

PD-AAF-891

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UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

4970267001502

Report Symbol U-347

1. PROJECT TITLE Rural Electrification I	2. PROJECT NUMBER 497-0267 Loan No. 497-T-052	3. MISSION/AID/W OFFICE Indonesia
	4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) FY 80-9	
<input checked="" type="checkbox"/> REGULAR EVALUATION <input type="checkbox"/> SPECIAL EVALUATION		

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY 78	B. Final Obligation Expected FY 81	C. Final Input Delivery FY 84	A. Total	\$ 97.2 mil.	From (month/yr.)	7/1979
			B. U.S.	\$ 39.4 mil.	To (month/yr.)	6/1980
Date of Evaluation Review						

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., air ram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Determination of final action with PLN conductor procurement.	R. Johnson, AID M. Basoeki, PLN	7/15/80
2. PLN to provide adequate financing for headquarter complex construction.	R. Davis, AID M. Basoeki, PLN	7/31/80
3. PDO to assign vehicles to consultants	B. Hawley, AID S. Awal, PDO	7/15/80
4. PDO to assign full complement of counterpart engineers to C.T. Main.	R. Johnson, AID H. Johnson, MALN S. Awal, PDO	7/31/80
5. PDO to complete housing for consultants in Lusu.	R. Davis, AID S. Awal, PDO	7/31/80
6. PDO to pay monies owed to NRECA.	B. Hawley, AID McNeill, NRECA S. Awal, PDO	8/30/80
7. PDO to provide additional floor space for PDO and consultant staffs.	B. Hawley, AID S. Awal, PDO	9/30/80

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify)	A. <input type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T		B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Change Implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P		C. <input type="checkbox"/> Discontinue Project	

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Name and Title)		12. Mission/AID/W Office Director Approval	
a. Devin/Ben Hawley - Project Officer <i>[Signature]</i> Abe Grayson - PIE <i>[Signature]</i> Rudy Ellert-Beck - PRO <i>[Signature]</i> R Zimmerman - Evaluation Officer W Bollinger - DD		Signature <i>[Signature]</i> Typed Name Thomas C. Niblock, Director Date June 25, 1980	

RURAL ELECTRIFICATION - PES
AID LOAN 497-T-052
AID GRANT 497-0267

13. SUMMARY NARRATIVE

This Project Evaluation Summary (PES) represents the second annual USAID review of a multidonor - multi-GOI agency pilot effort to test a model for providing electricity to the rural areas of Indonesia. The model has four key components as follows:

- Areawide Coverage of discrete service areas having 30,000 to 50,000 households. The pilot areas in Indonesia each have between 20 and 110 villages covering approximately 1/3 of a kabupaten. The target in Indonesia is to achieve 50% coverage in the selected project areas within 5 years and 85% within 15 years.

- Economic Viability through reduction in construction costs consistent with reliability and safety and through restructuring of tariffs. The initial costs as well as the minimum monthly bill to the average rural resident can be within reasonably affordable limits. Original estimates were that it would cost about \$500 per household to bring electric service to villagers in Indonesia. (See Sect. 23 below).

- Financial Soundness. The model, if implemented carefully and managed properly, should demonstrate that rural electrification is not merely a social program but can be instituted on a financially sound basis. In many electrified rural areas in other parts of the world, the financial returns are improving markedly over time, though they begin from very low initial levels.

- Productive Uses. If rural electrification is to contribute towards the economic development of an area, it must be placed in a productive context. All projects should include elements designed to stimulate community use and productive use of electricity 24 hours/day.

A. Project Progress Status.

USAID has been working with the Government of Indonesia since the fall of 1975 on the development of this pilot project which will demonstrate the replicability and appropriateness

of the above model as a mechanism for electrifying the rural areas of Indonesia.

Among other things, it was decided to test the above model in ten different areas of rural Indonesia which represent typical Javanese, outer island and transmigration environments. It was further decided to implement the project through two different agencies of the GOI representing a public power company approach which involves extensions of an existing power grid and a private cooperative approach which involves institutional building, beneficiary involvement and the use of isolated diesel power supplies.

The project is a multidonor effort with the Canadian Government (CIDA) financing the generation plants for the three outer island projects and the Royal Netherlands Government (Dutch) financing part of the distribution wiring for the seven Central Java systems. The project financing is as follows:

<u>Country</u>	<u>Amount</u>	<u>Date Signed</u>
USAID Grant	US\$ 6 million	March 30, 1978
USAID Loan	US\$ 30 million	May 6, 1978
CIDA Grant	US\$ 1.8 million *	November 16, 1978
CIDA Loan	US\$ 21 million *	October 13, 1978
Dutch Loan	US\$ 5 million *	March 21, 1979
GOI	US\$ 30 million *	Same as above
<hr/>		
TOTAL:	US\$ 93.8 million	

The seven Central Java Systems are being constructed by the State Power Company (PLN) which will also operate and maintain the completed systems. The three outer island systems are being administered by the Directorate General of Cooperative (DGC). The DGC will assist three private cooperatives to design, construct, and operate their own rural electric systems.

The first year of the project (dating from the signing of

* equivalent

the USAID Loan Agreement May 6, 1978) achieved considerable progress in laying the foundations which should result in smooth implementation in future years, including:

- increased PLN & DGC staffs;
- orientation tours of the highly successful Philippine R.E. Program;
- final selection and arrival of consultants (C.T. Main as the consultant for design and construction supervision, and the NRECA for organization, management, operation, maintenance and training assistance);
- preparation of detailed project implementation plans covering organization, construction activities, training, and productive uses;
- construction by PLN using its own "off the shelf" materials of a demonstration project in three villages in Klaten, Central Java;
- the organization and granting of charters by DGC/PDO to its three outer island cooperatives;
- purchase of suitable land at each outer island site for DGC headquarters complexes.

