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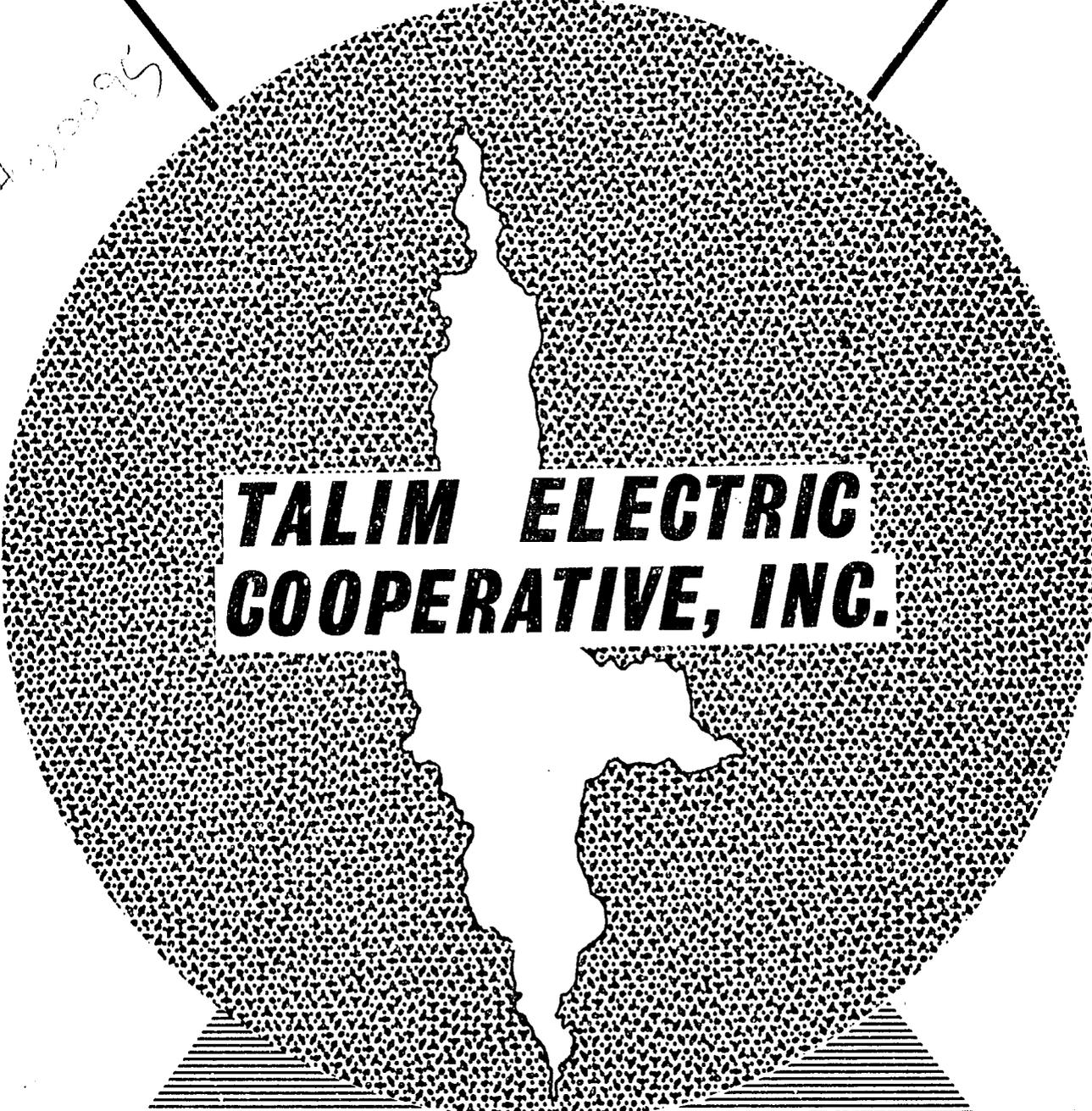
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Feasibility Report

4-20095



**TALIM ELECTRIC
COOPERATIVE, INC.**

NATIONAL ELECTRIFICATION ADMINISTRATION
QUEZON CITY, PHILIPPINES

TALIM ELECTRIC COOPERATIVE, INC.

