also reduced by large

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1. Decree of the First Minister No. 81/MP/1960 dated 23 March 1960.

2. These "1960 Wage Regulations for the PLN" were issued with Decree of the First Minister No. 160/MP/1960 dated 6 May 1960.

cuts in managers' salaries.[1] If, as is possible, similar wage cuts were implemented in the PLN, the 1960 wage level represents a substantial change in real terms over wages of the previous few years.

The 1960 PLN Wage Regulations

Tables 11.1 and 11.2 and Figure 11.1 present data on the 1960 wage regulations in the PLN. An employee's gross monthly cash wage was calculated from a basic salary, to

TABLE 11.1 Composition of a Low-ranking PLN Employee's Wage, East Java, 1960[a]

Category	Rp.	
Base Wage Rate	163	
Adjustment for permanent employees (5.6%)	9	
Effective Base Wage Rate		172
Cost of Living Allowance[b]		345
Family Allowance[c]		121
Sub-gross Wage		638
Variable Allowance[d]		13
Rice Allowance		113
Gross Wage		764

Notes: a. After the introduction of PGPLN 1960, and calculated on the following assumptions: Employee is of grade 7 rank; employee is married with three thildren; variable allowance in East Java is 2%; rice price of Rp 4.3 per litre.

b. 200% of Effective Base Wage Rate.

c. 17½% of Effective Base Wage Rate per dependent.

d. 2% of Sub-gross Wage.

Source: Based on information supplied by the Directorate General of Power and Electricity.

1. Hawkins in Glassburner, op.cit., p.218-9, notes that wages in most sectors of the economy lagged behind price increases in the late fifties. In McVey, op.cit., p.510, Hawkins comments "In an attempt to narrow wage and salary differentials in the newly nationalised estates, the PPN (government plantation enterprises) undertook a general reduction in salaries in late 1959. It has been argued that this measure produced serious decline in morale, loss of experienced employees, and adverse effects on efficiency and output." See also Blake, op.cit.

which were added various cash allowances in the following manner (see Table 11.1):[1]

gross monthly cash wage = (effective base wage) + (cost of living allowance) + (family allowance) + (variable allowance) + (rice allowance)

Throughout the sixties each of these components was altered a number of times - some disappeared completely to be replaced by others (such as the rice cash allowance which was replaced by rice rations in kind), while the method of calculating them was also frequently altered. The overall result for anyone trying to trace out changes is one of confusion. However, if we concentrate our attention on the position as it was in mid-1960 when PGPLN 1960 was issued, the gross monthly cash wage that an employee received can

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1. To an "effective" base wage rate, calculated by adding 5.6 percent to the base salary, was added a "cost of living" allowance (tundjangan kemahalan, 200 percent of the effective base rate in 1960) and a "family" allowance (tundjangan keluarga, 17.5 percent of the effective base rate for each dependent) which formed the sub-gross wage (sub bruto). Two further allowances, a "variable" allowance for regional differences in living costs (tundjangan variable) and a "rice" allowance (tundjangan beras) based on the local rice price and the size of an employee's family, were added to form the monthly cash wage (gadji bruto).

be summed up (approximately) in the following equation:[1]

$$W_g = (3.168\ W_b + 0.185\ W_b N_f)(1 + V) + 30(P_r - 1.6)(1 + 0.1\ N_f)$$

where W_g = gross monthly cash wage (Rp)

W_b = base wage rate (Rp)

N_f = number of dependents

V = variable allowance (percentage)

P_r = local rice price (Rp per litre)

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1. The equation summarises the effect of the relevant clauses in PGPLN 1960, a copy of which was provided by the PLN. It is not exactly correct for all ranks within the industry. Under some circumstances, further small allowances were granted to employees on the lowest salaries. There were small variations for other reasons also. However the general pattern that the equation can be used to describe (which is what we are interested in here) is correct. The cost of living allowance was 2 W_{be} (where W_{be} is the "effective base wage rate), and the family allowance was 0.175 W_{be} multiplied by the number of dependents (N_f). Therefore the sub-gross wage (W_{sg}) was:

$$W_{sg} = W_{be} + 2\ W_{be} + 0.175\ W_{be}\ N_f$$

$$= W_{be}\ (3 + 0.175\ N_f)$$

But since W_{be} was 5.6 percent greater than the base wage rate (W_b),

$$W_{sg} = 1.056\ W_b\ (3 + 0.175\ N_f)$$

$$= 3.168\ W_b + 0.185\ W_b N_f$$

The variable allowance was a specified percentage (V) of the W_{sg}, so the W_{sg} plus variable allowance was $W_{sg}\ (1 + V)$, which equals:

$$(3.168\ W_b + 0.185\ W_b N_f)\ (1 + V)$$

Finally, the rice allowance was designed so that each employee could buy at least 30 litres, towards which he was expected to contribute only Rp 1.6. Thus each employee's rice allowance came to at least 30 $(P_r - 1.6)$. In addition, this was increased by 10 percent for each dependent, so the total rice allowance received by an employee was

$$30(P_r - 1.6)\ (1 + 0.1\ N_f).$$

Using this equation, we can attempt to answer some questions about the structure and adequacy of wages at that time.

Of the four variables which determined the gross monthly cash wage, two - the variable allowance and the rice price - were directly related to the local cost of living. Thus one principle that was followed was that as far as possible, the real wages of comparable employees should be equal throughout the country. A second advantage of relating wages to the local cost of living was that to a considerable extent, employees were automatically cushioned against inflation.

In order to examine wage differentials with respect to skill, seniority and the size of an employee's family, we must hold these "regional" variables constant by considering the position in one area. This is done in Table 11.2 and Figure 11.1 where it is assumed that in Djakarta in 1960 the rice price was Rp 6.6 per litre and the variable allowance was 7 percent.[1]

The data need some explanation. First, Table 11.2 and Figure 11.1 (as well as later figures) show what we might call the "Djakarta equivalent" of the wages paid throughout the industry. It will be assumed that the data presented reflect in real terms the position in other areas of Indonesia. Second, only information on gross monthly cash wages (which include cash payments for rice) is presented. This seriously limits the value of the data. We will discuss the effect of other payments - in cash and in kind - later. Third, the scale of ranks must be understood. At that time, there were 49 ranks ranging from 0 to 48 inclusive. The great majority of employees, perhaps nearly 80 percent, were in ranks 0 to 12.

Table 11.2 shows the approximate gross cash wage that different representative employees would have received. A young unmarried man with full primary education entering at

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1. The rice price and variable allowance were set on the basis of information supplied in Nugroho, Indonesia Facts and Figures, op.cit., and the Directorate General of Power and Electricity respectively.

TABLE 11.2 Approximate Gross Monthly Cash Wages of PLN Employees, Djakarta, 1960[a]

Years of Experience in stated Rank	Family Composition	Rank	Base Wage Rate (Rp)	Gross Wage (Rp)
None	Unmarried	7	100	490
5	Married; 1 child	12	188	890
10	Married; 3 children	17	385	1,820
15	Married; 3 children	22	580	2,640
20	Married; 3 children	30	938	4,130
20	Married; 3 children	12	320	1,550
25	Married; 3 children	48	2,700	11,500

Notes: a. After the introduction of PGPLN 1960; wage rates calculated on the following assumptions: Years of experience, scale of rank and family composition as shown in the Table; Djakarta rice price Rp 6.6 per litre; and tundangan variable (variable allowance) for Djakarta of 7 percent.

Source: As for Table 11.1.

rank 7 would have received about Rp 500 (about $2) per month.[1] Another man with a family and say seven or eight years' seniority who had received promotion might have been in rank 12 and on a basic wage rate appropriate to five years' seniority in that rank; he would have received nearly Rp 900 (nearly $4) per month. A third employee perhaps ten years the senior of this second employee and with a larger family might, with diligence, have been promoted to somewhere between ranks 17 and 22 and earned 10 to 15 years' seniority in this position. He would have been earning between Rp 1,800 ($7) and Rp 2,600 ($10) per

1. The black market exchange rate in early 1960 fluctuated widely, but was about Rp 250 = $1. Some idea of the domestic purchasing power of Rp 500 can be obtained from the fact that the retail price of 10 litres of rice (which is about the average monthly consumption of an adult) was about Rp 60.

month. These salaries would have been substantially more than those of the majority of employees. As the second last row in Table 11.2 shows, a good deal of the increase that this third man received would have been an automatic reward for seniority and not for increased skill which led to promotion. If this employee had remained at rank 12 and received almost automatic increases, his gross cash salary would have risen to about Rp 1,550 ($6).[1] Finally, Table 11.2 shows that employees in higher ranks received large differentials. A small number (probably not more than 10 percent) received over Rp 4,000 ($16) per month, while the Directors of the enterprise received around Rp 10,000 ($40) per month.

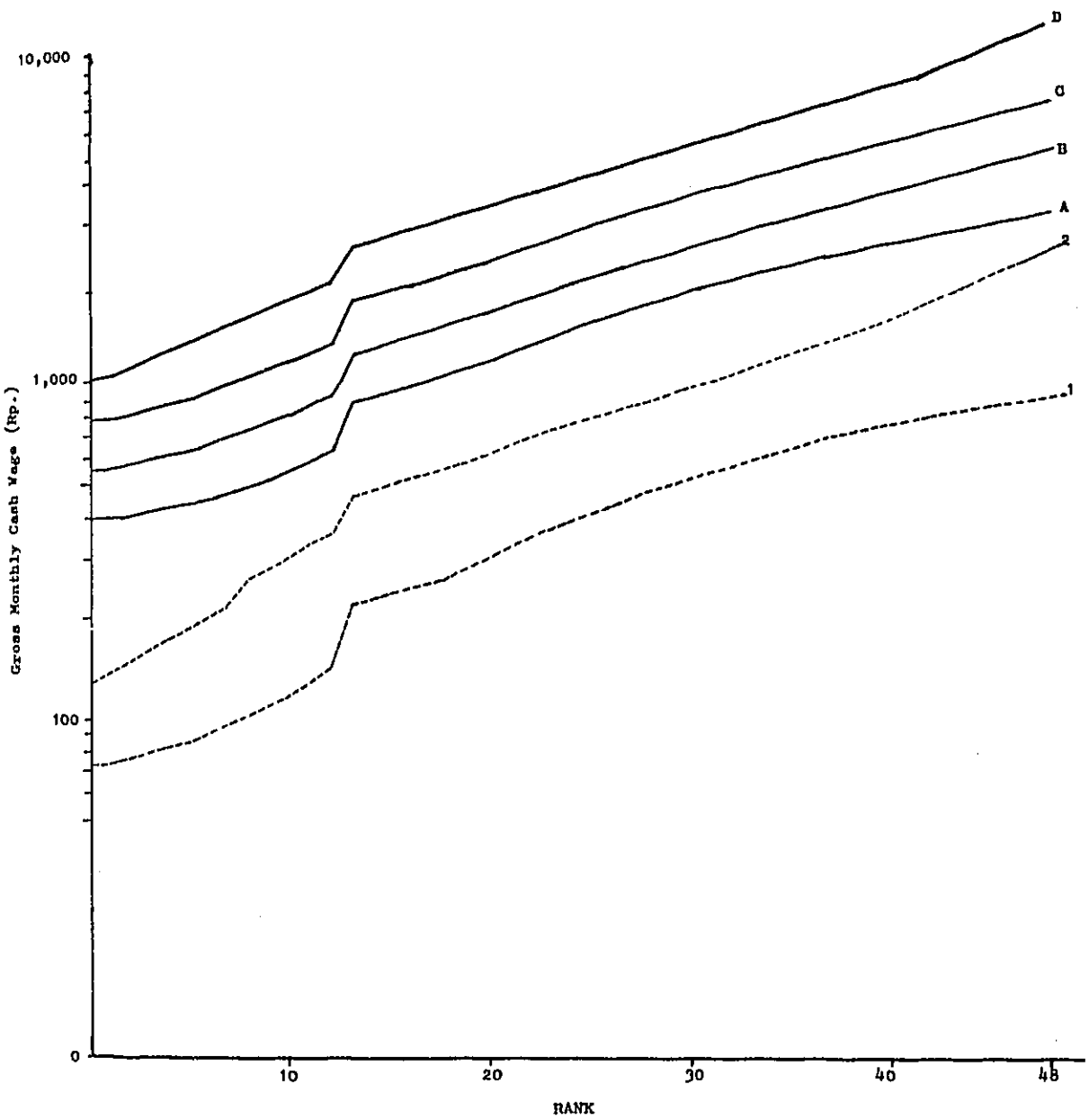
The pattern is shown more clearly in Figure 11.1 Lines (1) and (2) show the lower and upper limits of the "basic salary" rates respectively, the difference between the limits being accounted for by seniority. Ths position for four special cases after the various allowances were added on is shown by lines (A)-(D) in the upper section. The bottom line (A) represents the case of an unmarried employee with the lowest basic wage rate. This line represents the minimum gross monthly cash wage payable (in Djakarta). On the other hand, the upper line (D) represents the case of an employee with 10 children and 20 years' seniority and shows the maximum salary usually available.[2] The two middle lines represent the cases of an employee with three children and five years' seniority (B) and one with ten children and five years' seniority (C).

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1. It might be argued that increased skill is highly correlated to experience and seniority. In most of the jobs carried out by rank 12 workers or below however, the skill content would have been very low.

2. The assumption of 10 children is unrealistic for 1960, since at that time the maximum that an employee could claim for was 6 children. The choice of ten was made for two reasons. First, the limit of 6 children was later removed, so the figure of ten is slightly more representative of the upper limit as it existed later. Second, the inclusion of four extra children alters the pattern only slightly and perhaps compensates for the omission of certain allowances.

FIGURE 11.1 PGPLN 1960 - Cash Wages Including Rice Allowance



Notes:
1 = lower limit of basic salary rate.
2 = upper limit of basic salary rate.
A = Gross salary of single man on base salary (lower limit) for his rank.
B = Employee, married with three children, five years seniority in his rank.
C = Employee, married with ten children, five years seniority in his rank.
D = Employee, married with ten children, twenty years seniority in his rank.

In order to make much use of Figure 11.1 some additional assumptions are needed: that vertical movements within a given rank are a function of the composition of the employee's family and seniority; and that horizontal movements (promotions) are a function of skill. These assumptions are not as limiting as they might seem. The first is uncontroversial. The second is more so, since political affiliations and seniority as well as skill determined promotion. It is impossible to untangle these other influences. The most that we can say is that above about rank 20, skill (broadly defined to include on-the-job experience as well as formal training) was probably the most important single factor affecting promotion.

With all of these constraints, what (if any) conclusions can we draw about intra-industry differentials? First, money wage differentials were determined by various factors: local living costs, family composition, seniority, and skill. There were no differentials based on sex or race. Second, of these factors by far the most important was skill. The only way that employees could hope to rise above a monthly wage of about Rp 1,500 was to be promoted. Most employees were below rank 13 where a worker with three children would often have received less than Rp 1,000. On the other hand, most employees above rank 20 received well over Rp 2,000. Thus the differential for skill alone was often 4:1 or more. At the extremes, the skill margin was about 10:1. This is considerably more than is usual in Western countries.[1] Third, the combined influence of other factors, excluding allowances for geographical variations in living costs, widened the extreme differential

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1. "Typical rates for skilled men in Western-type industrial economies are 15 to 40% above those of labourers." H.A. Turner, Wage Trends, Wage Policies, and Collective Bargaining: the Problems for Underdeveloped Countries, University of Cambridge, Department of Applied Economics, Occasional Paper No. 6, 1965, p.16.

between maximum and minimum gross cash wages considerably - to over 25:1. Fourth, this implies that the combined effect of family composition and seniority on differentials was no more than 3:1, a conclusion which Figure 11.1 bears out.[1] By holding the basic wage rate (W_b), the variable allowance (V) and the rice price (P_r) constant in the equation given above, it can be shown that the maximum differential for family composition is a little over 1.5:1,[2] which means that the remaining differential is accounted for by seniority.[3] Our conclusions, the roughness of which must be emphasised, are summarised in Table 11.3.

TABLE 11.3 Approximate Gross Cash Wage Differentials for Skill, Family Composition and Seniority in the Electricity Industry, Djakarta, 1960 (after PGPLN 1960)

Type	Range
Skill	10:1
Family Composition	1.5:1
Seniority	2:1
All three combined	30:1

Three other issues can be investigated by using the available data: the distribution of cash wage levels within the industry; the adequacy for subsistence of the monthly cash wage; and the effect on the total wage of other components. In order to obtain a picture of the

1. In general, line (D) is no more than three times the level of line (A).
2. Taking 10 children as the maximum family size.
3. Figure 11.1 confirms this also. Line (2) is approximately twice the level of line (1). The difference between them is accounted for entirely by seniority, so if all other variables are held constant, the effect of seniority on gross wages levels is determined by the relationship between the maximum and minimum basic wage rates.

distribution of cash wage levels we must, in the absence of precise information, make assumptions about the distribution of the industry's work force by grades, about family composition, and about seniority. We shall assume that the percentage of the workforce in different ranks in 1960 was the same as that in 1969.[1] PLN statistics show that on average, each employee had one wife and 2.6 children in 1969. We will therefore assume that all employees except those on probation (who are assumed, somewhat unrealistically, to be on the lowest salary rank and single) had 4 dependents. Finally, it will be assumed that all permanent employees had the maximum of 25 years seniority. These assumptions allow us to construct a "maximum salary" line in Figure 11.2, which broadly shows the percentage of employees earning <u>less</u> than any particular "Djakarta equivalent" gross monthly cash wage in 1960.[2]

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1. In fact, there was probably a rapid increase in employment in the industry between 1960 and 1965. Increases in the lower ranks may well have been proportionately greater than in the upper ranks, but given the uncertainty of the position, it is not possible to improve on the above assumption. In addition, the workforce classification was changed twice during the sixties, so it was necessary to convert the classification system used in Table 10.4 to the ranking system that existed in 1960. This conversion, based on information supplied by the Directorate General of Power and Electricity, was carried out according to the following "conversion chart":

1969 Ranks		1960 Ranks
Probationary	=	0
I	=	1 to 12
II	=	13 to 35
III	=	36 to 45
IV	=	46 and above

2. It should be noted in passing, that since the large majority of employees had less than 25 years seniority, in most cases the actual salaries received were below the "maximum salary" line. On the other hand, a very few employees with especially large families and long service might have slightly exceeded the "maximum salary" line.

FIGURE 11.2 Percentage of Employees Earning Below Particular Djakarta Salary Equivalent Levels in 1960 - Gross Wages Only Excluding Extras

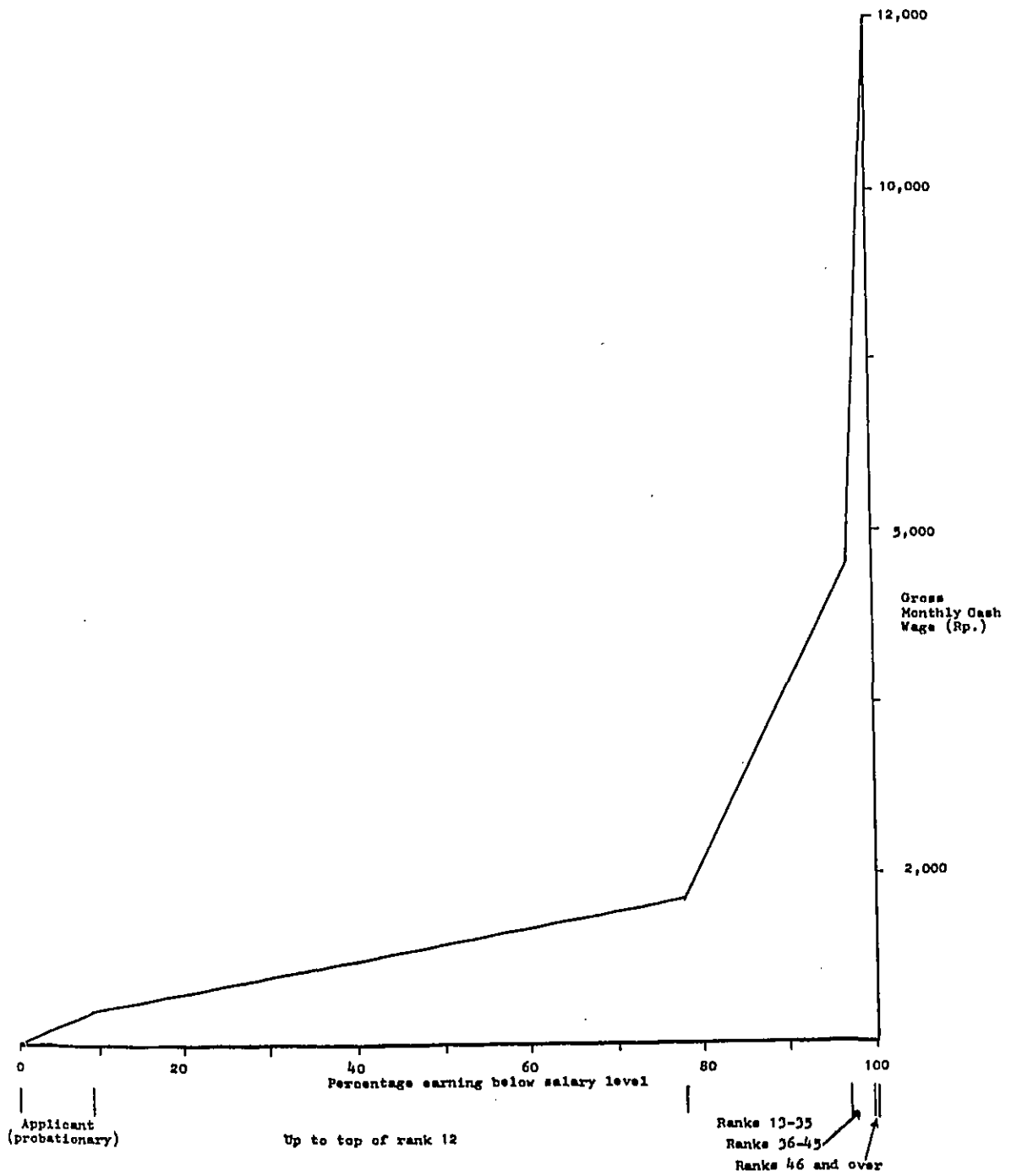


Figure 11.2 suggests that the nearly 80 percent of employees who were in ranks 0 to 12 received a gross cash wage of less than about Rp 1,700, while about 40 percent received less than Rp 1,000. At the other extreme, the 3 percent of top level employees who were employed in ranks 36 and above could under favourable circumstances have earned well over Rp 5,000 per month. This distribution pattern of cash wage levels with its concentration at lower levels has some implications for the incentive provided to workers - a subject to which we will return later.

It is often argued in Indonesia that corruption is almost inevitable among public sector employees because official salaries are so low that if they were honest they could not live. Thus public sector wages should be raised. The assumption behind this argument is that it is a "living wage" that public sector employees are striving for, and that if they were paid at least that wage then corruption would decline and efficiency would increase. But this is too simple. What the level of a "living wage" is depends largely on one's definition of needs. One suspects that the level that public sector employees aspire to is apt to be easily adjusted upwards.