During the second year of the project considerable additional progress has been made towards actual construction and energization of the systems. Some of the significant events since the June 1979 PES review include:

- finalization of PLN and Bank Indonesia Subloan Agreements
- negotiation of three R.E. Coops construction loans with the BRI;
- loan disbursement for training and vehicle procurement for PLN;
- evaluation of bids for the conductors;
- signing of contract between PLN and P.D. Perusda for 16,000 wood poles to the seven sites in Central Java at an average price of Rp 53,000/pole (\$84.80/pole);
- development of engineering and construction progress schedules by C.T. Main for both PLN and DGC distribution

systems including the headquarters complexes;

- completion of preliminary field staking in all seven of the Central Java Project Service Areas;
- construction and energization of a PLN demonstration project for three villages in Klaten, Central Java;
- initiation of construction by the DGC/PDO/RE task force and the Lombok RE Cooperative of a demonstration project for three villages in East Lombok;
- some progress in preparations for HQ complexes in several locations;
- completion of several types of training courses and orientation tours for project personnel;

B. Project Issues and Problems

The Rural Electrification project, despite the generally significant progress reflected above in this summary statement and in subsequent sections in more detail, has encountered some delay and now faces a complex set of increasingly serious issues, many of which have arisen due to external factors beyond either the project's control or any reasonable predictions. There are cost overrun problems and new data that raise affordability questions. There are communications problems and differences of perception between consultants and PLN/DGC officials. There are management and coordination problems, contracting and procurement problems and quality control issues. There are even some institutional conflicts between central government and local organizations.

In Section 23 at the end of this PES we have attempted to delineate the nature of these basic issues and describe what efforts are underway or planned to deal with the problems.

14. EVALUATION METHODOLOGY

This is the second evaluation of this project. It is based upon recent field trips to the subprojects sites and discussions with GOI counterparts in PLN, DGC/PDO, other GOI national, provincial and local officials, expatriate consultants from NRECA and C.T. Main, other donor personnel and USAID staff.

AID/Wash. representatives participated in this exercise by undertaking project site visits, assisting in improvements in the PES preparation and attending the Mission evaluation review meeting where their comments helped keep a focus on project issues (discussed in Section 23 below).

15. EXTERNAL FACTORS

(a) On November 15, 1978, the GOI instituted a 50% devaluation of the rupiah against the dollar. This could not have been foreseen in the feasibility studies.

(b) Over the past year, inflation in Indonesia has been approximately 25% and in the U.S. over 12%. Both rates are higher than projected in the feasibility studies.

(c) On May 1, 1980 the GOI raised the prices of kerosene and fuel oil by 50%. At the same time PLN also raised its electric rates by the same amount.

These external factors will no doubt have a negative impact on the success of the project. Just how severe remains a question. The devaluation and increased costs have necessitated rate increases which will undoubtedly reduce both the percentage of people who will connect up and the consumption of those that do. USAID has retained the services of an economist, Dr. Mark Gellerson, to investigate this problem as a part of his economic analysis of the six NRECA/PLN RE II feasibility studies. His report is expected in about 90 days. An initial discussion of the affordability issue, nevertheless, is provided in Section 23 at the end of this PES.

16. INPUTS

The inputs of the project consist of funding from the GOI, AID, the Canadian and Dutch Governments, technical assistance, and training.

(a) Funding

As of April 30, 1980 \$2,155,046.84 of the AID Grant have already been disbursed for technical assistance and training and \$75,270.44 of the AID Loan have been disbursed. The GOI has expended approximately Rp.1.06 billion (US\$1.7 million) in support of the DGC/PDO and Rp.971 million (US\$1.6 million) for PLN. Although the PLN budget for IFY 79/80 was

sufficient to keep the seven subprojects in Central Java moving ahead approximately on schedule, USAID has recently been advised that the PLN project budget for FY 80/81 has been cut so that there are not sufficient funds to procure additional poles or to start construction of the seven headquarter complexes. USAID has had a number of discussions on this with PLN and we understand that steps are being taken to restore these funds.

The DGC budget for IFY 79/80 was released late as in past years. Progress was achieved in part due to loans made to the PDO by C.T. Main which totalled nearly Rp 20 million and by the NRECA consultants who have made personal loans to the PDO totalling almost Rp 2 million. See issues Section 23.

USAID and CIDA have also recently been informed by their consultants that, because of incorrect cost estimates and inflation, there is a long range funding problem associated with the local currency portions of the BRI loans made to the three outer island cooperatives. In other words, even though the local currency loans made by the GOI through the BRI to the three RE cooperatives are substantial in size, they are not sufficient to cover the local costs of construction. During the Mission Review, Bank Indonesia and Ministry of Finance representatives indicated that these loans will be increased with no problem.

For the Lampung distribution system there may also be a shortfall on the foreign exchange portion of the project because the pre-design centerline staking shows almost twice the number of kilometers as shown in the feasibility studies. This shortfall could be made up if the GOI will pick up the costs of constructing the headquarter complexes for all three outer island areas and allow the USAID Loan to be shifted as necessary to cover the increased foreign exchange costs of constructing the Lampung distribution system. This, of course, would further increase the local currency shortfall mentioned above. C.T. Main is preparing a revised project cost estimate which will describe this problem in detail. The matter will then be taken up with the appropriate officials in the GOI.

(b) Technical Assistance

(i) C.T. Main

A three-year contract was signed on September 18, 1978 with Charles T. Main International (C.T. Main) to provide 467 person months of consulting services for the design and

construction supervision of the distribution systems and headquarter complexes. C.T. Main personnel are stationed in Central Java and on the three outer islands and in Jakarta. As work progressed on the PLN portion of the project in Central Java, it soon became evident that an additional electrical engineer for systems design was needed as well as a civil engineer to assist in the design and supervision of headquarter complexes.

