

NRECA FINAL REPORT

RURAL ELECTRIFICATION PROJECTS

DEPARTMENT OF COOPERATIVES

CONTRACT AID/ASIA-C-1357

AID LOAN NO. 497-T-052

DECEMBER, 1984

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INTRODUCTION

This report presents a history of the formation and development of three RURAL ELECTRIC COOPERATIVES in Indonesia. It covers events which occurred from January, 1979, the period when the cooperatives were organized, through December, 1984, the United States Agency for International Development (USAID) Project Assistance Completion Date (PACD).

BACKGROUND

The Government of Indonesia (GOI) initiated a demonstration rural electrification program to provide areawide electric power distribution in specified areas. The objective of this program was to demonstrate conclusively that reliable electric service and the social and economic benefits that accrue therefrom can be made available to the very poor people at a price they are able to pay.

Three of the electrical power systems are located on separate islands outside of Java and were implemented through rural electric cooperatives (REC). The three outer island systems are located on Central Lampung, South Sumatra (Sinar Siwo Mego REC), East Lombok (Sinar Rinjani REC), and Luwu, South Sulawesi (Samabotuna REC) and are being constructed and developed by the member-consumers themselves through the rural electric cooperative organizations. Each cooperative owns and operates a diesel generating plant to provide power for the electrical distribution system, and each has their own headquarters facilities. A special agency known as the Project Development Office (PDO) under the Department of Cooperatives is the GOI implementing agency for the cooperatives.

USAID assisted the GOI in this demonstration including making available AID grant funds to provide organizational, management and technical advisory services. The National Rural Electric Cooperative Association (NRECA), through its International Programs Division, was contracted by AID to provide these services. The services for the Cooperatives included complete assistance in the organization of the individual cooperatives; including staffing patterns, job descriptions, cost accounting, O&M methods, training, planning, policies and procedures, housewiring and etc.

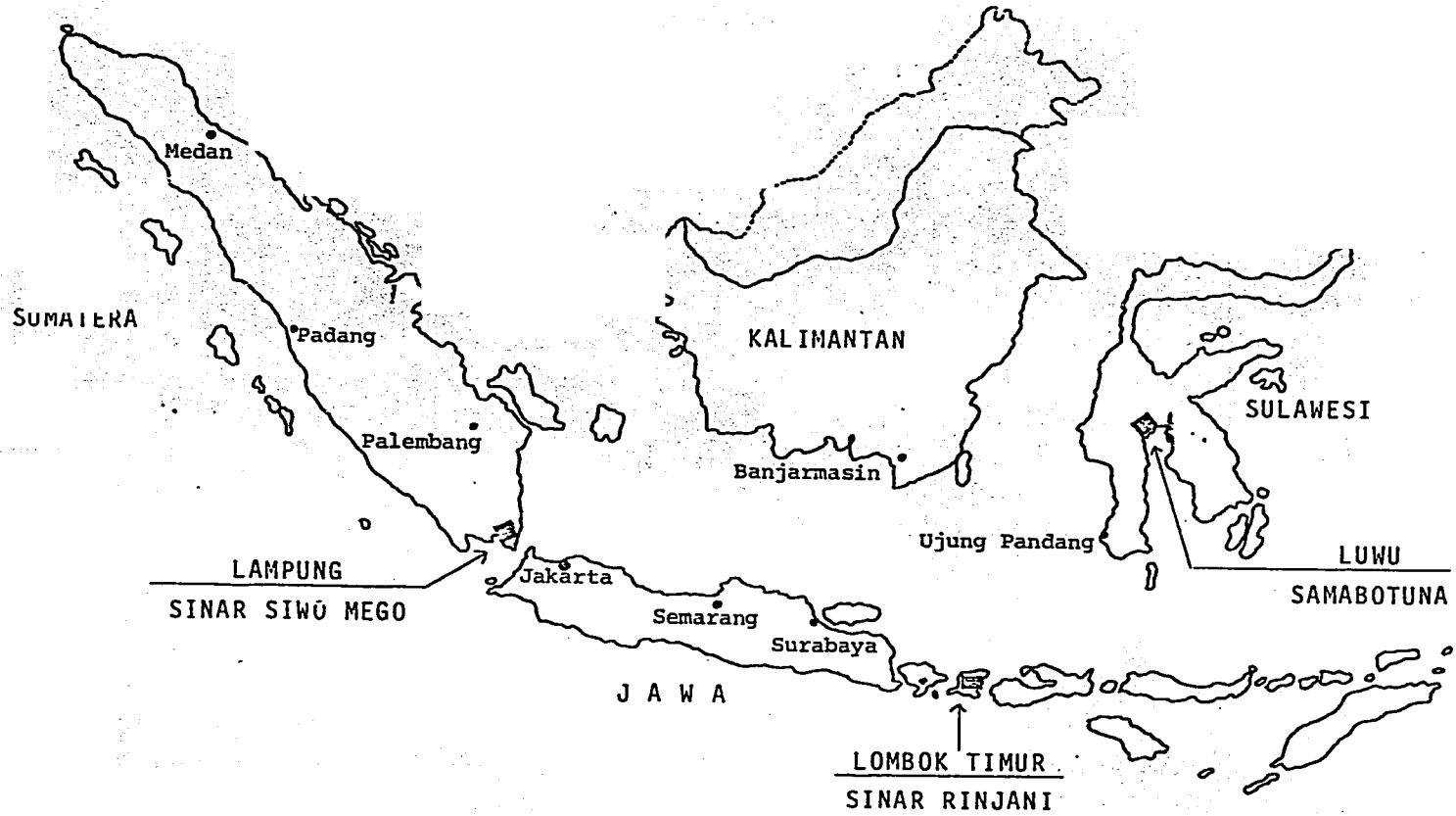
USAID also made available grant funds for the services of an Architectural and Engineering firm, Chas. T. Main International Inc., who was responsible for commodity procurement, headquarters and distribution system design and construction. (Information on these activities are included in Chas. T. Main's final report dated December 1984)

The personnel which NRECA furnished for the performance of this contract are listed as follows:

1.	DENNIS WILSON	Team Leader	November 1978 - March 1980
2.	PETER MCNEILL	Team Leader	April 1980 - July 1982
3.	RAY SHOFF	Team Leader	August 1982 - Dec. 1984
		Administrative Officer	January 1981 - July 1982
		Training Officer	January 1979 - Sept. 1980
4.	LOUIE SANSING	Training Officer	October 1980 - March 1984
		Lombok Project Advisor	February 1979 - Sept. 1980
5.	PAUL SWANSON	Lombok Project Advisor	October 1980 - July 1982
		Luwu Project Advisor	March 1979 - Sept. 1980
6.	JOHN DEFOOR	Luwu Project Advisor	October 1980 - Feb. 1983
7.	LLOYD LAKE	Lampung Project Advisor	Sept. 1978 - July 1981
8.	CLAUDE FRANKE	Lampung Project Advisor	August 1981 - July 1982
9.	WILLIAM GREG	Administrative Officer	July 1979 - Sept. 1980

In total, the NRECA team provided two hundred and seventy eight (278) person-months in Organization-Management-Training Activities for the PDO and the three rural electric cooperatives.

