PERUSAHAAN UMUM LISTRIK NEGARA (PLN)

AGENCY OF MINISTRY OF MINES AND ENERGY

GOVERNMENT OF THE REPUBLIC OF INDONESIA

NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

PDAA716

FINAL REPORT

PLN RURAL-ELECTRIFICATION PROJECTS

CENTRAL JAVA

DECEMBER 31, 1984

F I N A L R E P O R T

NRECA INDONESIAN TEAM

UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT

Contract No. AID/ASIA C1347
Loan No. 497-T-052

IMPLEMENTING AGENCY :

PERUSAHAAN UMUM LISTRIK NEGARA
State Electricity Public Corporation

CONSULTANTS :

National Rural Electric Cooperative Association
Management, Organization and Training

C.T. Main International, Inc.
Architect and Engineering

INTRODUCTION

This report is a condensed "Status Report" of the Rural Electrification Project in Central Java, Indonesia.

The project was funded through a Loan Agreement and a Grant Agreement between the Government of Indonesia (GOI) and the United States of America (USA). The agreements were implemented through the United States Agency for International Development (USAID) in Jakarta, Indonesia.

The Grant Agreement provided funds for consultancy services for the project by Chas. T. Main International, Inc., (Main) and the National Rural Electric Cooperative Association (NRECA). This report does not include any of the contributions of Main, unless relevant.

Since 1979, NRECA has submitted status reports on the State Electricity Public Corporation's (PLN) Rural Electrification Projects (PLN-RE) to USAID and to PLN. These reports were prepared and distributed monthly through the 1979 - 82 period, and quarterly thereafter. This report is NRECA's Final Report, coinciding with USAID's "Project Assistance Completion Date" (PACD), December 31, 1984.

NRECA's role in this project development was generally in the fields of Organization - Management - Training. One full-time consultant position was filled throughout the period January 1979 to August 1983.

The NRECA consultant in this on-site position resided in Semarang, Central Java, the headquarters for PLN-RE Central Java staff.

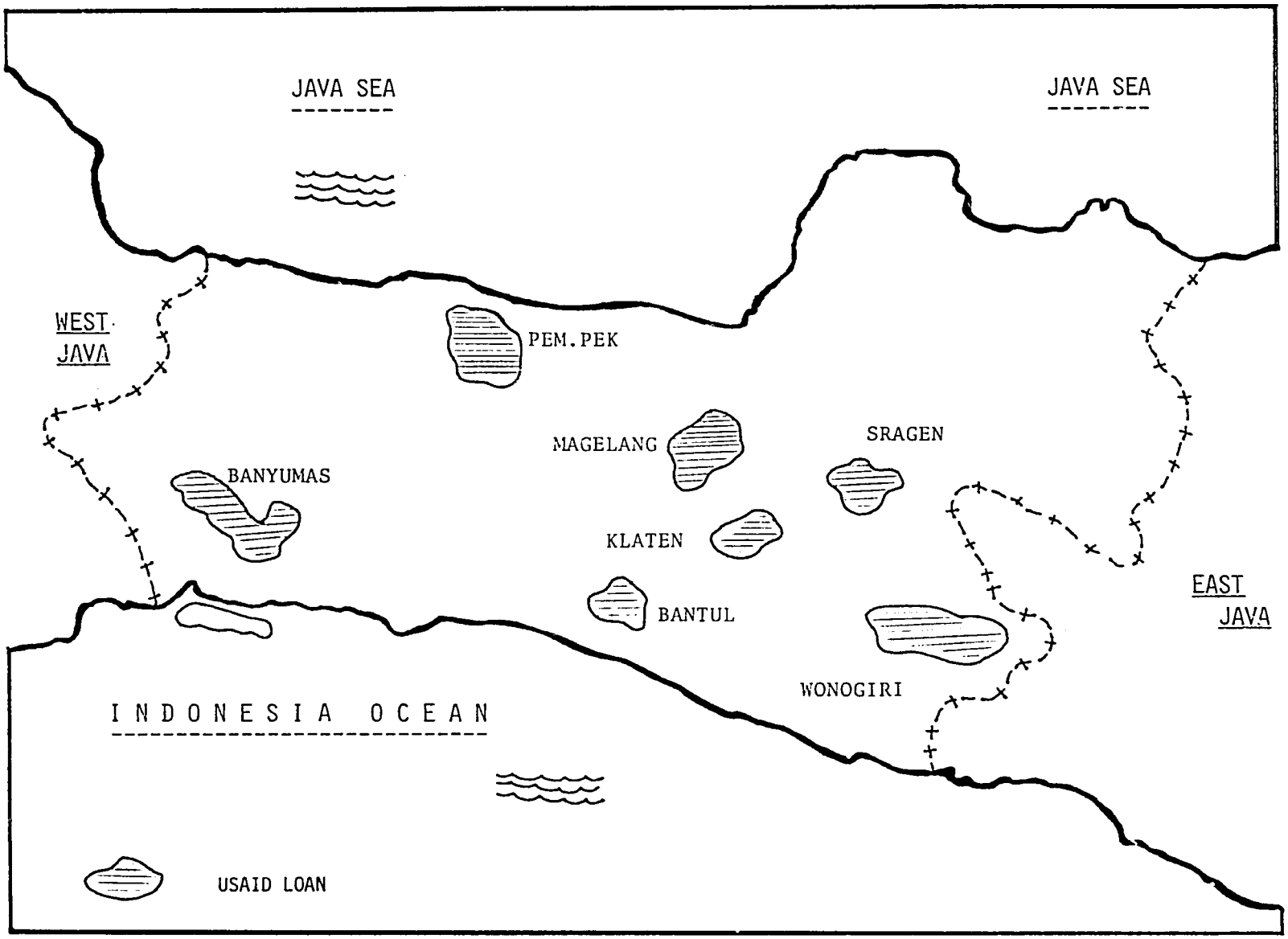
In addition to consultant services from the full-time position, NRECA's Jakarta-based staff provided back-up support for the full-time consultant, and traveled to Central Java as required. Jakarta-based NRECA staff also maintained liaison with PLN-RE staff in their Jakarta headquarters.

After departure of the the on-site consultant in 1983, the NRECA Team Leader spent approximately one-third of his time in Central Java on PLN-RE activities. The NRECA Team (in-country and home office) Consultants who assisted, either full-time or part time, with the PLN-RE project activities between 1979 and 1984, are listed below:

CHARLES HAM,	NRECA Short Time Resident, Semarang
SAM T. ADKINS,	NRECA Full Time Resident, Semarang
DENNIS WILSON,	NRECA Team Leader, Jakarta
PETER T. MCNEILL	NRECA Team Leader, Jakarta
RAY SHOFF,	NRECA Team Leader, Jakarta
LOUIE E. SANSING,	NRECA Training Officer/Advisor, Jakarta

NRECA Home Office, Washington, D.C.:

SAMUEL T. BUNKER,	Administrator
JAMES A. CUDNEY,	Regional Administrator
EDWARD E. GAITHER,	Regional Administrator


JAVA SEA
JAVA SEA
WEST JAVA
PEM.PEK
MAGELANG
SRAGEN
BANYUMAS
KLATEN
BANTUL
EAST JAVA
WONOGIRI
INDONESIA OCEAN
USAID LOAN

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PART I

DESCRIPTION AND OBJECTIVES OF THE PROJECT (PLN)

The majority of the urban areas in Indonesia have been electrified, however, only a small per centage of the rural areas receive central station electric power.
Before the United States Agency for International Development (USAID) Electrification Project, with the concept of "Area Coverage", the State Electricity Public Corporation (PLN) had already begun construction of Rural Electrification. However, these projects were scattered in nature.