On the DGC portion of the project, C.T. Main has encountered considerable difficulty because of the lack of budgetary support from DGC due in part to low original estimates that resulted in low budget provisions which, in turn, could not be corrected in mid year; because of the remoteness of the project areas; and because DGC was unable to provide the high quality and experienced local contractor for technical support originally expected by C.T. Main. (Note: DGC is of the opinion that the project contracts are too loosely written in that they do not provide specific details on the type of experience and training required for C.T. Main and NRECA consultants and for DGC personnel). In February of 1979 it was agreed that the best solution to this problem would be to augment both PDO and C.T. Main staff in order to make up for the deficiency. The DGC agreed to increase PDO's staff by six electrical engineers and four draftsmen. C.T. Main agreed to provide three electrical engineer designers/trainers, a drafting supervisor, and a civil engineer to coordinate the design and supervision of construction of the headquarter complexes.

After considerable delay a contract amendment was negotiated and signed on March 3, 1980. The amendment calls for 221 additional person-months plus funding to allow C.T. Main to subcontract for site surveys, soils investigations and design of the headquarters complexes. Including the new positions, C.T. Main will have 18 long term personnel on board and should have sufficient staff to carry out their contract. For additional discussion see Section 23 on Issues below.

(ii) NRECA

A three-year contract was signed on August 23, 1978 with the National Rural Electric Cooperative Association (NRECA) to provide 298 person-months of consulting services in organization, operation, maintenance and training.

Although the team leader arrived in November 1978 the team was not completely assembled until March 1979. NRECA personnel are stationed on the three outer islands, Jakarta, and Central Java.

The team has assisted both DGC and PLN in their preparation of implementation plans and in the establishment of demonstration projects in Central Java, Lombok and Lampung. Their main thrust has been to assist DGC/PDO with the development and organization of the three island cooperatives as well as provide management assistance and training to both PLN and the cooperatives.

On January 3, 1980 an amendment to NRECA's contract was signed to provide an additional 54 person-months of service. This extension provided for an additional 18 months of service for both the team leader and the training officer as well as 28 person-months to assist PLN and DGC to conduct feasibility studies for RE II.

(iii) SANDWELL & COMPANY

The CIDA grant provides for 325 person-months of technical assistance for the design and construction of the electricity generation plants for the three outer islands as well as training in their operation and maintenance. A contract was signed on May 18, 1979, with the Canadian firm of Sandwell and Company for these services.

Sandwell has made three visits to Indonesia since the signing of the contract and now intends to provide a resident representative about mid-June. IFB's for generation equipment have been published and contracts should be signed by late summer.

(c) Training

During the first year of the project, training plans were prepared by both PLN and the PDO with the assistance of the NRECA Training Consultant as part of the overall implementation plan. Over the first four years, PLN plans to train 758 people in 22 in-country training courses and 71 people in the U.S. and in the Philippines. Likewise, in the same time period, the DGC/PDO plans to train 350 people through 30 in-country training courses and 32 people in the U.S. and in the Philippines. Estimates are that this training program will cost approximately \$920 thousand instead of the \$600 thousand provided for in the USAID Grant and Loan Agreement. The reason for this increase is that both the numbers of people to be trained and the numbers of type of training courses have been significantly expanded over the estimate made in the Project Paper. For example, the PP estimated that 300 Coop and only 140 total PLN staff would receive training. Both the GOI and USAID agree on the importance of this training

to project success and funds are being sought by both parties to provide this training.

To date PLN has trained 92 people in 2 in-country training courses and 18 people in the U.S. and in the Philippines. During the first two years DGC/PDO has trained 168 people in 8 in-country training courses and 1 person in the U.S. and Philippines.

Under separate contracts, AID has also provided 4 months of consulting services of a Productive Uses Planner and 4 months of an expert to conduct an Environmental Assessment (EA). Many of the ideas taken from the report of the Productive Uses Planner were incorporated into the implementation plans of both PLN and the DGC. The EA is still underway.

17. OUTPUTS

(a) Plans, Specifications and Procurement Documentation (IFBs)

The implementation plans prepared by PLN and DGC/PDO are very comprehensive plans and among the best USAID/I has ever received on any project. While flexible, they described in considerable detail how the subprojects will be organized and constructed as well as the training activities and the program for stimulating productive uses of electricity. Both agencies are to be commended for the high quality of these plans. Over the past years, these plans have been used repeatedly as reference guidelines both as background material for new people coming into the project and as reminders of past agreements.

Mapping and preliminary staking of all seven Central Java sites has been completed. A total of 3,017 kilometers of three phase primary feeders and associated single phase and primary taps have been staked.

Likewise 1,705 kilometers of lines have been staked and 624 field staking sheets have been prepared for the outer island subprojects. This represents 85% of the estimated total for Lampung, 80% for Luwu and 40% for Lombok. The lower figure for Lombok is a result of original miscalculations in staking by the consultant.

PLN, with C.T. Main assistance, has issued IFBs for tools and construction equipment, conductor, and distribution

material. PLN's housewiring IFB is in final stages of completion. The bids for the tools and construction equipment were opened February 7, 1980. They have been evaluated and letters of intent have been sent to the eleven selected suppliers. PLN has already signed a contract with a local supplier to deliver 16,000 wood poles to the seven Central Java sites. Additional discussion is provided in the issues section under item #23 at the end of this report.

The DGC/PDO/RE with C.T. Main's assistance is in the process of issuing IFBs for wood poles, distribution material, conductor and generation facilities for all three RE coops. The housewiring material IFBs are also in final stages of completion. The GDC/PDO/RE has issued IFBs, held bid openings, evaluated bids and signed procurement contract for the distribution material, poles, conductor and housewiring material for the Lombok Demonstration Project. There have still been no signed procurement contracts for the Lampung Demonstration Project.

(b) Headquarters Complexes

Both the DGC and PLN have bought the necessary land for all ten headquarters complexes. PLN has entered into a contract with Gajah Mada University for site surveys and soils investigations of the seven Central Java sites. This work is now underway and is scheduled to be completed in August 1980. The designs and construction drawings for the PLN sites are in preliminary stages of preparation. The C.T. Main civil engineer responsible for the design and supervision of construction of the DGC headquarters complexes has just arrived in Indonesia. The design and construction of the outer island headquarters complexes have been delayed pending his arrival. However, it is expected that, together with the PDO engineers and the Coops staff, C.T. Main will now be able to move ahead expeditiously to design and supervise construction of the three outer island headquarters sites within the next two years. Special effort will be required to get the warehouses completed before the project construction materials arrive.