LOAN-FEASIBILITY AND ENGINEERING STUDY

June, 1970

Prepared by the

**NATIONAL ELECTRIFICATION ADMINISTRATION OF THE
PHILIPPINES**

Assisted by the

**NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION OF THE
UNITED STATES OF AMERICA**

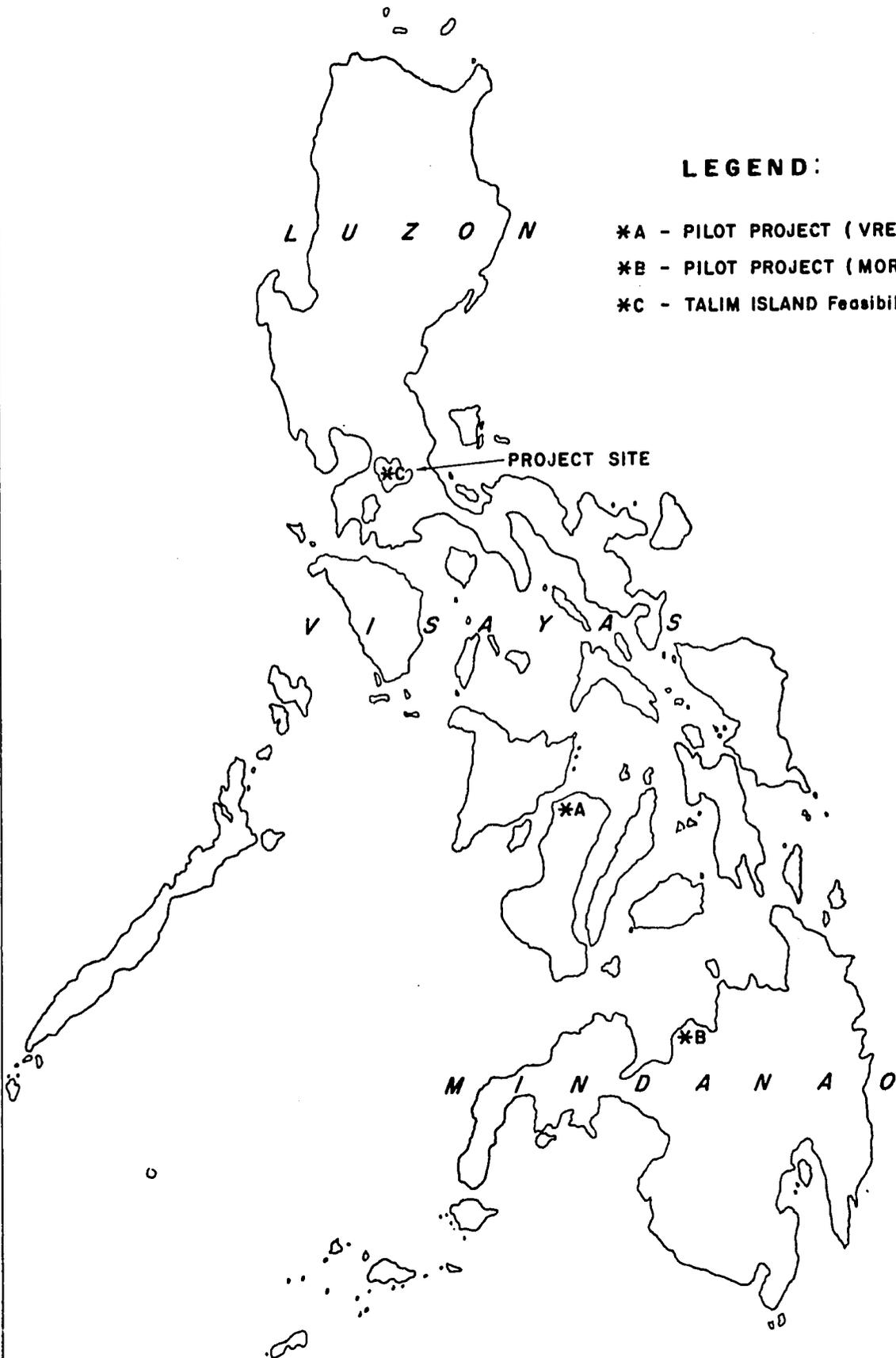
for the

GOVERNMENT OF THE REPUBLIC OF THE PHILIPPINES

PROJECT LOCATION MAP PHILIPPINES

LEGEND:

- *A - PILOT PROJECT (VRESKO)
- *B - PILOT PROJECT (MORESCO)
- *C - TALIM ISLAND Feasibility Study