The Government of Indonesia is vitally interested in the electrification of the rural areas, and has taken steps with the assistance of the United States Government (USAID) to implement pilot rural electrification programs. In the beginning of this project, fewer than 2 % of the rural people in Indonesia presently enjoy the benefits of electric service. It is believed that the "area coverage" concept of electrification will bring better living conditions to millions of rural residents and will spread benefits to all of Indonesia.

Seven (7) pilot Rural Electrification Project areas were selected in Central Java and are being constructed and developed by the State Electricity Public Corporation (PLN) who owns and operates these systems. The source of power for these systems is the existing PLN transmission grid in Central Java.

The National Rural Electric Cooperative Association (NRECA) through their International Programs Division served as consultant to PLN in Organization, Management and Training areas. Services provided are listed in this report.

THE SEVEN PLN PROJECTS
(Projections from the Feasibility Study & Actual staking)

SERVICE AREA	VILLAGES TO BE SERVED	VILLAGES AFTER STAKING	APPROXIMATE NO. OF CONNECTIONS
Klaten	96	104	25,000
Pem/Pem	103	143	20,000
Bantul	21	29	20,000
Wonogiri	54	54	15,000
Sragen	49	55	15,000
Magelang	83	88	20,000
Banyumas	35	38	15,000
TOTALS	441	511	130,000

The above tabulations are estimates for the end of the third year of commercial operation, except the column "Villages After Staking" which is actual.

Progress of the seven (7) PLN Projects:

a. Completed staking activities showed 511 villages to be served.

b. PLN's target to 31 December 1984 is to energize 440 villages serving 70,000 customers.

c. As of 31 December 1984 the actual villages energized are 337 serving 59,467 customers.

SERVICE AREA	VILLAGES SERVED	CUSTOMERS SERVED
Klaten	87	16,538
Pem/Pek	41	7,420
Bantul	29	13,232
Wonogiri	29	3,407
Sragen	53	4,709
Magelang	60	4,741
Banyumas	38	9,420
T O T A L S	337	59,467

SCOPE OF WORK, NRECA TEAM

ORGANIZATION

Since PLN was well established in Central Java prior to the start of these seven (7) RE projects, and had branch and sub-branch offices throughout Central Java, formation of new organizations, or entities, for developing RE was not necessary. Therefore NRECA's assistance in organization was limited to development of alternative organizational structures for the individual RE projects, presenting these to PLN for their consideration, assisting in final selection, and formation thereof.

MANAGEMENT

PLN's Central Java organization is divided into two basic categories: Construction Unit (P.I. Ring JATENG) and Operations and Maintenance Unit (Distribusi JATENG). In general, NRECA served as a vehicle for coordination between the two units for RE project-related management activities.

TRAINING

Activities in this category consumed the majority of the NRECA consultant's time. These began in the first half of 1979 when NRECA staff proposed training course contents and schedules, both in-country training and overseas training, for inclusion in the PLN-RE Implementation Plan. (Preparation of this plan was one of the conditions precedent to the release of USAID loan funds).

In NRECA's original in-country training course proposal, twenty-one

(21) courses were listed to be conducted during the period mid-1979 to the fourth quarter of 1983. As training progressed, subject matter of some of the proposed courses were combined, as deemed advisable by PLN and NRECA staff. Fourteen (14) training courses were actually conducted during the period mid-July 1979 to mid-1984.

Participants in the training courses were key employees in the two (2) PLN units in Central Java. Employees of PLN's Construction Unit, who were scheduled to work in the PLN-RE program, were included as participants in training courses. Employees of PLN's Operations and Maintenance Unit, who were scheduled to assist in construction phase housewiring activities and RE project operation and maintenance, were also included. In total, four hundred thirteen (413) PLN employees received training in the fourteen (14) courses conducted (course listing is included on page 21 of this report).

NRECA's role in this training began with preparation of course contents, proposing schedules and locations. As a matter of routine, PLN and NRECA staff met to prepare for each course and to assign instructors. NRECA prepared suggested "teaching plans" for each subject, provided training materials, and served as general coordinator for all training. The majority of the instructors came from the ranks of PLN's two Central Java Units and PLN's Head office staff. NRECA and C.T. Main staffs served as instructors for numerous specialized subjects and other subjects as required.

OVERSEAS TRAINING

Included: trips for PLN-RE management-level and supervisor-level personnel to observe completed RE projects in neighboring country, Philippines, and on-the-job training (OJT) for key employees in PLN's Operations and Maintenance Unit. During the period 1978 - 80, nearly fifty (50) PLN employees went to the Philippines on one-week observation trips. One group of ten (10) PLN Operations and Maintenance Unit employees participated in OJT in the United States and in the Philippines, November 1979 to February 1980. A second group of nine (9) received OJT in the same countries May - August 1980.

NRECA's role in overseas training was all-inclusive. Training schedules and outlines were prepared and presented to PLN and USAID for approval, training sponsors were located, and coordination provided between sponsors, PLN and trainees throughout the 1979 - 80 overseas training period.

COORDINATION

Four agencies/organizations were active in implementation of the seven RE projects : PLN, USAID, Consultant C.T. Main, Inc, and NRECA.

Within the PLN organization, the focal point for action was the Rural Electrification Sub-Directorate located at PLN's Head office in Jakarta. In Central Java, PLN's Operations and Maintenance Unit (originally referred to as "Wilayah XIII", later changed to "Distribusi JATENG") and Construction Unit (P.I. Ring JATENG) coordinated with PLN-RE/Jakarta to fulfill PLN's responsibilities in RE project implementation.

Within USAID/Jakarta, the office of Power, Transportation and Engineering (PTE) was responsible for RE projects. A USAID-RE project officer was assigned from this office to hold direct responsibility for fulfilling USAID's obligations.

C.T. Main, Inc. was responsible for: material/equipment procurement, system design, field engineering, and construction supervision. Throughout the project implementation period, 1979 - 1984, this firm had offices and staff in both Central Java and Jakarta.

NRECA and C.T. Main staff maintained close coordination in both Central Java and Jakarta.

As agreed at an early stage in project development, NRECA shared in the responsibility for material/equipment selection, storage, use, as related to "housewiring" (material for service lines, KWH meter entrances, and interval housewiring plus the tools and equipment for installation). In general, NRECA assisted in housewiring design and installations made by personnel of PLN's Operations and Maintenance Unit. C.T. Main was responsible for all design, procurement installations to be made by personnel of PLN's Construction Unit (primary and secondary distribution lines plus headquarters facilities).