RURAL ELECTRIFICATION
COOPERATIVE PROJECT SITES



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PROJECT DEVELOPMENT OFFICE FOR RURAL ELECTRIFICATION

As a condition precedent to release of U.S. dollar loan funds, a Project Development Office for Rural Electrification (PDO-RE) was formed in calendar year 1978. Originally the PDO-RE was directly under the office of the Director General of Cooperatives but in 1983, when the GOI formed a separate Ministry of Cooperatives, PDO-RE's reporting relationship shifted to the Department of Cooperatives within this Ministry.

With assistance from NRECA, the PDO-RE was organized and staffed for three basic functions: Organization of REC's and personnel training; budgeting and control of loan funds for the REC's; technical assistance for engineering, material/equipment procurement and construction. During the period 1978 to the end of 1984, USAID's PACD, personnel complement varied from thirty (30) to sixty (60) persons, and refinements were made in organizational structure.

As with most new agencies, time was required before the PDO-RE began to function effectively. The two major problems were: minimal authority in decision-making within the GOI framework; and low salaries resulting in a high personnel turnover.

By USAID's PACD, PDO-RE had developed key personnel in the accounting and technical departments, to provide continuing assistance to the REC's. Administrative functions within the PDO-RE were performed efficiently and requests for assistance in the development of additional rural electrification projects were being processed.

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PROJECT FUNDING

Loan funds for the REC's were from two sources: USAID's commodity loan and GOI's counterpart loan. Originally the Canadian Government, through their international development agency, approved a loan to fund the power supply components of the project, but this was not utilized.

The USAID loan was in the amount of ten million dollars (\$10,000,000) divided between the three REC's. Loan terms included two percent (2%) interest during the ten year grace period and three percent (3%) interest during the twenty year amortization period (30 year loan).

The GOI loan totalled the 1978 rupiah equivalent of \$14,402,000 U.S. dollars which, due to devaluation, was only the equivalent of \$5,400,000 U.S. dollars at the time of the PACD. Loan terms limited the grace period to six years with a fourteen year amortization period (20 year loan). The interest rate was set at six percent (6%).

To identify and commit the end-user of these loan funds, re-loan agreements were executed between the GOI Bank Rakyat Indonesia (BRI) and the three REC's. PDO-RE and NRECA staff provided recommendations on division of the loans between the three REC's, using feasibility-study projections as the basis for division. Re-loan agreements included the addition of six-tenths of one percent (.6%) service charge for BRI, raising the interest on the U.S. dollar loan to 2.6% during the grace period, 3.6% during the amortization period, and raising interest on the GOI loan to 6.6%.

Both the USAID and GOI provided grant funds to develop the REC's. The USAID grant expenditures at the PACD were approximately six million five hundred thousand (\$6,500,000) dollars which was primarily for architecture and engineering consultants and organization-management-training consultants.

The GOI grant, as stipulated in the USAID-GOI loan, was listed as the rupiah equivalent of one million three hundred and fifteen thousand (\$1,315,000) dollars for consultant support. In addition, rupiah funds were made available to support the PDO-RE and the REC's from the GOI's annual budget (DIP funds). At the PACD, approximately Rp 4,700,000,000 rupiah had been expended for all purposes. The dollar equivalent, which is difficult to estimate due to drastic changes in rupiah-dollar conversion rates, may approximate \$5,700,000.

REC ORGANIZATION AND DEVELOPMENT

The PDO-RE and NRECA staff, assisted by local DGC staff, conducted information meetings in the three REC areas beginning in January of 1979. This activity was followed by actual organization of each REC, adoption of by-laws and election of directors. By April 1979, the organization phase of REC development had been completed.

Temporary offices were established within each REC area in 1979. Permanent headquarters facilities, which included an office building and a warehouse, were completed and occupied in 1983/1984.

During the pre-construction period, a small staff of about six people was employed at each REC. When membership solicitation began, and RE demonstration project construction started, employee complement increased substantially.

Listed below are statistics relating to the REC's service areas, and organization, as of the PACD.

	<u>KECAMATAN</u>	<u>DESAS</u>	<u>BOARD MEMBERS</u>	<u>EMPLOYEES</u>
Lampung	9	109	5	81
Lombok	5	29	7	46
Luwu	5	51	9	76

MANAGEMENT

After organization, a local DGC representative served as Project Coordinator and controller of GOI grant funds, and also served as REC Acting Manager. By the end of 1980, PDO-RE had appointed an acting manager for each REC from PDO-RE staff.

Ironically, at the PACD, management was again by coordinator-manager dual role at the Luwu REC, and plans were being made to appoint the Acting Manager as Coordinator at the Lombok REC. As the REC's grow and accept greater financial responsibilities with their own capital, the role of the Coordinator is diminishing. Eventually, as grant funding is phased out, the Coordinators position will be abolished and Managers will be appointed on a permanent basis.

TRAINING

The greatest activity for the NRECA OMT team was TRAINING, ----- both formal class room training ----- and on-the-job training.

Key employees of the PDO-RE first received training in the Philippines with the Philippines National Electrification Administration (NEA).

Seven persons spent two weeks in the Philippines in 1978 where NEA and NRECA staff conducted training courses. Later that year, two key NEA staff members came to Indonesia and assisted NRECA with first-stage training for PDO-RE staff.

The position of NRECA training officer in Indonesia was filled in January of 1979 and remained occupied until March of 1984. PDO-RE had a full-time training officer from late 1979 until his unfortunate death in early 1984. As of the PACD, PDO-RE's training officer position remained vacant.

Under the heading of formal training, PDO-RE and NRECA conducted 51 training courses. A total of 535 persons participated in the courses, many of whom attended two or more courses. (See pages 10-13)

Training materials included a comprehensive Accounting Procedures Manual; Work Flow Manuals; and numerous training materials on individual subjects. Unfortunately, much of the NRECA/PDO-RE training material was lost in November of 1984 when the Sarinah office building was destroyed by fire. Key manuals were reconstructed from training materials which had been distributed to the RECs prior to the fire.

I. COURSES HELD IN JAKARTA

<u>COURSE TITLE</u>	<u>DATES HELD</u>	<u>NUMBER OF PARTICIPANTS</u>
1. Project Orientation-planning (PDO-RE staff)	April 4 - 7th, 1979	15
2. Rural Member Service Specialists (Member Services Dept. personnel)	June 6 -11th, 1979	12
3. Bookkeepers Training Course	Nov. 5 - 13th, 1979	14
4. Electrical Genset Operation & Maintenance	Nov. 26 - Dec. 1979	4
5. Accounting Reporting	Dec. 13 - 26th, 1982	12
6. Pole Inspection	Feb. 7 - 10th, 1983	6

II. COURSES HELD AT THE LAMPUNG REC

1. Management Seminar I	May 2 - 5th, 1979	8
2. Management Training Course II	Oct. 4 - 6th, 1979	10
3. Accounting Workshop	Nov. 24 - 29th, 1980	6
4. Apprentice Linemen Training Course	Feb. 9 - 18th, 1981	18
5. Electrician Training Course	Feb. 12 - 19th, 1981	9
6. Kwh Meter, Meter Entrance Workshop	April 22 - 23rd, 1981	10
7. Construction Cost Accounting II	April 25 - May 1, 1981	9
8. Distribution System Operation & Maintenance	May 29 - 30th, 1981	26
9. Meter Reading, Billing, Collection	June 16 - 17th, 1981	9