PREPARED UNDER AGREEMENTS
BETWEEN

NATIONAL ECONOMIC COUNCIL
GOVERNMENT OF THE PHILIPPINES

AND

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES OF AMERICA

THROUGH

PRO/AG #492-21-290-095, May 16, 1969
PIO/T #492-095-3-90111, May 16, 1969

AND BY

CONTRACT NO. AID/ea - 90, NOVEMBER 28, 1969
BETWEEN

AGENCY FOR INTERNATIONAL DEVELOPMENT
UNITED STATES OF AMERICA

AND

NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
WASHINGTON D. C. USA

REPUBLIKA NG PILIPINAS
TANGGAPING PANGULO
PAMBANSANG PANGASIWAAN NG ELEKTRIPIKASYON
(NATIONAL ELECTRIFICATION ADMINISTRATION)
Lungsod Ng Quezon

June 11, 1970

The Honorable
Gerardo P. Sicat
Acting Chairman
National Economic Council
Manila, Philippines

Dear Mr. Chairman,

We are honored to submit to you this report on "Talim Electric Cooperative, Inc." It is the first of a new series to be prepared by the joint NEA/NRECA Staffs in compliance with agreements between NEC and USAID for the development of an electrification program for the Philippines. Other reports will follow, to complement work already in hand and expand the concept of electrification for everyone on an area-coverage basis.

The report is complete as to preliminary economic, social and engineering study and a determination of feasibility. It offers a prudent and desirable project in furtherance of national objectives for total electrification of the Philippines. If acceptable it may be used as the basis for seeking funds and organizing implementation of the project.

May we commend it to your study and consideration. The Team responsible for its preparation is fully available to assist in any discussion and review.

Respectfully submitted:

NATIONAL ELECTRIFICATION ADMINISTRATION

By:



ELISEO C. TIRONA

Project Coordinator

Deputy Administrator – Operations

PREFACE

Project Background:

During 1964-65 a comprehensive survey was made of the electric power industry of the Philippines. A report was prepared, under a USAID contract, by a group of specialists from the United States. This report is often referred to as the "Thomas Report" - named after the Chairman of that survey team.

One section of the survey covered problems in the electrification of rural areas. Adequate service was almost non-existent outside major urban centers. Many recommendations were made to improve this situation, two important items being:

- (1) "Pilot rural electric cooperative projects be initiated, and that the NRECA-AID program, or a similar program under the direction of comparable overseas technical agencies, be engaged to assist EA (Electrification Administration) in establishing such pilot projects. Under such a program two or three experienced technicians should be assigned to each project for a period to two years to help organize, supervise construction and render management assistance during the early period of operation, in order to achieve effective operation."
- (2) "Funds to be made available, either through USAID, or other overseas agency, for the construction of these pilot projects and that a portion of such funds be designated for relending to the users of electric power for house wiring and purchase of small electric appliances and equipment so as to expedite load building."

Such recommendations were implemented during 1967-68 when a National Rural Electric Cooperative Association (NRECA) Team, under agreements between the Philippine National Economic Council (NEC) and USAID, conducted Loan Feasibility and Engineering Studies for two proposed Rural Electric Service Cooperatives in the Philippines. The first in Negros Occidental along the Victorias - Manapla - Cadiz littoral and the second in Misamis Oriental (Mindanao) on the northern coast between Iligan and Cagayan de Oro. Both systems were designed on an Area Coverage concept, wherein all potential consumers of the service area are to be served on non-discriminatory rate basis. Over 10,000 potential consumers existed in each area. In 1968, under agreements between USAID and the Government

of the Philippines, loans were made available to finance the construction of these two pilot projects. Construction procedures began in 1970, with completion expected in 1971.

In order to add impetus to the electrification program of the Philippines, a new law — R. A. 6038 was passed in July 1969. The old Electrification Administration was superseded by a new 'National Electrification Administration' (NEA) with broad authorities and opportunities to encourage, support and accelerate the development of electric power systems. It was declared as the National Policy:

"The total electrification of the Philippines on an area coverage basis being vital to the welfare of its people and the sound development of the nation, it is hereby declared to be the policy of the State to pursue and foster, in an orderly and vigorous manner, the attainment of this objective. For this purpose, the State shall promote, encourage and assist all public service entities engaged in supplying electric service, particularly electric cooperatives, which are willing diligently to pursue this objective."

Widespread support for these new concepts of electrification, on an area coverage basis through Cooperatives, was demonstrated by the enactment of R. A. 6038. Development of the pilot-projects was also bringing a greater realization of their worth. In 1969 agreements were made between NEC, USAID and NRECA for a new team to come to the Philippines to work with NEA staff in developing, through precept and example, capabilities in the preparation of Loan Feasibility and Engineering reports for new power systems and an organization to support this implementation and development.