During the pre-construction (planning, procurement) stage, "coordination meetings" were held regularly between the four agencies/organizations. These meetings, called and chaired by the Deputy Director of PLN-RE, Jakarta, (or his assignee) were productive and beneficial in maintaining project continuity and coordinated efforts.

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PART II

PROJECT IMPLEMENTATION

PLN's Implementation Plan for RE, prepared in coordination with both consultants, indicated that: the material/equipment procurement period would be 1979 - 80, the construction period 1980 - 82, and project completion (full operations) by 1983. It was proven that schedules included in plans were overly optimistic and that project completion, envisioned for 1983, will actually occur in 1985.

The major factor which caused delay related to material/equipment procurement. Historically, procurement through international bidding is a time-consuming process.

Recognizing the benefits of early energization of at least a small segment of an RE project area, PLN used materials from their own stock and constructed a demonstration RE project in the Klaten area, in Central Java. The villages in the demonstration area were: Jonggrangan, Gergunung and Karanganom. This project, constructed to serve a potential of two thousand (2,000) customers within reach of the distribution system, was energized in mid-1979.

PLN/NRECA monitored this project from first energization until the last half of 1984. Comments and statistical data are included in later sections of this report.

As a second step in achieving early energization in the RE project areas, PLN began an interim distribution system construction program in late-1981 continuing into the second quarter of 1982. This program, again utilizing PLN's own construction material items which were not yet available from USAID loan procurement, resulted in completion of segments of electrical distribution systems in all seven (7) RE areas. Nearly eleven thousand (11,000) customers were served from these distribution systems in thirty seven (37) desas (villages).

By early 1983, construction materials in sufficient quantities to sustain a vast construction program had arrived and were distributed to the sites. Thereafter, line construction of the main project was in full swing.

PROJECT STATUS

Of the three thousand six hundred fifty-eight (3,658) kilometers of distribution line included in the project, two thousand two hundred forty-three (2,243) kilometers were completed by October 31, 1984 (61 %). At the end of 1984, distribution line construction was approximately two-thirds complete, seven (7) project total, with distribution systems in two (Bantul and Banyumas) of the seven (7) projects virtually completed. (Statistics on construction status are included on page 22 of this report).

By the end of October 1984, PLN's Operations and Maintenance Unit had succeeded in completing housewiring installations and energizing slightly more than fifty thousand (50,000) customers in the seven (7) projects. Customer connections totaled approximately fifty nine thousand (59,000) at the end of 1984. (Statistics on consumer connections are included on page 23 of this report)

Headquarters facilities at each site, consisting of two buildings (one office building and one warehouse/maintenance shop/operations center) which were constructed in 1981 - 82 and financed jointly by USAID loan and PLN construction funds, were in use at the end of 1984. An average of twelve (12) PLN Operations and Maintenance Unit employees were utilizing these facilities plus construction personnel from PLN P.I. Ring.

PLN's Operations and Maintenance Unit and its branch in the areas utilized the services of local village cooperative units (KUDs)

to install service lines, KWH meter entrances, and housewiring. The KUDs, with an average of one hundred (100) employees at each of the seven (7) projects, also utilized the PLN-RE headquarters facilities for material pick-up and customer connect-order processing.

STATISTICS (ASSUMPTIONS VERSUS ACTUAL)

Although the project was not actually complete at the end of 1984, progress was sufficient to enable meaningful comparisons between assumptions/predictions included in feasibility studies, and actual results. Key comparisons are listed in paragraphs that follow.

Customer connection level in feasibility study assumptions showed fifty percent (50 %) of potential customers at the end of the third operating year, increasing gradually thereafter until saturation in the fifteenth operating year.

In the Klaten RE demonstration project, nearly one hundred percent (100 %) of the potential customers, which could be served from existing distribution lines, had availed of electric service by the end of the second operating year. Experience in the total seven projects indicates that at least one-third (33 %) of potential customers request electric service at the time PLN first solicits applications.

The above comparisons are of particular interest when connection cost comparisons are injected. Although PLN maintained their customer connection charge at the same level throughout the 1979 - 84 period under study, housewiring costs increased substantially. Therefore, a typical connection cost by late 1984 (connection charge, security deposit and housewiring) was Rp 77,500 (US $ 72.56).

Of this amount, 20 - 25 percent is payable in cash prior to connection and the balance financed over a variable period.

It seems evident that "affordability" considerations are of no greater importance today than they were during the period when feasibility studies were prepared. This is true even though connection charges (and energy charges) have increased substantially.

KWH consumption estimates in the feasibility studies have been proven to be conservative. Actual billing statistics show that the average use for customers in all seven RE areas is in excess of predictions. (Statistics on page 24 of this report).

It was predicted that monthly KWH consumption for residential customers would remain in the low twenties (20s) during the first five years of operations. System average KWH consumption (including commercial, irrigation, grain mills, etc.) was assumed to be less than forty (40) KWHs per month per customer during the same period.

Statistical data from the Klaten RE demonstration project, for the period 1979 - 1984, indicates that residential customer usage grew from twenty-eight (28) KWHs a month during the first year's operation to thirty-eight (38) KWHs/month by the fifth year. System average KWH consumption for the same period grew from thirty (30) KWH the first year to forty-six (46) KWH the fifth year

(statistical data on the Klaten demo project is included on page 25 of this report).

Statistical data for each of the seven projects shows that system average KWH consumption during initial months of energization varies from a low of thirty (30) KWH/month to a high of sixty-three (63) per month. The seven-project average for the same period was forty-six (46) KWH/month/customer. This represents an increase of approximately twenty-five percent (25 %) above predicted levels. If consideration is given to the fact that initial months' KWH consumption is almost entirely for residential usage (commercial, irrigation, grain mills, customers not yet solicited/connected), the percent increase above predictions exceeds one hundred percent (100 %).

The average monthly electric billing for residential electric service was estimated (in the Feasibility Study) at one thousand thirteen rupiah (Rp 1013) ($ 2.44) during initial years of operation. The cost per KWH purchased by customers was estimated at forty-six rupiah (Rp 46) ($ .11).

From the period when feasibility studies were prepared, 1977 until late 1984, it was necessary for PLN to increase tariff (retail rate) on five occasions. Thus, on a rupiah-cost basis, the average monthly electric billing during first-year billings, seven project total, approximated four thousand four hundred rupiah (Rp 4400) and the cost per KWH purchased equalled ninety-seven rupiah (Rp 97).

First-glance computations indicates that the actual average monthly billing is about four times the rupiah cost estimate, and actual average cost per KWH purchased about twice the estimate. However, in making this comparison, it is necessary to consider that KWH consumption is much higher than predicted and therefore, the rupiah billing would naturally be higher.

When average monthly billing and average purchase cost per KWH are viewed in a U.S. dollar comparison, the results differ dramatically. The average bill increased from a two dollar, forty-four cents ($ 2.44) estimate to a four dollar, twelve cent ($ 4.12) actual. The purchase cost per KWH decreased from an eleven cent ($ .11) estimate to a nine cent ($ .09) actual. These comparisons become understandable when consideration is given to the adjustment in rupiah/dollar exchange rate from 1977 to 1984 ending (Rp 415/$ to Rp 1068/$).