Currently there are two project issues with respect to the headquarters sites. On the outer island sites, the DGC/PDO purchased the land before the coops were legally formed and before the construction loans were negotiated and signed between the three RE Coops and the BRI. Now that the RE Coops have been formed, with elected Boards of Directors, and they have construction capital, it is recommended by the

NRECA that the DGC/PDO sell or grant the land (possibly on a 99 year lease) for the headquarters to the cooperatives. The DGC/PDO agrees that the RE Coops should own their own land but the method of ownership transfer is still undecided.

On the PLN side, it may be that some of the administrative functions, i.e. billing and collections, will be done out of more central locations. If this were to happen, the size of some of the administrative offices could be reduced. The NRECA has made some recommendations on this issue. They need to be reviewed and a policy decision made by PLN.

(c) Operating Electric Distribution Systems

During the first year of project implementation, PLN, using its own materials, constructed and placed in operation a demonstration RD Project covering the first three villages leading out from the Klaten substation in Central Java. This involved construction of 13 km of three phase and single phase lines, 26 km of secondary underbuild, the setting of 483 poles, installing 32 transformers and the wiring by June 1, 1979 of over 600 houses. Since then a total of 1868 houses representing 93.4% of the total houses in these three villages have been connected up. The average KWH of use/customer of about 30 KWH/month has exceeded the estimate of 22 KWH/month contained in the feasibility studies. Also the average bill of approximately Rp 2,000 has exceeded previous estimates of peoples' ability to pay for electricity in these areas. As of May 15, 1980 only 44 customers have been disconnected due to failure to pay their electric bill and of these 36 have been reconnected after full payment of past bills including a Rp 200 late charge and a reconnection charge of Rp 300.

The DGC is now constructing a similar demonstration project covering three villages in East Lombok. By August 1980 it is expected that nearly 2,000 homes in these three villages will be enjoying the benefits of electricity.

(d) Internal Housewiring

Both PLN and DGC have developed basic designs and material specifications for housewiring as well as guidelines for implementing the housewiring program. These guidelines include procurement, material handling and storage and the details of a loan program which would create a revolving fund to be used for replenishing supplies of housewiring materials. Eventually this revolving fund will be used to

support the productive uses program.

As mentioned above some 1868 houses have already been wired in the Klaten Demonstration Project Area. The East Lombok RE Coops have likewise wired 1300 houses.

(e) Training Courses Completed and Trained Personnel

In-country training courses have been held for PDO staff, the Coops Boards of Directors, the Auditing Committees, temporary managers, bookkeepers, financial managers, linemen and electricians as well as other local government officials associated with the outer island projects. A total of 260 Indonesians have now received in-country orientation training in support of the outer island subprojects. PLN has also held a two week "General Orientation to RE" training course in Semarang. This course was attended by 25 prospective managers and division chiefs of the seven Central Java RD systems. PLN sent two groups totalling 19 prospective managers and division chiefs to the United States and the Philippines for 3 months of on-the-job training.

In addition, 87 Indonesians have been sent for orientation tours of the highly successful Philippine Program. This includes 45 PLN officials and 42 DGC/PDO staff and local government officials.

(f) Billing and Collection System

A short-term consultant from NRECA worked with PLN and the DGC for about six weeks in the design of an accounting system for the project. The NRECA has also made recommendations for billing and collecting, but implementation will have to await energization of the systems. The billing and collection systems in the demonstration project is the same as PLN's present system for urban customers in Central Java and is being handled by personnel from the Klaten PLN sub-branch office.

18. PURPOSE

The purpose of this project is to demonstrate that electricity can be provided to the rural areas of Indonesia at a price which the majority of the people can afford through systems which are technically sound and financially viable and that the introduction of electricity to the selected areas

will bring about a significant increase in production and employment opportunities and improve the quality of life of the rural poor. Another purpose is to train a sufficient cadre of Indonesian experts in all phases of rural electrification so as to manage and expand the program.

While it is too early to evaluate the project purpose, USAID remains optimistic that by 1983 the End of Project Status as described below will be achieved.

(1) Seven rural areas in Central Java including over 400 villages will be provided with reasonably priced, reliable electric power 24 hours a day from the PLN grid. These areas have a combined population of over 1.3 million people including approximately 260,000 families. It is expected that at least 50% of these people will enjoy the benefits of electricity in their homes and nearly all the people living in these areas will benefit through street lighting, the lighting of schools and other public buildings, the increased use of refrigeration and ice in markets and restaurants, the use of irrigation pumps, potable water pumps and other productive usages.

(2) Three rural areas in the outer island districts of Central Lampung, East Lombok and Luwu including almost 200 villages will be provided with reasonably priced, reliable electric power 24 hours a day by member-owned and managed electric cooperatives. Likewise the combined population of these areas is over 650,000 including approximately 130,000 families and it is expected that at least 50% of them will be connected to the system. All the other people in the area will benefit in much the same manner as described above for the Central Java systems.

(3) A three-phase backbone system expandable to serve additional residents in all these areas.

(4) An active power usage program at each of the ten areas which is working with local leaders and private individuals to promote a whole host of productive power use projects and enterprises.

(5) The existence at each site of a three to four hectare headquarters site (six or ten Ha. in the outer islands) complete with office space, warehouse, storage yard, maintenance facilities and, as necessary, staff housing.

(6) Each system will have a fully trained and functioning management and operating staff to operate, maintain

and expand their services.

(7) Both PLN and the DGC will be fully capable of organizing, financing, designing, procuring materials for, supervising construction and initial operation of rural electric systems.

(8) The project will have been continually evaluated during implementation and the first three years of operation.

This evaluation will provide a continuous flow of feedback information to the GOI and USAID project managers and will indicate the linkages between project purpose and the sector goal.