The NRECA Feasibility Study Team began its work with NEA in December 1969. This report on Talim Electric Cooperative is the first of its studies to be completed. Other studies will follow, for projects throughout the Country, during the two-year operating period authorized for this work.

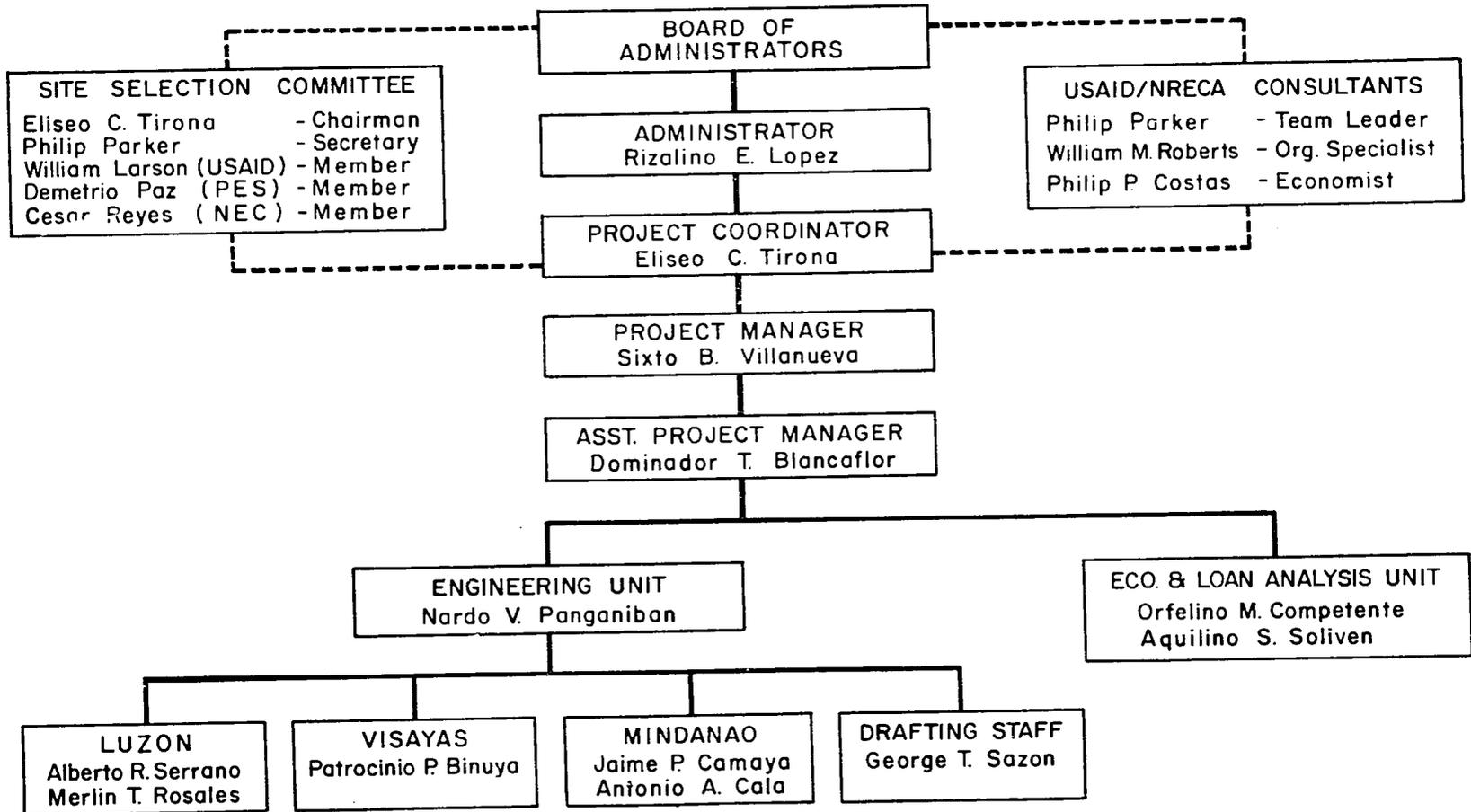
Acknowledgments:

This report is responsive to the hopes and aspiration of many individuals and organizations who have worked together to try to transform them into realities. Talim Island electrification is but a part of a grander scheme which looks to a total electrification of the

Philippines in the future. Special thanks are due to the many officials of government --- National, Provincial, Municipal and Barrio; individual citizens; business and civic organizations; school teachers and ministers who spent many hours of their free time gathering data for this report, and organized the Cooperative to make this dream possible.