In summary, it is evident that electric service in rural Indonesia is: desired by the vast majority of the population, affordable to the majority, and is put to use for both lighting and productive uses as evidenced by the relatively high KWH consumption.

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PART III

LESSONS LEARNED

Beginning with feasibility studies and continuing through the USAID loan approval period, the RE program for Central Java was deemed to include seven (7) separate identifiable RE projects. It was proven, however, that in a large electric utility such as PLN, separation of segments of electrical distribution lines to form an isolated, identifiable project, and separation of the RE project in the management organizational structure, is very difficult, if not impossible.

It was intended that each RE project would have a specific service area within which all distribution line and customer electrical services were to be a part of the project. It was planned that electrical metering equipment would be installed to determine the total KWHs of energy delivered to the project each month, and the KW power demand. This information was to be included in monthly statistical reports on the operations of each respective project.

When engineering design was completed and power sources identified for each project, it was recognized that not one---but several---existing distribution lines would be tapped for power supply in each area. This made metering of KWH/KW input per project a difficult task. Therefore, primary line metering equipment was not installed at any of the seven (7) sites (as of the USAID PACD date)

and statistical data collection was limited to KWH sales, customer billing information.

With regard to identifying each RE project in the organizational structure of PLN, and management of the business aspects when the projects became operational, this task was incomplete as of the PACD date. Because of the need to integrate RE project distribution system facilities with existing facilities, permanent identification of the RE projects may not be possible.

Absence of statistical data on KWH/KW input per project, or integrated project management rather than separate management, do not destroy project feasibility or effectiveness. The ultimate goal is still attainable, that of providing reliable electric service to the rural people at a cost they can afford. It does, however, indicate that this belongs in the "lessons learned" column, and lending agencies/ loan recipients in future RE projects may benefit from experiences included herein.

SUMMARY OF RECOMMENTATIONS

Although this joint PLN/USAID RE endeavor met with considerable delay, NRECA deems the project as a success. Nearly sixty thousand (60,000) rural families in Central Java were receiving electric service at the end of 1984, most of whom previously considered electric service as only a dream. This number of recipients will double over the next one-to-two years, and continue to rise thereafter.

The demand for electric service exceeds expectations: utilization of electric service for productive uses is a known desire that is becoming a reality, and electric service affordability has been proven. In addition to these facts, the employment of local residents (KUD employees) for service line/housewiring installations provides an economic boost in the RE service areas. NRECA recommends that:

1. PLN Central-Java continue to provide statistical data from computer billing printouts to USAID/Jakarta, at least through calendar year 1985.

2. USAID/Jakarta continue to monitor the growth of the RE projects, and provide assistance to PLN as requested/required.

3. PLN re-appraise the benefits of primary metering of electric energy flow to the RE projects, and install metering at projects where practical.

4. USAID/PLN jointly conduct a "Project Evaluation" in the 1986 - 87 period, and distribute results to all organizations/ agencies involved in this RE project implementation, and other interested parties.

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IN-COUNTRY TRAINING COURSES CONDUCTED
PLN-RE CENTRAL JAVA

COURSE #	COURSE NAME	LOCATION	DATE	PARTICIPANTS #
I	Introduction to, Supervision of, RE Systems	Wilayah XIII / Semarang	July 1979	25
II	Construction Supervision/training skills	P.I. Ring ,,	November 1980	36
	Construction Supervision/training skills	P.I. Ring ,,	June 1982	39
III	Construction Material Logistics	P.I. Ring ,,	January 1981	31
	Construction Material Logistics	P.I. Ring ,,	January 1983	26
IV	Financial Accounting/Reporting	P.I. Ring ,,	June 1981	24
V	Trainors Training - Housewiring	P.I. Ring ,,	November 1981	28
VI	Kwh Meter Testing, Record Keeping	P.I. Ring ,,	November 1982	23
VII	Distribution System Engineering/Design	P.I. Ring ,,	February 1983	27
VIII	Distribution System Operation/Maintenance	P.I. Ring ,,	November 1983	36
	Distribution System Operation/Maintenance	P.I. Ring ,,	January 1984	37
IX	Line Maintenance Techniques and care/ use of Electrical Test Equipment	Klaten Headquarters	April 1984	28
	---------- ,, ----------	Bantul ,,	April 1984	26
	---------- ,, ----------	Pemalang ,,	May 1984	27
	TOTAL NUMBER OF PARTICIPANTS -			413

CONSTRUCTION PROGRESS/STATUS

PLN/USAID ASSISTED RE PROJECTS, CENTRAL JAVA

REPORTED-AS-OF OCTOBER 31st, 1984

#	PROJECT	# POLE SET	K M 3-PHASE PRIMARY-LINE INSTALLED	KM 1-PHASE PRIMARY-LINE INSTALLED	KM SECONDARY LINE INSTALLED	TOTAL KM OF POLE LINE INSTALLED	TOTAL KM OF POLE LINE IN PROJECTS	% COMPLETION PRIMARY SECOND-ARY POLE-LINES
1	Bantul	7,356	31.210	188.233	200.050	419.493	419.493	100 %
2	Klaten	11,094	68.837	261.732	152.424	482.993	637.452	75.76%
3	Magelang	6,747	49.861	177.180	64.326	291.367	411.345	70.83%
4	Pemalang	14,908	29.116	86.183	63.758	179.057	743.483	24.08%
5	Banyumas	5,562	45.825	163.522	90.121	299.468	299.468	100 %
6	Sragen	8,019	36.678	219.4	136.238	392.316	488.305	80.34%
7	Wonogiri	9,559	40.273	113.959	81.309	235.541	666.25	35.35%
TOTAL		63,245	301.800	1,210.209	788,226	2,300.235	3,665.796	62.74%

POLES	INSTALLED	REQUIRED	% INSTALLED
Concrete	30,449	32,371	94.06 %
Steel	22.560	22,921	98.42 %
Wood	10,236	10,257	99.79 %
TOTAL	63,245	65,549	96.48 %

NOTE : Secondary line (under-build) strung on the same poles as primary line is as follows :

1,032 Km INSTALLED

1,582 Km REQUIRED - 65 % complete

BILLING AND CONNECTION STATISTICS
PLN/USAID ASSISTED RE PROJECTS, CENTRAL JAVA
REPORTED AS OCTOBER 31ST, 1 9 8 4

COLUMN	1	2	3	4	5	6	7	8	9
PROJECT	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	CUSTOMERS CONNECTED OCTOBER 31st	ESTIMATE OF CONNECTIONS DECEMBER 31, '84
Bantul	4408	4463	5064	6163	7984	8816	10141	12255	17400
Klaten	7757	8255	9605	10573	11759	12079	12665	15071	16000
Magelang	2153	2247	2263	2381	2429	2680	3487	3982	4300
Pemalang	3534	3744	3971	4200	4745	5191	5637	6140	6800
Banyumas	1142	1453	1643	1881	2188	4126	6619	7251	7600
Sragen	885	1020	1314	1558	1827	1952	2120	2785	3500
Wonogiri	861	920	1219	1535	1996	2319	2554	2896	3400
T O T A L S	20740	22102	25079	28291	32928	37163	43223	50380	59000

October 31st, 1984 December 31st, 1984

LEGEND 1. Columns 1 thru 7 indicate the number of customers billed for electric service during seven consecutive months in 1984. Information was obtained from PLN computer-billing printouts and project visitations.