<u>COURSE TITLE</u>	<u>DATES HELD</u>	<u>NUMBER OF PARTICIPANTS</u>
10. Power Plant Recording and Reporting Workshop	June 18, 1981	6
11. Accounting/Reporting, Operating Period	June 19 - 21, 1981	5
12. Cooperative Work Flow Procedure	March 22 - 31st, 1982	15
13. Engineering Procedure Rural Distribution System	June 14 - 18th, 1982	7
14. Kwh Meter Testing	March 12 - 19th, 1984	8
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III. <u>COURSES HELD AT THE LOMBOK REC</u>		
<u>COURSE TITLE</u>	<u>DATES HELD</u>	<u>NUMBER OF PARTICIPANTS</u>
1. Management Seminar I	May 21 - 24th, 1979	9
2. Management Training Course II	Sept. 24 - 26th, 1979	11
3. Electrician-Trainors Training Course	Nov. 5 - 10th, 1979	3
4. Electrician Training Course	Nov. 12 - 17th, 1979	14
5. Electric Genset Operation & Maintenance	Nov. 26 - Dec. 1, 1979	4
6. Construction Material Management and Construction Cost Accounting	March 10 - 15th, 1980	6
7. Apprentice Linemen Training Course	April 7 - 9th, 1980 28 - 30th, 1980 May 1 - 10th, 1980	9
8. Staff Orientation	June 23rd, 1980	9

<u>COURSE TITLE</u>	<u>DATES HELD</u>	<u>NUMBER OF PARTICIPANTS</u>
9. Meter Reading, Billing and Collecting	June 24 - 25th, 1980	6
10. Power Plant Operation & Maintenance	July 21 - 26th, 1980	6
11. Distribution System Operation and Maintenance	June 26 - 28th, 1980 Aug. 4 - 5th, 1980	14
12. Safety and First Aid Training	July 21 - 30 th, 1980	12
13. Staff Orientation Seminar	Sep. 29 - Oct. 4, 1980	5
14. Power Plant Recording	Oct. 1 - 2nd, 1980	8
15. Accounting Workshop	Nov. 24 - 29th, 1980	6
16. Service Drops, Service Entrance	July 14 - 15th, 1981	12
17. Cooperative Work Flow Procedure I	Feb. 1 - 4th, 1982	12
18. Cooperative Work Flow Procedure II	April 28 - May 1st, 1982	14
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IV. <u>COURSES HELD AT LUWU REC</u>		
1. Management Seminar I	May 9 - 12th, 1979	8
2. Management Training Course II	Oct. 11 - 13th, 1980	8
3. Electrician Training Course	May 4 - 9th, 1981	12
4. Linemen Training Course	May 4 - 25th, 1981	12
5. Materials Management & Housewiring	May 18 - 19th, 1981	9

<u>COURSE TITLE</u>	<u>DATES HELD</u>	<u>NUMBER OF PARTICIPANT</u>
6. Construction Cost Accounting	May 19 - 23rd, 1981	9
7. Meter Reading, Billing and Collection	August 21, 1981	13
8. Distribution System Operation and Maintenance	Aug. 24 - 25th, 1981	23
9. Safety Procedures	August 25, 1981	23
10. Service Drops and Staking Sheets	August 26, 1981	8
11. Cooperative Management Workshon	August 27th, 1981	5
12. Cooperative Work Flow Procedure	March 1 - 6th, 1982	12
13. Safety Training	January 21 -26. 1983	24

RURAL ELECTRIFICATION DEMONSTRATION PROJECTS

By mid 1979, after the REC's has been organized, employee complement selected, and management training courses conducted, it became evident that there would be a considerable time-lapse until electric generating equipment was available and electrical distribution systems were in place. The major cause of the expected delay related to the time required to prepare and issue IFB's, select suppliers, and receive materials/equipment on site. Both USAID and the PDO-RE were desirous that some physical facilities be installed and consumers connected at an early date. Therefore it was decided that "demonstration" rural electrification projects would be installed in each REC area.

LOMBOK RE-DEMO PROJECT

The Lombok REC was chosen as the location for the first RE-demo project. USAID furnished excess property generators at no cost to the REC other than transportation, inspection, and testing expense. Five 100 KW and one 50 KW gensets were installed in a new power-plant building constructed in Aikmel, East Lombok, using rupiah loan funds.

Cost of distribution system construction materials/equipment, procured in-country, were paid from the GOI loan. Labor and overhead costs for construction of the distribution system were also paid from the GOI loan.

PDO-RE and NRECA staff trained local manpower to perform the construction activities which began in the first quarter of 1980. Distribution lines were built in three desas, with a 200 wood-pole distribution system capable of reaching fourteen hundred (1400) consumers.

Concurrently, a temporary office was erected at Aikmel, funded through GOI grant funds

In August of 1980, the system was energized and the Sinar Rinjani REC began its business operations. Only 12 hour electric service was provided initially but, in February of 1981, the REC began providing 24 hour electric service and has continued around the clock service.

This REC added a fourth desa to their distribution system in 1981 followed by the addition of a fifth desa in 1982. By the time contract construction began on the main project in the third quarter of 1983, the REC was already serving in excess of two thousand (2000) consumers.

LAMPUNG REC RE-DEMO PROJECT

AID provided four 100 KW, and one 75 KW generator to this REC which were installed in a temporary power plant near Metro, Lampung, in the second quarter of 1981. The REC paid only the transportation, inspection testing, and installation costs.

Distribution system and housewiring materials/equipment were procured through USAID loan funds. By special government to government assistance, most of these items were purchased internationally through small quantity procurement to expedite DEMO-project implementation.

PDO-RE and NRECA conducted training programs for REC linemen, electricians and power plant operators.

Distribution system construction began in the first quarter of 1981 and the system was energized in May of that year.

Approximately twelve hundred (1200) poles were installed in 110 Km of distribution line in 3 desa to ultimately reach two thousand (2000) consumers.

In 1983 a second RE demonstration project was installed by REC personnel in Probolinggo, an area in the NE part of the REC's service area. This was prompted by a request from national government officials to provide electric service to this area which was to be the scene of an international agricultural exposition in August of that year.

Approximately eight hundred (800) wood poles were installed in 70 Km of distribution line to ultimately serve one thousand five hundred (1500) consumers. At the PACD, the Lampung REC was serving a total of nearly four thousand (4000) consumers in the two RE-demo project areas.

Luwu REC RE-DEMO PROJECT

USAID also furnished excess property generators to this REC at no cost other than overhaul, testing, and transportation. Five 100 KW and one 35 KW gensets were made available for RE-demo projects.

Under arrangements similar to Lampung project material procurement, USAID loan funds were used to buy distribution system materials for a RE-demo project in desa Bone Bone, South Sulawesi. Housewiring materials were procured with rupiah loan funds.

PDO-RE and NRECA conducted training courses for REC linemen and Electricians. Construction began in the second quarter of 1981 and by August of that year, a 200 pole low-voltage electrical distribution system had been installed in the densely populated areas of Bone Bone. A temporary power plant was installed in the desa and the system was energized in August of 1981 serving over seven hundred (700) consumers.

In 1982, a second RE-demo project was installed in the desa Mangkutana in the NE part of the REC's service area. A separate temporary power plant was installed and two of the USAID-furnished gensets were placed in service. Distribution lines were extended throughout the densely populated area of the desa, and in June of 1982, the REC began supplying electric service to two hundred (200) consumers.