19. PROGRAM OR SECTOR GOAL

The goal of this project is to improve the standard of living and increase employment and productivity of the rural population in ten selected areas of Indonesia.

Again, while it is too early to evaluate this goal, USAID is optimistic that the provision of electric power to these areas should bring a new dimension to the package of existing rural development programs that together will improve productivity and employment opportunities as well as raise the quality of life for the people who live in the target areas.

There are a very large number and variety of potential productive uses of electricity in these ten rural areas, most of which could benefit the poor and the very poor. A partial list would include rice and other grain mills, irrigation, poultry farms, sugar processing, copra, tobacco and other food processing, refrigeration in shops and restaurants, sawmills and box factories, rattan furniture and other wood-working shops, hollow blocks, floor and roof tiles and pottery factories, blacksmith, machinery and repair shops, food, pharmacy and general merchandise stores. Many of these activities already exist in the target areas using substitute forms of power. However, in other countries, the extension of electricity to the rural areas caused significant increases in the number of new activities as well as increased output from existing farm, commercial and agro-industrial enterprises.

There is strong reason to believe that this will also occur in Indonesia.

In addition to stimulating production in the selected areas, the introduction of electric power into these rural areas should generate considerable employment thus making a contribution to one of Indonesia's more intractable problems. For example, one Co-op in the Philippines reports that in the four years since energization, twenty-five new business enterprises have been established creating a total of 430 new jobs. This does not count additional employment generated at the existing firms or home industry, e.g., handicrafts. Also each system will employ over 100 people in management, operation and maintenance. Extrapolating from this example we estimate that the ten utilities planned to be established in this proposed project should create at least 5,000 new jobs in small to medium scale industry plus untold thousands of new employment opportunities for home and handicraft industries. The project may also demonstrate that further indirect benefits to rural residents will occur through the impact of electricity on such things as potable water supply, quality of health services, availability of education and training, and the nature and quality of government services.

20. BENEFICIARIES */

The numbers of target villages and households at the proposed project sites are given below:

Site	No. of Target Villages	Pop. of Target Villages	No. of Target Households**	Est. Target Pop.	Village Pop. Density***
A. <u>Central Java</u>					
Pek-Pem.	102	242,120	20,000	102,000	1141
Klaten	98	245,105	25,000	120,000	2003
Bant.-Sleman	21	169,964	20,000	84,000	1403
Sragen	47	139,278	15,000	70,000	1132
Magelang	83	175,630	20,000	100,000	1002
Wonogiri	54	167,081	15,000	81,000	872
Banyumas	35	145,301	15,000	75,000	791
B. <u>Outer Islands</u>					
Luwu	65	132,263	15,000	85,000	34
Lampung	108	272,505	25,000	150,000	590
Lombok	34	262,312	25,000	115,000	828
<hr/>					
TOTALS:	647	1,952,559	195,000	983,000	-

* Based upon assumption that 50% of households would connect to the system, an assumption which was made for planning purposes and which has since been confirmed to be within reason by various social/economic surveys. (Also see attachment).

** Based on average household size at each site.

*** No. of persons per sq. km of village land.

Thus, a total of 195,000 households (composed of, as shown above, an estimated 983,000 people) in 647 initial target villages will immediately and directly benefit from the project spread effects (through street lighting, the lighting of educational and public buildings, potable water pumps, increased jobs and productivity resulting from more activity in the formal

and informal economic sectors, etc.) The project will almost immediately benefit the remaining 1,000,000 people of the target villages even if their households are not electrified. The cost of the project (\$93.8 million) should be less than \$100 per primary beneficiary and less than \$50 per secondary beneficiary.

Tabulations of the data gathered by the 1977 survey of these areas show the following classification of the proposed beneficiaries by primary occupation of the heads of households:

Primary occupation of household head	No. of household head	%
Farmer	44,743	60.0
Wage laborer	18,200	24.4
Salaried	6,454	8.6
Tradesman	4,078	5.5
Cash crop farmer	1,122	1.5
TOTALS	74,597	100.0

From the above table it can be seen that the proposed direct beneficiaries will be the rural poor; the small farmer, the daily wage laborer and the small entrepreneur. Together, they total some 90% of the 74,597 sample households.

From further analysis of the survey data it can be stated that:

(a) The vast majority of the farmers in these areas (37,045 or 82.3% of farmers) cultivate less than one hectare of land; this is at or below the national average holding of 0.98 ha. In general, especially in Java, the land holdings of the cash crop farmers conform to this pattern. Because of this, they are forced into secondary, tertiary and even quaternary occupations to sustain a livelihood so that the line between small farmers and daily wage laborers is hard to delineate. Wage laborers rarely earn over Rp 500 (\$.80) a day;

more usual is half that sum.

(b) Tradesmen are also generally engaged in small-scale enterprises. Of 4,078 tradesmen, 3,499 (86.0% of tradesmen) have a maximum of two employees.

(c) Salaried and professional people, including civil servants, amount to 8.6% of the total sample households and usually constitute the village elite.

(d) Transmigrants (i.e., settlers in newly-opened lands in islands outside of Java) are the predominant potential direct beneficiaries in Lampung and, to a lesser extent, in Luwu. In the latter site, however, many of the possible beneficiaries have never had the opportunity for participation in the national life of the country. The provision of electricity will aid considerably their efforts in this direction.

21. EFFECT TO DATE

The project has already caused a great deal of discussion and debate among policy makers within the GOI. They well understand the linkage between RE and Rural Development and have attached priority to the project. These discussions have resulted in the lowering of the burden to consumers, by extending credit for connection and construction costs, the trial use of kilowatt hour meters for small consumers, and the acceptance of rural electric coops, at least on a trial basis, as a complementary institutional vehicle for rural electrification. It is expected that the project will eventually convince the GOI leadership that the model being demonstrated is replicable, appropriate and can be used to electrify the entire country in a financially sound manner.

22. LESSONS LEARNED

1. USAID is learning that consultants can be mobilized more rapidly and work more effectively when the GOI is relieved of the burden of logistical support requirements. USAID took a significant step in this regard by providing housing for the Jakarta, Lampung and Lombok based consultants and some of their vehicles.