2. The numbers in column #8 show the total connected customers.

3. Column 9 is NRECA's estimate of total connections at 1984 year-end based on information received during project visitations.

STATISTICAL DATA

PLN/USAID ASSISTED RE PROJECTS, CENTRAL JAVA

Based on three-month average August - October, 1984

PROJECT	AVERAGE KWH USAGE PER MONTH	AVERAGE COST PER KWH CONSUMED (ENERGY COST ONLY)	AVERAGE MONTHLY BILLING (ELECTRIC ENERGY ONLY)	TOTAL AVERAGE BILLING (WITH HW & SERVICE CONNECT CHARGES)
1. Banyumas	30	Rp. 107	Rp. 3218	Rp. 5759
2. Magelang	33	103	3395	4857
3. Wonogiri	40	97	3877	6543
4. Klaten	41	96	3924	5688
5. Sragen	56	91	5102	5287
6. Pemalang	57	97	5545	8150
7. Bantul	63	96	6044	7740
Seven Project average	46	97	4444	6289

KLATEN RE DEMONSTRATION PROJECT
BILLING STATISTICS 18 MONTH PERIOD
1983 - 84

1	2	3	Rp. 4	Rp. 5	Rp. 6	Rp. 7	Rp. 8	Rp. 9	Rp. 10
February 1983	2062	118,870	8,286,905	5,045	4,019	1,026	58	70	88
March	2069	94,206	8,966,390	4,334	3,313	1,021	45	73	95
April	2074	84,399	8,486,160	4,091	3,110	981	41	76	100
May	2082	106,272	*				51		
June	2092	111,460	*				53		
July	2149	105,085	9,321,160	4,337	3,648	689	49	75	89
August	2194	96,916	7,686,515	3,503	3,243	260	44	73	79
September	2217	94,430	7,496,590	3,381	3,211	170	43	75	79
October	2225	98,019	7,611,795	3,421	3,254	167	44	74	78
November	2284	96,553	7,865,715	3,444	3,174	270	42	75	81
December	2300	107,321	8,469,705	3,682	3,423	259	47	73	79
January 1984	2310	113,034	8,693,150	3,763	3,681	82	49	75	77
February	2316	103,821	8,218,130	3,548	3,486	62	45	78	79
March	2335	116,634	11,277,445	4,830	4,750	73	50	95	97
April	2340	97,958	9,879,730	4,222	4,154	69	42	99	101
May	2342	96,392	9,657,380	4,124	3,940	58	41	96	100
June	2343	109,987	10,779,645	4,601	4,186	58	47	89	98
July	2343	114,821	11,098,425	4,737	4,687	50	49	96	97
18 Month Average ...							47	81	89

LEGEND : 1 - Month/Year
2 - Total Number Customers Billed
3 - Total KWH Billing
4 - Total Rupiah Billing (Rp.)
5 - Average Bill per Customer (total) (Rp.)
6 - Average Bill, Energy only (Rp.)
7 - Average Billing for Housewiring loans (Rp.)
8 - Average KWH/customer
9 - Average Rupiah/KWH, Energy
10 - Average Rupiah/KWH, Total

* Computer printout problem

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Bantul

PHYSICAL PLANT

POLE SET:	7,356	PER CENT COMPLETION	100 %
3Ø CONDUCTOR STRUNG	31 KM	PER CENT COMPLETION	100 %
1Ø CONDUCTOR STRUNG	188 KM	PER CENT COMPLETION	100 %
SECONDARY LINE STRUNG	200 KM	PER CENT COMPLETION	100 %
TOTAL POLE-LINE COMPLETED	419 KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	16,127
Houses wired (approximate-number)	12,800
Customers Connected	12,255
Customers Billed	10,141
As of:	November 15, 1984
Estimated Customer Connections 12/31/84	17,400

OTHER INFORMATION

Number of employees assigned to the RE project	17
Number of KUD's assisting in H.W. program	9
Average number of employee's per KUD	260
Total KWH meters originally allocated to project	19,300
Total KWH meters tested/sealed to date	19,300

BILLING INFORMATION

Average monthly KWH consumption per customer	63
Average monthly Electric Bill, Energy only	Rp 6,044
Average total monthly billing, including house-wiring & connect charge	7,740

Report date: August through October, 1984

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Klaten

PHYSICAL PLANT

POLE SET:	11,094		PER CENT COMPLETION	100 %
3Ø CONDUCTOR STRUNG	69	KM	PER CENT COMPLETION	100 %
1Ø CONDUCTOR STRUNG	253	KM	PER CENT COMPLETION	96 %
SECONDARY LINE STRUNG	152	KM	PER CENT COMPLETION	49 %
TOTAL POLE-LINE COMPLETED	474	KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	Est. 15,500
Houses wired (approximate-number)	Est. 15,150
Customers Connected	15,071
Customers Billed	12,665
As of:	October 31, 1984
Estimated Customer Connections 12/31/84	16,000

OTHER INFORMATION

Number of employees assigned to the RE project	13
Number of KUD's assisting in H.W. program	12
Average number of employee's per KUD	145
Total KWH meters originally allocated to project	28,800
Total KWH meters tested/sealed to date	* 12,225

* Plus Kwh meters from stock in PLN branch.

BILLING INFORMATION

Average monthly KWH consumption per customer	41
Average monthly Electric Bill, Energy only	Rp 3,924
Average total monthly billing, including house-wiring & connect charge	5,688

Report date: August through October 1984

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Magelang

PHYSICAL PLANT

POLE SET:	6,747		PER CENT COMPLETION	96 %
3Ø CONDUCTOR STRUNG	50	KM	PER CENT COMPLETION	85 %
1Ø CONDUCTOR STRUNG	170	KM	PER CENT COMPLETION	60 %
SECONDARY LINE STRUNG	63	KM	PER CENT COMPLETION	78 %
TOTAL POLE-LINE COMPLETED	283	KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	Est.	4,300
Houses wired (approximate-number)	Est.	4,050
Customers Connected		3,982
Customers Billed		3,487
As of:		November 11, 1984
Estimated Customer Connections 12/31/84		4,300

OTHER INFORMATION

Number of employees assigned to the RE project	12
Number of KUD's assisting in H.W. program	5
Average number of employee's per KUD	91
Total KWH meters originally allocated to project	13,274
Total KWH meters tested/sealed to date	9,442

BILLING INFORMATION

Average monthly KWH consumption per customer		33
Average monthly Electric Bill, Energy only	Rp	3,395
Average total monthly billing, including house-wiring & connect charge		4,857

Report date: August through October, 1984

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Pemalang

PHYSICAL PLANT

POLE SET:	14,908	PER CENT COMPLETION	96 %
3Ø CONDUCTOR STRUNG	29 KM	PER CENT COMPLETION	24 %
1Ø CONDUCTOR STRUNG	86 KM	PER CENT COMPLETION	25 %
SECONDARY LINE STRUNG	64 KM	PER CENT COMPLETION	23 %
TOTAL POLE-LINE COMPLETED	179 KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

A contractor began work in December, 1984

Electric Service/Housewiring agreements signed	Est. 6,800
Houses wired (approximate-number)	Est. 6,250
Customers Connected	6,140
Customers Billed	5,637
As of:	October 31, 1984
Estimated Customer Connections 12/31/84	6,800

OTHER INFORMATION

Number of employees assigned to the RE project	10
Number of KUD's assisting in H.W. program	8
Average number of employee's per KUD	64
Total KWH meters originally allocated to project	21,000
Total KWH meters tested/sealed to date	11,073 (Nov. 12, 1984)

BILLING INFORMATION

Average monthly KWH consumption per customer	57
Average monthly Electric Bill, Energy only	Rp 5,545
Average total monthly billing, including house-wiring & connect charge	8,150

Report date: August through October, 1984

One more KUD to be used beginning-in December

NOTE: One duplex and one single-occupancy house now under construction at the headquarters site.