Republic of the Philippines
 Office of the President
 NATIONAL ELECTRIFICATION ADMINISTRATION
 Quezon City

ELECTRIC SERVICE COOPERATIVE SURVEY TEAM
 ORGANIZATION CHART



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SECTION 1

INTRODUCTION

1. 1

INTRODUCTION

This report is the first to be prepared under the current NEA/NRECA work in developing new electric power systems to serve, under area-coverage concepts and consonant with R. A. 6038 requirements, those areas of the Philippines which lack electric service.

When the joint team assembled, at the end of 1969, to begin its task the first question was -- "Where shall we begin?" With 30 million people lacking service there was certainly no lack of opportunity. The interest generated by pilot-projects VRESCO and MORESCO, plus a growing awareness nationwide of the benefits to be derived from this program, caused many suggestions and recommendations to be made to the team. In fact there was a list of about 35 potential projects available for immediate review, and the prospect of many more as word spread of the new program activities.

In fairness to each proposed project area it appeared that choices should only be made after an impartial review of conditions at each site, and comparative evaluation so that the most prudent selection could be made. It appeared for a while that the team might spend most of its time in preliminary reconnaissance trips to each site in order to obtain data pertinent to the selection of a few projects for study. It must be remembered that the team has constraints of time, manpower, money and resources which set limits on the number of studies which could be undertaken.

This first problem was overcome by creating a "Site Selection Committee" of five members -- one each from PES, NEC, NEA, USAID/P and NRECA. The committee agreed to certain guidelines designed to accelerate the decision of project site selection during the first few months, and thus permit the team to go to work on the necessary studies. Criteria were established by which project areas were evaluated and Talim was selected by the committee, on 26, February 1970. Work on this study, and associated organization of the cooperative, began without further delay.

It is neither necessary or appropriate to give here the detailed reasoning which led to this project selection. The choice perhaps caused some concern among many of those interested in this program, for it is easy to suppose that other areas offer greater opportunities for feasibility, larger service area, more consumers, or other valued and important elements of system development. However, there were several general concepts which were major

factors in the decision and these will bear repeating as they form a part of the "total electrification of the Philippines" overview which emphasizes that this project is but one part of a larger program.

These concepts were:

- (1) It has excellent characteristics for coordinating and training the NEA/NRECA group in this initial study:
 - (a) There are already defined boundaries encompassing a fairly simple system.
 - (b) Preliminary reports showed a power source readily available through MERALCO.
 - (c) Franchise problems were minimal.
 - (d) The project area is readily accessible from Manila.
- (2) The report could be prepared relatively quickly as compared to more complex, larger and more sophisticated systems. This will permit the project to be brought to early fruition and thus bring a greater impact to the whole electrification program.
- (3) It will provide a very convenient 'show window' for demonstrating the potential of this program to all interested agencies and parties.
- (4) It will establish clearly the benefits and desirability of cooperation between private and consumer owned segments of the industry.

The report development has followed three parallel paths, each dependent on the others and travelled concurrently. First, has been the education and organization of the cooperative's membership. This is a task which will never end, for a respected understanding between the cooperative's operation and management and the members which it serves, is fundamental to the strength and success of the organization. There is a long way to go but at least we have the cooperative established in a climate of acceptance and support from the people; incorporation accomplished and a Board of Directors in office through "grass-roots" action by the membership; and confidence growing for the future.

Second, is the training aspect of the program as it relates to the NEA staff working with the NRECA consultants. The staff is small, but competent, enthusiastic and dedicated and will form a nucleus around which the NEA organization and responsibilities may grow. The team has been organized to handle the work load efficiently and in an orderly manner, with responsibilities assigned and authorities delegated. Surely an arrangement which will help implementation of the electrification program on a grander scale in the future.

Third, has been the actual data gathering, economic analysis, load estimates, costs, design and feasibility computations -- all those components which together form the complete report. In the initial stages there was use made of much research work on economic and social conditions of the area compiled by staff of Laguna Lake Development Authority. This data was obtained through questionnaires completed on a household basis, and was adapted for our use by correlation with other data, and interpretation in the light of our project needs. Perhaps one of the significant benefits to the program as a whole comes from experience gathered by the team in compiling this report. New ideas have been generated, and techniques refined, to the advantages of future work on succeeding projects.