2. In planning future projects, more precise attention should be given to defining the duties and responsibilities of the consultants as well as their working relationships with

their counterparts.

3. More lead time should be allowed for mobilization of the consulting teams and for the provision of local support. A possible solution for alleviating some of the start-up difficulties in the future loans would be to provide for a small draw-down on project loan funds for this purpose prior to satisfaction of all conditions precedent to disbursement for major procurement.

4. Every attempt should be made to keep to a minimum number of conditions attached to the loan agreement.

5. USAID should ensure that it has adequate personnel to support a project of this magnitude.

23. ADDITIONAL REMARKS: ISSUES

As in most rural development projects there is no shortage of issues or problems. We have decided to present these issues together in this section of the PES rather than scatter them throughout different sections where their true significance might be either misunderstood or overlooked.

A. Affordability/Economic Viability

The major issue in RE for both the PLN and DGC is the question of affordability and economic viability of the project. Part and parcel of this problem is that of cost overruns. Both of these issues were presented to GOI officials at the Mission Review in the format below:

1. Financial soundness versus people's ability to pay

One of the key components of the USAID model for Rural Electrification which this project is trying to demonstrate is financial soundness. USAID has never suggested that PLN undertake electrification of the rural areas of Indonesia primarily as a social program. We are optimistic that, with properly designed rates and assuming that the project will be implemented in an economical manner and managed properly, it can be instituted on a financially sound basis given the concessional financing built into the original project design.

In this regard, the results of the Klaten demonstration project have been quite encouraging. We have seen at Klaten that (1) a higher percentage of the people in the three villages have connected up than expected. (That is 93.4% in the first year, versus our target figure of 50% in three years).

(2) people have been willing and able to pay more for electricity than was assumed in the feasibility studies (an average bill of Rp 2,000 vs Rp 1,500).

(3) the monthly consumption of electricity per customer of 30 kwh exceeds the estimate of 22 kwh in the feasibility studies.

It is recognized that the three demonstration villages are more affluent than the average villages to be served by the project. Moreover, the recent increases in PLN's rates and the design of the tariff structure have serious implications for both the rural people's ability to pay for electricity and the financial soundness of the project. According to information received from PLN's Subdirectorate for Rural Electrification, residential consumers in the project sites will now have to pay a monthly bill of approximately Rp 3,000 for 22 kwh consumption during the first four years. This is accounted for as follows:

First four years (22 kwh)

Connection charge installment	Rp 625
Demand charge (450 VA)	Rp1,260
Kwh charge (22 x Rp 23)	Rp 506
Fuel surcharge (22 x Rp 6)	Rp 132
Housewiring installment	<u>Rp 410</u>
Monthly bill	Rp2,933

According to the present tariff structure, this bill will be reduced after four years due to the final payment of the connection charge and housewiring installments. Thereafter, the low voltage RE customer will have to pay approximately Rp 1.898 per month for 22 kwh consumption.

We have three questions regarding these new rates.

(1) What is the effect of the new rates on the ability of the rural people to pay? This question relates to the percentage of customers who will connect up and their monthly consumption of electricity. Obviously, if the rates are too high the project will not benefit large numbers of people in the lower income groups, i.e., PLN will not achieve area wide coverage and there will also be a loss of revenue due to restrictions in consumption by those who do connect up.

Recent surveys by the rural sociologist who has prepared a report on the social soundness for the feasibility studies for the six new PLN R.E. systems show that only 12% of the people in these areas could afford to pay Rp 3,000 or more for electricity, 21% could afford Rp 2,500 or more, and 40% could afford to pay Rp 2,000 or more. If this is true, then it would seem that the new rates are too high for the average rural household and that PLN should consider ways to reduce the minimum monthly bill to under Rp 2,000.

Additional information on ability and willingness of villagers to pay the higher charges is needed. This information will be needed prior to authorization of RE II. The findings of the rural sociologist can be tested over the next 6 to 8 months in the Klaten pilot area as well as in test villages, i.e., Lombok and Lampung.

(2) What is the effect of the higher costs of project construction and the higher costs of operation and maintenance on the financial viability of the system?

While our economist has barely started working on this problem, we understand from PLN sources that the long range marginal costs of delivering electricity to low voltage rural customers in Central Java is around Rp 110/Kwh. And we understand from PLN's Subdirectorate of Rural Electrification which has done some computer runs of the financial forecast of the six new PLN RE systems that the minimum bill for 22 Kwh needs to be around Rp 3,000 as shown above to achieve a positive cash flow within five to seven years. However, our economist has estimated that, over the fifteen year project life time and assuming connection rates and usage do not change, the same revenues would be generated by imposing a straight per Kwh charge of Rp 81 for residential consumers and removing all other charges. However, these revenues would be generated later in the life of the project so the present value of the cash flow would be reduced. Under this straight

per Kwh charge, the average monthly bill for low voltage rural households could be reduced to about Rp 1,782 (assuming 22 Kwhs consumption). Therefore, it seems likely that the number of connections might increase, which would actually lead to an increase in revenues. Moreover, such a straight per Kwh charge would provide a steadier source of revenues and more closely reflect the long run marginal costs of supplying electricity in the PLN system. The possibility of this approach to rates will be explored. Second, if the per Kwh charge for commercial consumers was increased by, say Rp 19, this might allow the per Kwh charge for residential consumers to be lowered to about Rp 77 while still generating the same total revenue. Of course, such an increase in the per Kwh charge to commercial consumers might reduce the number of commercial connections; but, any reduction might be small if electricity costs are small relative to other production costs (and if they remain below the costs of alternative forms of energy). In addition, residential consumption would likely increase since the typical monthly bill would be reduced to about Rp 1,694. Also it does not appear that the higher rates would have much of an effect on the ability of commercial consumers to pay. This possibility will likewise be explored as a way of dealing with the problems of heavy costs to small consumers.