What, then, was a "living wage" for a low-ranking PLN employee in 1960? A back-of-the-envelope answer can be given for Djakarta by drawing upon a survey of consumption patterns of Indonesian working-class families in 1953-54 which implied that the average monthly expenditure (and therefore presumably somewhat above the bare minimum) for a family of 5 persons was then about Rp 400.[1] Between 1954 and 1960 the weighted price index of foodstuffs in Djakarta

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1. F. Weinreb and A. Madjid Ibrahim, "Penjelidikan Beaja Hidup di Djakarta. Sebuah laporan oleh: Lembaga Penjelidikan Ekonomi dan Masjarakat," Ekonomi dan Keuangan Indonesia, 10 (11/12), Nov/Dec. 1957. Also published as pamphlet No. 6A by the Lembaga Penjelidikan Ekonomi dan Masjarakat, Fakultas Ekonomi, Universitas Indonesia. The average family size of the sample in the survey was 5.9 people, and the average monthly expenditure per family was Rp 475.

rose by between 3.5 and 4.0 times,[1] so the cost of a modest living for a married PLN employee with three children would have been between Rp 1,400 and Rp 1,600. If the data in Figure 11.2 are roughly correct, it appears that the wages of nearly 70 percent of PLN employees were below this level in 1960.

The discussion to this stage has centred on the gross monthly cash wage. There were automatic deductions for pensions and for income tax from the gross wage, but these were small and can be ignored. However the effect of annual bonuses, wages in kind and other fringe benefits was quite large and although it is difficult to know how to allow for them, an attempt must be made. In addition, it is well known that many public sector employees also earned extra money on the side by using their positions to offer services to the public. This almost certainly occurred in the PLN, but no information is available so we will ignore this source of income.

The most important additional benefits appear to have been clothing, medical and dental services to an employee and his family, housing, and perhaps loans. Probably of lesser value were the leave conditions which were quite generous by Western standards. To the PLN, all of these extras were fixed costs that raised total labour costs considerably, perhaps almost doubling them. Later we will attempt to measure their significance during the sixties. As to their effect on real wage levels at different ranks, their impact varied. The real value of clothing, medical and dental services, loans, and other fringe benefits was probably greatest for employees with large families in the lower ranks. Thus these benefits probably had the effect

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1. The Djakarta weighted price indices of 18 and 19 foodstuffs between 1954 and 1960 rose by 3.9 and 3.6 times respectively. , Nugroho, op.cit.

of raising the left-hand end of lines (A) to (D) in Figure 11.1 and the whole curve in Figure 11.2.

On the other hand, it was mainly high ranking employees who were provided with almost rent free PLN houses, cars (with drivers), and free electricity and gas. (Although lower ranking employees were entitled to small amounts of free electricity and gas, the privilege was of little use to the majority who lived in houses not supplied with these services.) The real value of PLN housing and cars was quite high, and probably more than compensated for the effect of other fringe benefits which favoured the lower ranks. At a very rough guess, the total effect of all additional benefits may have been to lift real wages by 50 percent for the lower ranks and to double them for the highest ranking officials. The wage differentials shown in Table 11.3 would therefore have been altered: the overall and skill differentials probably increased while those for seniority were probably reduced and for family composition increased.

Developments after 1960.

As mentioned above, during the next few years a gamut of alterations to PGPLN 1960 was introduced, the effects of which are impossible to trace out in detail. The practice of paying out about one month's cash wages as an annual bonus became institutionalised and, contrary to the government's original intention, bore no relation at all to the profitability or otherwise of the PLN's annual operations. Loans to employees at Lebaran (and Christmas), repayable over six months, were also common. In an effort to maintain employees' living standards in the face of growing inflation, various arbitrary increases in cash wages were announced, apparently with little thought to the effect on wage differentials and incentives. For example, in December 1961 the "sub-gross wage" was increased by amounts ranging from 25 percent for employees below rank 13 to 5 percent for ranks 43 and above.[1] In August 1962 another upward adjustment occurred when all base wage rates were raised by

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1. Instruction No. Instr/016/DIRPLN/61 issued by the PLN Board of Directors dated 7 December 1961.

30 percent.[1] Most allowances - for local living costs, for spectacles, for travel, and so on - had to be continually revised.[2]

In August 1962 the long awaited definitive Government Regulation No. 14/1962 on "Stipulations on Basic Wages Rates for Employees of State Enterprises" was issued.[3] This Regulation added little to the principles laid down nearly three years earlier in the First Minister's Decree No. 559/MP/1959. The 1959 wage system was ratified, with the usual lip service given to the need for flexibility to suit the different conditions in the wide range of state enterprises and for a system based on productivity, skill and difficulty of work. One change was to the previous policy that wages in state enterprises should be above those in the rest of the public service. Parity was the new ideal. A second change, a clarification, was that the maximum differential between the highest and the lowest basic wage rates was to be 20:1. No explanation for this choice was given.

After some delay, the 1962 Regulation led to a reappraisal of the position within the Department of Public Works. In January 1964, a Regulation which became known as "PGPPN-DEPUT" was issued by the Minister, bringing wages in all state enterprises within the Department into line with

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1. Instruction No. Instr/014/DIRPLN/62 issued by the PLN Board of Directors dated 7 August 1962.
2. For example, the variable allowance in the gross wage was adjusted every six months between January 1960 and December 1961. In Djakarta the allowance rose from 7 to 17 percent over the period, while in Atjeh (for example) it rose from 12 to 32 percent.
3. Peraturan Pemerintah No. 14 Tahun 1962 about Ketentuan - Ketentuan Pokok Gadji Pegawai Perusahaan Negara, dated 15 August 1962.

the 1962 Government Regulation.[1] The Minister's regulation covered the PLN, and was the basis for fixing wages within the industry for the following four years.

As inflation accelerated in the 1964-1965 period the position became chaotic. The many regulations specifying allowances in money terms and not in real terms became out of date almost as soon as they were revised. The PLN managers tried desperately to maintain the level of real wages by frequent changes in the wage regulations. In October 1965 cost of living allowances were increased.[2] In early January 1966 all wages were increased fivefold.[3] By July it was necessary to treble them again,[4] and as from 1 January 1967 they were doubled.[5] Four months later on 1 April, wages were increased by a further 50 percent.[6] Thus in a period of less than eighteen months cash wages were increased by 45 times.

These were emergency measures, however, and the government recognised the importance of reappraising the position so that distortions could be removed. At the end of December 1967, a Government Regulation was issued spelling out official policy of the post-coup government

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1. Regulation of the Minister for Public Works and Power No. 2/PRT/1964 dated 24 January 1964. PGPPN-DEPUT is an abbreviation for Peraturan Gadji Pegawai Perusahaan Negara pada Departemen Pekerdjaan Umum dan Tenaga [Regulation on Wages for Employees of State Enterprises within the Department of Public Works and Power].
2. Circular No. 1/Sedmenlk/65 issued by the Minister for Electricity and Power on 11 October 1965.
3. Instruction No. Instr/001/DIRPLN/66 issued by the Board of Directors of the PLN on 3 January 1966.
4. Instruction of the Deputy Minister/Head of the Department of Electricity and Power No. 06/INSTR/1966 dated 11 July 1966.
5. Instruction No. 16/Instr/1966 issued by the Director General for Power and Electricity on 20 December 1966.
6. Instruction No. 13/1/1967 issued by the Director General for Power and Electricity on 3 April 1967.

towards wages in state enterprises.[1] The basic principles of the Regulation were much the same as for earlier policy. A basic salary was to be paid with various allowances added, including allowances in kind.[2] Within the broad outlines laid down, the appropriate Minister and state enterprise Directors were given wide discretion. In settling salary regulations, it was specified that three matters should be paramount: employees' cost of living; "cost accounting" (or production costs); and the differential for "net all-in" salaries (including payments in kind) for employees - the maximum differential in any one state enterprise between employees with the same number of dependents and years of service was to be 8:1 (or 10:1 if Directors' salaries were considered). In practice, more important than these general principles were the actual levels of basic wage rates and allowances set. Basic wage (before allowances) were to be within the range Rp 400 - Rp 10,000, and maximum allowances were specified.

The Regulation was adopted by the Minister for Public Works, who decided that the maximum monthly allowances possible should be paid.[3] The effect of the new salary

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1. Peraturan Pemerintah No. 23/1967 dated 30 December 1967 on "Basic Provisions on the Salaries of Employees of State Enterprises." This regulation is reprinted in Warta Cafi No. 49, 29 February 1968. p.440.

2. The most important of these was usually an allowance of 10 kg of rice for each employee and for each of his dependents. It appears that the practice of providing rice rations in the PLN was adopted in early 1964.

3. These were: 5 percent of the basic wage for a wife and 2 percent for each child; 10 percent of (basic wage + dependents' allowance) for the cost of living; an "enterprise allowance" (tundjangan perusahaan) of 30 percent of the basic wage. In addition a "responsibility allowance" (tundjangan djabatan) of up to 20 percent of the basic wage rate was allowable to certain employees. It is not clear how many employees received this latter allowance (probably fewer than 5 percent), so it has not been allowed for in the equations. Government Regulation No. 23/1967 was adopted for the Department of Public Works by Regulation of the Minister for Public Works and Electric Power No. 4/PRT/1968 dated 14 October 1968 and made retrospective to 1 January 1968.

regulations, known as PGPPN-DEPPUT 1968,[1] can be broadly summarised in two equations:[2]

Case 1: if $W_b < 1000$.

$$W_g = 1100 + W_b\ (0.055\ N_w + 0.022\ N_c + 0.3)$$

Case 2: if $W_b \geq 1000$.

$$W_g = W_b\ (1.4 + 0.055\ N_w + 0.022\ N_c)$$

where

W_g = gross monthly cash wage (excluding rice allowance)

W_b = basic wage rate

N_w = number of wives (maximum of one)

N_c = number of children

The effect of these two equations is shown in Figure 11.3 for the four "representative" employees used in Figure 11.1.

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1. Peraturan Gadji Pegawai Perusahaan-Perusahaan Negara - Departemen Pekerdjaan Umum dan Tenaga Listrik 1968 [Wage Regulations for State Enterprise Employees in the Department of Public Works and Electric Power 1968].

2. Two equations are necessary because it was stipulated that where an employee's basic wage rate (W_b) was less than Rp 1,000, it should be automatically raised to Rp 1,000 for part of the calculation of the gross monthly cash wage. Case 1 above was calculated as follows: to a minimum of Rp 1,000 were added allowances of 5 percent of the basic wage for a wife ($0.05\ W_b N_w$) and 2 percent for children ($0.02\ W_b\ N_c$). The total thus obtained was increased by 10 percent to allow for the cost of living, thus:

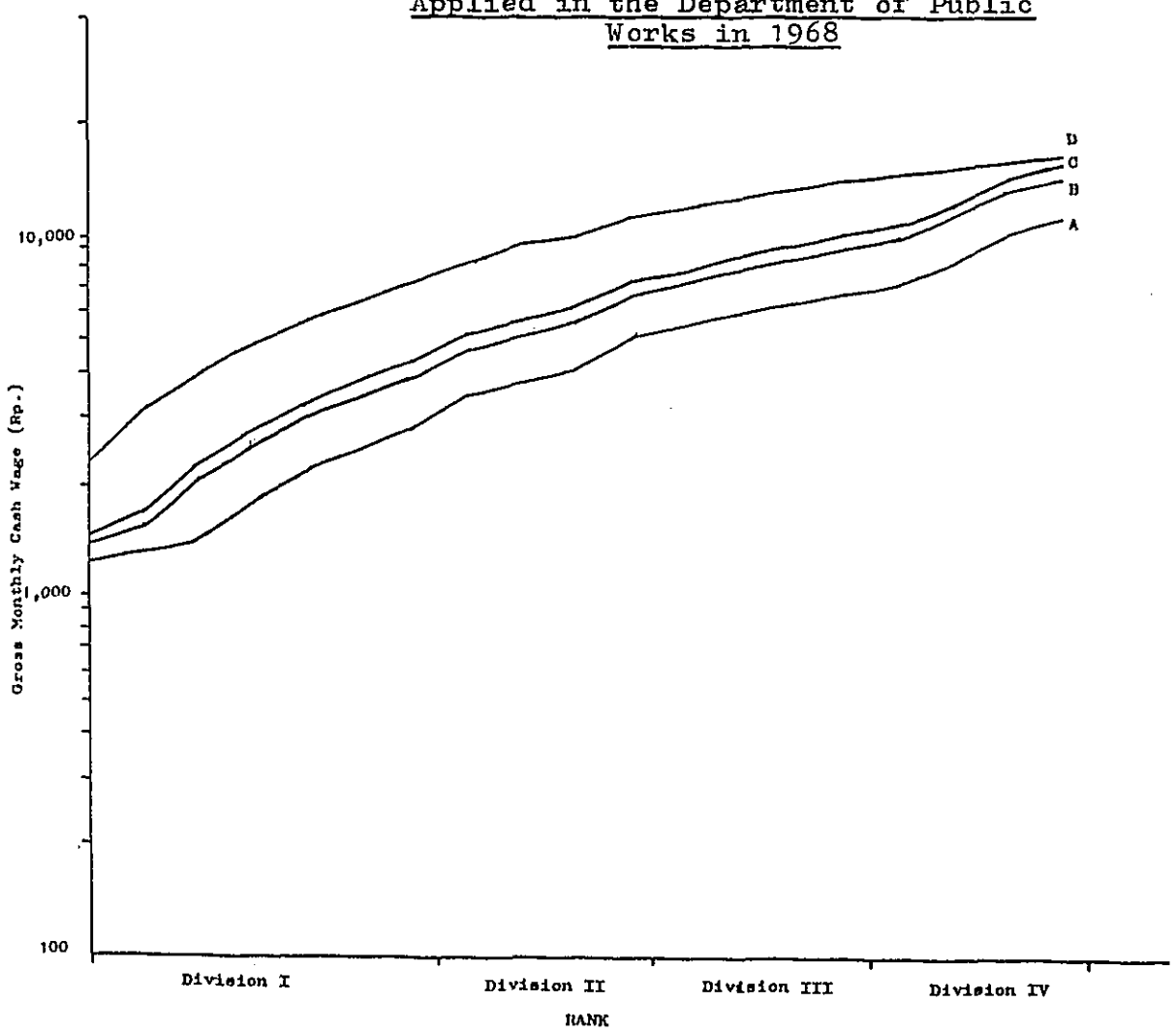
$$(1000 + 0.05\ W_b N_w + 0.02\ W_b N_c)\ (1 + 0.1)$$

A further $0.3\ W_b$ was added (enterprise allowance), and the equation when simplified equals Case 1. Case 2 was calculated in a similar manner, except that the W_b was substituted for the Rp 1,000:

$$(W_b + 0.05\ W_b N_w + 0.02\ W_b N_c)\ (1 + 0.1) + 0.3\ W_b$$

which simplifies to Case 2 above.

FIGURE 11.3 PGPPN-DEPPUT 1968 - Cash Wages Only and Excluding Rice Allowance as Applied in the Department of Public Works in 1968



Notes: A = as for Figure 11.1.
B = "
C = "
D = "

Figure 11.3 shows gross monthly cash wages <u>excluding the rice allowance</u> (which in most cases in 1968 was paid in kind) and therefore is not comparable with Figure 11.1 Figure 11.3 shows that when gross monthly cash wages are considered, the skill differential (taken as the difference between the maximum and minimum wage for any one employee with other factors held constant) at 8:1 or more is considerably higher than other differentials. However other components of wages - the most important being the rice allowance, medical services and housing - are not shown. An adjustment can be made for one component immediately. Figure 11.4 shows the effect on salaries if the market value of the rice rations are included,[1] which makes Figure 11.4 roughly comparable with Figure 11.1.

The effect is quite dramatic. The skill differential is reduced, depending upon the size of the employee's family. For the married employee with three children and five years' seniority, the differential for skill is reduced from about 10:1 to about 4:1. The differential for family composition is naturally widened considerably, while the differential for seniority is unaffected.

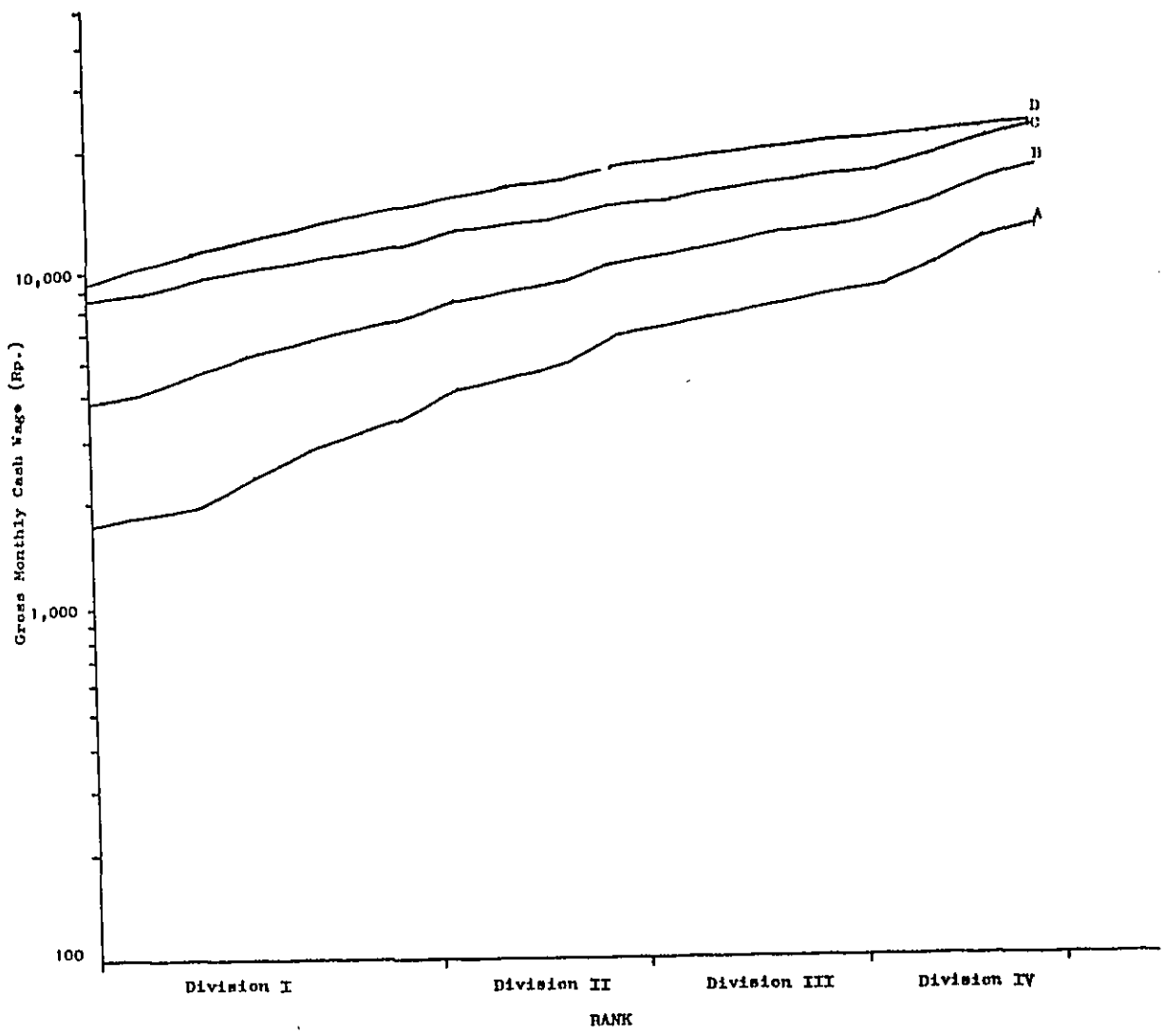
Although Figures 11.3 and 11.4 provide a general picture of certain components of wages paid in state enterprises within the Public Works Department in 1968 (and presumably also throughout the Department itself since government policy then was parity for state enterprises and the public service), wages in some state enterprises varied slightly. The PLN was one of these enterprises. Because the PLN was in a difficult financial position, the Directors opted to take advantage of the flexibility allowed by the Government Regulation and introduced arbitrary wage cuts.[2] The effect

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1. Assuming 10 kg for each employee or member of his family, and a rice price of Rp 50 per kg.

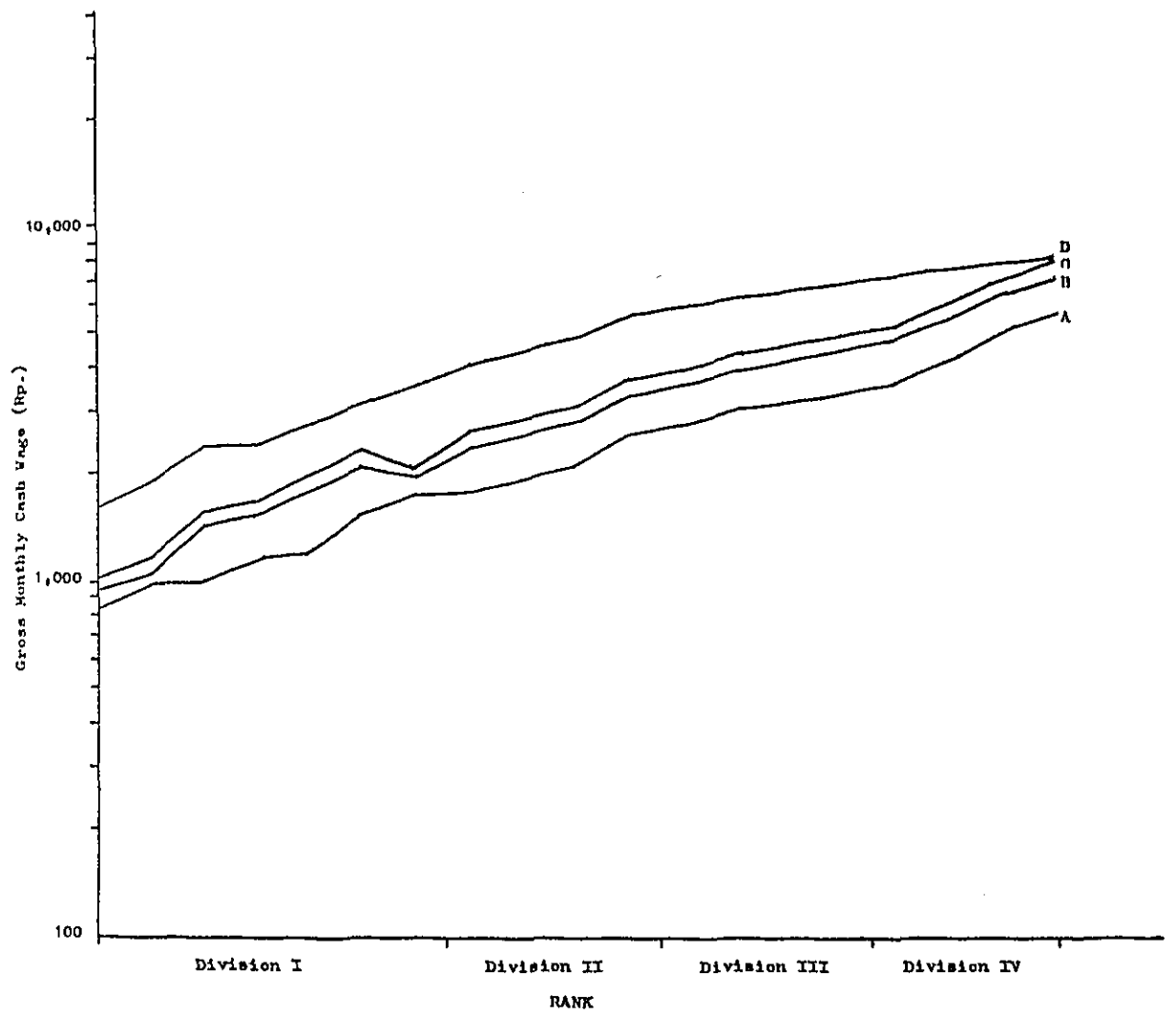
2. For all employees with a base wage rate of less than Rp 1,500, gross monthly cash wages (excluding rice allowance) were cut by 30 percent. Employees with a base wage rate of between Rp 1,500 and Rp 2,500 suffered a cut of 40 percent, while those above this level suffered cuts of 50 percent.