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Banyumas

PHYSICAL PLANT

POLE SET:	5,562	PER CENT COMPLETION	100 %
3Ø CONDUCTOR STRUNG	46 KM	PER CENT COMPLETION	100 %
1Ø CONDUCTOR STRUNG	164 KM	PER CENT COMPLETION	100 %
SECONDARY LINE STRUNG	90 KM	PER CENT COMPLETION	100 %
TOTAL POLE-LINE COMPLETED	300 KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	Est.	7,450
Houses wired (approximate-number)	Est.	7,300
Customers Connected		7,251
Customers Billed		6,619
As of:		October 31, 1984
Estimated Customer Connections 12/31/84		7,600

OTHER INFORMATION

Number of employees assigned to the RE project	10
Number of KUD's assisting in H.W. program	4
Average number of employee's per KUD	32
Total KWH meters originally allocated to project	13,152
Total KWH meters tested/sealed to date	8,160

BILLING INFORMATION

Average monthly KWH consumption per customer		30
Average monthly Electric Bill, Energy only	Rp	3,218
Average total monthly billing, including house-wiring & connect charge		5,759

Report date: August through October, 1984

NOTE: One duplex and one single-occupancy house are now under construction at the headquarters site.

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Sragen

PHYSICAL PLANT

POLE SET:	8,019	PER CENT COMPLETION	100 %
3Ø CONDUCTOR STRUNG	37 KM	PER CENT COMPLETION	100 %
1Ø CONDUCTOR STRUNG	219 KM	PER CENT COMPLETION	100 %
SECONDARY LINE STRUNG	136 KM	PER CENT COMPLETION	58
TOTAL POLE-LINE COMPLETED	392 KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	Est.	3,000
Houses wired (approximate-number)	Est.	2,850
Customers Connected		2,785
Customers Billed		2,120
As of:		October 31, 1984
Estimated Customer Connections 12/31/84		3,500

OTHER INFORMATION

Number of employees assigned to the RE project	12
Number of KUD's assisting in H.W. program	5
Average number of employee's per KUD	63
Total KWH meters originally allocated to project	12,192
Total KWH meters tested/sealed to date	6,087

BILLING INFORMATION

Average monthly KWH consumption per customer		56
Average monthly Electric Bill, Energy only	Rp	5,102
Average total monthly billing, including house-wiring & connect charge		5,287

Report date: August through October, 1984

STATUS REPORT

PLN/USAID ASSISTED RURAL ELECTRIFICATION PROJECTS, CENTRAL JAVA

RE PROJECT NAME: Wonogiri

PHYSICAL PLANT

POLE SET:	9,559	PER CENT COMPLETION	87 %
3Ø CONDUCTOR STRUNG	40 KM	PER CENT COMPLETION	69 %
1Ø CONDUCTOR STRUNG	114 KM	PER CENT COMPLETION	32 %
SECONDARY LINE STRUNG	81 KM	PER CENT COMPLETION	32 %
TOTAL POLE-LINE COMPLETED	235 KM	AS OF:	October 27, 1984

CUSTOMER-CONNECTION STATISTICS

Electric Service/Housewiring agreements signed	Est. 3,000
Houses wired (approximate-number)	Est. 2,950
Customers Connected	2,896
Customers Billed	2,554
As of:	October 31, 1984
Estimated Customer Connections 12/31/84	3,400

OTHER INFORMATION

Number of employees assigned to the RE project	10
Number of KUD's assisting in H.W. program	6
Average number of employee's per KUD	48
Total KWH meters originally allocated to project	8,832
Total KWH meters tested/sealed to date	8,300

BILLING INFORMATION

Average monthly KWH consumption per customer	40
Average monthly Electric Bill, Energy only	Rp 3,877
Average total monthly billing, including house-wiring & connect charge	6,543

Report date: August through October, 1984

SUMMARY OF EXPENDITURES

National Rural Electric Cooperative Association
1800 Massachusetts Ave., N.W.
Washington, D.C. 20036

AID/ASIA - C1347
Date : November, 1984
Period of contract: 8/25/78 - 12/31/84

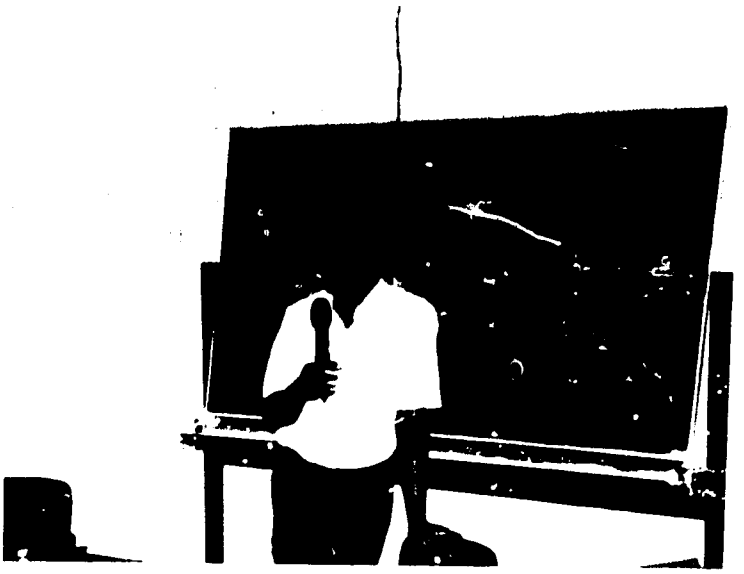
	BUDGET	TOTAL EXPENSE TO DATE	PRIOR BILLINGS	CURRENT BILLINGS
Salaries - Field	$ 1,228,300	$ 1,259,434.12	$ 1,254,721.46	$ 4,712.66
Salaries - Home	216,300	224,701.25	224,407.95	293.30
Fringe Benefits	461,400	469,516.26	468,268.69	1,247.57
Consultant Fees	34,000	33,906.25	33,906.25	
Allowances	438,400	382,481.37	381,161.07	1,320.30
Travel & Transportation	415,000	397,127.07	396,716.10	410.97
Other Direct Costs	154,800	118,465.74	117,790.45	675.29
Overhead	614,600	656,372.54	654,019.74	2,352.80
Equipment & Materials	27,200	21,841.58	21,369.58	472.00
T O T A L	$ 3,590,000	$ 3,563,846.18	$ 3,552,361.29	$ 11,484.89

TRAINING ACTIVITIES

Participants in the "Accounting and Reporting" training course held in Semarang, June 8 - 20th, 1981

PLN Construction Supervisors in attendance at the training-course "Construction Supervision and Training Skills" Semarang, June 1982.