(3) If the people can afford to pay more than we expect for electricity, why would PLN opt for a tariff design which results in a significant reduction in the average monthly bill after four years of operation as shown above, especially since this reduction would result in revenue below the long run marginal cost of supplying electricity? It would seem to us that PLN might instead charge less for electricity in the initial stages of the project with the understanding that there will be increases in the future, not planned decreases.

Contrary to popular belief we feel that the rural poor of Indonesia can afford to pay for electricity at PLN's long range marginal cost of delivery. For example, a poor person who only uses 15 Kwh/month (say 3 low voltage light bulbs used six hours per night and a convenience outlet used for a radio one hour per day) would only have to pay Rp 1,650 per month if he was charged Rp 110 per Kwh. This would seem to indicate that the poor rural people are actually subsidizing the larger consumers under the present PLN rate structure!

In summary, we feel that if the GOI and PLN are serious about electrifying the rural areas of Indonesia then an appropriate tariff structure should be designed that will

both allow large numbers of people to enjoy electricity and will also improve PLN's financial position.

2. Economic Viability and Cost Overruns

This topic is directly related to the above issue because, if costs of procurement, construction, operation and maintenance can be reduced, these savings can result in more customers being connected and ultimately a lower monthly electric bill.

The project was originally designed to serve approximately 130,000 customers by the third year of operations. Project financing included US\$ 20 million from the USAID and US\$ 12 million equivalent in Rupiah from the GOI. This \$32 million package would have resulted, therefore, in an average cost per customer of US\$ 246. After the USAID Loan Agreement was signed, the Royal Netherlands Government (RNG) decided to contribute an additional US\$ 5 million equivalent in Guilders to further expand the system. At \$246/customer this should result in at least 20,000 additional customers. In fact, because the USAID assistance also included infrastructure development like headquarters complexes, the additional Dutch contribution should have resulted in perhaps 30,000 new customers. However, recent cost analysis based on current cost data indicates that the project faces substantial cost increases. USAID has identified potential cost savings which would not compromise the construction and performance of the system:

- (a) Reduction of requirements for tools and construction equipment;
- (b) Installation of a fully adequate but smaller size internal housewiring than currently used by PLN;
- (c) Re-opening the tender for conductor to include international suppliers; and
- (d) Elimination of tranformer taps.

PLN representatives were not prepared to discuss these issues during the Mission Review meeting. They asked for more time to review the issues paper we had prepared. Since the review, however, PLN and USAID have commenced a series of small meetings to resolve each sub-issue; agreement has been

reached on reduced quantities of tools and equipment, and alternate bids will be requested for housewiring and transformer. PLN is concluding the negotiations with the local bidders for conductor and has agreed to re-open the tender to international suppliers if negotiations prove unsatisfactory.

In summary, total project costs now exceed US\$ 40 million compared with US\$ 37 million as originally budgeted as shown below: (All figures US\$ 000)

Items	Original Budget			Current Estimate		
	AID	RNG	GOI	Full Bid	Alter-nate	Savings
Tools & Equip. Grounding	included in #2 & 6			3,272*	2,638	634
Distribution Hardware	14,538			9,600	9,600	
Distribution Line Conductor		5,000		7,164	3,799	3,365
Housewiring, Materials and Meters	2,500			5,968	5,708	259
Wooden Poles			included in # 7	4,250	4,250	
Headquarters Complexes	2,462		1,050	3,512	3,512	
Distribution System Construction			7,382	1,900	1,900	
Headquarters Complexes Construction			included in # 7	1,232	1,232	
Miscellaneous Start-up	500		3,568	4,068	4,068	
TOTAL	20,000	5,000	12,000	40,964	36,707	4,257

Since both the AID and the RNG contributions are fixed, PLN has to decide whether to make up for the short fall or adopt the proposed alternative.

* This figure is based upon the procurement of 142,000 groundrods and other changes in the grounding materials.

B. GOI Support and Management for the Project

The problem of adequate GOI support relates mostly to the DGC portion of the project. PLN's performance to date has been most satisfactory in respect to housing, offices, office supplies, engineering backup services and other local support. PLN officials sent abroad for training or orientation have been well qualified. Most impressively, PLN, using over Rp 600 million of its own materials and internal funds, has constructed a demonstration rural electrification system in three villages near Klaten, Central Java which is already serving over 90% of the 2000 households in these villages. This pilot project was planned, staked and, completely built in 4 months by force account with assistance from the consultants.

The DGC's lack of support has been very much a function of poor organization and its inadequate Rupiah budget.

- Organization

The DGC has formed a new Project Development Organization (PDO) but the PDO has not yet proven sufficiently effective in implementing the project. Part of the problem may be the PDO is still part of DGC rather than functioning as a separate entity. In any events, there have been serious staffing and budgeting problems. The lack of a formal organization, the periodic reassignment of personnel, the absence of firm direction and follow-up, and the lack of coordination among the staff make it difficult for the consultants to work effectively with the PDO.

There is now a new organizational chart for PDO, and there have been several improvements in administration. Further improvement is anticipated following the recent appointment (April 1, 1980) of a very competent individual from the Ministry of Trade and Cooperatives as Project Officer for R.E., directly accountable to the Minister.

- Budget and Finances

During the first year of the project, an inadequate budget

resulted partly from a mistake in estimate of costs. Last year USAID was promised there would be a Rp 1.4 billion budget for IFY 79/80 which would have been adequate. This budget should have been approved by BAPPENAS in June and released by August 1979.

Subsequently, USAID was disappointed to learn that the DGC did not even submit their budget to BAPPENAS until August and the request was for only Rp 760 million. While this inadequate budget has been released since October, we have little knowledge of how these funds have been expended to date. Only recently did the PDO repay Rp 20 million loaned to the PDO by C.T. Main. This loan represented expenditures over the past year by C.T. Main on behalf of the PDO. The loans made to the PDO by NRECA personnel have yet to be repaid.