FIGURE 11.4 PGPPN-DEPPUT 1968 - Cash Wages Plus Money Value of Rice Allowance as Applied in the Department of Public Works in 1968



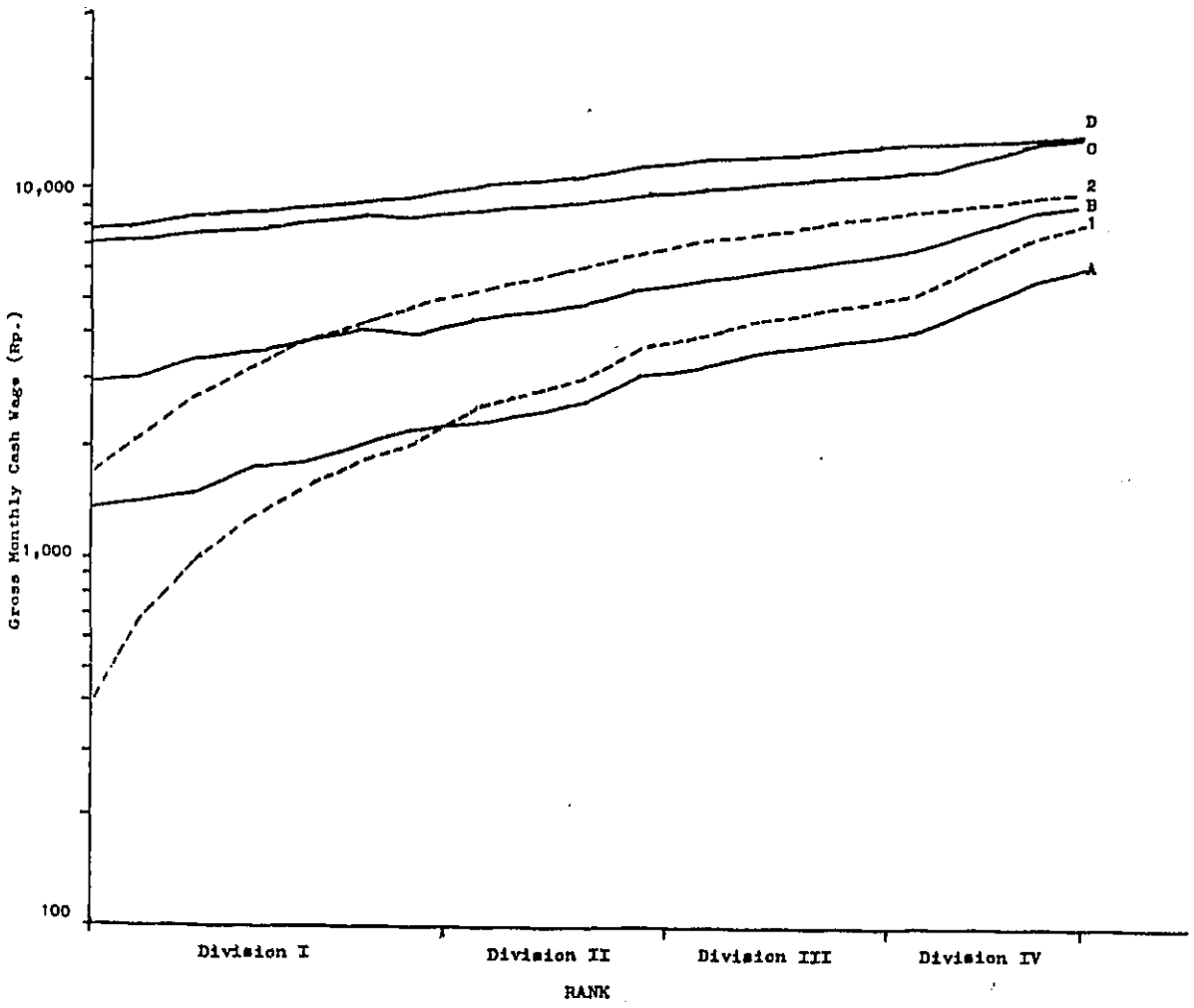
Notes: A = as for Figure 11.1.
B = "
C = "
D = "

FIGURE 11.5 PGPPN-DEPPUT 1968 - Cash Wages Only and Excluding Rice Allowance as Applied in the PLN in 1968



Notes: A = as for Figure 11.1.
B = "
C = "
D = "

FIGURE 11.6 PGPPN-DEPPUT 1968 - Cash Wages Plus Money Value of Rice Allowance as Applied in the PLN in 1968



Notes: 1 = as for Figure 11.1.
2 = "
A = "
B = "
C = "
D = "

of these cuts is shown in Figure 11.5 (which is comparable with Figure 11.3).[1] Nevertheless the rice allowance supplied by the PLN was unchanged, and its market value is allowed for in Figure 11.6, which shows the cash wage plus market value of the rice allowance paid to employees in the PLN in 1968. It is thus comparable with Figure 11.1 which shows similar data for 1960. Various other wage components are not included, but will be considered presently.

A comparison of Figures 11.1 and 11.6 shows that the skill differential in 1968 was considerably smaller than in 1960. At the beginning of the decade, the skill differential was about the same for all employees at roughly 10:1. In 1968, the skill differential varied depending on family composition but was less than half the 1960 figure. The highest skill differential was less than 5:1, while the lowest was about 2:1. The differential for family composition was generally larger in 1968 than eight years earlier, while the seniority differential (shown by the relationship between the maximum and minimum base rates, i.e. lines (1) and (2) in Figure 11.6 was greater at lower ranks but less at higher levels. The overall differential between maximum and minimum cash wages plus rice allowance in 1968 was slightly over 10:1, only about one-third that of eight years earlier. The position for 1968 is summarised in Table 11.4.

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1. The PLN wage regulations (including arbitrary wage cuts) for 1968 can be summed up in the following equations (which are derived in a similar way to the earlier equations):

Case 1: $W_b < 1000.$

$$W_g = 770 + 0.7\ W_b\ (0.3 + 0.055\ N_w + 0.022\ N_c)$$

Case 2: $1000 < W_b < 1500.$

$$W_g = 0.7\ W_b\ (1.4 + 0.055\ N_w + 0.022\ N_c)$$

Case 3: $1500 < W_b < 2500.$

$$W_g = 0.6\ W_b\ (1.4 + 0.055\ N_w + 0.022\ N_c)$$

Case 4: $W_b > 2500.$

$$W_g = 0.5\ W_b\ (1.4 + 0.055\ N_w + 0.022\ N_c).$$

TABLE 11.4 Approximate Gross Wage Differentials[a] for Skill, Family Composition and Seniority in the Electricity Industry in 1968

Type	Range
Skill	4.5 to 2.0:1
Family Composition	2.0 to 1.5:1
Seniority	4.0 to 1.2:1
All three combined	11:1

Note: a. Cash wages plus money value of rice allowance.

As for the earlier Tables and Figures, some attempt must be made to allow for the value of other wage components supplied to employees in 1968. The main ones were probably still medical services, housing and cars. An adjustment for the value of medical services would have a qualitatively similar effect to the inclusion of the rice allowances: skill differentials would be reduced further, while the differential for family composition would increase. On the other hand, the real wages of officials in the highest ranks would be boosted very substantially by the inclusion of the market value of housing and cars, and to a small extent by the "responsibility allowance" granted to some of them. Once again, at a rough guess these changes probably widen the overall differential and the margin for skill, while those for seniority were probably reduced and for family composition increased.

The Average Wage Level

The wage data so far presented do not enable us to ascertain the relative contribution of cash wages and food subsidies to total labour costs, or how labour costs have varied during the sixties. It is widely believed that the real salaries of government employees have fallen substantially because of the effects of inflation during the past decade,[1]

1. See, for example, Theodore M. Smith, "Corruption, Tradition and Change," Indonesia, No. 11, April 1971, p.30, who refers to the "disastrous effects which inflation has had on salaried government officials between the years 1958 and 1968."

but little data have ever been presented to support this assertion. It may be, as mentioned earlier, that salaries in the newly nationalised enterprises fell in the period 1957-1960, but since 1960 the evidence for the electricity sector at least suggests that rather the opposite trend has been present. Table 11.5, which should be read with a great deal of caution, sheds some light on these matters. In theory, the sum of the first three columns (Food Subsidy, Cash Wages and Allowances, and Income Tax) represents the aggregate of the gross monthly cash wages plus market value of rice allowances plotted in Figures 11.1 and 11.6.[1] The category "Other Costs" appears to include medical costs, uniforms, holiday and bonus pay, and certain subsidies to employees (training, electricity and gas, etc.), but probably does not include housing and vehicle costs. This item (and consequently the total) is therefore probably understated, perhaps considerably.

Nevertheless the data are sufficiently reliable to allow us to draw a few conclusions. First, "Other Costs" account for between 25 and 38 percent of total labour costs for the four years (1967-1970) for which a calculation is possible (all planned expenditures only, however!). Since the item is underestimated, "Other Costs" probably accounted for about half of total real labour costs to the PLN. In other words, the data presented in Figures 11.1 and 11.6 probably represented only about half of the total value of goods and services received by employees.

Second, Table 11.5 can be used to estimate how PLN employees fared during the sixties. Table 11.6 compares the derived index of labour costs per employee with the Djakarta cost of living index for the period 1961-69. The Table suggests that between 1961 and 1965, total labour costs per employee (which are assumed to be a good proxy for total real

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1. It appears that after early 1964, the PLN paid the full market value for the rice that it purchased to supply to PLN employees. (And, what amounts to the same thing, when PLN employees were expected to purchase their own rice instead of receiving it in kind, they received a subsidy equivalent to the market value).

TABLE 11.5 Rough Estimates of Labour Costs in the Electricity Public Utility, 1961-1970[a]

Units: 1961-65 millions old Rp
1966-70 millions new Rp

	Net Wages paid to employees					
	Food Subsidy	Cash Wages & Allowances	Income Tax	Other Costs	Total Labour Costs	Total Labour Cost per Employee[b] (Rp)
1961	99		191		290	14,500
1962	408		250		658	32,900
1963	633		483		1,116	55,800
1964	1,720		1,680		3,400	170,000
1965	3,750		4,150		7,900	395,000
1966	n.a.		n.a.		149	8,100
1967						
Planned	299	192	78	350	918	49,500
Realised[c]	n.a.	n.a.	n.a.	n.a.	589	31,800
1968						
Planned	507	268	95	497	1,366	74,300
Realised[c]	n.a.	n.a.	n.a.	n.a.	1,520	82,700
1969						
Planned	871	869	195	705	2,639	147,700
1970						
Planned	649	1,498	163	736	3,047	n.a.

Notes:
a. The Table is only reliable for showing broad trends. For a discussion of the drawbacks of the PLN's financial reports, see Chapters 12 and 13.
b. For 1961-1965, total employment was somewhat unrealistically assumed to be 20,000, since the source itself implies that the cost figures were prepared on this assumption. For 1966-1969, labour force figures were obtained from the Annual Reports of the PLN.
c. Realised expenditure for the first half of the year only, and estimated for the second half.

Source: 1961-65: Perusahaan Listrik Negara Lampiran Laporan Inventarisasi [Appendix to the Inventory Report of the PLN], typescript, prepared in July 1966 and supplied by the Department of Public Works and Power; these figures are also given in Ismail Nazar, Tindjauan Sekitar Penetapan/Penjesuaian Tarip Perusahaan Listrik Negara [Observations on Tariff Setting in the PLN], unpublished thesis in the Fakultas Ekonomi, Universitas Indonesia, 1967, Chapter 5.

1966-68: Laporan Tahunan [Annual Reports] for 1966, 1967, 1968, mimeo., supplied by the PLN.

Source: contd...

1969-70: Rentjana Anggaran Belandja Perusahaan Tahun 1969, Perusahaan Listrik Negara and Rentjana Anggaran Perusahaan Tahun 1970 Perusahaan Listrik Negara [Planned budgets for the PLN for 1969 and 1970 respectively], mimeo., supplied by the PLN.

TABLE 11.6 Index of Total Labour Costs per Employee in the Electricity Public Utility and Cost of Living in Djakarta, 1961-1969

(1961 = 100)

Year	Labour Total Costs per Employee	Djakarta Cost of Living (62 items)
1961	100	100
1962	227	257
1963	385	586
1964	1,170	1,380
1965	2,720	9,565
1966	55,900	70,300
1967	219,000	149,000
1968	570,000	276,000
1969	1,020,000	303,000

Source: Index of Labour Costs: Table 11.5.

Cost of Living Index: various issues of the Bulletin for Indonesian Economic Studies, and Warta B.P.S. [official Monthly Bulletin of the Central Statistical Bureau], various issues.

resources transferred from the PLN to employees) lagged behind price increases. This seems likely, because although the PLN management frequently revised wage regulations, there may have been a regulatory lag. After 1966 however, as the rate of inflation dropped, labour costs per employee continued to rise. Over the whole of the period, average labour costs appear to have risen by 10,000 times in money terms, while the cost of living index rose by about 3,000 times, suggesting a substantial gain

for PLN employees.[1] The figures are probably sufficiently reliable to enable us to say with some confidence that the position of PLN employees did not deteriorate during the decade, and may indeed have improved. (It should be remembered that because of the uncertainty about wage changes in the 1957-1960 period, this may mean nothing more than that by 1969, real wages had recovered to their 1957 level.)

Conclusion

Since nationalisation, the PLN has had little real independence in wage matters. Two main constraints operated: government policy and chaotic economic conditions. By the end of the sixties, the latter problem had all but disappeared, but the former remained. Although in theory wage regulations have always allowed PLN managers considerable flexibility, in practice an independent wage policy has not been politically feasible.

There is no evidence to suggest that the government gave careful thought to a wages policy for the public sector at any stage. The failure to draw up careful labour policies, including a wages policy, has had serious effects of which the plight of the electricity industry is merely a particular example. Wage levels in an industry should be set only after considering a number of other economic factors, the most important being living costs, comparable wages in other sectors, the ability of an industry to pay, productivity, and wider economic effects on aggregate demand and costs in other industries. Of all these factors, in Indonesia only the first was given great emphasis, although the second was of some significance since a relationship between wages in the state enterprises and the rest of the public sector was specified. The other factors were almost completely ignored.

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1. To complicate matters further, the Djakarta cost of living index should be treated with a good deal of caution. The regimen on which the index is based has not been revised for many years, other indices of price movements for Djakarta (such as the 19 items index) give slightly different results, and changes in the cost of living index naturally varied throughout Indonesia.

In the electricity industry, productivity per worker was low and the PLN could not really afford the wage bill which it was obliged to meet. It is not so much that average wages were high, but that the PLN was also obliged to follow the government's de facto policy of employment creation. This is where the crux of the problem lay, as it did for much of the public sector: since the government (and the PLN) had never clearly thought through their labour policies, there were conflicting objectives which were never resolved and were being pursued simultaneously. "Adequate" wages and a policy of employment creation were both forced on the PLN, and the inevitable result was a high wages bill.

A second major criticism of government policy as reflected in the PLN concerns wage differentials. Until more information about the effect of different types of incentives on PLN employees' performance is available, it is difficult to make any firm statements. For example, it seems quite likely that a PLN employee assesses the value of a marginal increase in salary with respect to the total monthly income of his family, rather than with respect to his own income from the PLN. The total family income, which would include income earned by the employee himself outside of office hours as well as wages received by his wife and children, could often be twice his total real income from the PLN. Another factor influencing the effectiveness of skill differentials in raising labour productivity is the ease or difficulty with which an employee can obtain extra training. Especially for employees at lower ranks, it may in practice be all but impossible to obtain additional formal skills. Furthermore, working class Indonesians live with a great deal of uncertainty about the future. One suspects that their rate of time discount is high by Western standards. Considering all of these factors, it may well be that even a differential of 10:1 for skill does not provide a strong incentive to gain extra training.

In more general terms, as yet neither the PLN nor the government has given sufficient thought to the matter of incentives. The present system of differentials has developed in an ad hoc fashion without careful consideration of the pros and cons. Do the existing differentials for family composition encourage a casual attitude towards birth control? Should some of the additional allowances be done away with in the interests of wage simplicity? Should there be higher differentials at lower ranks which taper off for the highest officials? Would other types of differentials be more effective in improving employees' performance?

One recent example of the type of change that needs to be considered are the TKK and the TKD allowances[1] introduced into the PLN in April 1969. Each employee is awarded up to 24 points per day, depending mainly on his attendance record. Significant cash incentive payments which range from a monthly maximum of Rp 320 at the lowest levels to Rp 2,500 at the highest levels are added to an employee's normal monthly salary on the basis of his points score. Officials report that the scheme has been successful in encouraging employees to be present at PLN offices for the full working day rather than only part of it, as was common a few years ago.

The questions posed above and many others need much more thought, by the managers of the PLN in particular and by the government in general. In short, the objectives of the wage policy need to be clearly defined, any conflicts between them resolved, and the means to achieve the objectives deliberately chosen. The comments by Turner in a survey of wage issues in underdeveloped countries are most apposite to the Indonesian electricity industry.[2]

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1. Tundjangan Kompensasi Karya (Employees Compensation Allowance) and Tundjangan Kompensasi Djabatan (Officials Compensation Allowance).
2. Turner, op.cit., p.20-21.

"...the enterprise has often slipped into the place of the traditional community, in which relations are on the basis of rights, obligations and privileges rather than of efforts and due payments; and firms have found it politically and tactically convenient to encourage a relationship of paternalism and dependence with their workers. Moreover, the desire of governments to imitate the social legislation of advanced countries sometimes finds an outlet - since the economy cannot support or the administration organise such things for everybody - in their imposition on the limited advanced sector.

Non-economic factors are thus very influential in the situation. And this is particularly true of the general level and structure of wages and salaries. The workers' capacity for industrial conflict may be negligible, but their political influence is often considerable (if not always direct and formally-channelled), while the state's role in wage-fixing is commonly major... Increases in legal minimum wages or public salaries seem an easy route to prove the value of a recently-acquired independence...

Political, social, and institutional factors may thus be even more important in income-determination in underdeveloped countries than they appear to have become in developed ones. There <u>are</u> cases where an improvement in the standards of employed workers has resulted from these pressures at the expense of a still more restricted group's luxury consumption. But that <u>other</u> results of these wage-trends may be bad for development is pretty clear. And this is so, not merely in economic terms - of inflation, and the maldistribution and wastage of human and material resources - but in social ones: they may, for instance, have aggravated 'intellectual' and urban unemployment."

CHAPTER 12 The Financial Position during the Sixties

The Financial Accounts

There is very little information about the financial position of the PLN since nationalisation publicly available. One reason is that for much of the time the actual financial position was unknown even to the PLN Directors. Another is that the state enterprises are not legally required to present comprehensive annual reports to parliament or any other institution directly representing the Indonesian people. The enterprises frequently prepare reports for circulation within the public service, but usually these are not easily available (officially, at least!) to the public. However official financial accounts (balance sheets and revenue and expenditure statements) for 1961 to 1965 have recently been prepared for the PLN, although they are confidential. A second set of less official (but probably more reliable) revenue and expenditure accounts has been made available, and will be discussed below.

Nevertheless it is worth making a few comments on the official financial accounts, which were drawn up for the BPU-PLN by a firm of Djakarta accountants. They are revealing for the light they throw on the accounting practices used and on the problems of managing the enterprise during the period.[1] For one thing, the accounts were prepared years after the event. The financial reports for 1961 were not ready until September 1966, and those for 1965 not until 1969. For another, the communication and administrative difficulties that hampered their preparation are evident. Usually some branch offices failed to lodge reports at all. Others were badly behind in completing the change-over from the Dutch accounting practices and this delayed efforts to standardise procedures and made the preparation of integrated accounts difficult. Further

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1. The accounts include data for the gas section of the BPU-PLN, but since we will not analyse them quantitatively, this does not matter.

the Accountant noted that not all accounts had been checked by an external auditor; accounts from some regional boards had been subject to only an internal PLN audit. The Accountant was therefore not in a position to vouch for them.

But even more serious than these drawbacks were some of the accounting practices followed. No allowance at all was made for the effects of inflation on the value of either capital assets or liabilities.[1] PLN officials report that government regulations required that historical costs and not replacement costs were to be applied, so they had no choice although they themselves realised how meaningless historical costs were. In addition, for unexplained reasons income shown in the revenue and expenditure account refers to the value of bills issued by the BPU-PLN and not revenue actually received. This made no allowance for the long delays in payment - sometimes up to two years - for perhaps twenty percent of total revenue owed to the PLN, and for bills that were never paid. Finally, even ignoring the effects of capital erosion through inflation, policies applied throughout the industry to allow for depreciation and other capital costs were apparently quite arbitrary. This shows up most clearly in the revenue and expenditure accounts, where it seems that some PLN managers regarded the depreciation allowances and other capital charges as sort of residual items to be increased or decreased depending on the size of the surplus or deficit.[2]

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1. For a discussion of how the neglect of the effects of inflation affected company financial accounts in Australia, see Russell Mathews and John McB. Grant, Inflation and Company Finance, Melbourne, The Law Book Co., 1958. Mathews and Grant found that comparatively mild inflation - by Indonesian standards - led to significant distortions in the financial accounts of Australian companies during the post-war period.

2. For example, while examining a set of revenue and expenditure accounts for one regional board, the author noticed that the depreciation item had been completely omitted for one year. The board's accountant explained that "Our deficit for that year was already too large!!"

The very existence of all of these drawbacks is significant. A number of conclusions about the financial position of the PLN can be drawn. Firstly, the official financial statements for the period are quite useless as a record of flows of real resources, and because of bad recording procedures are most unreliable for flows of monetary resources. The balance sheet for any one year is a mixture of rupiahs for various preceding years, and therefore provides no guide to the real position of the enterprise.[1] Prices rose so rapidly at times that the book value of identical items recorded in the accounts at different times during any one year must have varied considerably too.

Secondly, despite the gross distortions some trends are clear and are in line with other data, presented below, relating to the financial affairs of the PLN during the period. From 1961 until 1965 (and probably since then) the PLN received large amounts of funds from the government. This development was not unexpected, because when the BPU-PLN was formed the government planned to provide capital funds for expansion until well into the seventies.[2] According to the plans set out in 1961, prices would be sufficient for revenue from sales to cover operating costs and yield a substantial surplus available for taxes, depreciation, allocations to reserves, and for a development fund. Expansion of the industry was to be so rapid, however, that substantial additional funds would be required. These were to be supplied by the government, apparently in the form of equity investments (although the terms were not made quite clear).

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1. The market value of some buildings, for example, was probably thousands of times the book value as recorded for, say, 1965.