TRAINING ACTIVITIES



Meter-Testers Training Course, Semarang, October 19 - 31, 1982

Chief of Wilayah XIII Meter Department, Mr. Rochman, teaching "Basic Electricity"

Material-Logistics Course, January 17 - 22, 1983

Mr. Ristam, PLN Wilayah XIII RE Chief, lecturing at the training course.

TRAINING ACTIVITIES

Ir. John Rumondor, Deputy Director for RE, congratulates the training course graduates during the closing ceremony for the "Accounting and Reporting" training course, Semarang, June 20th, 1981

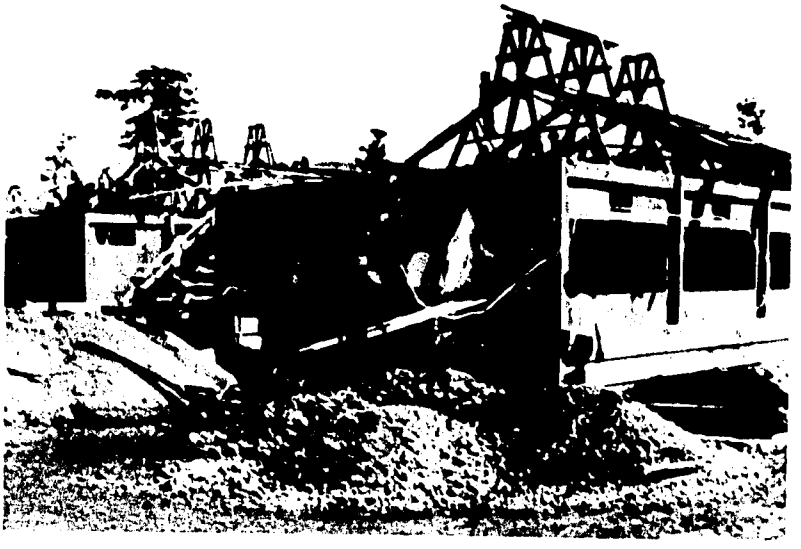
A participant receives his certificate-of-completion during the closing-program of the Meter-Testers training course, October 19 - 31, 1982

CONSTRUCTION MATERIALS

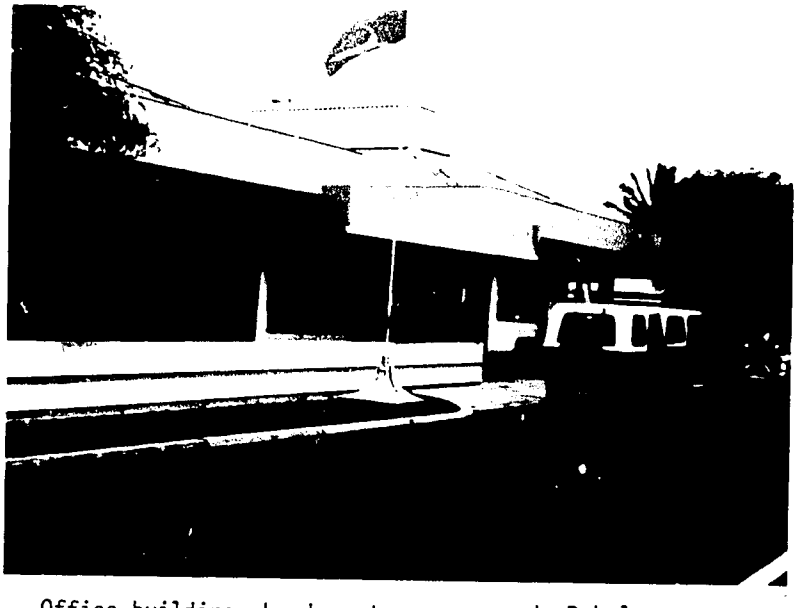
Construction vehicles, procured through the USAID loan for use in the RE projects, upon arrival in Semarang, 1982.

Housewiring materials. After receiving-procedures are completed, materials are neatly stored in warehouses, 1982.

HEADQUARTERS FACILITIES



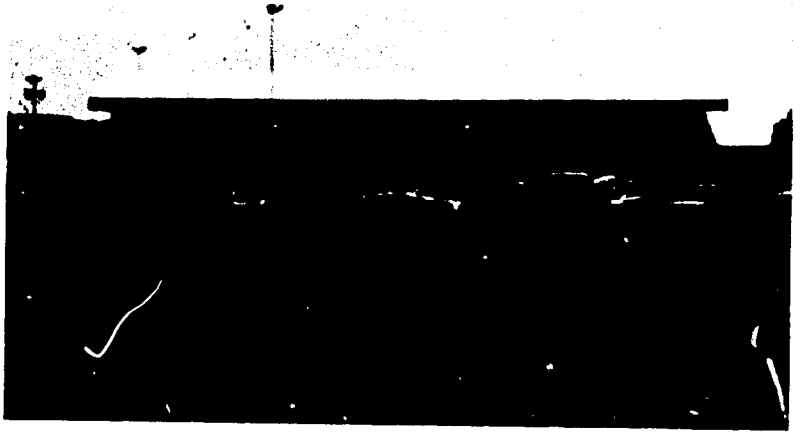
Headquarters facilities under construction at the Pekalongan (Pemalang) RE project, 1982.



Office building, headquarters compound, Pekalongan (Pemalang) project, November 1984.

HEADQUARTERS FACILITIES

Headquarters facilities under construction at the Magelang RE project including an office for operations personnel and warehousing facilities.



Warehouse/vehicle maintenance shop, Bantul RE project, 1984 (identical facilities at each RE site)

KLATEN DEMONSTRATION PROJECT

Productive-use of Electric Service

A PLN customer engaged in his battery-charging business. Klaten, 1981.

A customer of PLN service in the Klaten area utilizes electric saws to cut boards for furniture construction and electric lights to permit finishing-work during evening hours, 1981.