- Luwu Housing

Under the Grant Agreement Implementation Letter No. G-2, USAID agreed to rent housing for the consultants working in Jakarta, Lampung and Lombok; PLN agreed to furnish housing for the consultants working in Semarang; and DGC agreed to build five three-bedroom houses in Luwu. It has been almost two years since this Implementation Letter was signed. While PLN provided housing as required, the DGC housing on Luwu is still under construction. In the interim, the consultant staff working in Luwu has rented and rebuilt a house at a cost to the project of over Rp 9 million. DGC states that the houses will be completed in July 1980.

In summary, therefore, as of the Mission Review, USAID was still waiting for the following actions from DGC/PDO:

- (1) Evidence that the PDO has adequate financial resources to function effectively;
- (2) Repayment of monies owed to NRECA;
- (3) Assignment of the full complement of counterpart engineers to C.T. Main;
- (4) Provision of additional floor space, estimated at approximately 300 sq. meters, to effectively accommodate the PDO and consultant staffs;
- (5) Completion of the houses in Luwu, complete with water, electricity and furniture with the space requirements agreed to by the DGC in Implementation Letter No. 1 to the Grant Agreement;

(6) Vehicles assigned to the consultants in accordance with the above mentioned Implementation Letter No. 1.

During the Mission Review, all of these general support related issues were discussed and some further assurances or actions were offered, to wit:

- adequate budget was now available for the project;
- the housing problems would all be resolved by July 1980;
- vehicles would be assigned within the next few weeks if not immediately; and,
- the remaining 3 issues would need to be further discussed but DGC is willing and eager to do so with the objective of resolving them in the immediate future.

C. Consultants' and USAID's Performance

The support issues outlined above, however, are only part of the problem. The DGC believed that there are also shortcomings on the part of the American consultants. These include misassignment and improper tasking of personnel; inadequate time on the job; slow performance in completing cost estimates, feasibility reports, and IFBs; and poor reporting on project progress as against planned progress. There are also communication problems between consultants and GOI officials and between the two consultant organizations (C.T. Main and NRECA).

During the review, both consultants agreed that they have had their shortcomings. They are of the opinion now, however, that these are pretty well under control, and one NRECA member even suggested that perhaps the air is now cleared: "We have all been too fractious in the past. If now we can all be more cooperative, this project can move ahead quickly".

Regarding USAID support for the project, the DGC Project Manager was of the opinion that it has been generally "beyond what would be normally expected". He did note, however, that there have been communication problems between GOI officials from both DGC and the PLN and the USAID project staff. Such problems in communication often result from the changes in attitudes, standards and practices necessitated by the novel approach to electrification presented by this project and from the tensions inherent in expediting such a large-scale development effort. Whatever their cause, these difficulties in communication for both the consultants and USAID with the GOI and even between the consultants and the USAID project staff will need to be overcome if effective consultation and working relationships are to be developed.

D. Cooperatives' Participation

The credibility of the cooperative concept for rural electrification is also an issue. During their field trip to Lampung, in particular, the AID/W team found some dissatisfaction among Cooperative Board members because they did not feel they were really participating in decisions. DGC or its representatives seemed to make all decisions and the Coop merely rubber stamped.

The DGC recognizes this dissatisfaction and agrees that the Coop roles have to be improved and broadened, but points out the need for stewardship before much real authority can be turned over to the Coops themselves. This is a point well taken and emphasizes the need for continued upgrading of Coop institutional capability in order to transfer full authority to the Coops at an early date.

PROJECT TITLE: RURAL ELECTRIFICATION

I. Impact re Section 102(d) Criteria: (Explain How)

Increase Agricultural Productivity

Electrification should enable farmers, either individually or cooperatively to establish electrically powered irrigation pumps for areas where alternative irrigation systems are not physically or economically feasible. This should lead to more extensive and intensive land utilization and a shift from cultivation of low-productivity (corn) to high-productivity (rice) cash crops. Farm losses should also be reduced through the use of electrified dryers, grain mills and storage facilities.

Reduce Infant Mortality

Electrification should stimulate improvements in medical and health care and in environmental sanitation through the establishment of local electric-powered water supply systems and the increased investment by rural health clinics and maternity centers in electrical equipment such as sterilizers, refrigerators, x-ray machines, operating lamps, etc.

Control Population Growth

Electrification should increase standards of living and quality of life that will generate changes in the consumption and investment patterns and aspirations of the rural households. These factors will raise the opportunity costs of additional children thus creating pressures for limiting further child-bearing. Reinforcing the shifts in the economics of fertility, the increased social, educational and community activities of children tend to reduce the children's economic value to parents as productive agents. Also the increased incomes and greater opportunities for saving and investment should reduce the need for the traditional investment in children for old age security. Finally, the increased evening hours devoted to work and other leisure activities should reduce sexual activity.

Promote Greater Income Distribution

Electrification should generate increased incomes of the rural poor and increase participation in the labor force by women and the poorest of the poor. Higher incomes should result from increased production from irrigation new farm inputs, or additional land brought under cultivation, increased employment in new or expanded enterprises and higher prices for farm products. Increased participation for women and disadvantaged groups should result from agricultural changes, increased educational opportunities, industrial and business development and household use of time.

Reduce Un-Under Employment

Electrification should generate new small-scale business enterprises and stimulate existing firms. It should also help attract medium and large scale industrial enterprises to establish in rural areas. The more intensive labor requirements of irrigated farms as well as the development of idle or unproductive land should generate significant increases in agricultural employment opportunities.

And related criteria:

Strengthen/Create Institutions which Aid Social/Economic Development

The electrification of schools, government offices and other institutions should expand their productive use and increase the quality of their services to the communities thus generating widespread social and economic changes in the rural areas.

Improve Condition of Women: Social/Economic/Political

Electrification should increase female employment opportunities and incomes and improve the quality of life for women. Electrification and the increased use of machinery tends to equalize the natural strength advantage of men. Studies of electrified areas show that women engage in more productive types of works, work for longer periods during the year and have higher mean annual cash incomes than their counterparts

in non-electrified areas. They also benefit from increased numbers and types of household electrical appliances.