At the time that contract construction of the main project began in the second quarter of 1984, this REC was serving approximately one thousand (1000) consumers in the two RE-demo projects.

ELECTRIC-POWER SUPPLY

With the exception of isolated, small, low voltage lines in some of the desas, the service areas of all three REC's were void of electric distribution lines at the time the REC's were formed. Therefore, self-generation was the only option for power supply to the REC's consumers. Although the potential for small-hydro-electrical installations exists, the time-frame for development excluded the present use thereof. Diesel powered generators were chosen as the logical source of power for each location.

It was indicated in feasibility studies that, in total, 33 MW's of generation would be required for the three REC's by the 6th year of operation. The Canadian Government through CIDA was to supply generation through their loan package which would equal or surpass this capacity. Unfortunately, with the passage of time, cost estimates for generation proposed by CIDA reached the installed cost per KW of plus or minus U.S.\$1,200. Therefore, the total generation requirements were reviewed and weighed against CIDA proposals and, in the last half of 1982, it was decided that the CIDA loan would not be utilized for electrification projects.

The PDO-RE and NRECA evaluated the power supply problem in view of the new developments. It was agreed that a request would be made to USAID to allow the procurement of 1200 KW's of additional generation, 400 KW per REC, from USAID loan funds to supplement the excess-property generation that USAID had previously furnished. USAID approved the request and in late 1983, orders were placed.

In 1984, the PDO-RE was listed to receive an allocation from the U.S. Government PL480 program which was to be used for procuring generating equipment. It was recognized however that several months would pass before these funds would actually be available so again USAID was requested to allow the purchase of additional generation from the USAID loan. Upon approval, an 800 KW generator was ordered for the Luwu REC, and an 800 KW and a 400 KW generator for the Lombok REC. These gensets arrived in-country in late 1984.

USAID also approved the procurement of parts for overhaul and maintenance of the excess property generators. An order was placed in late 1983 and by the PACD, each REC had received a supply of parts which should last two or more years. (Additional parts will be ordered through PL480 funding).

At the PACD, PDO-RE staff was working on the technical specifications for generation equipment, and power plant buildings were being designed. It is expected that PL480 funds will be available by mid-1985 and that equipment may then be ordered.

CONSTRUCTION

This report will only highlight construction by category and time-frame. The final report of the A & E consultant, C.T. Main International, included complete information on construction activities and costs.

Headquarters ----- After the 3 REC's were organized in early 1979, assistance was provided by consultants in the selection of headquarters sites. Design work began in that same year but, due to unexpected problems, contracts for construction of headquarters facilities were not awarded until mid-1982.

The Lampung REC headquarters construction was contracted in June 1982, and completed in March, 1984. The Lombok REC headquarters construction was contracted in September, 1982, and completed in October, 1983. Headquarters facilities for the Luwu REC were contracted in July of 1982 and completed in May of 1984. Facilities at all sites included an office building, warehouse, open storage area, roads and fencing.

Power Production ----- As included in earlier pages of this report, temporary power plants were constructed at all three REC's with rupiah loan funds. Permanent power plants will be funded from PL480 funds.

Distribution Systems ----- Aside from electrical distribution systems associated with the RE demonstration projects, construction began on the main project (155 Km) in July of 1983 at the Lombok REC, and was more than 90% complete by the PACD.

At the Luwu REC, construction began in August of 1984 (611Km), and was about 25% complete at the PACD.

At the Lampung REC, contractors had been selected for construction of the main-project by the PACD. However, construction was not scheduled to begin on the 1405 Km of primary and secondary lines until February, 1985, due to lack of treated poles.

BUSINESS OPERATIONS

From the formation of the REC's in early 1979, until the time reloan agreements were completed with BRI and GOI loan funds were made available in February of 1980, the only source of funds for the REC's was (DIP) grant funds. Control, banking, and accounting for DIP funds was the sole responsibility of the DGC project coordinator and his staff.

In preparation for the REC's own business operations, NRECA staff prepared the format for accounting and reporting. General and subsidiary ledger books were obtained from the U.S.A. and an accounting system was installed that patterned the system used by U.S.A. REC's, with modifications for local conditions, banking, etc.

Bank accounts were opened in each REC area to control cash receipts and expenditures from the four sources of funds for the REC's; GOI rupiah loan funds; membership fees (Rp 1,000 per member); housewiring funds; and general revenue from sale of electric energy. With the exception of membership fees, two bank accounts were opened for all funds --- one serving as a depository referred to as the Board of Directors account, and the second serving as a disbursement account for use by the manager. Transfers from receiving to disbursement account is controlled by the Board of Directors.

NRECA designed, and had translated to Bahasa Indonesia, 70 different forms for use in the business operations (construction and operations) of the REC. The PDO-RE staff had these reproduced in large quantities and forwarded to the REC's.

Membership fees ----- Each prospective member-consumer is required to complete an application for membership and pay a fixed fee of Rp 1,000. After approval of the membership application by the Board of Directors, a membership certificate is issued to the member. The membership fee is refunded if the member moves from the REC service area, however, if an unpaid energy bill exists, the membership fee is applied against the accounts receivable.

Housewiring ----- All REC's conduct housewiring programs as a part of their regular business functions. The REC's prepare wiring diagrams, material quantity estimates, provide material and contract-electricians to perform the installation, and make final inspection of the work. The REC bills the member on an actual cost of installation basis which in the beginning was about Rp 10,000 per house for three lights and one outlet, and at the PACD was averaging closer to Rp 20,000 per house.

It was deemed essential that the REC become involved in housewiring to be sure that members were ready to receive electric service when the REC's distribution lines were installed.

GOI Rupiah Loan Funds ----- NRECA initially recommended a budget process and prepared a format for requesting loan funds on a quarterly basis. This was accepted by PDO-RE, however engineers estimates of requirements for the first loan fund release were vastly over estimated. The first release of funds was so large that PDO-RE and the banking institution, Bank Rakyat Indonesia, mutually agreed that a major share of the first release be returned to BRI.

Thereafter, loan fund releases were limited to specific, individual, purposes which was beneficial from the standpoint of limiting interest expense, but troublesome from the standpoint of project implementation.

The process remained the same at the PACD. PDO-RE requests BRI/Jakarta for loan fund advance to a REC for a specific purpose, and BRI transfers the funds to the REC's account in the BRI branch in the project area.

Operating Revenues (sale of electric energy) ----- Prior to RE demonstration project energization, NRECA and the PDO-RE recommended retail electric rates (tariff) applicable at each REC. Rates were established based on the current cost of diesel fuel and other expected expenses. Unfortunately, diesel fuel costs increased from Rp 50/liter at the time of energization to a price of Rp 220/liter at the PACD.

The REC's were new entities in the electrical power field in Indonesia. As a result, it was not easily defined as to what agency controlled their tariff. As a result, tariff increases always lagged far behind diesel fuel increases resulting in a sizeable deficit financial operation at each REC. Revenues received from the sale of energy were supplemented with GOI DIP funds to enable the REC's to meet all expenses.

Most of the member-consumers served in the RE demonstration project had never lived in a home with electric service. They were not accustomed to paying bills monthly for a service that had already been received. Therefore, in the beginning, collection was a problem for the REC's.

NRECA prepared operating-policies for the three REC's including a policy on disconnect for non-payment of energy billing. It was difficult to enforce in the early months of operation but, after numerous consumers were disconnected and the examples were set, collection problems minimized.