2. The broad outline of planned sources of investible funds was given in an appendix to Government Regulation No. 67/1961 which established the BPU-PLN, dated 29 March 1961. (There does not, incidentally, appear to be any connection between the outlays suggested in this appendix and those forecast in the Eight Year Development Plan).

In practice, the neatly laid out plans soon fell apart. Both operating and capital costs rose rapidly, and the surplus on current operations dwindled while the funds needed for planned investments soon exceeded early estimates. Although the official revenue and expenditure account shows a gross surplus (before depreciation and taxes) each year during the 1961-1965 period, this is not credible. It seems far more likely that revenues are overstated and that costs are underestimated. For much of the period the government was probably subsidising the PLN's current operations as well as capital expansion. Large amounts of rupiah construction funds were supplied to the PLN via Bapindo[1] and grants of foreign currency (which appears to have been supplied through the Department of Public Works) added substantially to the total real resources transferred to the industry. No comprehensive record of the total amount of resources provided in these ways is available. According to PLN officials it is still unclear whether the PLN is eventually expected to pay back the funds, or whether the government now considers them as either straight out grants or equity investments.

Thirdly, given the inflationary conditions and such accounting practices as the use of historical cost methods, it was inevitable that hidden reserves of various kinds would be formed within the industry. The formation of hidden reserves inside state enterprises is forbidden by law,[2] so the PLN has undoubtedly been forced into acting illegally - as have probably nearly all other state enterprises.

Finally, it is obvious that to all intents and purposes ever since the formation of the PLN the Directors have been operating virtually without knowledge of the enterprise's true financial position. Not only is the information

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1. Bank Pembangunan Indonesia, or the Indonesian Development Bank.

2. Clause 7 of Government Regulation No. 67/1961 forbids the formation of secret reserves in the PLN.

that is provided in the official financial accounts almost meaningless, but it is not presented in a suitable manner. For any business enterprise, the same financial information can be presented in many forms, depending on the relationships that are being emphasised. No attempt seems to have been made to prepare the PLN's financial reports in a useful way. For example, accounts should be presented so that the position of each regional board is clear, and so that the performance of each of the industry's main sectors can be seen. Perhaps such niceties have hitherto been considered unimportant since the statements have been so dated. If in the near future the delay in preparation can be shortened however, the presentation of the data will have to be improved before they can be of much use to the Directors. It should be made clear that in this, the PLN is probably in no worse a position than most other public enterprises and perhaps even better than many. Nevertheless, as far as the PLN is concerned the position is obviously still most unsatisfactory.

It may have been inevitable under the circumstances that the financial statements of the enterprise would become hopelessly distorted and of little use to managers. However the position was probably exacerbated by the attitude of the PLN officials themselves who have emphasised technical rather than financial matters. It is natural that this should have occurred. For one thing, most of the managers are trained as engineers and are unfamiliar with accounting and economic concepts. For another, one suspects that in the inflationary situation, there was an attitudinal flight from money into real goods on the part of the officials. At the best of times they were uncomfortable with financial affairs, and as conditions deteriorated their main concern became to keep machines running, to try to maintain the value of employees' real wages, and to keep construction projects going.

Rough Estimates of Revenue and Expenditure

Although the official (audited) financial statements are not available for presentation, unofficial data are. The unofficial data, moreover, are more complete and

and appear to be more realistic than the official accounts. Table 12.1 below is basically a revenue and expenditure account for the years 1961 to 1970.

A number of points should be borne in mind in considering the Table. Firstly, the accuracy of the Table probably varies considerably from year to year, and some items of expenditure are likely to be more accurate than others. The figures for 1961 to 1965 appear to be all estimates, possibly made at the beginning of the year to which they refer. It is likely that when the estimates for each year were prepared no allowance was made for inflation, and that the past year's experience was taken as the main base for the coming year. The figures for this period, therefore, may provide a very poor guide to the expenditures incurred during the years to which they are supposed to refer. However, even if this is the case they probably give an indication of the trend of the previous year's expenditures, and as such are sufficient for our purpose of examining broad trends. At least the proportion of the three main items (fuel, labour and maintenance) to the sub-total remain roughly constant. The figures for 1966, the year of hyperinflation, appear to be particularly unreliable since they are a mid-year estimate and it is likely that insufficient allowance was made for price changes. The figures for 1967 and 1968 are estimates based on realised expenditure for the first six months of each year only. Figures for 1969 and 1970 represent planned budgets.

Secondly, the PLN was not required to pay normal capital costs for such items as interest, profit payments, or any allowance for depreciation. The relatively small capital charge item seems to have been included as a token allowance. The funds usually seem to have been used in other ways, for maintenance of machines or for small capital expenditures financed occasionally by the PLN itself and might therefore well be grouped with the maintenance item. In practice, in the face of large deficits and the necessity to keep down costs, few

TABLE 12.1 Rough Estimates of Revenue and Expenditure for the Electricity Public Utility[a] 1961-1968; Planned for 1969 and 1970

Units: 1961-65 millions old Rp
1966-70 millions new Rp

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Expenditure										
fuel + lubricating oil[c]	137	232	1,208	1,994	6,074	113	773	2,223	3,367	3,061
labour[d]	290	658	1,116	3,400	7,900	149	589	1,520	2,639	3,047
maintenance	106	250	2,098	2,728	6,561	176	1,306	851	3,620	2,359
electricity purchases[e]	-	-	-	-	-	1	114	389	553	584
office costs, admin.[f]	54	115	539	351	400	13	-	-	261	254
vehicle costs[g]	49	128	890	384	450	16	61	-	300	250
other costs	44	91	254	137	150	7	123	652	297	426
Sub-total	681	1,473	6,106	8,995	21,535	476	2,967	5,634	11,037	9,981
capital charge[h]	327	327	812	1,005	4,616	5	292	563	1,104	998
Total Expenditure[b]	1,008	1,800	6,918	10,000	26,151	482	3,259	6,197	12,141	10,979
Revenue										
sales of electricity and other revenue[i]	1,315	1,644	4,062	5,401	7,009	244	2,332	5,568	9,002	10,043
Results of Operations	343	-156	-2,857	-4,599	-19,142	-238	-926	-630	-3,139	-936
Other Sources of Funds										
foreign exchange ($mill.)	4.4	1.9	1.4	3.4	4.8	n.a.	n.a.	n.a.	n.a.	n.a.
subsidies[j]	-	-	-	4,049	18,815	n.a.	n.a.	n.a.	n.a.	n.a.

Notes:
a. Employment figures suggest that 1961-65 expenditure figures refer to the BPU-PLN as a whole (see note i).
b. Figures may not add due to rounding.
c. Including cost of transporting fuel.
d. Including various allowances, costs of rice contributions, income tax paid on behalf of employees, medical costs, etc.
e. For 1961-65 these figures are presumably included elsewhere; refers to purchases of electricity from non-PLN plants.
f. For 1967 and 1968 included in "other costs".
g. For 1968 included in "other costs".
h. From 1967 onwards it was the practice to simply set this item at about 10 percent of the sub-total of all other costs.
i. Presumably includes revenue from connection and extension charges. Only revenue from "sales of electricity" is shown for 1961-65, and no other revenue is given. This suggests that other enterprises under the BPU-PLN, such as the State Gas Enterprise, may not be included in the above table (see note a).
j. In 1963 Rp 1.1 billion (old Rp) was received from the Government as a loan and repaid in 1964 and 1965. In 1965 a guarantee of rupiah financing was received from the Government which was at the time sufficient to open letters of credit to the value of $7.05 million.

Source: 1961-65: Perusahaan Listrik Negara Lampiran Laporan Inventarisasi [Appendix to the Inventory Report of the PLN], Typescript, prepared in July 1966 and supplied by the Department of Public Works and Power; these figures are also given in Ismail Nazar, Tindjauan Sekitar Penetapan/Penjesuaian Tarip Perusahaan Listrik Negara [Observations on Tariff Setting in the PLN] unpublished thesis in the Fakultas Ekonomi, Universitas Indonesia, 1967, Chapter 5.
1966-68: Laporan Tahunan [Annual Reports] for 1966, 1967, 1968, mimeo., supplied by the PLN.
1969-70: Rentjana Anggaran Belandja Perusahaan Tahun 1969, Perusahaan Listrik Negara and Rentjana Anggaran Perusahaan Tahun 1970 Perusahaan Listrik Negara [Planned budgets for the PLN for 1969 and 1970 respectively], mimeo., supplied by the PLN.

expenditures appear to have been made under this heading. Since in this section we are concerned only with identifying the main trends, we shall assume that the capital charge item was usually spent on maintenance. The remaining items of expenditure, excluding maintenance, could be calculated with some accuracy, at least relative to each other, at the beginning of a year, thus the relative proportions of different items of current expenditures are probably reasonably realistic.

The income figures, although considerably more reliable than the capital charge, are open to doubt and it is not clear how they should be adjusted. If, like the official accounts, they were drawn up on the assumption that all bills would be paid (although this was probably not the case), they may be over-estimated by perhaps 15 percent or more. On the other hand, it has apparently sometimes been the practice of the PLN to report revenue after allowing for about a 25-30 percent loss from unpaid bills and it is quite possible that an allowance of this order was made for most years. If this has been done, revenue has probably been underestimated since a 15-20 percent loss rate seems a more reasonable estimate.[1]

Thirdly, for the period 1961-64 the figures in Table 12.1 apparently refer to the whole of the BPU-PLN. After 1964 all figures presumably refer to the PLN alone, although even

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1. In private interviews, PLN officials estimated that although some consumers (such as government departments and the armed forces) delay settling their electricity accounts for up to two years, usually 80 to 85 percent of bills are eventually paid. It is inevitable, however, that some current will be lost through technically unavoidable transmission and distribution losses. This is often about 10 percent of kWh generated or slightly more. Other losses may occur because of thieving or because the PLN underestimates legal consumption by unmetered consumers. In the case of thieving, the current is usually tapped from the wires before the electricity reaches the consumers' meters. In Indonesia recently it appears that between 25 and 30 percent of electricity generated is lost before it reaches consumers' meters (see Table 13.16 below), and thus some 15 to 20 percent of all current generated is "lost," either through stealing or underestimation by the PLN. This constitutes an unrecoverable loss to the PLN.

this is not certain, particularly for 1965.[1] Since the PLN was by far the largest of the organisations under the BPU-PLN, accounting for some 80 percent of total employees, the figures for 1961-64 are not grossly inaccurate for our purposes.

Fourthly, as noted earlier, there were certain other sources of funds (rupiah and foreign exchange grants from the government) which were used to meet running costs and the figures given in Table 12.1 probably do not include these funds.

Finally, no clear distinction is made between expenditures on capital and current account, and in practice it appears that they were sometimes mixed up. In response to the pressures to keep poorly maintained machines running despite inflation and a tight financial position, any funds available (whether officially for current or capital expenditures) were used for necessary running expenditures such as spare parts, fuel and wages. Sometimes capital funds used in this way may have been later replaced, sometimes not. Indeed throughout the whole period a series of ad hoc measures on both the revenue and expenditure sides enabled the PLN to continue operating.

In view of all of these qualifications, it is clear that the data in Table 12.1 are of very doubtful reliability. However, the trends which emerge are quite revealing and reinforce other reports of the financial difficulties of the PLN during the sixties.

First, the allowance for capital charges is extremely low and as noted above in practice was often almost all unspent or spent on other items. In other words, no interest or depreciation were usually charged to the revenue and expenditure

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1. It appears that the number of employees allowed for in cost calculations for 1965 remained constant at the 1963 and 1964 figure of 20,000. If the State Gas Enterprise and other sections of the former BPU-PLN were separated out, the number of employees allowed for should have fallen by some thousands in 1965. Thus there is reason to suspect that 1965 figures include sections of the former BPU-PLN. On the other hand, there is evidence to suggest that the figures for 1961 to 1965 may include only the electricity section of the BPU-PLN. In the original data, only revenue from sales of electricity is shown for 1961-65, and no other revenue is listed. See notes a. and i. to Table 12.1.

account. An attempt will be made in Chapter 13 to allow for this in calculating a full cost price for 1969.

Second, throughout the period 1962-70 the PLN's expected revenue from sales was quite insufficient to cover all the running costs which revenue is normally expected to cover. Prices were insufficient to cover costs even when the capital charges were excluded. As a result, in order to continue operating, the PLN was forced to adopt a range of stratagems on both the revenue and expenditure sides. These included diverting to current expenditure government funds officially intended for capital expenditure, obtaining direct subsidies from the government in the form of rupiah and foreign exchange, and obtaining credits from the government, from other state enterprises and from foreign companies. There are no accurate figures for all of these separate items, and so the total value of the support given in this way must remain unknown. In addition, the PLN was forced to economize on some items of expenditure such as maintenance and wages with undesirable consequences. These ad hoc practices are undesirable since they make forward planning for the management almost impossible and made it almost equally difficult to sort out sources and uses of revenue after the event. The cuts in expenditure on maintenance and delays in increasing wages soon led to deterioration of equipment and to dissatisfaction amongst employees.

Thus, because allowances for capital costs were almost non-existent and because revenue was not sufficient to cover running costs, the PLN has, in effect, received both direct and indirect hidden subsidies throughout the whole period. The consequences arising from this situation will be taken up in the next Chapter.

CHAPTER 13 Pricing in Theory and in Practice

We saw in the preceding Chapter that for most of the sixties, the prices charged for electricity did not cover the cost of production to the PLN. This poor financial performance immediately leads to a consideration of prices. An understanding of pricing policy is essential to a proper appreciation of the dilemmas faced by PLN managers during the last decade. As Cavers and Nelson put it in a study of the troubles of the electricity supply industry in Latin America:[1]

> "...electrical rates provide the focal point on which all the problems of the industry - regulatory policy, demand for the service, financing - converge. They are the final result of regulatory policy, and the cause of ability or inability to finance expansion from within ..."

In this Chapter we will examine tariff policies and practices in the industry: what has been the policy of different governments towards electricity tariffs?; how, in practice, have prices varied in recent years?; how did prices charged to the various consumer groups vary with respect to each other? It will be convenient while examining these issues to look also at the types of tariff used and their effects.

Official Policy on Pricing

In the quarter century since independence, political leaders have courted public support by declaring time and time again that every Indonesian has a right to certain basic goods and services, which usually (by implication, at least) include the goods and services provided by the public utilities. As a result, a particular set of attitudes has developed towards the pricing of government services. These attitudes are nicely exhibited in the matter of electricity prices.

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1. David F. Cavers and James R. Nelson, Electric Power Regulation in Latin America, Baltimore, The Johns Hopkins Press, 1959, p. 70 (emphasis in the original).

Ever since the question of electricity tariffs and the financing of nationalised electricity companies was debated in 1950, there has been confusion about what financial objectives the industry is expected to pursue.[1] The trouble has been basically simple: both low tariff rates and a healthy financial position allowing a net contribution to the national budget have been desired. The industry has been asked to pursue conflicting objectives, and the priorities attached to these objectives have not been clear.

In the 1950 parliamentary debates there was strong support for the nationalisation of the electricity companies since continued Dutch ownership of them was identified with economic colonialism and exploitation. It was widely believed that nationalisation would automatically go a long way towards eliminating the problems of the industry and benefiting the public generally. But precisely how the benefits would arise was not clear. It was certainly expected that it would be possible to lower the level of tariffs. Second, some people also saw the possibility of an alteration in the structure of tariffs as a benefit, so that a "progressive" rate would apply which favoured the "common people." In addition, many parliamentarians hoped that the new state enterprises would be a source of net revenue to the government. A fourth implicit objective was rapid growth leading to widespread electrification and industrialisation throughout Indonesia.

In the 1950 debates two positions emerged. There was general agreement that nationalisation should be carried out sooner or later, but on the question of tariffs there were differing views. The government, concerned that the nationalised electricity companies might run at a loss, took a cautious stand and pointed out that if users did not pay full costs, the deficits would have to be covered from general revenues. The

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1. For a more detailed discussion, see Chapter 2 above.

government argued that this would be unjust to those who did not use electricity. On the other hand, many parliamentarians were more reckless and were only concerned with the immediate reality of electricity prices that were "too high." Some members apparently felt that electricity companies would still be able to earn a surplus even if prices were lowered considerably, presumably because they believed that the Dutch companies were earning "excess profits." Others argued that in any case the profit motive was "inefficient and anarchistic, since it was not regulated according to the needs of the state or of the masses." Some MPs simply accepted that losses might be incurred. The final result of the debates was a mild set back for the government when it was forced to agree to the temporary suspension of the price increases and to the formation of a State Commission to review the rises. The lesson that the government learned in 1950, one that has remained true ever since, is that increases in public utility prices generally (and electricity prices in particular) have high political costs

The dichotomy between a small number of government ministers and officials (who appreciated the disadvantages and especially the regressive implications of subsidies to electricity consumers) and "public opinion" generally (which was opposed to all price increases including electricity price increases) persisted throughout the fifties and the sixties. For example, in 1960 the then Minister for Public Works, Ir Dipokusumo, expressed the views of the "full cost" school when he addressed an electric power conference.[1] Dipokusumo reiterated the general principle that electricity consumers should not be subsidised out of general revenue because it was unfair. He explicity laid down the financial target for the PLN of covering all costs, including new investments, repayment of foreign loans, and the avoidance

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1. The same policy, almost word for word, was laid out in the Eight Year Plan Document. Ir Dipokusumo, "Perkembangan Teknik Tenaga Listrik di Indonesia," Prasaran2 Seminar Pertama Teknik Tenaga Listrik, op.cit.

of the need for government subsidies. In addition, he indicated that prices for small domestic consumers would be comparatively low.

But as we have seen, between 1960 and 1965 the financial position of the industry steadily deteriorated. There was often a long regulatory lag before electricity tariffs could be increased, as it was apparently usually the practice to obtain Cabinet approval. Throughout the period it remained official government policy, reiterated in a ritual incantation from time to time, that state enterprises should contribute to national finances.[1] This implied that electricity consumers should not be subsidised, but in practice they were. By 1965 the inevitability of the position, given government reluctance to raise prices, was recognised. The preambles to tariff revisions late that year and early in 1966 implied that although the goal was still to eliminate the need for subsidies, it would not be possible to achieve this objective immediately.

It is somewhat paradoxical that in early 1966 the PLN finally accepted publicly that subsidies would be inevitable for some time to come, because the new Suharto government had just begun to espouse the policy of a return to fiscal responsibility. Much publicity was given to the determination that public enterprises would cover costs. In fact, of course, the government ran into such fierce opposition to increases in government-controlled prices that it was obliged to reconsider some proposed increases, including those in electricity tariffs.[2]

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1. For example, an announcement issued by the Department of Public Works and Power at the time of the 1963 tariff increases explained that both running and capital costs had been taken into account in calculating costs. Further, the non-electricity using public was not expected to cover any production costs. See Warta Cafi, No. 92, 10 May 1963, p. 636.

2. See the Bulletin of Indonesian Economic Studies, February 1966, No. 4, pp. 1-4, and Djakarta newspaper reports of student rioting in January and February 1966.

Since 1966 the official policy of the Suharto government on electricity tariffs has been basically no different from that of previous governments. Apart from the target of eventually covering full costs, emphasis has been given to the need to favour small consumers, to force wealthy consumers to pay for their "extravagance," to discourage wasteful consumption, and to encourage industrial consumption for power purposes.[1]

But as is so often the case in Indonesia, official policy is one thing and practice another. As we shall see, in 1969 electricity consumers were still receiving substantial assistance, and at the time of writing (October 1971, about five and a half years after the new government's announcements that subsidies must cease) the PLN was still not covering costs.

Much of the trouble lies in the fact that the subsidies are indirect. In statements made by present and former industry officials and in documents issued by the PLN, there is often confusion over the term "subsidy." It is not infrequently explained at some length that running costs are still barely being covered and that it is not yet possible to raise prices to cover capital costs. Yet the same source will then proceed to explain that the government no longer provides subsidies to the PLN![2]

A typical example of the failure to distinguish between direct and indirect subsidies is contained in a paper presented by two high officials to the Seminar on Electricity in Djakarta in 1969.[3] On the basis of various

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1. These objectives were set out in an appendix to the tariff revision introduced in February and March 1967, and revised in May 1967. The appendix is reproduced in Warta Cafi, No. 34, 14 February 1967, pp. 298-302.

2. See, for example, the Beberapa Pendjelasan Mengenai Penjesuaian Tarip Dasar Listrik Tahun 1968 [Some Notes on the Alterations to the Basic Electricity Tariff in 1968], mimeo., Djakarta, 29 April 1968, issued with the May 1968 tariff revisions, reprinted in Warta Cafi, No. 113, 21 May 1968, p. 504.

3 Tjipto Juwono and Abdul Kadir, Sistim Tarip Listrik - kearah industrial approach [The Electricity Tariff System - towards an industrial approach], paper presented to the Seminar on Electricity in Djakarta, July 1969.

assumptions the paper finds that the PLN will reach a "breakeven point" in 1974 where revenue will cover costs. For one thing, the allowance for capital charges in the cost figures chosen is quite inadequate. The practice discussed in Chapter 12 of assuming that capital costs are 10 percent of running costs is merely continued. For another, the paper suggests that if the PLN were relieved of the obligation to pay fuel, import and company taxes, the breakeven point would be reached earlier. There is no reason why electricity consumers should not pay the same indirect taxes that consumers of other goods pay, so in pressing for relief from these taxes the PLN is asking for an indirect subsidy. This fact seems to be only dimly appreciated, if appreciated at all, by most PLN officials. Whilst it was not explicity stated that at the breakeven point the government's policy of "full cost accounting" would be achieved, this was the clear implication.

In its final Statement of Conclusions, the 1969 Electricity Seminar repeated the error. After referring to official policy that prices should be set on the basis of "cost accounting" and that the PLN must operate without a subsidy, the Seminar issued a call for the PLN to be relieved of fuel, import and company taxes![1]

The Average Price Level During the Sixties

Because of the different consumer categories and complicated tariff schedules, the average price of a unit of electricity (one kWh) is tricky to pin down at the best of times. Often economists take the average revenue received per kWh sold (or better, the average bill prepared per kWh, which is slightly larger than the average revenue since the latter excludes bad debts) as a proxy for the average price. In most countries

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1. Departemen Pekerdjaan Umum dan Tenaga Listrik, Direktorat Djendral Tenaga dan Listrik, Hasil-Hasil Seminar Kelistrikan Terbatas [Statement of Conclusions of the Closed Seminar on Electricity], mimeo., held between 29 July and 4 August 1969 in Djakarta.

electricity prices are relatively stable and bad debts are low, so average revenue is a good indication of average prices. Unfortunately in Indonesia these conditions do not apply, so average revenue is not a satisfactory guide to the average price. Nevertheless in the absence of anything more suitable, in an attempt to trace out the trend of the price of electricity during the sixties we must rely on average revenue per kWh sold as a proxy. The available data are presented in Table 13.1. The

TABLE 13.1 Rough Estimates of Average Price as measured by Average Revenue Received per kWh Sold, 1961-1969

Year	Revenue[a]	Sales (million kWh)	Revenue Received per kWh Sold (Rp)	Index of Column (3)	Index of Djakarta Cost of Living[b]
	(1)	(2)	(3) = (1)/(2)	(4)	(5)
1961	1,315	930	1.41	100	100
1962	1,644	987	1.67	118	257
1963	4,062	1,021	3.98	282	586
1964	5,401	1,094	4.94	350	1,380
1965	7,009	1,204	5.82	413	9,565
1966	244	1,224	0.2	14,200	70,300
1967	2,332	1,194	1.95	138,000	149,000
1968	5,568	1,221	4.56	323,000	276,000
1969	9,002	1,316	6.85	485,000	303,000

Notes: a. 1961-65: millions old Rp. 1966-70 millions new Rp.

b. 62 items index.