The report consists of several sections with the contents summarized in the next section. Each section deals with a different aspect of the total enterprise, and each may be read separately for reference to that particular area of concern. The sequence follows a logical pattern in accordance with the development of the report. However, each section is dependent on others in many ways with data developed in one section being applied as factors for consideration elsewhere; and all sections being an integrated part of the comprehensive report.

Talim Electric Cooperative is a unique project. It has represented a challenge to the team and becomes an important part of the total electrification program. Our experience with the people and the community leaders has been a rewarding one and we have no doubt of the project's success in their hands. Given the opportunity for development, and businesslike operation and management, Talim Electric Cooperative will provide ever-increasing benefits to the area and its people as the years go by.

SECTION 2

SUMMARY & RECOMMENDATIONS

2.1

SUMMARY

This preliminary engineering and feasibility study for Talim Electric Cooperative, Inc. joins with the VRESCO and MORESCO pilot-projects in seeking to advance the goals of nationwide electrification for the Philippines. It has the advantage of understanding and support generated by those first projects and also is sustained by R. A. 6038 — The "National Electrification Act" which was enacted in 1969 to support just such development.

The report, prepared by a joint NEA/NRECA team, has provided valuable training in concepts and techniques. By its selection the project will do much to emphasize and encourage development of other projects throughout the Philippines. The people of the area are enthusiastic in this cooperative way of helping themselves. Democratic ways are reinforced and a needed service planned for all people of the area.

Data for evaluation of the potential of the area has been gathered in many ways. A questionnaire providing social and economic data was initiated by the Laguna Lake Development Authority and tabulated by the team. This was correlated with other data obtained by NEA staff, census records, discussion with local leaders and field investigation. Load and consumer characteristics were derived to form the basis for design and feasibility calculations.

A service area was selected to embrace all of Talim Island plus a few mainland barrios unserved by existing systems. The entire service area falls within the municipalities of Cardona and Binangonan. Franchise questions have been resolved and the Cooperative incorporated, with a representative Board of Directors.

A 20-34.5 kv. distribution system has been designed to bring electricity to all barrios within the service area. This voltage was chosen so that power supplies could be purchased directly from MERALCO, a substantial private utility offering wholesale service at 20-34.5 kv near the northern boundary of the Cooperative's system.

Rate schedules have been devised to bring service within the reach of all families and business, and encourage abundant use of electricity. Revenues so derived will be used to cover debt service and pay operating and maintenance costs. The plant investment was calculated from the system design and associated needs. Operating

2.4

and maintenance costs — including the cost of service from MERALCO, were obtained from the application of data in the report and from judgment factors by staff.

A wiring program is proposed by which all families may prepare their homes for the change to electric service. This will bring the benefits of electricity to them much quicker than might be possible using only their own resources — and, of course, the Cooperative will benefit from the increased load imposed on the system at an earlier time.

A financial forecast and capital budget has been prepared for each year of the 10-year period covered by the study. The results show that, under the parameters which are established, the system is feasible and prudent. Debt service will be provided and O & M costs met. Reasonable reserves will also be established, sufficient not only for system security but also to meet future improvements and expansion.

The total initial system cost will be ₱2,106,400 to provide service to 3900 consumers by the fifth year, plus ₱180,000 for the wiring program. Through action by the Board of Directors of Talim Electric Cooperative this report forms the basis for their application to NEA for these loan funds to implement the project.

RECOMMENDATIONS

These recommendations are offered in order to emphasize important points which are detailed in the report, and focus attention on concepts and techniques which may contribute to a prudent implementation of the project. They are written, for the most part in general terms and are intended to be used for guidance and counsel to those responsible for further development.

1. The Cooperative should file an application with the National Electrification Administration for a construction loan, under R. A. 6038 provisions, in the amount of ₱2,106,400 for the construction and acquisition of facilities detailed in this report, and for purposes outlined in Section 13, - Loan Application.
2. This loan should be granted through the NEA revolving fund, at an interest rate not to exceed 4% and for a period not less than 30 years. Interest payments should be deferred for two years after the system has been energized. Principal payments should be deferred for 5 years after the date of the note. Principal repayments should be made in equal installments throughout the 25 year period. Interest should be paid on outstanding balances.
3. The Cooperative should file an application with NEA for a wiring loan, under R. A. 6038 provisions, in the amount of ₱180,000 for wiring facilities in 2000 homes. This will enable members to take advantage of electric service at an earlier date, and enhance the cooperative's feasibility through increased use of power.
4. This loan should be granted in one principal amount, repayable in one lump sum at the end of a 5-year period, with interest paid annually at a rate not to exceed 4%. The cooperative should be required to re-lend this money to members, for approved purposes, at a rate not to exceed 2% above the prime loan rate.
5. All loan funds, both construction and wiring, should be available, in full amount, to the Cooperative upon loan approval. An orderly implementation of the project with minimum delay, requires that loan funds be available when needed to meet obligations during the construction and development period.