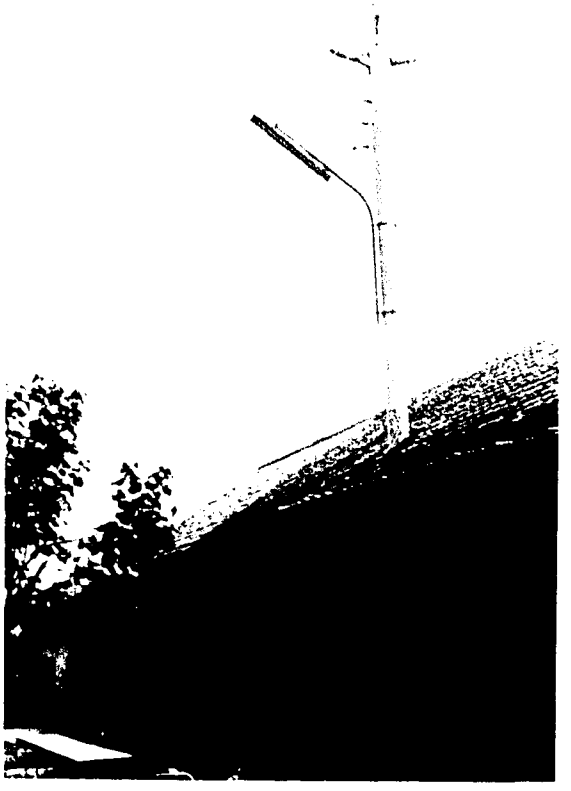
DISTRIBUTION LINE UNDER CONSTRUCTION

PLN P.I. Ring employees constructing an electrical distribution-line for the PLN/USAID RE projects, using a modern basket-truck, 1982.

A PLN-PI Ring lineman placing secondary attachments on a concrete pole, in a newly-constructed distribution-line, 1982.

DISTRIBUTION LINE COMPLETED

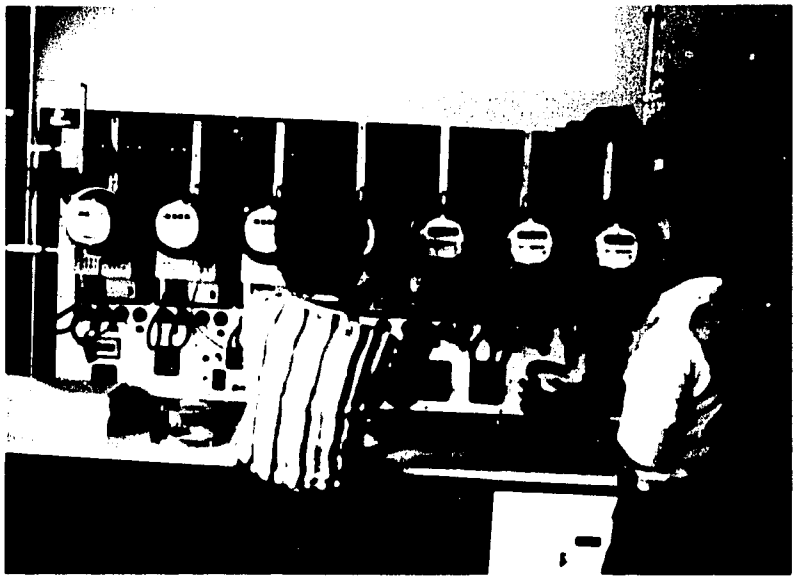
Typical three-phase line construction, with two-wire low voltage underbuild (plus neutral wire)



Which came first, the chicken or the egg in this case, the pole or the house (actually it was the pole)

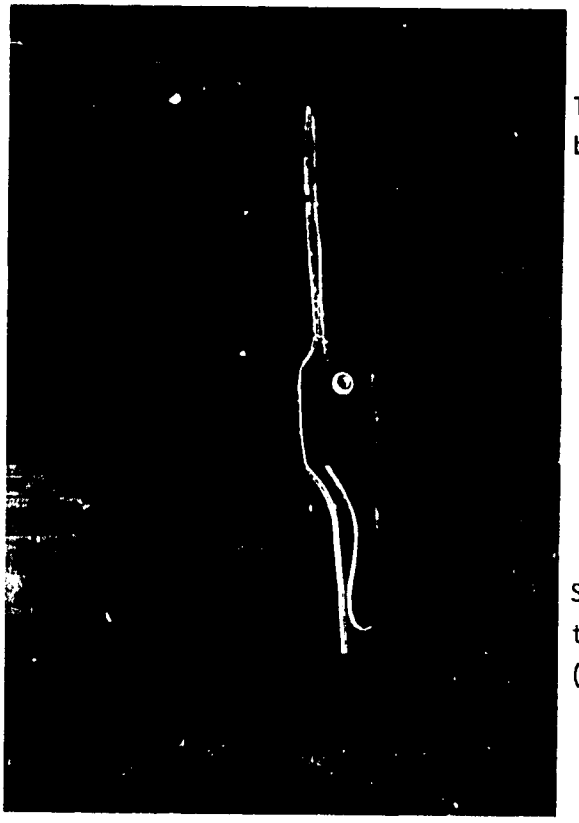
KWH METER INSTALLATION & TESTING

PLN workmen installing a Kwh meter-entrance on a new dwelling, 1981.



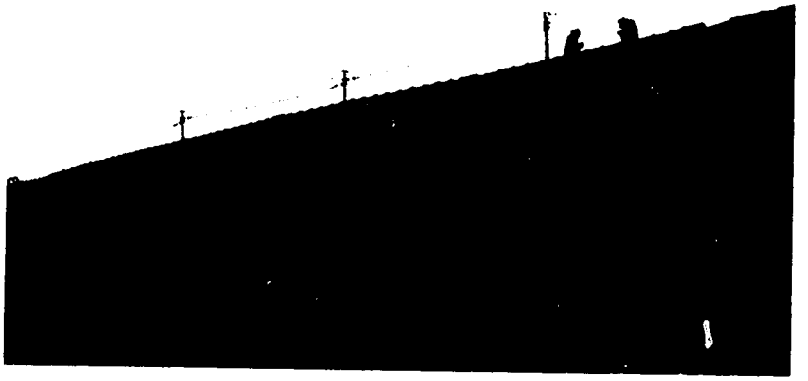
Meter-testing in progress, Bantul (Yogyakarta) project, November, 1984.

HOUSEWIRING & SERVICE-DROP INSTALLATION

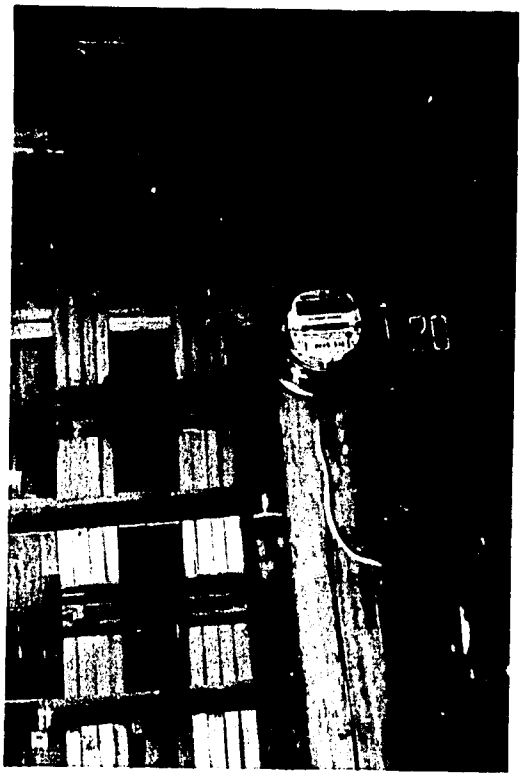


Typical housewiring in a bamboo house (left).

Service-drop installation to serve multiple customers (bottom)



KWH METER INSTALLATION



Typical Kwh meter (Cash register) installation on a bamboo house.