Source: Revenue : Table 12.1.
Sales : Table 5.1.
Cost of Living : As for Table 11.6.

figures shown are based on Table 12.1 and are therefore subject to the qualifications given earlier about the data for total revenue.

Since the beginning of the decade, seven new electricity tariff schedules have been introduced: in January 1960, April 1963, November-December 1965, twice in 1966 (January and February), in May 1967 and in May 1968. All of these schedules (except that introduced in February 1966 which adjusted the January 1966 tariffs downwards) increased prices, so as Table 13.1 shows, the average price has continually risen. A comparison with the Djakarta price index for the period (also shown in the Table), suggests that until 1966 increases in electricity prices lagged behind general cost rises. More recently, the tariff revisions in 1967 and 1968 appear to have closed the gap. Overall, it may even be that in real terms the price of electricity has risen slightly since 1961.

The Structure of the Tariff

Information on the effect of tariff schedules for different consumer groups is even more difficult to come by. No satisfactory data are available on actual bills sent out to consumers in the different classes, but we can gain at least a rough picture by using tariff schedules to estimate monthly charges for "representative customers" in the main consumer categories. This procedure is less risky than it might seem. Complete tariff schedules are available, and the PLN collects detailed information on or prepares estimates of the technical characteristics (connected load in watts and energy consumption in kWh) of each main class of consumers. The main problem is that the actual prices charged were sometimes (perhaps usually) somewhat higher than those listed in the tariff schedules - the main adjustments appear to have been for rising fuel prices and other "general costs." However the discrepancy was probably not more than 10 percent, so we can safely ignore the

issue without grossly distorting the picture. An unfortunate drawback is that because of a reclassification of consumer groups introduced with the 1965 tariff revision, it is possible to examine the position only since then.

Tariff Schedules. Before looking at relative electricity prices in detail, the tariff schedules themselves (some examples of which are shown in Table 13.2) are worth noting. One feature which stands out is the now unusual form of tariff chosen. A demand charge is incorporated even for comparatively small lighting consumers (medium and large domestic, as well as for some other groups not shown in the Table), and the energy charge is related to the number of hours of consumption, rather than (as is far more usual) to the number of kWh consumed.[1] Further, as the Table shows, a large proportion of sales was made to consumers in the unmetered small domestic group who pay a flat rate calculated according to their connected load. In fact, many consumers in the medium domestic group are also unmetered, and their energy consumption is only an estimate.

Secondly, the tariff schedule has a number of economically undesirable characteristics. The second energy block in each case is more expensive than the first and is therefore sharply anti-promotional, a feature which almost never exists in modern electricity tariffs. Since the marginal cost of supplying additional energy (provided it is not taken at the peak) usually falls, most modern tariff schedules promote electricity consumption by allowing successively lower prices for extra energy blocks. It is difficult to see why an anti-promotional tariff structure was originally chosen, because it was

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1. If a medium domestic consumer had, for example, 825 VA (commonly converted to 825 watts) of capacity available and used 120 kWh per month, in 1968 his monthly bill (excluding additional charges) would have been calculated as follows:

		Rp
33 units of capacity (i.e. 33 x 25 VA)	x Rp 10.5 =	346.5
120 kWh	x Rp 5.0 =	600.0
Total Bill	=	946.5

This averages out to Rp 7.88 per kWh - see Table 13.3 below.

TABLE 13.2 Sample Tariffs, 1965 and 1968

Type of Consumer	Share of kWh Sold in 1968 (%)	Conditions of Service: Demand Charge	Running Charge[a]	1965 (old Rp/kWh)	1968 (new Rp/kWh)
Small Domestic (up to 250 VA)	34	Max. 60 VA	Nil	600	87
		Max. 150 VA	Nil	1,900	216
		Max. 200 VA	Nil	2,800	288
Medium Domestic (250 VA to 1300 VA)[b]	17	Each 25 VA	-	150	10.5
		-	First 200 hrs[c]	35	5.0
		-	Over 200 hrs	200	15.0
Large Domestic (over 1300 VA)	3.4	Each 25 VA	-	300	11.0
		-	First 200 hrs[c]	70	5.5
		-	Over 200 hrs	400	16.5
Industrial[d]	13	Each 0.5 kVA	-	1,500	135
		-	First 100 hrs	35	5.5
		-	Over 100 hrs	65	5.5
		-	Peak use	350	20

Notes: a. For small Domestic Consumers, until a recent change the PLN assumed 400 hours use at maximum capacity load per month. For other consumer groups, the initial energy rate charge applies for:

(total connected capacity x no. of stated hours)kWh

For example, if a Medium Domestic consumer had 1,000 VA of connected capacity in 1965, he would have been able to consume 200 kWh per month (= 1,000 VA x 200 hours) at Rp 35 per kWh before the higher energy rate charge (Rp 200 per kWh in this case) would have been charged.

Notes: b. Medium Domestic up to 2,500 VA and Large Domestic over 2,500 VA in 1968 schedule.

c. 250 hours per month in 1968 schedule.

d. In 1965 there were two industrial categories - one for "priority" industries favoured by the government, and one for "ordinary" industries. The latter rate is shown here. By 1968, there was only one industry category: excluded from this category are the "Special" large consumers, who are granted specially negotiated wholesale rates by the PLN. (The exclusion of the special group in the above Table accounts for the different shares going to industry shown above and in Table 6.11.)

Source: Tariff Schedules supplied by the PLN Central Office.

not additional electricity consumption itself that was the problem, but additional consumption at the peak. But another notable economic feature of present tariffs is that there is little disincentive to peak consumption. Only one group, industrial consumers, are charged a penalty for peak consumption. The present pricing system therefore fails almost completely to discourage consumption by residential consumers when the disincentive should occur. Further, the important small domestic consumers have no disincentive at all to conserve electricity. The PLN has always relied upon exhortation to discourage excessive consumption - a measure which, judging by the number of lights that burn in Indonesia during daylight hours, has been a dismal failure.

A further general criticism of the tariff is its complexity. In 1968 there were still 12 consumer categories, some of which were charged according to a quite complex tariff system which, in addition to separate demand and energy charges, sometimes included penalty charges for peak consumption and for other reasons. As mentioned above, the position was complicated by the other small charges that were often added on.

Actual Prices Charged. But these comments aside, the tariff schedules alone provide only a very vague idea of relative prices per kWh paid by different consumer groups. Naturally the effective price varies considerably, depending upon the load factor of a consumer (which determines how many kWh the fixed demand charge is spread over) and whether or not the second anti-promotional energy rate is charged. On occasions the PLN itself has provided estimates of average prices paid by different consumer groups. These estimates, however, are unrealistic in that the "representative consumers" chosen by the PLN to illustrate the calculation of a monthly electricity bill are not representative at all. The result is to present pricing policies in a politically favourable light by suggesting that prices are lower than they probably really are.[1]

In the absence of reliable information on prices actually charged, we can obtain a rough picture of the effect of the different tariff schedules on prices by applying them to more realistic "representative" consumers than those used by the PLN. This is done in Table 13.3 and Figure 13.1 which show how four recent tariff schedules have affected the prices charged to "representative" consumers in six main consumer groups. As usual, a word of caution is in order. Table 13.3 is not meant to show the average annual price per kWh that consumers actually paid. Rather, it is meant to provide a guide to what we will call the "effective" price - that is, the price that our representative consumers would have paid immediately after each new tariff schedule was introduced if they had been charged strictly according to the schedule (and no extra charges were included).

There are various reasons why these two prices (the actual price paid and our estimate) would have differed. For one thing, tariff schedules were not introduced at the

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1. This is done in Beberapa Pendjelasan Mengenai Penjesuaian Tarip Dasar Listrik Tahun 1968, op. cit.

TABLE 13.3 Average Price per kWh set for Various Consumer Groups in Different Tariff Schedules, 1965-1968

(All prices in new rupiahs)

Consumer Group[a]	PLN Classification	Share of kWh sold in 1968 (%)	Year[b] of Tariff Schedule 1965	1966	1967	1968
Small Domestic	S_1	34	0.0345	0.069	0.654	3.923
Medium Domestic	R_1	17	0.0762	0.118	1.212	7.88
Large Domestic	R_2	3.4	0.1704	0.224	1.853	9.182
Industrial	P	13	0.0713	0.169	5.17	8.5
Large Commercial	K_2	4	0.1883	0.549	7.421	18.58
Government Agencies	U_2	12	0.0874	0.165	1.202	8.855
Total		83.4	-	-	-	-

Notes: a. For the purposes of calculating monthly bills and average prices per kWh, it was assumed that the "representative consumer" in each of the above categories had the following characteristics:

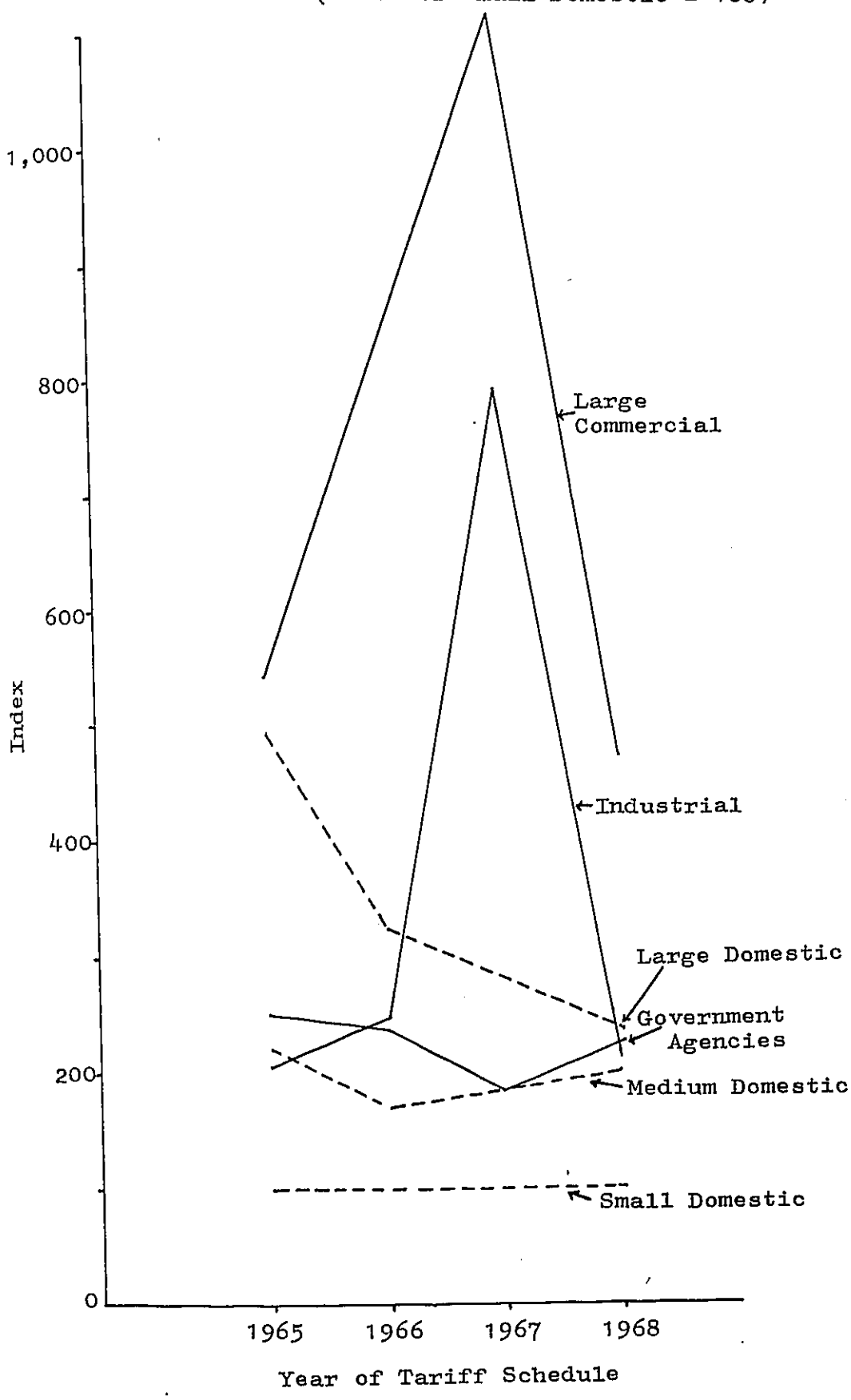
	Connected Load (VA)	Monthly Consumption (kWh)
Small Domestic	150	55
Medium Domestic	825	120
Large Domestic	4,100	490
Industrial	20,000	1,800
Large Commercial	6,500	760
Government Agencies	3,800	870

These figures are based on information supplied by the PLN for 1968, and are close to the all-Indonesia averages for the various consumer groups.

b. The tariff schedules shown in the Table were introduced at the following times: November-December 1965; February 1966; May 1967; and May 1968. In fact, two tariff schedules were introduced in 1966. Only the second is included here, since the first was withdrawn about a month after being introduced.

Source: Calculated from PLN Tariff Schedules.

FIGURE 13.1 Average Price per kWh Paid by Various Consumer Groups Relative to Each Other, 1965-1968
(Price of Small Domestic = 100)



Source: Table 13.3.

beginning of the calendar year, so an average annual price might have included the effects of two different tariffs. Second, there were reclassifications of some consumer groups, and so the "average" technical characteristics of a particular consumer group sometimes changed significantly throughout the period.[1] Third, as mentioned earlier, in practice consumers were required to pay additional charges which are not shown in the tariff schedules.[2]

The effective prices per kWh charged to different consumer groups as shown in the Table and the Figure are interesting for two reasons: for the absolute price relativities implicit in any one tariff schedule, and for the variations in relativities in the various schedules. We shall return to the issue of appropriate relativities later, but it is clear intuitively that the PLN's price relativities bear little relation to the cost of production and supply for each group. Nearly all electricity supplied to every group except industrial consumers is for lighting purposes, the cost of production of which is usually well above the cost of production of electricity supplied to industry for power purposes. As we shall see below, if prices were set so as to reflect costs more closely, the relative price paid by industrial consumers would be a good deal lower.

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1. For example, in 1967 the average connected load and energy consumption for a large commercial consumer was about 4,000 watts and 4,600 kWh per annum respectively. In 1968 more than half of the consumers formerly in the large commercial category were allowed to transfer to the small commercial category, presumably in order to take advantage of lower prices. Thus the average characteristics of the large commercial group rose to about 6,500 watts and 9,000 kWh respectively.

2. Considering these factors, it is somewhat reassuring to be able to report that an examination of what small amount of actual confidential data the PLN could provide relating to average prices charged per kWh (which is for 1967 and 1968 only) does not give a grossly different pattern to that which our calculations above show. Our overall conclusions would not be affected if actual data were substituted in the Table above.

Secondly, as Figure 13.1 shows, in the four tariff schedules studied there has been considerable variation in price relativities. As between 1965 and 1968, prices paid by all groups excluding the large domestic category maintained a roughly constant relationship. However in view of the official policy of eliminating subsidies and, where possible, of favouring lower income groups, it is somewhat surprising to find a steady fall in the relative price paid by the affluent large domestic consumers. While for most consumers the price per kWh increased by about 100 times, prices charged to large domestic consumers increased by only about 50 times. Another significant feature shown in the figure is that the relative price of electricity for industrial consumers has not improved since 1965. PLN managers have themselves from time to time pointed to the need to lower the relative price charged to industrial consumers, and they argued that the 1968 tariff was an improvement in this direction.[1] As Figure 13.1 shows, whilst it is true that the 1968 tariff schedule lowered the relative price charged to industrial consumers considerably, this merely accomplished a return to the pre-1967 position and nothing more.

Estimated Cost of Delivering a kWh of Electricity in 1969

Prices by themselves without information on costs are not of much value. We will now attempt to determine what the average full cost of delivering a kWh to final consumers would have been in 1969 if the PLN had been required - as electricity utilities are required in most other countries - to bear reasonable capital costs.[2] Later we will take the analysis further by trying to estimate the costs of supplying particular consumer groups.

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1. Tjipto Juwono and Abdul Kadir, op. cit.
2. This section follows a study by the Planning Unit of the Indian Statistical Institute, Price Policy for Electricity Undertakings, New Delhi, June 1962, mimeo.

The determination of the average full cost of electricity is essentially the simple process of adding, in place of the present underestimated capital allowance, a reasonable allowance for capital costs (return on capital, or gross profit, plus depreciation) on to the other costs incurred in delivering electricity.

To do this it is necessary to make a number of controversial assumptions to arrive at an allowance for capital and also to estimate other costs, such as fuel, labour, maintenance, etc. This exercise was recently performed by a Japanese team which visited Indonesia. The Japanese estimates, however, appear to have underestimated the capital value base for depreciation and other capital charges (no revaluation of assets was included). For this reason as well as because of other drawbacks, they cannot therefore be used as they stand.

Charge on Capital (Gross Profit) and Depreciation.[1] The charge on capital per kWh sold has been worked out by dividing the return expected on capital by the number of kWh estimated to be consumed by the ultimate consumers in 1969 per kW installed.

It is difficult to settle on a rate of return on capital which seems suitable - this is the familiar problem of deciding on a rate of discount for public sector projects which properly reflects the opportunity cost of capital. $7\frac{1}{2}$ - 10 percent seems a reasonable range for the rate of gross profit on capital (in real terms, and making no allowance for inflation) employed in the electricity supply industry. Ten percent is the figure used in the Indian study referred to earlier. A survey of a number of other industries in the Indian economy suggested that a rate of gross profit of about 10 percent could reasonably be expected from capital invested in industries which were in

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1. Following the Indian study, gross profit is defined as excluding depreciation, but including interest charges, dividends, retained profits, and direct taxation.

a state of growth and were relatively risk free. Seven-and-a-half percent must be regarded as the bottom of any reasonable range since it is almost certainly below the opportunity cost of capital in Indonesia.

To settle on the return expected per kW, and to spread this over the kWh generated annually per kW, we need estimates of total capacity and for value of capacity stock per kW. For total capacity a range of 605-658 MW seems reasonable. The higher figure is reached by adding 125 MW for Djatiluhur to the 533 MW existing in the PLN at the end of 1969; the lower figure is obtained by allowing for 53 MW capacity in the PLN to be completely written off.[1] Since sales of electricity to final consumers from the public electricity supply system in 1969 were 1,316 million kWh, the amount of electricity delivered to final consumers may be put at 2,000 kWh per kW or 2,175 kWh per kW installed, depending on what figure for total capacity we take.

Upper and lower values of capital stock per kW have been set at $400 and $300. Some recent estimates of investment/kW in the generation sector only are shown in Table 13.4 below.[2] To these must be added an allowance for investment in transmission and distribution facilities. A rough rule of thumb sometimes used in the electricity industry is to allow for $1 of investment expenditure in the transmission sector and $1 in the distribution sector for each $1 in investment expenditure in generation.[3]

The value of capital installed in the transmission sector and especially the distribution sector in Indonesia is probably small relative to the generation sector. As we have seen, transmission and distribution are relatively

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1. PLN reports 54 MW as broken at the end of 1969 (see Table 5.19). Not all of this would be broken beyond repair, but some of the operating capital would be old.

2. Little information on construction costs for Djatiluhur Hydroelectric power station is available, but what figures there are suggest high capital costs. The Japanese team estimated that construction costs for power generation (including a share of common costs of the multi-purpose project) were high, about $86 million or about $688/kW.

3. Sometimes a considerably higher rule of thumb is used - $1 in generation to $2 in transmission and $3 in distribution.

TABLE 13.4 Capital Costs of Various Plants in Indonesia

Power Station	Type	Capacity (MW)	Total Investment in Generation ($ mill.)	Investment per kW ($/kW)
Tandjung Perak	Thermal	50	15.9	320
Tandjung Priok	Thermal	50	16.5	330
Makassar	Thermal	25	8.5	340
Outdoor Mobile Units	Diesel	6.3	1.3	200
Palembang	Gas	12.5	2.0	160
Kebajoran	Diesel	15	2.3	152

Source: Andi Junde, A Cost Study of Some Thermal Power Plants in Indonesia, in Ahmad M. Hoesni et.al., Beberapa Aspek Persoalan2 Ketenagaan Negara2 ECAFE Dalam Hubungannja Dengan Indonesia, Djakarta, mimeo., monograph No. 02-EREP-68 from the Lembaga Masalah Ketenagaan, July 1968.

neglected and it is likely that the amounts spent on these sectors have been less than even the lower rule of thumb proportions. Furthermore, in many isolated areas, no expenditure on transmission is necessary at all since the distribution lines which run out from the diesel plants to nearby consumers are relatively cheap.

Moreover, the investment figures given in Table 13.4 represent original investment, and some allowance should be made for depreciation in the value of assets. But since much of the present capital stock of the PLN is relatively new - about 355 MW have been installed since 1960 - we need not be too generous in our allowance

for depreciation.[1] It is with all of these intangibles in mind that the capital values above have been chosen.[2]

For depreciation, an overall average of 2 percent per annum is allowed. Usually less than this (perhaps 1.5 percent) is allowed on hydro plants, while more than this (perhaps 2.5 percent) is allowed on thermal. Other facilities in the industry such as distribution equipment and diesel plants would, under present methods of operation in Indonesia, have a rate of depreciation considerably higher than 2 percent per annum.[3] The resulting charge per kWh sold is shown in Table 13.5.

The combined effect is to require a total yield (gross profit plus depreciation) of between 9.5 percent and 12 percent on capital (low and high estimates), in comparison to the total of 8.6 percent required by the Japanese team. Even our high estimate does not appear at all excessive in comparison with Britain where a gross yield of 12.4 percent

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1. One argument that has been advanced from time to time in Indonesia is that since almost no compensation payments were made for equipment taken over from the nationalised Dutch electricity firms, electricity consumers should not be required to pay capital charges on this equipment. This argument is invalid on both resource allocation and welfare grounds. From the resource allocation point of view, some of the capital in the electricity industry taken over from the Dutch firms is still valuable as part of the nation's economic resources. If a zero price is attached to this particular set of resources, it can only encourage even further misallocation of resources than has already occurred. On welfare grounds, there is no reason why the gain to the nation from obtaining capital cheaply through nationalising Dutch electricity enterprises should be arbitrarily passed on to electricity consumers. The benefits of nationalisation are better dealt with as a gain to the nation as a whole; the Indonesian government can later make an explicit decision about the distribution of welfare gains throughout the nation.

2. In contrast to the above figures, the Japanese team valued assets at about $130 per kW, and charged 5 percent for interest on capital. No allowance was made for any surplus.