Statistics ----- On pages 34 through 36 of this report are summaries of operations at each REC for calendar year 1984. The consumer connections are listed in the bottom section of each summary. The Lampung REC's consumer total did not change substantially since construction of the main distribution lines had not begun.

The average Kwh per consumer at Lampung and Lombok REC's ranged from 21 to 28 Kwh/month while at the Luwu REC, consumption level dropped substantially as additional consumers were added. By comparison, the consumption level in early years operations, depicted in the feasibility studies, was 20 Kwh/month.

Line one of each summary lists the actual rupiah billing for energy sales while line two represents disconnect-reconnect fees.

The cost of the largest expense item, diesel fuel and lube oil, is shown on line four. The GOI increased the price of diesel fuel substantially in March of 1984 and this is reflected in April fuel costs.

Line fifteen of the summaries shows the cash gain or (loss).

It may be noted that the Lombok and Luwu REC's experienced a loss (cash expenses exceeded billed energy sales) every month during 1984.

This is because of relatively low connection levels and low tariff. The Lampung REC showed a cash gain for seven months of the year.

Interest accruals are not cash expense items during loan grace periods since the accrual is deducted from principal loan balance. Depreciation is a book accrual only.

Income/expense on a cash basis for calendar year 1984, as converted to rupiah per Kwh, is listed as follows:

	LAMPUNG	LOMBOK	LUWU
Revenue per Kwh billed	Rp 162	Rp 141	Rp 161
Cash expense per Kwh billed	158	194	257
Net gain or loss per Kwh billed	4	(53)	(96)

The high expense per Kwh billed for Luwu relates to; higher costs of diesel fuel than the other REC's; higher system losses because the demonstration projects were low-voltage installations; and relatively low Kwh sales.

Unfortunately, the REC's had not reached a consumer connection level at the PACD high enough to produce really meaningful operating statistics. By the end of 1985, it is expected that the REC's financial and statistical reports can provide the basis for project viability studies and financial projections.

LESSON LEARNEDCONSULTANT SERVICES

In their desire to implement the RE projects in Indonesia at the earliest possible date, USAID required the OMT consultant to bring their entire team to Indonesia in the first half of 1979. However, beyond USAID's control, long delays were experienced before the main project was constructed at each location. Team members were occupied with RE demo project preparations, construction and operation, however, by the time construction of the main projects were under way, USAID grant funds were depleting and most of the OMT team members had departed Indonesia.

With regards to two separate consulting firms (A & E services and OMT services) in retrospect, it would have been beneficial if there had been one team leader in charge of both teams. Better coordination would have resulted and project implementation may have benefited.

PROCUREMENT/WAREHOUSING

Original construction schedules indicated that headquarters facilities, especially warehouse buildings, would be constructed first and be ready for use before construction materials arrived. Unfortunately several problems occurred in design and tendering, and most of the construction material arrived at the REC's before the headquarters facilities were completed. This created a storage and security problem, and resulted in more loss and breakage than usual due to extra movement of materials.

TECHNICAL

At the PACD, one major problem was left unsolved relating to distribution system protection, sectionalizing. The oil circuit reclosures that were ordered for the three REC's will not coordinate with power plant protective devices. When a fault occurs on the distribution system, the power plant goes off-the-line.

At the time the A & E firm selected OCR's for distribution system protection, it was still planned that large-size generators, with a relatively high generating voltage, would be supplied through the Canadian loan. If this had occurred, coordination between distribution system and power plant protective devices would not have been a problem. However, the generators procured more or less piece-meal are of relatively small size and all generate at low voltage (380 volts). Under existing conditions, coordination can not be achieved.

A second problem in the technical field relates to transformers for the distribution system. As usual for rural distribution systems, single phase transformers were chosen and all have a 220/440 volt low-voltage rating. To provide service to three-phase loads, two or three transformers are normally banked (connected together) to provide three phase power.

The distribution systems include V-phase lines with two primary conductors and a neutral conductor. Normally two single phase transformers are banked open-wye, open-delta, to provide three-phase from these lines. Unfortunately, with 220/440 volt secondary voltage, these transformers can not provide the standard 380 volt 3 phase from V-phase lines.

The REC's will need a stock of single phase transformers with 380 volt low-voltage rating.

REC ORGANIZATIONS

As a part of the loan/grant arrangements, the GOI provided grant funds to assist in project implementation. These funds were made available by the local DGC offices through their normal funding procedures and with normal restrictions. One restriction related to the salary level which was relatively low, and basically the same for all employees in general categories.

This created a problem in the selection and retention of qualified employees. After receiving training, at least 30 per cent of the original employees at the REC either left the REC entirely or transferred to another position.

REC MANAGEMENT

In the makeup of a typical REC, the Board of Directors is a policy making body and board members, as individuals, do not become involved in day to day work schedules or employee functions. Board members usually have their own profession or business and only come to the REC headquarters for board meetings.

A lesson was learned in implementing these rural electrification projects. It is almost an impossible task to confine board members to policy making functions, and allow the manager to do the managing.

From the time of organization of the REC's until the PACD, board members were provided with office space and a small salary/allowance. In some instances, REC transportation equipment was monopolized by board members to the detriment of REC operations. REC managers have learned to live with this situation.

RE DEMONSTRATION PROJECTS

The demonstration projects were effective from the viewpoint of providing electric service to a few of the REC members at a relatively early date. The Lombok REC, for example, had already constructed and energized distribution lines only 1½ years after the REC was organized. The other RECs had lines energized 2 to 2½ years after organization. This can be considered as fast work.

Unfortunately, too much time was spent implementing small costly demonstration projects to the detriment of main project implementation. At the PACD, nearly 6 years after the REC's were formed, only the Lombok REC's distribution system neared completion, with construction activities to continue for 2 or more years at the other RECs.

The two REC pilot projects in the Philippines by comparison were implemented much faster. Consultants arrived on site in early 1969. By the third quarter of 1971, part of the main lines were already energized at both projects, and project completion was accomplished by the end of 1972.

RECOMMENDATIONS

REC Management/Training ---- It is evident that the three REC's will need additional assistance in construction material/equipment control while the main distribution lines are still under construction. They also need additional assistance and training in operation and maintenance of electrical distribution systems, plus refresher courses in other business operations.

It is advisable for USAID to continue some form of assistance to these pilot projects throughout 1985 and possibly into 1986. Continuation of OMT consultant services on a limited basis may be the most effective solution.

Electrical power supply ----- The most critical problem with regards to physical facilities is the shortage of generation. It was fortunate for the REC's that USAID allowed the use of their dollar loan funds to purchase generators, after the Canadian loan was set aside. However, this was only interim assistance while the final solution to genset procurement was sought.

At the PACD, the three projects had been allocated in excess of five million dollars (US \$5,000,000) from the U.S. Government's PL480 program for generation facilities. It is imperative that the PDO-RE work out the details for use of these funds and place orders for additional generation at the earliest possible date.

Distribution Systems ----- The most critical need is wood poles for the Lampung and Luwu REC's. Although the pole treatment plant at the Lampung REC has been prepared for treating poles, a shortage of raw poles still exists. The PDO-RE should review management problems at the treating plant and take what action is necessary in an effort to expedite pole deliveries from suppliers.