6. The Cooperative is protected by municipal type franchises. Once the loans are approved, and providing the laws governing franchise allocations remain unchanged, the Cooperative should seek a legislative franchise.
7. During consideration of this report the Cooperative's Board of Directors should continue to meet to adopt Bylaws and approve basic policies and procedures, in addition to a continuing program of training for themselves, and education of the people of the area in the cooperative's concepts and design.
8. Once the loan is approved appropriate information should be filed with the Public Service Commission, in accordance with Section 42 of R. A. 6038.
9. After loan approval and announcement the Cooperative should proceed with an active campaign to secure membership applications in accordance with Bylaw provisions.
10. After loan approval the Cooperative should secure, through contract, the services of competent consulting engineers to undertake detailed design studies, surveys, prepare plans and specifications and provide such other service and advice as may be required.
11. We recommend, that the Cooperative solicit 'material only' bids from selected, pre-qualified, suppliers based on C&F prices at Manila. Materials should be specified as to quality and design. All off-shore procurement should be under the supplier's responsibility as to financing and shipping. Importation should be arranged by the Cooperative under its duty-free prerogatives. The Cooperative should be prepared to execute a domestic letter of credit for the full amount of any material order, so that bid prices may be minimized and responsible suppliers encouraged to compete for the order.
12. Construction should be arranged through competitive bidding by pre-qualified, selected bidders proposing a basic 'labor only' contract using materials secured as in paragraph 10.
13. Communications are essential for the proper operation and maintenance of the system. Funds have been budgeted to establish a communication network throughout the service area, either by radio or by telephone lines installed jointly on the power poles. The selection should be made by the Consulting Engineers and incorporated in the system design.

14. Continuous engineering monitoring of the system should be maintained and long range planning studies undertaken to ensure an orderly and efficient growth.
15. The Cooperative, through its Board of Directors, must seek and hire a competent professional manager to be fully responsible for the operation of the system in accordance with policies which the Board has established. This should be done as soon as loan funds are available.
16. The Cooperative must develop programs of power use education; training in all staff functions; safety – much of which can and should be accomplished through cooperation with other organizations, such as the Philippine Electric Cooperative Association.
17. The disbursement and use of the Cooperative's funds must be safeguarded through bonding of responsible employees and agents, and comprehensive enforceable policies governing cash flow, bank transactions and investments.
18. NEA must continue to support and assist the Cooperative through services and concepts established by R. A. 6038. This is necessary to be responsive to the Nation's goals in electrification and also to strengthen the Cooperative and improve loan security.
19. Expenses and revenues of the system must be under constant review so that any substantial departure from the planned development may be considered and remedial action taken where necessary. This includes an understanding of the rate structure and modification which may be required for the benefit of the system and its members, or to meet the needs of new and growing loads.
20. The Cooperative should seek competent legal advice to guide the Board of Directors.

SECTION 3

LEGAL REQUIREMENTS

3.1

LEGAL REQUIREMENTS

A. General

R. A. 6038 was enacted in 1969 during the Sixth Congress --- Ninth Special Session. The Act is referred to as the "National Electrification Administration Act". It declares a national policy objective for the total electrification of the Philippines on an area coverage basis, providing for the organization of the National Electrification Administration, the organization, promotion and development of electric cooperatives to attain the objective, prescribing terms and conditions for their operation, the repeal of R. A. 2717, and for other purposes.

Chapter I, of R. A. 6038 is a statement of policy and definitions.

Chapter II provides for the National Electrification Administration --- its authorities and obligations. A Board of Administrators is authorized to exercise full control over the new agency and establish policies and procedures responsive to the national objectives. Loan funding for the program, including standards for loan making, are also a part of this chapter.

Chapter III of the Act is related to Electric Cooperatives, and covers organization purpose, powers and obligations.

Chapter IV is concerned with transitory provisions which permit the orderly change in policies, procedures and operation from the dissolved Electrification Administration established by R. A. 2717, to compliance with the new Act.