3. The Japanese team allowed an effective rate of 3.6 percent annually.

TABLE 13.5 Capital and Depreciation Charges per kWh Sold in 1969

(Assuming $1 = Rp 375)

	High Estimate	Low Estimate
Charge on Capital		
Total capacity (MW)	658	605
Value per kW ($)	400	300
Value per kW (Rp '000)	150	112.5
Annual Rate of Return	10%	7.5%
Annual charge (Rp)	15,000	8,440
kWh sold/kW installed	2,000	2,175
Charge on capital (Rp/kWh)	7.5	3.88
Depreciation at 2% per annum		
Annual charge (Rp)	3,000	2,250
Depreciation (Rp/kWh)	1.5	1.03
Total Charge (Rp/kWh)	9.0	4.91

per annum for the five year period 1962-67 was required[1] or India where about 12 percent was assumed. Capital is in considerably scarcer supply in Indonesia than in Britain, and it would not be unreasonable to expect capital investment in Indonesia to justify itself by yielding a return considerably in excess of that asked in developed countries. Indonesian electricity consumers would certainly be obtaining cheap capital if a gross yield of less than 12 percent was required in the electricity industry.

Fuel, Labour, Maintenance and Other Costs.[2] It is difficult to arrive at a reasonable estimate of expenditure on these items for 1969. The estimates made in the PLN's

1. Graham L. Reid and Kevin Allen, Nationalized Industries, Penguin Modern Economics, Harmondsworth, Middlesex, 1970, Chapter 2.

2. Including purchases of electricity, and vehicle, office and other costs.

Budget Plan for 1969 are clearly too high, since several important cost components fell in price during the year.[1] The Japanese team made some allowances for cost changes, and the best we can do is to take their figures. These are reproduced below in Table 13.6. The Table also shows the result when these items are spread evenly over the 1,316 million kWh delivered to final consumers in 1969.

TABLE 13.6 Estimated Expenditure by the PLN on Fuel, Labour, Maintenance and Other Costs in 1969, Excluding Capital Costs

		Rp million	Rp/kWh sold
Personnel		2,847	2.165
Fuel and lubricating oil		3,164	2.405
Maintenance		2,469	1.88
Total Other		1,421	1.07
Purchased power	553		
Transport	300		
Office Costs	261		
Miscellaneous	308		
Total		9,902[a]	7.52

Note: a. Figures may not add due to rounding.

Summation of Costs. Table 13.7 brings together the estimates made in the paragraphs above. The Table shows that, even with favourable assumptions about the charge on capital and depreciation, the average cost of supplying electricity to final consumers when inputs are valued at market prices is at least Rp 12.4 per kWh and probably considerably higher, perhaps as much as Rp 16.5 per kWh. These figures are about 80 percent and 140 percent respectively above the average total revenue per kWh of

1. Rentjana Anggaran Belandja Perusahaan Tahun 1969 Perusahaan Listrik Negara, mimeo., September 1968.

Rp 6.85 that the PLN expected to receive in 1969.[1]

TABLE 13.7 Estimated Average Cost of Supplying Electricity (Rp per kWh sold) in 1969

	Rp/kWh		
Personnel	2.165		
Fuel and lubricating oil	2.405		
Maintenance	1.88		
Other costs	1.07		
Charge on capital	3.88	or	7.5
Depreciation	1.03	or	1.5
Total	12.43 ($.033)	or or	16.52 ($.043)

Full Cost Pricing for the Different Consumer Groups

We can usefully take the analysis a little further yet. Since it seems clear that the average price of electricity was depressed well below its real cost of production in 1969, two other questions immediately arise. Were all consumer groups subsidised, or did the prices charged to some groups cover costs? If consumer groups did not benefit equally from the subsidy, how was the subsidy distributed? In order to answer these questions, we need to compare the price charged to each consumer

1. This figure of Rp. 6.85 was arrived at by dividing the total revenue expected to be received from both sales of electricity (Rp 8.5 billion) and other sources, mainly new connections and extensions (Rp 0.5 billion), by the number of kWh sold (see Table 13.1). The effect of inflation on the PLN's revenue and costs should be borne in mind here. In a period of rapid inflation (such as occurred in Indonesia for several years prior to 1969), the long delays that sometimes occur before consumers settle their bills mean that the real value of revenues received may often be substantially below the real value of bills originally sent out. On the other hand, the PLN itself often delayed settling accounts for such items as fuel for long periods, and thus tended to gain because of these payment lags. Unfortunately, it is impossible with the available data to make any estimate of the net gains and losses of real resources to the PLN as a result of these delays.

group with an estimate of the full cost of servicing each group.

Information on actual prices charged in 1969 is not available, but the 1968 tariff schedule remained in force throughout the whole of 1969, so we will not go too far wrong if we take the prices shown in Table 13.3 for the 1968 tariff schedule as reflecting prices charged in 1969.

The main difficulty lies on the cost side. In order to calculate the cost of supplying different consumer groups in the electric supply industry, it is usual to undertake three main steps. First, total costs are classified into three categories: demand (or "capacity" or "fixed") costs; energy (or "running" or "variable") costs; and consumer costs. Second, the classified costs are allocated to consumer classes or by type of load. In order to do this it is usually necessary to subdivide the previous three-way classification by each of the three main sectors of the industry (generation, transmission and distribution). Finally, the demand, energy and consumer costs thus assigned to each consumer class are totalled to determine the cost of supply for each class. It is then a simple matter to divide each total by the consumption of that class to determine the cost per kWh.

Even at the best of times when detailed and accurate cost figures are available, there is a substantial element of arbitrariness in this procedure. The allocation of most energy and consumer costs is uncontroversial. But most demand costs are not easily allocated, precisely because they are joint costs determined by the peak load on the system. Electrical engineers particularly, working as managers in the electric supply industry in Western countries, have devised up to twenty or more allocation methods but have not arrived at any clearly

optimal solution.[1] Economists have done no better. Since there is no consensus on the correct way to allocate demand costs, any method of allocation is in some sense arbitrary. Because of the variety of joint cost allocation methods available, estimates of the costs of supplying a particular consumer group can vary widely, even when complete cost data are available.

This being so, it is inevitable that any attempt at cost allocation with Indonesian data will be rough. However a few simple (though arbitrary) assumptions will take us quite a long way. As before, we will be conservative in our guesses. Most assumptions err on the side of favouring lighting consumers. A more exact calculation would probably lead to lighting consumers bearing a higher proportion of total costs, and industrial consumers a lower proportion.

In the first place, we will assume that the high and low estimates of the average cost of supplying a kWh in 1969 given above in Table 13.7 define the range of the PLN's production costs for that year. This assumption allows us to draw up a table of the PLN's estimated total real costs for 1969 as shown in Table 13.8. (The Capital charges and Depreciation item shown in Table 13.8 is, of course, based on all the assumptions made earlier and is correct only insofar as those assumptions are correct.)

Secondly, in order to subdivide the estimates of total costs so that they can be allocated to different consumer classes, we will ignore consumer costs completely and will assume that the main cost items are divided between demand and energy costs as shown in Table 13.9. These assumptions favour lighting consumers. For example, consumer costs per kWh of metering and billing are always comparatively high for small scale consumers (the vast

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1. For a discussion of the problems of allocating demand costs, see Paul J. Garfield and Wallace F. Lovejoy, Public Utility Economics, Englewood Cliffs, N.J., Prentice-Hall, 1964, pp. 159-164.

TABLE 13.8 Estimated Total Real Costs for the PLN for 1969
(Rp million)

	Low Estimate	High Estimate
Personnel	2,847	2,847
Fuel and lubricating oil	3,164	3,164
Maintenance	2,469	2,469
Other costs	1,421	1,421
Capital Charges and Depreciation	6,462	11,844
Total Costs	16,363	21,745

Source: Calculated from Tables 13.6 and 13.7.

TABLE 13.9 Assumed Allocation of Total Costs between Demand and Energy Costs

	Demand Costs.	Energy Costs
	%	%
Personnel	100	-
Fuel and lubricating oil	10	90
Maintenance	40	60
Other Costs	50	50
Capital Charges and Depreciation	100	-

majority of whom are lighting consumers) and low for large electricity users, many of whom are in the industrial category. By lumping consumer costs in with demand and energy costs, we are relieving lighting consumers of the burden of paying costs which are usually allocated specifically to them.[1] As for the division between demand and energy costs, we have erred on the side of making demand costs higher than they probably really are. Since the method of allocating demand costs that will be adopted below favours lighting consumers, the larger demand costs are relative to energy costs, the more likely is it that lighting consumers are being favoured. On the basis of these assumptions, we can divide up the total cost estimates into demand and energy components, as shown in Table 13.10.

All that remains is for the totals thus calculated to be allocated over the kWh consumed by each consumer class. The allocation of energy costs poses no problem, since it is reasonable that every customer should bear at least the direct cost of production of each kWh consumed. Thus as a *minimum*, Rp 5,039 million should be spread over the 1,316 million kWh sold in 1969, which means that each kWh cost at least Rp 3.829.

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1. We are ignoring consumer costs because it is impossible with the available information to make a reasonable guess of what they are for the different consumer groups. Two points can be made in defence. First, consumer costs are only a small proportion of total average costs per kWh. For example, in the Indian study made in 1962, while the total average cost of supplying electricity to a domestic consumer was estimated at 35.9 np. per kWh, consumer costs only made up 1.7 np. (or about 5 percent) of the total. The estimated cost of supplying a large industrial consumer was about 10.0 np. per kWh, of which only 0.2 np. (2 percent) was due to consumer costs. Second, the Indian data reinforces the argument that consumer costs are considerably higher for domestic consumers than for industrial consumers. This is also true for other lighting customers; in India, consumer costs for public and commercial lighting were 0.6 np. and 0.7 np. per kWh respectively. Indian Statistical Institute, op. cit.

TABLE 13.10 Estimated Total Real Costs for the PLN for 1969, Demand and Energy Components

(Rp million)

	Low Estimate		High Estimate	
	Demand Costs	Energy Costs	Demand Costs	Energy Costs
Personnel	2,847	-	2,847	-
Fuel and lubricating oil	316	2,848	316	2,848
Maintenance	988	1,481	988	1,481
Other costs	710	710	710	710
Capital Charges and Depreciation	6,462	-	11,844	-
Total	11,323	5,039	16,705	5,039
(Percentage)	(69)	(31)	(77)	(23)

Source: Calculated from Tables 13.8 and 13.9.

The allocation of demand costs is not so straightforward. In view of the high tariffs charged to industrial consumers during the peak load period (see Table 13.2 above), it seems likely that few industries take electricity from the PLN at peak times. This suspicion is reinforced by the knowledge that two or three shift factory operations are not common in Indonesia. Further, the sophisticated industrial enterprises that do have shift work probably rely mainly on their own generating plants. Thus it could be argued that industrial consumers probably contributed so little to the peak demand on the PLN's productive capacity in 1969 that they should not be expected

to bear any of the capacity costs at all.[1] We shall not take this extreme position however, but will instead arbitrarily assume that 10 percent of the costs associated with the peak demand are attributable to the requirements of industrial consumers.[2] These costs will therefore be spread over the total number of kWh sold to industrial consumers in 1969.

Non-industrial consumers in Indonesia take electricity almost entirely for lighting purposes. If possible, it would be desirable to estimate to what extent each of the different lighting consumer groups contributes to the peak load. Unfortunately this is not possible, however, and the best way of approaching the problem appears to be to treat all lighting consumers equally. This is equivalent to assuming that all of the non-industrial consumer groups have exactly the same load characteristics, and can therefore be thought of as all belonging to a single large homogeneous consumer group. This is certainly a second best solution, but it seems the best that we can do.

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1. The argument being that if industrial consumers did not contribute to the peak load, it would not affect the total amount of productive capacity required by the PLN if all industrial consumers were to withdraw from the system. This being the case, industrial consumers utilised only "spare" capacity and should be expected to cover only the marginal costs that they incurred. On the other hand, whilst this argument is appealing on resource allocation grounds, there are various reasons for expecting industrial consumers to pay more than the marginal costs of production incurred by them. For one thing, the analysis throughout this section implies that the PLN might be expected to include in its costs of production a rate of return on capital. Marginal cost pricing for industrial consumers only - as we have applied it here - would mean that this group would not be expected to contribute to the PLN's surplus. It does not seem reasonable that industrial consumers should be relieved of this obligation.

2. Ordinary and special industrial consumers (groups "P" and "chusus" in the PLN's classification respectively) together consumed about 18 percent of all kWh sold in 1968 (see Table 6.10). Given their probable propensity to avoid the peak, the assumption that they were responsible for 10 percent of peak demand is probably allocating to them more of the demand costs than is their due.

Adopting this procedure, all that remains is to spread the 90 percent of demand costs allocable to lighting consumers over the total number of kWh sold to them in 1969.

There is a further problem: we do not know how total sales were divided between lighting and industrial consumers in 1969. Although figures for total sales in 1969 are available (1,316 million kWh), we have no disaggregation by consumer group for the year. However in the previous year about 18 percent of kWh sold went to industry and about 82 percent to lighting consumers (see Table 6.10). We will assume that the proportions remained unchanged in 1969, in other words that 237 million kWh and 1,079 million kWh were sold to industrial and lighting consumers respectively.

On the basis of this series of assumptions, demand costs for 1969 can be allocated as shown in Table 13.11.

TABLE 13.11 Allocation of Production Costs for 1969

	Unit	Low Estimate	High Estimate
1 Energy Cost Allocation			
a. Total Energy Costs	Rp million	5,039	5,039
b. Spread over 1,316 million kWh	Rp/kWh	3.829	3.829
2 Demand Cost Allocation			
a. Total Demand Costs	Rp million	11,323	16,705
b. Share borne by industry (10%)	Rp million	1,132	1,670
c. Spread over 237 million kWh	Rp/kWh	4.776	7.046
d. Share borne by lighting (90%)	Rp million	10,191	15,035
e. Spread over 1,079 million kWh	Rp/kWh	9.445	13.934
3 Totals			
a. For industry (1b + 2c)	Rp/kWh	8.605	10.875
b. For lighting (1b + 2e)	Rp/kWh	13.274	17.763

Source: Calculated from Table 13.10.

Demand costs for industrial consumers work out at between about Rp 4.8 and Rp 7.0 per kWh, and between about Rp 9.4 and Rp 13.9 for lighting consumers. When energy costs are added in, the total cost per kWh sold to industrial consumers appears to have been between Rp 8.6 and Rp 10.9, and for lighting consumers between Rp 13.3 and Rp 17.8.

An alternative approach to the question of relative prices is to make estimates of appropriate prices on the basis of an international comparison. Table 13.12 presents information from various ECAFE countries on average annual revenue per kWh sold (which for most countries would have been close to the price per kWh) received from selected consumer groups. The overall pattern is fairly clear and contrasts sharply with the position in Indonesia observed earlier. In most ECAFE countries, domestic and commercial consumers who take electricity mainly for lighting purposes (although for the region as a whole this is considerably less true than it is for Indonesia) pay about 50 percent above the average, whilst industrial consumers pay about 75 percent of the overall average. In only two countries, New Zealand and Nepal, did the price paid by industrial consumers rise above the average, and then only marginally. If the average (unweighted) ratios for the region were applied in Indonesia and a full cost pricing policy was followed, depending upon whether the high or low average cost estimates above were accepted, industrial consumers would be asked to pay between Rp 9.3 and Rp 12.4 per kWh, and lighting consumers would be charged between Rp 18.6 and Rp 24.8 per kWh.

We should note immediately that because of the peculiar structure of demand in Indonesia where consumption by industry is comparatively unimportant, this form of international comparison is useful only as the roughest of guides. However because in most ECAFE countries the contribution of industrial consumers to the peak load would be higher than in Indonesia, the international

TABLE 13.12 Average Annual Revenue (per kWh sold) Received from Selected Consumer Groups[a] as a Percentage of the Overall Average in Various ECAFE Countries, 1965-1967

Year and Country	Domestic	Commercial	Industrial	Overall Average (= 100)	Actual Average Price (US cents)
1965					
Australia	105	166	76	100	2.06
Ceylon	88	147	70	100	3.60
Japan	198	157	73	100	1.72
Korea	224	b	87	100	1.73
Malaysia	171	110	64	100	2.70
Nepal	132	-	39	100	4.06
New Zealand	84	181	101	100	1.51
Philippines	164	140	77	100	1.24
Singapore	210	86	67	100	2.36
Taiwan	148	339	78	100	1.26
Thailand	152	103	70	100	3.18
1966					
Australia	121	156	74	100	2.07
Ceylon	90	151	69	100	3.49
Japan	196	155	72	100	1.74
Korea	225	b	85	100	1.97
Nepal	101	108	73	100	4.92
New Zealand	84	166	104	100	1.55
Taiwan	146	320	77	100	1.24
Thailand	149	124	69	100	2.94
1967					
Australia	105	161	76	100	2.05
Ceylon	119	161	62	100	2.77
Hong Kong	114	98	75	100	2.31
India	181	187	69	100	1.60
Japan	200	159	77	100	1.70
Korea	235	b	90	100	2.0
Malaysia	183	146	71	100	2.58
Nepal	99	79	103	100	3.50
New Zealand	84	170	101	100	1.36
Singapore	142	142	67	100	2.45
Taiwan	143	298	76	100	1.23
Overall (Unweighted) Average	146	162	76	100	-

Notes: a. Agricultural, Street Lighting and other consumer groups not shown.
b. Apparently included in Industrial category.

Source: ECAFE Bulletins on Electric Power in Asia and the Far East for the years 1965 to 1967.

comparison may well understate the spread of prices that would be appropriate in the Indonesian case. In other words, the suspicion that the detailed allocation of costs carried out earlier favours lighting consumers at the expense of the industrial group is reinforced.

Effective Subsidies to Different Consumer Groups

We are now in a position to return to the questions posed earlier about the size of subsidies received by different consumer groups. By comparing our estimates of prices charged to and costs incurred by selected consumer groups, we can calculate the subsidy per kWh received by the different categories. This is done in Table 13.13, which shows that the PLN's claim that the small domestic consumers are favoured is correct if we look at the subsidy per kWh. However the medium and large domestic consumers also received large subsidies, as do government offices. On the other hand, although industrial consumers also appear to have received a net subsidy, it was fairly small, whilst the commercial consumers were charged about their true costs of supply and may well have been paying a rate considerably above cost. Thus whilst there is some cross subsidisation implicit in the present pricing system, what stands out most strongly is the fact that nearly all consumers still receive a net subsidy from the PLN. (As Table 13.3 showed earlier, the six consumer groups represented in Table 13.13 accounted for over 80 percent of sales in 1968. The analysis could be extended to cover the other consumer classes not included, but our overall conclusions would remain substantially altered.)

One other feature of Table 13.13 should be noted. When the estimates are used to calculate a total effective annual subsidy, a most interesting result emerges. Total annual subsidies were surprisingly large for all groups except industrial and commercial consumers, and in addition they were highly regressive. Small domestic consumers received a subsidy of between about Rp 6,000 and

TABLE 13.13 Estimates of Prices, Real Costs and Effective Subsidies for Various Consumer Groups, 1969

Consumer Group	Estimated Price (Rp/kWh)	Estimated[a] Cost (Rp/kWh)	Effective Subsidy (Rp/kWh)	Annual Consumption (kWh)	Total Effective Subsidy per Annum (Rp)
Small Domestic	3.9	13.3-17.8	9.4-13.9	660	6,200-9,170
Medium Domestic	7.9	13.3-17.8	5.4-9.9	1,440	7,780-14,260
Large Domestic	9.2	13.3-17.8	4.1-8.6	5,880	24,110-50,570
Industrial	8.5	8.6-10.8	0.1-2.3	21,600	2,160-4,970
Large Commercial[b]	18.6	13.3-17.8	(0.8-5.3)	9,120	(7,300-48,340)
Government Agencies	8.9	13.3-17.8	4.4-8.9	10,440	45,940-92,920

Notes: a. All groups except Industrial regarded as lighting consumers.
b. Subsidy is negative.

Source: Tables 13.3 and 13.11.

Rp 9,000 per annum (about $15 to $25), whilst large domestic consumers were subsidised by between Rp 24,000 and Rp 50,000 each year ($60 to $120). This latter group includes most of the richest of the Indonesian elite. Industrial consumers received small subsidies, whilst commercial consumers appear to have been overcharged by quite large amounts which may have ranged up to nearly Rp 50,000 annually.

International Comparisons

From time to time during discussions on electricity pricing in Indonesia, references have been made to overseas practice,[1] though the references are usually to the structure of the tariff system rather than the average level of rates. It is usually correctly pointed out that overseas power tariffs are often considerably lower than lighting tariffs, while the reverse is true in Indonesia. It is also suggested that from the point of view of economic efficiency, this is an undesirable position and must change.

In relation to the average price level of electricity it is often implied that the average Indonesian price is roughly in line with average electricity prices overseas. It is this latter proposition that we will consider in this section. We will examine first some of the main factors influencing the cost of delivering a kWh to consumers in Indonesia against a background of conditions in other ECAFE countries, and then see what implications these factors appear to have for prices throughout the region and especially for Indonesia.

In drawing international comparisons, we run all the usual risks. First, definitions used may vary between nations and may not be made clear in the available statistics. Secondly, costs will vary because technical conditions vary in different countries and differences in cost levels may thus not reflect differences in efficiency at all.

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1. Tjipto Juwono and Abdul Kadir, op.cit.

Thirdly, as the Indonesian situation demonstrates, average price levels do not necessarily reflect different cost levels. But we shall assume that in the other countries, prices are roughly in line with costs. Fourthly, costs are compared in US currency converted at the official exchange rates; this may detract further from the comparability of prices. Finally, the statistics for many of the countries of the ECAFE region are probably not entirely realistic. Despite all these difficulties, an attempt will be made to make some comparisons, for what they are worth.

A number of factors suggest that Indonesia has higher costs of production than many of its neighbouring countries. We will begin by examining the capital costs of production, which are an important component of the total in an industry as capital intensive as the electricity industry.

Table 13.14 shows some typical construction costs of stations in the ECAFE region completed in the 1960-65 period. These costs are roughly comparable with those given for Indonesia in Table 13.4. It appears that the thermal power stations at Tandjung Priok and Tandjung Perak are expensive by international standards, as is the Makassar power plant. Rough figures suggest that construction costs for Djatiluhur were also high,[1] and the scattered diesel plants project met with many difficulties. That capital costs of plants built in Indonesia in the late fifties and the sixties appear to be high is not surprising considering that transport and construction delays took place and that cost control was probably often lax, both in the original screening of projects and in execution. Further, a large proportion of the investment during the period was financed with foreign aid which tied the Indonesian government to contractors in the aid giving countries rather than allowing it to select the most suitable bids available on the world market.

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1. See footnote 2 on p. 423.

TABLE 13.14 Typical Construction Costs of Recently Completed Thermal, Diesel and Gas Power Stations in Several ECAFE Countries

Country	Location/Name	Type[a]	MW	$/kW
Australia	Yallourn	T	240	153
	Bulimba	T	180	203
	Playford "B"	T	240	143
	Bunbury	T	120	186
	Darwin	T	15	380
	Alice Springs	D	2	230
	N.S.W.	T	1,400	107
		T	860	137
		T	400	183
		T	240	210
		T	120	247
Ceylon	Kelanitissa	T	50	225
Taiwan	Tunghsiao	G	56	102
Hong Kong	North Pt "B"	T	150	113
Korea	Pusan	T	132	214
	Yongwol	T	100	265
Malaysia	Johore	T	30	286
	Lemal	D	6	137
Philippines	Tegen	T	100	117
Singapore	Pasir Panjang "B"	T	120	170
INDONESIA	Tandjung Perak	T	50	320
	Tandjung Priok	T	50	330
	Makassar	T	25	340
	Outdoor Mobile Units	D	6.3	200
	Palembang	G	12.5	160
	Kebajoran	D	15	152

Notes: a. T = Thermal; D = Diesel; G = Gas.