Financial ----- The Lampung REC will have a serious shortfall in rupiah loan funds which could delay distribution system construction. The shortfall relates to the much larger distribution system than originally envisioned in feasibility studies. The Luwu REC will possibly experience a relatively small shortage of rupiah loan funds also.

It is important that PDO-RE face this problem at an early date and request additional funding. USAID could be of assistance since prompt utilization of USAID-loan construction materials/equipment is in the best interest of all parties concerned.

Still under the heading of financial, the terms for the GOI rupiah loans are not favorable for the REC's or for RE in general. The grace period is only six years and the interest rate of 6.6% is too high.

Rupiah loan money was first made available to the REC's in February of 1980. Therefore, the six year grace period will terminate in February of 1986. Due to long delays in main project implementation, the REC's revenue will be insufficient to begin loan amortization by February 1986.

As a first step, the PDO-RE should request an extension of the grace period to match the 10 year grace period on the U.S. dollar loan. A second step, or an accompanying step, should be a request for a more favorable interest rate.

Office Equipment ----- It was unfortunate that computers were not included in the U.S. dollar loan procurement. PDO-RE should make every effort to seek funds from other sources and modernize the REC operations.

The hand-billing procedure now being followed is slow, costly, and allows room for many errors. The general accounting and reporting procedures, plus inventory control, should also be computerized. Ironically, the REC's were equipped with modern tools and test equipment for operation and maintenance of the electrical distribution systems, but accounting department needs were unintentionally bypassed. Possibly PL480 funds can be used for this needed procurement in addition to generating equipment.

Oil Circuit Reclosures ----- As included in earlier pages of this report, problems exist with coordination between distribution system and power plant protective devices. USAID and NRECA should assist the PDO-RE in finding a solution. The logical first step may be contact with the OCR manufacture to receive the benefit of their recommendations. Changing the trip coils in the OCR's to much smaller sizes may be one solution.

Transformers ----- The PDO-RE should assist the REC's in procurement of line-type transformers with 380 volt secondary windings to provide service to 3-phase loads from a V-phase primary line. Since the amount is not large, say 30 transformers in total for the three projects of 15 KVA to 25 KVA sizes, possibly it could also be included in PL480 loan procurement.

Productive Use of Electric Energy ----- As a result of insufficient power supply from the start of the RE demonstration projects, and continuing to the PACD, the REC's have not actively promoted the productive use of electrical service. When the power supply problem is overcome, the REC's should receive help in establishing effective programs. PDO-RE should take the lead in coordinating efforts for the three REC's. USAID should monitor the success of productive use promotion, possibly with a short-term consultant whose overall assignment may be total project evaluation. Proper timing may relate to the period when PL480 funded generation is in operation.

NRECA believes that the potential for productive use of electric service exists in many forms in all three REC areas. A well planned, coordinated, programs, supplemented with low-interest loan availability for electrical equipment procurement, are the missing ingredients.

SUMMARY

This completes this NRECA report. Assisting and monitoring these RE projects should continue after the PACD. Analysis of project viability and long range financial projections can be made after calendar year 1985 financial and statistical data is available.

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SINAR SIMO MEDO REC
OPERATING STATISTICS - 1984

OPERATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
REVENUE												
Operating revenue	14,676,955	9,799,780	9,602,330	14,013,907	14,232,613	13,880,618	14,121,227	14,918,284	14,918,931	14,976,641	15,377,219	14,676,955
Miscellaneous revenue	25,250	-	41,500	-	22,500	263,000	283,000	178,750	73,500	3,500	-	25,250
TOTAL REVENUE	14,702,205	9,799,780	9,643,830	14,013,907	14,255,113	13,943,618	14,394,227	14,697,034	14,992,431	14,978,141	15,377,219	14,702,205
EXPENSES												
Power Plant - Fuel	8,981,280	7,788,000	7,580,540	8,319,980	8,538,866	8,989,800	8,748,740	8,982,820	9,530,400	9,364,520	10,105,480	8,981,280
Operations	1,116,799	1,117,460	1,005,975	1,190,639	1,099,325	1,187,750	1,241,338	1,256,838	1,385,142	1,371,928	1,453,050	1,109,781
Maintenance	230,352	456,800	64,040	-	2,700	77,550	4,897,000	43,600	185,496	48,990	2,586,008	667,725
TOTAL PRODUCTION EXPENSES	7,157,599	9,362,280	8,650,555	9,510,999	9,640,785	10,255,100	14,887,078	10,283,258	11,101,038	10,784,838	14,144,538	10,758,786
Distribution - Operations	3,000	45,900	51,500	120,886	105,000	198,750	125,700	-	5,250	-	12,700	6,000
Maintenance	432,809	246,211	199,378	274,170	485,192	231,933	88,898	116,393	31,546	112,687	100,319	24,868
TOTAL DISTRIBUTION EXPENSES	435,809	292,111	250,878	395,056	590,192	420,083	214,598	116,393	36,796	112,687	113,019	40,868
Consumer-accounts expense	838,598	830,798	437,407	492,247	615,905	728,425	461,499	417,362	487,813	577,291	669,062	1,216,111
General & Administrative	1,684,931	2,963,017	1,338,459	1,396,834	1,252,569	1,445,022	1,457,892	1,360,348	1,251,896	1,243,361	1,499,805	1,034,131
Sales expense	8,600	-	1,100	-	-	-	50,000	2,500	-	-	2,500	15,000
TOTAL OPERATING EXPENSES	9,925,537	13,448,786	10,678,399	11,678,399	11,793,936	12,869,930	17,071,067	12,174,861	12,877,343	12,718,177	16,428,924	13,114,896
Gross Operating Margin (3 min 14)	(192,672)	(3,649,006)	(832,569)	2,219,971	2,155,062	1,072,936	2,522,173	2,114,688	2,259,964	(1,051,705)	1,587,309	1,587,309
Interest expense	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038	1,319,038
Cash Operating Margin (15 min 16)	(1,511,770)	(4,968,044)	(2,151,607)	900,933	836,024	(246,102)	(3,995,878)	1,203,135	795,650	940,926	(2,370,743)	268,271
Depreciation/Amortization	814,007	814,007	814,007	814,007	814,007	1,156,567	1,296,174	814,007	814,007	916,356	916,356	916,356
Net Operating Margin (17 min 18)	(2,325,717)	(5,782,051)	(2,965,614)	86,926	22,017	-	(5,292,052)	389,128	(18,357)	24,570	(3,287,089)	(648,085)
NON-OPERATING REVENUES												
Housewiring Income	797,756	830,035	879,418	621,159	97,633	83,393	916,101	544,010	466,179	321,081	1,219,808	1,111,843
Other Income	821,830	127,769	51,456	17,381	210,347	71,989	92,401	27,722	88,759	95,555	110,475	217,398
TOTAL NON-OPERATING REVENUE	1,619,586	957,804	930,874	638,540	307,980	125,382	1,008,602	571,732	554,938	216,636	1,330,283	1,329,241
NON-OPERATING EXPENSE												
Housewiring expense - Material	610,432	576,468	597,547	528,744	-	69,300	622,526	415,735	288,173	41,662	831,887	707,786
Labor	121,835	116,795	109,375	96,210	-	-	126,610	81,770	81,455	7,878	170,950	144,790
Other	731,437	978,450	637,053	290,883	65,513	700	275,011	315,267	148,250	700	302,427	299,627
TOTAL NON-OPERATING EXPENSE	1,463,704	1,671,713	1,343,975	915,837	65,513	70,000	1,024,147	812,772	497,878	50,232	1,305,264	1,148,403
Non-Operating Margin (22 min 28)	135,882	(712,907)	(413,101)	(277,297)	242,467	55,382	(15,545)	(241,040)	57,060	166,404	25,019	180,838
TOTAL MARGIN (19 plus 27)	(2,189,835)	(6,495,958)	(3,378,715)	(190,371)	264,484	(1,004,727)	(5,307,597)	148,088	38,703	190,974	(3,262,089)	(467,247)
Contribution from DIP fund	1,383,452	1,426,072	1,196,584	1,778,628	1,648,528	1,347,307	1,811,080	1,435,469	1,587,762	1,607,905	1,476,259	1,674,781
TOTAL MARGIN INCLUD. DIP (28 plus 29)	(806,382)	(5,069,886)	(2,182,131)	1,588,257	1,913,012	342,580	(3,496,517)	1,783,557	1,626,465	1,798,879	(1,585,821)	1,207,534
Number receiving service	3,352	3,422	3,449	3,593	3,638	3,667	3,602	3,649	3,694	3,739	3,780	3,785
kWh billed	71,680	71,473	70,644	83,128	82,667	80,167	82,644	85,031	89,799	89,212	92,056	85,190
Average revenue per consumer	2,930	2,869	2,874	3,934	3,953	3,931	3,965	3,998	4,078	4,043	4,107	3,915
Average revenue per kWh billed	178	141,6	141	180	178	174	177	177	171,75	173	170,5	178
Average kWh consumption per consumer	20	20,5	20,3	22	22	22,6	22,3	23	23,7	23,3	24	22