Source: All countries except Indonesia: ECAFE, Electric Power in Asia and the Far East 1961 to 1965, New York, United Nations, 1968.

Indonesia: Table 13.4.

A second factor pushing up capital costs per kWh delivered appears to be the low technical efficiency in use of capital, as measured by kWh generated annually per kW of installed capacity. Table 13.15 shows that Indonesia ranks twelfth in a list of sixteen ECAFE countries (see column 1), and that technical efficiency in Indonesia is

TABLE 13.15 Generation of kWh per kW Installed and Average Transmission Losses in the ECAFE Region, 1961-1965

Country	Range (kWh/kW)[a]	Average Transmission Loss (%)
Japan	4,590 - 5,130	12.88
Taiwan	4,420 - 5,450	15.86
Korea	4,220 - 4,830	26.34
New Zealand	4,070 - 4,470	15.66
Philippines	3,920 - 5,030	13.38
India[b]	3,880 - 4,090	18.25
Hong Kong	3,690 - 4,610	13.26
Australia	3,540 - 4,180	15.56
Malaysia[c]	3,530 - 4,500	13.16
Singapore	3,050 - 4,080	11.32
Pakistan[d]	2,640 - 3,570	25.8
INDONESIA[e]	2,540 - 3,500	19.66
Ceylon	2,270 - 3,300	16.28
Iran[f]	2,070 - 2,650	20.4
Thailand	1,980 - 2,560	21.9
Burma[b]	1,505 - 1,895	26.85

Notes: a. The number of kWh generated per kW of installed capacity usually varies from year to year. The Table shows the range of variation (upper and lower limits) for the five year period 1961 to 1965.
b. No loss figures for 1965; for Burma, range figures omit 1963 and 1964.
c. States of Malaya only.
d. No loss figures for 1964.
e. Calculated from figures given by Ahmad M. Hoesni and A. Arismunandar, Surveys and Planning for Development of Energy Resources in Indonesia, in Ahmad M. Hoesni et. al., Beberapa Aspek Persoalan2 Ketenagaan Negara2 ECAFE, op.cit.
f. Only 1965 figures available.

Source: As for Table 13.14.

well below such economically successful countries of the region as Japan, Taiwan and Korea.[1] In addition, figures given in Table 13.16 suggest that technical efficiency in the Indonesian electricity industry deteriorated further during the sixties.

There appear to be two main reasons for this comparative inefficiency. For one thing, the over-investment in generation in the early sixties meant that generating capacity often lay idle simply because the transmission and distribution systems, especially in West Java, could not bear the load.[2] In addition, the comparatively high percentage of capacity in diesel plants has contributed to the inefficient use of capital. Many of these plants are used for a short period of perhaps only six hours a day. Table 13.17 shows that on the average, diesel plants produced only about 1,660 kWh per kW of capacity compared with a theoretical maximum of 8,760 kWh. This is very low by international standards, and is even low compared to the efficiency of utilisation achieved in the other main generation sectors in Indonesia.

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1. The efficiency of utilisation of installed capacity in Indonesia appears to be well below that in most other areas of the world. In 1964, kWh produced per kW of installed capacity in various areas was as follows: North America, 4,778 kWh; West Europe, 4,100 kWh; East Europe and USSR, 4,991 kWh; Asia (estimated), 4,712 kWh; Latin America, 3,901 kWh; Africa, 4,061 kWh; Oceania, 4,230 kWh; World (excluding communist countries in Asia), 4,576 kWh. The overall average for the developed countries was 4,651 kWh, and for the under-developed countries (excluding communist countries in Asia) 3,868 kWh. These figures are from N.B. Guyol, The World Electric Power Industry, op.cit., p. 94f.

2. See, for example, the comments made by M. Bertoye in his report to the Department of Public Works and Power in 1968 where he said of Djakarta, "Generally speaking, the distribution systems are overloaded. This condition is the main reason of the present difficulty to meet the demand as on the other side the generation capability is in excess." (p. 18), Republic of Indonesia, Department of Public Works and Power, Directorate General of Power and Electricity, Development of Electrical Systems of Java, mimeo., July 1968. It is to remedy this deficiency that the World Bank recently agreed to provide a loan of $15 million to the PLN.

TABLE 13.16 Generation of kWh per kW Installed and Transmission Losses for Indonesia, 1961-1970

Year	kWh Generated/kW	Losses (%)
1961	3,500	14.3
1962	3,290	20.5
1963	3,260	21.0
1964	2,540	22.0
1965	2,710	20.5
1966	2,660	21.5
1967	2,730	25.7
1968	2,660[a]	30.46
1969[b]	2,790[a]	29.0
1970[c]	n.a.	30.4

Notes: a. Excluding a small amount of electricity bought from outside the PLN in the Outer Islands. Electricity purchases made by PLN in Java are included and are assumed to be from Djatiluhur which since completion has been separated from the PLN and made into an independent state enterprise.
b. Estimates.
c. Forecast.

Source: 1961-67: Calculated from Figures given by Ahmad M. Hoesni and A. Arismunandar. See footnote e in Table 13.15.

1968-70: Calculated from figures given in the Annual Reports of the PLN for 1968 and 1969.

TABLE 13.17 Generation of kWh per kW Installed, by Prime Mover, 1966-1969

Year	Diesel	Thermal	Hydro	Gas	Total
1966	2,110	2,930	2,850	-	2,660
1967	1,960	2,700	3,240	-	2,730
1968[a]	1,370	2,650	3,600	1,780	2,660
1969[a]	1,660	2,500	3,710	1,400	2,790

Notes: a. Exclusions as for Table 13.16.

Source: 1966-67: Figures supplied by the Directorate General of Electricity and Gas.

1968-69: Calculated from the Annual Reports for 1968 and 1969.

Table 13.17 shows that diesel plants were used much less intensively than either thermal or hydro plants.

A third factor influencing costs per kWh sold are the high losses in transmission and distribution. In this respect, too, Tables 13.15 and 13.16 show that Indonesia compares fairly badly with many other countries in the region and that the position seems to have deteriorated further since 1965. The extremely high losses in recent years are no doubt partly due to the very poor condition of the distribution network, but part of the explanation is the practice of stealing. In Djakarta, where stealing is common, losses in transmission and distribution in 1969 were expected to account for as much as 40 percent of supply.

In discussing capital costs we have thus far isolated three main factors which could be expected to have a significant effect in raising the costs of producing electricity in Indonesia - high initial capital costs, comparatively inefficient use of capital invested in the generating sector (which is where most capital has been invested over the last 15 years), and high losses. The last two factors combined mean that in terms of kWh sold per kW of installed capacity, Indonesia must compare unfavourably with most other countries in the ECAFE region and costs per kWh sold will be pushed up as a result.

Turning now to other main components of costs, fuel costs might initially be slightly lower in Indonesia than elsewhere in the region, but this advantage is probably offset by high transport costs to the less accessible regions. Fuel costs on the Outer Islands are often more than double those on Java. No comparative international figures are available for fuel costs. Similarly, any advantages in the low wage rates are likely to be offset by a low kWh sold per employee ratio resulting from excess employment and high losses. In 1969, the PLN sold around 105,000 kWh per employee, a significant improvement in performance over the previous few years. By comparison,

the figure for Singapore in 1968 was about 434,000 kWh, for Australia about 874,000 kWh, and for Japan a remarkable 1,924,000 kWh. The figure for Papua New Guinea in 1968, an area where the industry is much smaller and faces some of the same difficulties as in Indonesia, was 128,000 kWh sold per employee, significantly above that of Indonesia.[1]

Another important factor which tends to push both capital and running costs in Indonesia above costs in other ECAFE countries is the average size of plant. There are considerable economies of scale in electricity generation, and even the largest and most modern thermal plants in Indonesia (Tandjung Priok and Tandjung Perak) are small by international standards.[2]

It thus appears that there are several factors tending to push up costs per kWh in Indonesia compared with neighbouring countries. How do prices compare? Table 13.18 lists the available sketchy data on average annual revenue per kWh sold for the ECAFE region for the years 1961-65. These presumably reflect the costs of production to some extent although not too much reliance can be placed on the Table. The countries are arranged in the same order as in Table 13.15 above and it appears that there is a rough inverse correlation between prices and efficiency. The average expected revenue per kWh sold by the PLN in 1969 of 1.83 cents (Rp 6.85) appears to be below prices in such countries as Hong Kong, Malaysia, Singapore and perhaps Korea, which on efficiency grounds could be expected to have lower costs of production and prices than Indonesia. On the information presented in

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1. See Table 10.3.

2. Data from the United Kingdom for 1964/65 illustrate how economic efficiency increases with plant size. For conventional steam plants of less than 5 MW capacity, general cost per kWh sent out (excluding capital charges) in US cents was 2.8. For plants of between 5 MW and 10 MW, the cost rose to 4.6 cents; the cost for plants between 100 and 150 MW was 1.0 cents, and for greater than 500 MW 0.6 cents. See N.B. Guyol, op.cit., p. 98.

TABLE 13.18 Overall Average Annual Revenue per kWh Sold, 1961-1965

(US Cents)

Country	Range	Average
Japan[a]	1.60 - 1.72	1.665
Taiwan	0.80 - 1.26	1.098
Korea	1.44 - 2.74	2.192
New Zealand	1.5 - 1.59	1.548
Philippines	1.23 - 2.96	1.752
India[b]	1.94	1.94
Hong Kong[c]	2.66 - 2.68	2.67
Australia	1.24 - 2.19	1.782
Malaysia[d]	2.62 - 3.07	2.754
Singapore[e]	2.36 - 2.54	2.445
Pakistan[f]	3.00	3.00
INDONESIA		
1969 Annual Revenue	1.83	
1969 Estimated Cost	3.32 - 4.3	
Ceylon	3.00 - 3.60	3.24
Iran	n.a.	n.a.
Thailand	3.14 - 4.12	3.6
Burma[g]	9.0 - 10.9	9.9

Notes:
a. 1962 not included.
b. 1961 only. There is evidence to suggest that this is about 50 percent below the cost of production. Indian Planning Unit, Indian Statistical Institute, op.cit.
c. 1961 and 1962 only.
d. States of Malaya only.
e. 1962 not included.
f. 1963 only.
g. 1964 and 1965 not included.

Source: All countries except Indonesia: as for Table 13.14.

Indonesia: Tables 13.1 and 13.7.

Table 13.15 it would be reasonable to expect costs of production in Indonesia to be on about the same level as Pakistan, Ceylon and Thailand (assuming that original construction costs and fuel, labour and maintenance costs did not vary greatly). Thus, our estimates of costs per kWh sold of between 3.3 cents and 4.3 cents (Rp 12.4 - Rp 16.5) per kWh do not appear to be unreasonably high, especially when the apparent decline in efficiency in Indonesia over recent years is borne in mind.

The Effects of Depressed Prices

Although in theory the broad outlines of the government's policy have been stated fairly clearly - the PLN is to operate on the principle of "cost-accounting" (full cost pricing) without a subsidy - the PLN's response to this policy has been confusing. According to a paper presented to the Seminar on Electricity in Djakarta in July 1969 by two high officials,[1] the PLN aims to eliminate deficits by about 1974, and thus fulfil government policy.

Two points might be made. First, when the comments were made, 1974 was still more than four years away, a long time to move towards balance in the industry's accounts. Second, there seems to be confusion within the PLN about the economic meaning of the term "subsidy" and about the difference between eliminating a book deficit and eliminating an economic deficit. If the costs of operations as shown in the books of the PLN are lower than the real costs incurred, and if the real costs incurred are borne by some other organisation (such as the government), then the PLN is receiving a subsidy from that organisation. If the PLN in turn passes on this subsidy to electricity consumers through setting prices below real costs, then consumers of electricity are being subsidised. A proper pricing procedure requires an adequate allowance for depreciation and other capital costs to be charged to

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1. Tjipto Juwono and Abdul Kadir, op.cit.

consumers. This crucial point often seems to be completely overlooked by politicians and other advocates of cheap electricity in Indonesia. So widespread has this habit become that many people, including some officials within the PLN, regard the PLN as covering costs when daily running expenses are covered. Indeed even the "breakeven" point nominated for 1974 does not provide for a proper allowance for capital costs.

The PLN is receiving indirect subsidies from the government in at least two ways. For one thing, the so-called capital charge item in the books of the PLN does not reflect the real capital costs that are being incurred in producing and distributing electricity. The government is foregoing interest on capital and the PLN is not generating sufficient internal funds to cover such items as depreciation and a surplus to build up reserves. Thus, even if the so-called capital charge were set aside and used for that purpose, full costs would not be covered and the PLN would still be in receipt of a hidden subsidy from the government. In practice, as we have noted, it has tended to be spent for other purposes or not at all. In addition, the PLN has probably managed to make ends meet only by drastic savings on maintenance expenditure, that is, through capital consumption. Sooner or later the capital lost in this way will have to be made up, through grants or credits from the government or from other sources. To the extent that consumers are not covering full present maintenance costs, they are indirectly being subsidised.

A good deal of the blame for the present confused situation must rest squarely with the government rather than with the PLN which has been placed in a very difficult position. The government has not allowed the PLN either to revalue assets or to charge on a full cost basis. The inevitable result has been the continuation of various ad hoc measures. It is perhaps natural but nevertheless disappointing to find that the PLN is now

pressing for further subsidies through relief from taxes. In the longer run, the nation would be better served by tackling the basic problems of high costs and low prices in order to put the PLN's finances on a sound footing. The difficulty with ad hoc measures is that they only hide the problems temporarily, rather than lead to a permanent solution.

The system of hidden subsidies has a number of consequences. First the government is deprived of the revenue from interest payments and from any surplus that the enterprise might have yielded under a full cost pricing system. In addition, the government has, during the last decade, incurred costs for running expenses. No accurate estimate of total funds lost to the government in these ways is possible. A first approximation might be made by making a rough estimate of interest and surplus foregone by the government, and of depreciation and other internal funds that the PLN might have been expected to generate.[1] On the assumptions of Table 13.5, charges on capital of Rp 4.91 - 9.00 per kWh would have yielded Rp 6.45 - 11.83 billion in 1969.[2] This is between 2.8 and 5.2 percent of the total domestic earnings of the central government in 1969-70 (Rp 228 billion). For a government in such urgent need of additional revenue as the Indonesian government to forgo such funds is an act of no small significance.

Second, the important point that large subsidies to public enterprises are usually inflationary is often overlooked in Indonesia - at least amongst the advocates of cheap electricity. Thus the paradoxical position developed during the sixties where the government's efforts

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1. The failure of the PLN to generate these internal funds is a cost to the government, inasmuch as the PLN would have been able to use these to finance capital expenditure or retire debt. As it is, the government has to bear these costs.

2. This assumes a zero price elasticity of demand. Given the existing acute shortage of electricity, this is not an unrealistic assumption to make.

to contain inflation through, inter alia, low electricity prices only increased the inflationary pressures resulting from the large government budget deficits swollen by subsidies to the PLN.

Third, unlike subsidies to some other public enterprises in sectors such as transport which benefit a high percentage of the total population from a wide range of income groups, a system which subsidises electricity consumers is very selective. As we saw in Chapter 6, considerably less than 1 percent of the total population are registered customers, and it is unlikely that more than 5 percent of the population live in dwellings to which electricity is connected. Further, as is common in underdeveloped countries, consumption of electricity in Indonesia is mainly an urban phenomenon. The five large cities of Djakarta, Bandung, Semarang, Surabaja and Malang account for about 41 percent of the total number of customers in Indonesia and for about 53 percent of total sales. Thus only a small segment of the Indonesian people, predominantly urban dwellers, enjoy the use of electricity. It is this group that enjoys a subsidy at the expense of the vast majority of the population, most of whom are rural dwellers.

In addition, under the present arrangement, the subsidy system is regressive. The largest consumers, who tend to be the wealthier and more powerful people in the community, receive the largest subsidy. Conversely, the smallest consumers receive very small subsidies by comparison. Since the price of electricity for large domestic consumers has fallen relative to prices for other consumers since 1965, in recent years the subsidy to the wealthiest consumers has probably increased. This regressive effect is a strong argument against the main justification put forward in support of the present arrangement - that consumers, many of whom are said to be civil servants on low salaries, cannot afford to pay higher prices. If the government wishes, for political reasons, to subsidise

electricity consumption by low income groups and civil servants, then appropriate adjustment of the structure of the tariff would be a more efficient means than depressing the average price level of electricity.

Fourth, by failing to require the PLN to meet strict financial objectives and provide a reasonable surplus, the Indonesian government is sacrificing a powerful incentive to efficiency. How to ensure efficiency in state-owned companies is notoriously one of the largest problems connected with this form of enterprise in all market economies, and the general experience is that a subsidised public enterprise is apt to be an efficient one.

There is a final issue to discuss. It may appear that the implicit argument being advanced here is that a policy of full cost pricing should be adopted. This is certainly the author's own preference, but it is not necessarily the conclusion to be drawn from the above discussion. Any pricing policy chosen involves value judgements because distributional issues are involved - an implicit decision is made to subsidise or not to subsidise particular consumer groups and electricity consumers as a class. Decisions about electricity pricing policies are political matters, best made by the appropriate Indonesian political authorities. The consensus that has emerged on this matter in most countries where a clear relationship has been established between public enterprises and the government was summed up by a United Kingdom Committee of Inquiry into the electricity supply industry in the following terms:[1]

> " 372. We state our view without any qualification that the governing factor in the minds of those running the Boards should be that it is their duty to make them pay.
>
> 373. If it is thought in the national interest that some course other than a purely economic

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1. Report of the Committee of Inquiry into the Electricity Supply Industry, Command 9672, H.M.S.O., January 1956, p. 97.

> course should be followed, it is in our opinion the responsibility of the Minister acting on behalf of the Government to require that course to be adopted. Whether this need be by a formal direction or by the expression of Government wishes in writing is not, in our opinion, important, so long as it is known publicly that the Minister has taken a particular course and is answerable to Parliament for it. It is not for the persons running the industry to undertake uneconomic schemes of expansion, whether in rural or urban areas, in the supposed national interest, if the effect is to subsidise one particular body of consumers out of the pockets of others.... Matters of supposed national interest if they conflict with the economic operation of the industry should be recognised as essentially political matters to be decided by the Minister subject to his responsibility to Parliament."

There seems no good reason why the experience of other countries should not be applicable in Indonesia. Thus rather than impose our own value judgements, we have tried above, firstly, to show that prices are still well out of line with costs, and secondly and more importantly, to quantify some of the effects of variation from full cost principles so that the consequences can be seen clearly rather than simply guessed at.

In principle, there is nothing wrong with variations from full cost pricing principles. There is nothing sacred about costs, and the prices of government goods and services in most countries are frequently, perhaps even usually, provided above or below cost for social and Political reasons. Public utilities certainly serve social as well as economic objectives - indeed this is one of the main reasons that their operations and prices are usually regulated. Nevertheless there are two general principles that should be followed if governments and the general public are to appreciate fully the consequences of any particular pricing policy. In the first place, the objectives of the policy should be defined. Secondly, the consequences of the policy, particularly its efficacy in achieving the specified objectives and the various costs of its adoption, should be investigated. Preferably, these

costs should be made quite explicit in the annual reports and financial statements of the enterprise because experience has shown that hidden costs are often forgotten costs. (This is one reason why indirect subsidies like tax exemptions are undesirable.)

The objectives that electricity tariffs are expected to further in Indonesia were set out earlier in the section. It is now clear that none of the electricity tariff schedules introduced since 1965 have been even close to the mark. They have been both ineffective in achieving their specified objectives, and have involved high social costs. Whilst it is true, for example, that prices to small domestic consumers have been low, other objectives have been sacrificed. Far from paying their full costs wealthy consumers receive large subsidies, and for most consumer groups tariff schedules do not in any way encourage the economic use of electricity.

Neither have tariffs encouraged industrial consumers to buy more power from the PLN. This is not so much a consequence of the tariff structure, as of the poor quality service offered by the PLN - but this in turn is a consequence in no small degree of the continual financial crises in the industry caused by the depressed average price level. Thus important costs of departing from a full cost pricing system have been inconvenience and delays to consumers, and sometimes even damage to electrical equipment. Most domestic consumers have had no choice but to put up with these costs, but many industrial consumers have made their preference clear by switching to own-generation - they have voted with their feet! Indonesia's experience parallels the pattern that emerged in Latin America when electricity prices were depressed. The authors of a study of Latin American experiences summed up their findings by concurring with an OEEC view:[1]

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1. OEEC, The Trend of the Selling Price of Electricity and its Relation to the Financing of New Plant, Paris, November 1958, p.24, quoted in Cavers and Nelson, op. cit., p.8.

> "If a price policy which prevented electricity undertakings from raising funds for development were to lead to a shortage of power, it would place a much heavier burden on economic activity than would the increase in income which electricity undertakings could obtain by bringing their prices into line with their costs."

Indonesian policy makers would do well to ask whether Cavers and Nelson's conclusion is not valid for Indonesia as well:[1]

> "It seems clear that Latin America's need is for more electricity, not for cheap electricity."

In summary then, if Indonesian decision makers believe that cheap electricity has positive net social benefits and is an efficient method of achieving their stated social objectives, then they are justified in persisting with the policy. However the above analysis shows that the social costs of cheap electricity, which include widening of income differentials, exacerbation of inflationary pressures, incentives to inefficiency in the PLN, and misallocation of investment in both the public sector (through encouragement of over-investment) and the private sector (through use of own-generation), have been high. These social costs are rarely mentioned in Indonesia, and one suspects that they are only dimly perceived - if perceived at all - by most policy makers. In the long run, cheap electricity for Indonesia has turned out to be expensive indeed.

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1. Cavers and Nelson, op.cit., p. 8.

CHAPTER 14 Conclusions

The history of the Indonesian electricity supply industry is hardly a successful growth story. By international standards, growth has been at best sluggish. For a country of 120 million people, the industry is still tiny. Further, since an abnormally high proportion of output has been used for lighting, the industry's contribution to the important goal of encouraging industrial development has been negligible. Yet since the Second World War, demand has always far exceeded supply. From this point of view, conditions could hardly have been more favourable. The industry seems to provide a perfect case where prices could have been sharply increased and supply rapidly expanded to the benefit of the vast majority of those involved. *What went wrong?*

There is sometimes a tendency in Indonesia to deprecate overseas experience in a particular field - to say that "that analysis (or solution) does not suit Indonesian conditions." In some cases, this is true. However it is often a mixture of nationalism and reluctance to admit that there are in fact definite (though perhaps unpleasant and difficult) steps that can be taken towards the solution of the particular problem. The electricity industry falls squarely into the latter category. It is a good example of an Indonesian problem that has close similarities to that experienced in other countries.