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SINAR BIKJANI - LONDON
OPERATING STATISTICS 1984

LINE #	OPERATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
REVENUE													
1	Operating revenue	5,522,350	5,065,840	4,841,105	5,208,760	6,699,028	6,976,026	7,151,514	7,068,218	7,169,380	7,915,256	8,421,747	10,200,168
2	Miscellaneous revenue	207,508	125,280	48,650	139,770	74,493	69,900	43,255	78,651	44,800	87,800	44,200	49,400
3	TOTAL REVENUE	5,729,858	5,191,120	4,889,755	5,348,530	6,773,523	7,044,926	7,205,169	7,146,869	7,214,180	7,973,056	8,465,947	10,249,568
EXPENSES													
4	Power Plant - Fuel	5,160,550	5,431,536	5,811,656	6,584,567	6,704,930	6,782,020	6,011,334	6,864,811	6,834,048	6,989,599	6,794,150	7,667,600
5	Operations	291,811	320,995	317,399	364,439	389,500	393,531	428,874	430,280	427,259	413,069	416,315	771,794
6	Maintenance	325,792	347,800	2,559,768	455,316	316,588	743,142	446,278	402,738	304,128	470,779	366,057	2,378,096
7	TOTAL PRODUCTION EXPENSES	5,778,153	6,100,331	8,688,823	7,404,322	7,411,018	7,919,693	6,886,436	7,697,825	7,265,435	7,873,447	7,406,522	10,817,490
8	Distribution - Operations	188,804	154,016	220,363	219,338	223,090	380,629	682,276	418,420	367,089	513,222	376,278	638,147
9	Maintenance	198,559	133,138	121,297	655,889	126,253	238,285	162,227	26,850	67,751	48,433	487,866	265,945
10	TOTAL DISTRIBUTION EXPENSES	386,363	287,154	341,660	875,227	349,343	618,914	848,503	445,270	434,840	561,655	864,144	904,092
11	Consumer accounts expense	202,514	245,074	254,601	242,758	256,103	326,239	232,704	373,837	353,956	300,952	397,862	782,205
12	General & Administrative	613,868	613,933	645,093	767,877	737,110	807,062	882,895	816,816	816,571	953,352	904,238	1,594,402
13	Sales expense	103,600	91,110	58,650	126,156	103,946	72,147	73,065	80,728	73,413	65,665	78,074	89,394
14	TOTAL OPERATING EXPENSES	7,162,458	7,337,602	9,988,737	9,455,840	8,887,520	9,744,555	9,019,353	9,424,604	8,944,215	9,756,071	9,467,840	14,188,183
15	Gross Operating Margin (3 min 14)	(1,433,552)	(2,146,482)	(5,098,982)	(4,107,310)	(2,093,997)	(2,699,629)	(1,814,184)	(2,277,735)	(1,730,035)	(1,782,015)	(1,181,893)	(3,938,615)
16	Interest expense	2,980,640	2,788,341	2,996,989	2,815,323	3,002,356	2,980,212	3,079,552	3,172,341	3,070,008	4,748,812	4,605,011	4,752,512
17	Cash Operating Margin (15 min 16)	(4,414,192)	(4,934,823)	(8,093,971)	(6,922,633)	(5,096,353)	(5,679,841)	(4,893,735)	(5,450,076)	(4,800,063)	(6,540,827)	(6,786,904)	(8,691,127)
18	Depreciation/Amortization	2,811,115	2,774,574	2,806,941	3,210,977	2,509,246	3,183,112	3,214,550	3,215,300	3,222,260	3,222,260	3,241,136	3,866,184
19	Net Operating Margin (17 min 18)	(7,225,358)	(7,709,397)	(10,900,912)	(10,133,610)	(7,605,599)	(8,662,953)	(8,108,286)	(8,669,376)	(8,022,323)	(9,762,787)	(9,728,040)	(12,563,311)
NON-OPERATING REVENUES													
20	Housewiring income	8,680,185	267,106	627,090	84,139	-	-	5,473,108	2,329,277	1,479,575	2,964,430	3,243,995	3,226,239
21	Other income	49,250	97,067	103,200	191,325	-	183,203	-	-	450	-	10,000	36,978
22	TOTAL NON-OPERATING REVENUE	8,729,435	464,173	730,290	275,464	-	193,203	5,473,108	2,329,277	1,480,029	2,965,980	3,253,995	3,263,217
NON-OPERATING EXPENSE													
23	Housewiring expense - Material	5,874,584	217,680	422,665	56,767	-	77,898	3,564,935	1,539,553	975,894	1,954,345	2,132,887	2,090,046
24	Labor	1,132,600	87,600	84,000	11,200	-	52,850	890,400	354,900	235,200	473,200	525,000	561,400
25	Other	821,188	323,417	118,119	47,257	-	40,548	352,219	110,912	126,652	345,309	235,285	376,782
26	TOTAL NON-OPERATING EXPENSE	7,828,372	628,697	624,784	115,224	-	171,296	4,807,554	2,005,365	1,337,746	2,772,954	2,893,172	3,028,234
27	Non-Operating Margin (22 min 26)	901,063	(164,524)	105,496	160,240	-	(18,093)	665,554	323,912	142,283	193,136	360,823	234,983
28	TOTAL MARGIN (19 plus 27)	(6,324,335)	(7,873,921)	(10,795,416)	(9,972,370)	(7,605,599)	(8,881,048)	(7,442,732)	(8,341,464)	(7,880,040)	(9,569,651)	(9,367,217)	(12,328,328)
29	Contribution from DIP fund	2,068,970	1,651,824	12,443,100	1,941,200	1,848,616	2,121,309	3,959,928	2,083,028	1,999,135	2,804,418	3,425,493	2,684,364
30	TOTAL MARGIN INCLD. DIP (28 plus 29)	(4,275,365)	(6,222,097)	1,647,684	(8,031,170)	(5,956,983)	(6,759,737)	(3,482,804)	(6,258,436)	(5,880,905)	(6,765,233)	(5,941,724)	(9,721,964)
Number receiving service													
	Number receiving service	1,743	1,753	1,794	1,798	1,794	1,759	1,721	1,736	1,794	2,100	2,222	2,521
	Units billed	44,680	42,885	40,144	39,345	42,340	46,291	48,597	51,727	50,863	57,288	58,443	71,086
	Average revenue per consumer	3,168	2,880	2,698	2,897	3,734	3,966	4,161	4,072	3,996	3,749	3,800	4,046
	Average revenue per unit billed	124	118	121	132	158	151	148	137	141	149	148	148
	Average kWh consumption per consumer	26	24	22	22	24	26	28	30	28	28	26	28

SABALOTHA REC
OPERATING STATISTICS - 1984

LINE #	OPERATIONS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
REVENUE													
1	Operating revenue	2,279,310	2,178,305	2,002,665	2,605,150	2,651,860	3,696,365	3,758,270	3,793,130	2,945,185	4,387,895	4,591,860	6,010,460
2	Miscellaneous revenue	19,500	25,500	8,000	18,500	46,500	-	25,000	21,000	26,747	41,500	36,000	18,500
3	TOTAL REVENUE	2,298,810	2,203,805	2,010,665	2,623,650	2,698,360	3,696,365	3,783,270	3,814,130	2,971,932	4,389,395	4,627,860	6,028,960
EXPENSES													
4	Power Plant - Fuel	2,722,774	2,719,617	2,766,543	2,601,775	3,266,212	4,095,020	4,196,450	3,796,650	2,703,430	4,382,890	4,480,815	4,676,655
5	Operations	302,500	265,400	265,400	258,100	217,500	217,500	226,500	164,000	107,500	132,700	262,500	162,500
6	Maintenance	48,072	16,832	55,332	106,529	33,571	81,257	161,900	82,175	81,035	29,484	54,361	245,308
7	TOTAL PRODUCTION EXPENSES	3,073,346	3,110,849	3,087,275	2,966,404	3,517,283	4,393,777	4,584,850	4,012,825	2,891,965	4,545,074	4,997,676	5,084,463
8	Distribution - Operations	135,869	315,296	349,790	293,988	468,660	471,870	314,117	164,500	138,000	611,800	92,500	98,000
9	Maintenance	35,689	132,406	131,406	251,127	471,861	303,023	248,794	-	61,700	54,000	-	-
10	TOTAL DISTRIBUTION EXPENSES	171,558	447,702	481,196	545,115	943,521	854,893	562,911	164,500	199,700	655,800	92,500	98,000
11	Consumer accounts expense	247,703	230,465	242,465	213,438	216,911	212,043	391,693	268,305	337,405	274,191	329,670	232,174
12	General & Administrative	585,723	643,907	565,663	832,237	725,665	724,089	1,005,534	807,366	682,762	779,503	891,387	732,336
13	Sales expense	17,500	-	17,250	17,400	17,000	48,900	16,900	30,350	110,200	48,350	88,450	-
14	TOTAL OPERATING EXPENSES	4,105,830	4,323,923	4,393,849	6,574,584	5,417,380	6,233,702	6,561,878	5,283,346	4,182,032	6,312,918	6,399,683	6,145,323
15	Operating Margin (3 min 14)	(1,807,020)	(2,123,118)	(2,383,184)	(2,050,944)	(2,719,020)	(2,537,337)	(2,777,608)	(1,469,216)	(1,220,100)	(1,963,523)	(1,772,423)	(1,116,363)
16	Gross Operating Margin (3 min 14)	839,790	839,790	839,790	839,790	839,790	839,790	839,790	839,790	839,790	839,790	839,790	839,790
17	Cash Operating Margin (15 min 16)	(2,646,810)	(2,962,908)	(3,222,974)	(2,890,734)	(3,558,810)	(3,377,127)	(3,617,498)	(2,309,006)	(2,059,920)	(2,803,313)	(2,612,213)	(1,956,153)
18	Depreciation/Amortization	200,982	200,982	200,982	200,982	200,982	200,982	200,982	200,982	542,602	542,602	542,602	542,602
19	Net Operating Margin (17 min 18)	(2,847,792)	(3,163,890)	(3,423,956)	(3,091,716)	(3,757,792)	(3,576,109)	(3,818,380)	(2,851,608)	(2,602,522)	(3,245,915)	(3,154,815)	(2,498,755)
NON-OPERATING REVENUES													
20	Housewiring Income	-	-	983,465	1,719,112	1,336,678	2,838,918	55,350	4,084,927	2,636,426	6,089,735	6,630,330	5,742,539
21	Other Income	29,340	-	-	-	-	-	-	-	36,342	-	-	-
22	TOTAL NON-OPERATING REVENUE	29,340	-	983,465	1,719,112	1,336,678	2,838,918	55,350	4,084,927	2,672,768	6,089,735	6,630,330	5,742,539
NON-OPERATING EXPENSE													
23	Housewiring expense - Material	-	-	441,230	820,442	766,109	1,565,313	31,429	2,308,395	1,486,227	3,185,697	2,943,159	3,002,106
24	Labor	147,572	28,942	173,142	505,478	472,832	495,000	8,400	842,600	402,600	850,200	784,200	793,800
25	Other	-	-	-	-	-	300,540	158,042	227,850	223,288	277,159	236,735	222,729
26	TOTAL NON-OPERATING EXPENSE	147,572	28,942	614,372	1,385,920	1,238,941	2,360,853	197,611	3,178,845	2,110,235	4,313,056	3,964,094	4,018,635
27	Non-Operating Margin (22 min 26)	(118,232)	(28,942)	369,093	333,192	98,037	478,065	(142,521)	906,082	554,533	1,776,679	1,668,236	1,723,904
28	TOTAL MARGIN (19 plus 27)	(2,966,024)	(3,192,832)	(3,054,863)	(2,758,524)	(3,671,755)	(3,100,044)	(3,960,901)	(1,956,931)	(2,047,367)	(1,569,236)	(1,488,579)	(774,851)
29	Contribution from DIP fund	2,021,500	2,021,500	2,021,500	2,495,000	2,448,000	2,445,000	2,435,000	2,496,250	2,545,300	2,717,400	2,435,000	2,425,150
30	TOTAL MARGIN INCLUD. DIP (28 plus 29)	(944,524)	(1,171,332)	(1,033,363)	(263,524)	(1,216,755)	(655,044)	(1,525,901)	539,319	497,933	1,148,164	946,421	1,650,299
PER CONSUMER DATA													
	Number receiving service	843	838	768	836	992	1,157	1,228	1,324	1,339	1,587	1,637	1,931
	kwhs billed	18,041	17,261	16,286	14,804	18,970	23,199	23,278	22,522	17,919	24,754	26,938	28,059
	Average revenue per consumer	2,704	2,596	1,950	2,997	2,673	3,195	3,061	2,856	2,586	2,914	2,805	2,895
	Average revenue per kwh billed	126	126	92	170	168	160	161,50	168	165	174	170	179
	Average kwh consumption per consumer	21	20,60	21	18	18	20	18,96	17	16	16	16	14,53

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