In analysing the difficulties of public enterprises, it has been found useful in both developed and under-developed countries to distinguish between different kinds of factors affecting the enterprise's performance:[1]

> "These may be divided into three classes, namely (a) "objective" socio-economic conditions, for example the "state of trade", both internal and external, the conditions of the labour market, the availability of various types of skill, the general social and ideological environment, (b) decisions taken externally to the enterprise, for example the

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1. "Management of Public Industries," in Public Industrial Management in Asia and the Far East, United Nations Technical Assistance Programme, New York, 1960, p.5.

law which prescribes its constitution and governs its relationship with higher authority, the laws that impose on it obligations in respect of labour relations, employee welfare and personnel practices generally, the directives that it receives from the responsible Minister, and the general economic policies which determine the scope of its operations; and (c) the internal organization and procedures of the enterprise itself. Unless the effect of the third of these can be isolated, to some degree, from that of the other two, the measurement of the specific contribution of managerial behaviour to the over-all result is not possible."

The first two categories are closely related, but it will be useful to distinguish between them here.

The basic argument advanced here is that (a) the "objective" socio-economic conditions and (b) the decisions taken externally to the enterprise were more important in retarding the growth of the industry than (c) the internal operations of the PLN itself. We are forced to this conclusion because although there are several ways in which PLN managers might have improved overall internal efficiency, the availability of capital was a crucial limiting factor. There were strong political pressures on the PLN to overinvest in generation to the neglect of transmission and distribution, and within the generation sector the PLN was obliged to invest more in diesel plants than pure efficiency criteria would have implied. Thus while an improvement in internal efficiency would have increased productive capability, only a small amount of the extra output could have actually been distributed to consumers. It is difficult to see that any measures the managers themselves might have taken would have made more than a small difference to the industry's average rate of growth of sales.

External Problems

The (a) uncertain and difficult socio-economic conditions in Indonesia throughout the sixties presented daunting problems for all industries. We will focus our attention on four particular features that severely hampered the operations of the PLN (and many other state

enterprises as well): transport and communication difficulties; inflation; social attitudes towards government-controlled prices; and the frequent changes in the government's budget priorities in the pre-1966 period.

Problems of transport and communications contributed greatly to the difficulties of effective management. It has sometimes jokingly been said of Indonesia that "The authority of the central government doesn't extend for more than 20 km out of Djakarta." This is an exaggeration of course, but throughout our study we saw many instances of regional PLN officials "bending" central office directives to suit local conditions. Under the circumstances this was the sensible thing to do, but the issue arises of whether it would not be best for the government to recognise the de facto situation and allow the different regional boards more overt independence, perhaps even in such matters as wages and working conditions, recruitment of staff, and pricing. Even in countries where transport and communication facilities are far better, the administration of electricity utilities is usually much more decentralised than in Indonesia. By area, the PLN must be one of the biggest electricity companies in the world. The tendency towards a high degree of centralisation in Indonesian public enterprises (and in other government services) has been noted by other scholars, who have questioned the policy:[1]

> "Has there, then, been any change in Indonesia's general economic environment to justify a belief that the highly centralised and monolithic P.P.N. [Government Estates Central] organisation will operate efficiently and profitably enough in circumstances of increasing complexity to carry on [an enterpreneurial function]? If it does not, what will be the consequences?
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> My own view is that the resoration of efficiency and financial discipline in P.P.N. will not be achieved just through the tightening of control and supervision from Djakarta. They could be achieved if the 'autonomy' granted to Units under Ordinance

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1. J.A.C. Mackie, "Indonesia's Government Estates and Their Masters," Pacific Affairs, Vol. XXXIV, No. 4, Winter 1961-62, pp.350-51.

> 19/1960 meant that real initiative and incentives to use it would be left to local officials. Successful operation of the estates presupposes not only realistic policies, but also a much tighter corporate discipline than any Indonesian public bodies have yet achieved."

For the PLN, one wonders whether the time has not come to experiment with more formal - and financial - decentralisation.

The effects of inflation and the constraints imposed by social attitudes towards government-controlled prices were closely related. Indonesian public utilities have proved especially vulnerable to inflation. A familiar "vicious circle" has developed. Public utility charges have usually been directly government-controlled, and there have been high political costs attached to raising them. All governments since independence have therefore tended to delay price increases for as long as possible, in practice preferring to allow themselves to be "forced" into granting subsidies. The subsidies have usually been inadequate, especially in the face of continuing inflation, so the service provided by the utility has deteriorated, public dissatisfaction has increased, and public resistance to further price increases for the "inefficient and badly run company" has strengthened. There is no way out of this dilemma that all public enterprises in all countries face: either prices must cover costs, or subsidies must be provided, or the quality of the services offered must decline. It is generally agreed in Indonesia that the latter two choices are most undesirable, yet the first choice is, in practice, deemed even more unsatisfactory.

In contrast to the consequences of inflation which swiftly and directly affected the PLN in a variety of ways, the frequent changes in the government's budget priorities (for both routine and investment expenditures) in the first half of the sixties were, in the short run at least, less serious. The electricity industry was fortunate, since the technology of the industry virtually compelled the government to supply at least the minimum of funds required to keep machines operating and construction projects

moving. It was not possible for an electricity generating station to cease production unobtrusively for a month or two without anybody noticing in the way that state enterprises in other industries could. And electricity construction schemes were prestige projects, usually backed by foreign aid givers, which the government was keen to press on with if possible. Thus although the industry was constantly plagued by financial difficulties because of its need to rely on uncertain outside financing, slow and steady progress was maintained.

Indeed this steady expansion of output and capacity is a notable characteristic of the industry - one that distinguishes it from most other industries throughout probably the whole of the post-war period and certainly throughout the sixties. The electricity sector is one of the very few Indonesian industries in which capacity and production has not actually declined at some stage since independence.[1]

The three last-mentioned socio-economic factors - inflation, social attitudes towards government-controlled prices, and frequent changes in the government's budget priorities - along with the atmosphere of political instability that prevailed throughout much of the post-

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1. Thus J.A.C. Mackie was not quite correct when he said that small holders' rubber "... is the only sector of the economy, other than the rather special case of the oil industry, where a substantial increase over prewar production has occurred," or that petroleum"...is the only sector of the economy in which substantial new investment has taken place...and a steady postwar increase of production has been maintained." But Mackie's comments point up well the fact that the growth of the electricity industry has, in terms of a domestic comparison, been quite good. Further, speaking of the nation's capital stock throughout the sixties, Glassburner notes that "... it is indubitable that it has declined in major sectors and probably in the aggregate." The electricity industry has therefore certainly outperformed the economy as a whole. See J.A.C. Mackie, "The Indonesian Economy, 1950-1963," and Bruce Glassburner, "Economic Policy-Making in Indonesia, 1950-1957," both in Bruce Glassburner (ed.), The Economy of Indonesia: Selected Readings, Ithaca, Cornell University Press, 1971, pp.28, 35 and 427 respectively.

war period, combined to produce a feeling of uncertainty and a high rate of time discount within the industry. Once a high rate of time discount is assumed, much of the apparently short-sighted behaviour of PLN decision makers becomes more rational. Longer term measures aimed at improving the performance of the industry, whether they were pressing for institutional reforms and a guaranteed financial position or long range investment planning, were not worth considering seriously. The environment in which the enterprise was operating was changing far too quickly. Far better to take any investment funds offered today, even if they would eventually lead to sectoral imbalance, rather than wait until tomorrow in the hope of arranging a more balanced investment program. A bird in the hand was worth ten in the bush!

In addition to the several difficulties arising from the wider economic environment, the performance of the PLN was severely constrained by (b) decisions made externally to the exterprise on matters directly affecting both current and capital income and expenditure. We have seen how little control the managers had over current income. Throughout most of the period they philosophically (perhaps too philosophically!) accepted that prices were largely outside their control and concentrated their attention on lobbying for subsidies and achieving economies on the expenditure side. The "Consulting and Contracting Scheme," one of the causes of friction during the "77 Employees Dispute," can be seen as an attempt by the PLN management to gain a little more independence in revenue decisions. On the cost side, there was little room to manoeuvre either as evidenced by the drastic cuts in maintenance that the management felt forced to implement. Further, as we saw in the chapters on labour matters, in theory PLN managers were allowed considerable freedom in recruitment and wage policies, but in practice they had only a small amount of discretion.

Indeed until about the end of 1965, the managers were under constant pressure to increase the labour force, and thus allow further increases in labour costs. Considering the political pressures of the times they did well to restrict the increase as much as they did. In many other government sectors, unjustified job creation was far more serious.

Similarly, many decisions about capital expenditure were made largely outside of the enterprise. Chapters 7 to 9 dealing with investment policies and their implementation showed how little say the PLN Directors really had in the financing and progress of investment plans for the electricity sector as a whole. In most developed countries, for example, electricity officials can draw up long term plans with a reasonable degree of confidence that sufficient finance will be forthcoming (often from long term government-guaranteed loans) to carry them through. In Indonesia, this was not the case. As we have seen, the role of foreign aid in determining investment plans in the industry was crucial. It was the availability of foreign credits that determined whether any particular sizable project was commenced, and the vested interest that the aid-giving nation then had in the project's successful completion was often an important political factor in ensuring that progress continued.

There is a lesson for the future here. Since the industry is one of the few cases where steady growth has occurred, the source of capital that permitted this expansion is of special interest. Unless domestic surpluses can be developed (either from within or outside of the industry), the electricity sector will have to rely entirely on the continued good graces of foreign aid givers for further growth. Since demand for electricity at present greatly exceeds supply, and since electricity is a luxury good in Indonesia, the economic case for expecting the sector to generate substantial surpluses for internal reinvestment seems compelling. If the electricity industry with its relatively favourable conditions is unable to raise funds

for capital accumulation, which Indonesian industry can?

Internal Problems

But to emphasise the external problems is not to say that improvements were not possible in (c) the internal organisation and procedures of the enterprise. Our study of labour issues earlier in the thesis confirmed some expected results and suggested that certain other matters, labour commitment and the wage structure in particular, should be looked at more closely. This is probably true not only for the PLN but for the public sector as a whole. It may be that the scope for improvement in labour productivity is wider and less costly than is often thought the case.

Overstaffing occurs - this will surprise no one - but in the PLN is probably not as serious as might have been expected. Certainly the output-labour ratio (measured in physical terms) is very low by international standards, but the techniques used (particularly the isolated diesel plants) and the geographical conditions justify a lower ratio than would be appropriate in most other countries. It is most encouraging that the PLN is facing up to the problem of excess employment with policies of accelerated retirement and a clampdown on new recruitment. This may well lead to a reduction in staff of some ten percent or more within the next five years.

Inefficient use of the existing work force is a more serious problem than its excessive size. For example, such matters as morale, clerical efficiency and maintenance standards could probably all be improved substantially without additional expenditure if suitable personnel policies were adopted. Failure to be more progressive in this area is one of the more serious weaknesses of the managerial policies in the industry.

It is a question of incentives and labour commitment. The usual response of both Indonesians and Westerners when the subject is raised is that an increase in wages is needed to improve labour efficiency. But one wonders. For one thing, total labour costs are at present too high in

the PLN. For the foreseeable future, the PLN will simply be unable to pay substantially increased wages out of its own revenue. This means either that other ways must be found to increase labour productivity, or that we must accept that there is little that can be done to improve labour productivity for some time to come.[1] Second, the macro-economic effects must be considered. The argument that if the PLN cannot pay, increased wages should be passed on either to consumers in the form of higher prices or to the taxpayer in the form of higher subsidies is not so straightforward as it appears. The effect of either policy would be to give PLN employees an average wage that was relatively high by domestic standards - dreadfully low by Western standards though it may be. Is it in the national interest that "high-wage islands" should be established in the electricity sector? Is this likely to generate pressures for higher average wages in other public enterprises? And perhaps throughout the whole government sector? And perhaps throughout the whole of the "modern" industrial sector also? Is this still in the national interest? Careful thought to the objectives and effects of a wages policy for the whole of the public sector is needed here, rather than the oversimplified response of attempting to raise average wages by an inevitably small amount.

Neither is it obvious that it is merely a question of increasing the wage differentials. Differentials for skill are already extremely high by Western standards. But as we have seen, we need more information about the effects of different types of incentives on PLN employees" performance. Does an employee evaluate a marginal increase in salary with respect to his own salary, or as seems quite likely, with respect to the total monthly income of his family? How feasible is it for an employee to gain the extra formal skills needed for rapid promotion in any case? It may well be all but impossible. Differentials of twenty,

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1. A third alternative is for the government to pay for increased wages in the industry with subsidies. Presumably this is unacceptable to the government - at least as a deliberate policy measure.

thirty or forty to one might be ineffective if for the majority of employees institutional factors present insurmountable barriers to their ever benefiting from the differentials.

There are other means of providing incentives and improving labour commitment than by increasing wages or widening differentials. It seems clear from the "77 Employees" episode that even within the upper echelons, employee discontent is high. In this context, it is significant that the "77" were amongst the industry's most highly paid workers. It may be that the attitudes of elitism and paternalism, closely related to the phenomenon of bapakism, are more serious barriers to high labour productivity than the wage structure. In this context, the following comments, offered at an ECAFE seminar on management of public industrial enterprises, could not have been more appropriate had they been written with the PLN especially in mind:[1]

> "The function of management is all too frequently conceived simply as the making of decisions which, expressed in the form of orders, are communicated, verbally or documentarily, to subordinates who are expected to obey them without question or comment. There is no doubt, of course, that this kind of management will work - but it rarely works well....
>
> Even if we continue to think in terms of a flow of orders downwards, we must remember that these are unlikely to be good orders unless there is an equally vigorous flow of information and suggestions upwards. Management in a state of splendid isolation can achieve little. Subordinates must not merely be allowed but positively encouraged to be constructively critical. If they disagree with the way in which something is being done, they must have opportunities to say so to their superiors, and if possible to suggest a better way. Otherwise, they will simply grumble unconstructively among themselves....
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> What enterprises in under-developed countries would seem most urgently to need is a new conception of the role which a "subordinate" should play. All too frequently, in the civil services of those countries, he is regarded as the passive recipient of directives,

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1. "Management of Public Industries," op.cit., p.22-23.

to be judged by his "correctness" in carrying them out. He is not expected to show initiative, and advice from him is often considered as approaching impertinence. Of one civil service, A.H. Hanson has written:

> 'The young man is not usually expected to think critically ... Superiors do not normally expect suggestions from him, and are liable to resent them, as implied criticism, if they are made.'

Of another country it has been said that many Ministers definitely do not want independent advice, while others say they want it but react to it in such a way that it is quite clear that they dislike it. Such attitudes are inimical to efficiency in the civil service; they are even more inimical to it in the comparatively new and experimental field of public enterprise."

If this diagnosis is correct, it points the way not automatically towards increased wages, but towards much more effective worker-management consultation than has ever existed in the PLN. Policies should be developed that will encourage PLN employees to identify with the enterprise, and to feel proud of its achievements.

The PLN management, like the managements of most other state enterprises, has been singularly unsuccessful in encouraging such attitudes amongst the body of employees. And formal institutions such as the enterprise councils will not be of much help until the managerial elite itself - in regional boards as well as in the Central Office - is genuinely committed to effective worker-management consultation. It may even be that a narrowing of income differentials so that managers' wages and standards of living are lower and closer to those of the majority of employees would forward this goal. It may well be existing attitudes and institutions that are the major barriers to an improvement in labour productivity rather than the low wage levels prevailing throughout the enterprise.

In addition to improvements in personnel policies, if PLN managers had been more determined they could have introduced other worthwhile reforms too. For example, more could have been done in the way of internal research and

in enabling skilled employees to keep abreast of recent overseas developments in their field of interest. The establishment of a small library, for example, stocked with complimentary copies of annual reports and other documents from electricity utilities throughout Asia should have been possible at a low cost. Secondly, the PLN could have been more aggressive in defending itself against charges of inefficiency and high prices, thus indirectly contributing to the development of a climate where the government could raise electricity prices. In many cases, harsh criticism of the PLN has been unjustified, and the managers of the PLN should have said so. Further, the Directors appear to have been too tolerant of a myriad of small inefficiencies within the enterprise, and too willing to accept the standard excuses that have become part of the "conventional wisdom" of Indonesian administrators. Poor communication doubtless presented problems for regional board managers trying to collect statistical returns promptly, but it is difficult to believe that had they been really determined they could not have done better. And this explanation will not suffice to explain why the West-West Java Regional Board centered in Djakarta has such a bad record in this matter. Or again, for years PLN employees have tended to arrive at their offices "around 8 a.m." instead of at the official 7 a.m. In 1969 the PLN Directors finally put their foot down, and in Djakarta at least most employees now arrive punctually at 7 a.m. This simple step, which improves both productivity and employee morale, involved no additional expenditure at all. Other examples, such as the failure to carry out simple maintenance, have already been discussed in some detail. Doubtless there are all sorts of difficulties which hinder such reforms, but it is hard to avoid the conclusion that the attitude of PLN managers - their casual acceptance of a situation that has existed for as long as they can remember - is also at fault.

Final Remarks

We have so far identified three broad classes of factors which have affected the PLN's performance and have argued that the "external"difficulties (factors (a) and (b) above) were more important than the "internal" ones. The main institutional difficulty has been that the precise rights and duties of the PLN vis-a-vis the Indonesian government have never been clearly defined. Indonesian decision makers, when framing policies for the PLN, have found it difficult to agree on priorities between conflicting objectives. For example, is the PLN to cover all costs, as many offical statements have made clear that it should, or is it to provide cheap electricity to a wide range of consumers? Just as importantly, decision makers have found it all but impossible to actually implement their decisions once made. Despite repeated declarations that "cheap electricity" is inequitable and inflationary and that subsidies must stop, in practice the subsidies continue. And although it has been government policy since nationalisation that the proportion of sales to industry must rise substantially, in fact the share has fallen. These contradictions stem mainly from the social attitudes and values that government officials, whether they like it or not, can transgress but rarely. The strong social resistance to increases in the prices of government-provided services means that the government is reluctant to allow a rise in electricity prices. But without a reasonable degree of financial independence, the PLN can itself do little to implement the government's official policies.

The problem for the PLN is that while on one hand the government has laid down its policies and has even indicated (though often not very clearly) priorities, on the other hand the government, in practice, has refused to allow the PLN to implement the policies. If social attitudes had allowed the government to frame an

institutional relationship which guaranteed the PLN a suitable degree of autonomy, then the enterprise would at least have had the opportunity to cope independently with the trying economic conditions of the day. Further, if such autonomy existed, PLN managers could also be held responsible - as they cannot be held responsible at present - for failing to implement government policies.

In one sense this interpretation of events is an optimistic one. It suggests a hope that the PLN Directors would do better if only they were given the chance to do so. It may be that such optimism is misplaced, for it is simply not possible to judge whether, under the circumstances, the Directors have done a reasonable job or not. What we are really suggesting is that the managers should be given the required freedom to manage the industry well, and that a proper mechanism of checks and balances be devised that will enable government officials, parliamentarians and the public to appraise and influence the PLN's overall performance without interfering in the day to day business. Clearly, delegation of responsibility to the PLN for achieving particular objectives is likely to fail if sufficient authority is not also granted - as it has not been in the past. This is a familiar problem for state enterprises the world over that has been discussed at length by public administrators. It is the "accountability versus autonomy" dilemma that has been referred to several times in earlier chapters.

This leads to the apparently paradoxical conclusion that in some directions more freedom is needed, while in others there should be less. Many critics of the PLN see the issues as black and white and offer the easy solution that the government should exercise tighter control over the industry. The "PLN-Gatrik clique," they have suggested, should be brought to heel. But this is an oversimplification. It is the correct balance between control and independence that must be found, not an extreme.

Little clear thought has as yet been given to such matters as finance, personnel policies, appointment of directors, or objectives. How should the wages and working conditions of PLN personnel compare with ordinary government employees? Should the directors be appointed from within the industry, or should the practice found so useful overseas of appointing directors from outside the industry and the public service be adopted? Most important of all is the clear definition of objectives:[1]

> "...emphasis must be placed on clarity of objectives. In collaboration with those concerned, it is necessary to break down the over-all national plan into a series of goals, or terms of reference, for each individual industry and plant, so that managers will clearly see the object of the exercise and have in front of them a series of well defined targets. It is equally necessary that these should be understood, in such terms as the various categories of personnel are capable of grasping, by everyone from the General Manager downwards. In the absence of clearly formulated goals, the organization lives a hand-to-mouth existence, changing its policies in response to all kinds of stray influences, both internal and external. Co-ordination of effort also suffers, and in extreme cases may become quite impossible when no one is quite certain what the object of the exercise is ... Loyalty to an organization which does not know where it is going is impossible. Moreover, clarity of objectives is a sine qua non for the proper delegation of responsibility. Without it, the ever present tendency towards over centralization is immeasurably strengthened, as those in the lower ranks of the managerial hierarchy are provided with no criteria for independent decision taking. Every question becomes "difficult", and consequently has to be referred to someone higher up."

It sounds all too familiar!

In conclusion, it is instructive to view the PLN and the hostile environment in which is operated in terms of Gunnar Myrdal's "soft state." Soft states are countries in which the[2]

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1. "Management of Public Industries," op.cit., p.4.
2. Gunnar Myrdal, Asian Drama: An Inquiry into the Poverty of Nations, New York, Pantheon, 1968, p.66.

> "...policies decided on are often not enforced, if they are enacted at all, and [in which] the authorities, even when framing policies, are reluctant to place obligations on people."

Or again, in soft states[1]

> "... national governments require extraordinarily little of their citizens. There are few obligations either to do things in the interest of the community or to avoid actions opposed to that interest. Even those obligations that do exist are enforced inadequately if at all. This low level of social discipline is one of the most fundamental differences between the South Asian countries today and Western countries at the beginning of their industrialization.... it is beyond doubt that rapid development will be exceedingly difficult to engender without an increase in social discipline in all strata..."

Both in the government's policies towards the PLN, and within the PLN itself, the characteristics of the soft state are evident. The most striking example of this on the part of various governments was in their attitude to electricity prices. As we have seen, successive governments repeatedly declared their determination to eliminate subsidies to the PLN and other state enterprises, yet all failed to do so. Government officials and parliamentarians are also well aware that much electricity is stolen, that many other public sector institutions (including the armed forces) are tardy in paying their electricity bills, and that it is not unknown for influential figures to lean on the PLN in order to receive special privileges. In official pronouncements, governments have naturally disapproved of these things, but in practice they have either been unwilling or simply unable to lend the PLN the moral and perhaps physical support it needs to deal with these problems. (Not the least important reason is that some government officials and parliamentarians themselves find the present system quite satisfactory.) Within the enterprise, too, the values of the "soft state" prevail. We saw above that many small opportunities for improvement exist which would involve little or no extra expenditure,

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1. Ibid., pp.896 and 899 (emphasis in original).

and yet so often it seems that all that is lacking is the determination and discipline to seize the opportunity.

In summary, by comparison with almost all other Indonesian industries, the growth record of the electricity industry has been good. But this has been achieved only with the help of large and continuing subsidies. The performance of the PLN will probably not improve substantially until the more urgent external problems are dealt with, particularly the "accountability versus autonomy" issue. But worthwhile opportunities have also been missed within the enterprise. In both cases, it is not the potential for development that has been lacking, but the determination and perhaps the capability to take advantage of the potential. As Hirschman put it in stating the theme of his best known book,[1]

> "Our diagnosis is simply that countries fail to take advantage of their development potential because, for reasons largely related their image of change, they find it difficult to take the decisions needed for development in the required number and at the required speed."

Thus it is attitudes and institutions that present the major impediment to growth. Our study of the PLN supports this conclusion.

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1. Albert O. Hirschman, The Strategy of Economic Development, New Haven, Yale University Press, 1958, p.25.

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