Electric utilities in the Philippines are governed by Public Service Law (Commonwealth Act 146) and other special laws, such as R. A. 6038 and conditions imposed by Municipal or Legislative franchise. The PSC and NEA both have responsibility for the supervision and control of the operation, installation and maintenance of electric power systems. They also promulgate rules and regulations within the scope of their respective authorities. Cooperation and coordination between the two agencies is required as a necessary influence in the national policy of electrification.

B. Cooperative Entity

1. Nature

The cooperative is a non-stock, non-profit, membership corporation which exists for the mutual benefit of its members and patrons. Its purpose is to provide a service not otherwise available to its members/patrons --- the supply of electric power, and encouragement in its fullest use for social and economic benefit to the service area. All this on an area coverage basis at the lowest possible cost consistent with sound economy and prudent management.

2. Powers

The cooperative is vested with all powers necessary or convenient for the accomplishment of its corporate purpose and capable of being delegated by the Congress. Specific powers are enumerated in Section 18 of R. A. 6038.

3. Limitations

There are several limitations placed on the cooperative, designed to protect the interest of its membership and ensure operation in full compliance with basic cooperative principals. Some of these limitations are:

- (a) At least ninety percent of those receiving service must be members of the cooperative.
- (b) A member must use the services offered by the cooperative and comply with the By-Laws.
- (c) Membership cannot be transferred and must be cancelled on failure to comply with the By-Laws.
- (d) Each member shall have one, and only one, vote.
- (e) All members, in similar classifications, will receive equal treatment.
- (f) Elected officials above Barrio level are not permitted to become Directors or Officials of the cooperative.
- (g) Articles of Incorporation and By-Laws may only be changed as provided for in the By-Laws.

- (h) No member shall be liable or responsible for the debts of the cooperative.

C. Necessary Legal Documentation

1. Articles of Incorporation

The Articles of Incorporation have been prepared in compliance with Sections 20 and 21 of R. A. 6038. Incorporators, and the interim Board of Directors who will serve until their successors can be duly elected, were selected as described in Section 4 --- Organization. The Articles were signed on 2nd June 1970 and have been submitted to the Administrator of NEA for registration and certification in behalf of the Board of Administrators. A copy of the Articles of Incorporation are included in the Appendix to this report.

2. By-Laws

By-laws are being drafted and discussed by the Cooperative's Board of Directors together with NEA/NRECA staff. They will comply with requirements of R. A. 6038 and will follow models established by the pilot-projects of VRESCO and MORESCO. Their preparation is concurrent with the final stages of this report preparation and they should be available for review when the project is under consideration for implementation.

3. Franchises

Prior to beginning this study it was established that utility franchises were held in the two municipalities involved --- Cardona having a private owner, and MERALCO holding Binangonan. Discussions were held with both parties to explain the Cooperative's plans and program and seek their cooperation in permitting service to be so rendered to unserved portions of both municipalities. Agreements in principle were reached and the report was undertaken.

The Cooperative now has resolutions from both Cardona and Binangonan municipal authorities granting required franchise rights. These are being submitted to the Governor and Board of Rizal province for ratification. Copies of each resolution are included in the Appendix of this report. Municipal franchises cover a period of 35 years. It may be that the cooperative will later seek to consolidate its

franchises in a legislative franchise which would be good for 50 years.

The Cooperative is agreed that in the event it is unable, for feasibility or other reasons, to go ahead with its plans, that it will exert its best efforts to seek return of franchise rights to those parties which waived them to permit the cooperative's planning in the first place.

4. Certificate of Public Convenience and Necessity

The Public Service Commission has certain powers and authorities towards cooperatives as described in Section 42 of R. A. 6038. The cooperative, at a later appropriate time, will seek PSC concurrence with the Cooperative's franchise and the issuance of a Certificate of Public Convenience and Necessity. Data required by PSC for information purposes will also be rendered in an overall approach by the Cooperative, working with NEA, to accomplish those matters required by R. A. 6038 and necessary to preserve a close working relationship between those two agencies.

5. Approval of this Report and Loan Application

A resolution by the Board of Directors of the Cooperative, which approves this report and adopts it as an application for a loan to permit implementation of the project, is made a part of Section 13 --- Loan Application.

SECTION 4

ORGANIZATION

ORGANIZATION

A. General

The organization of this electric cooperative has been directed by the NEA/NRECA team with the cooperation and assistance of many individuals from private life, business, and all levels of government. Experience brought from the United States, together with work already done on pilot-projects in the Philippines which preceded this project, was applied to the task. Factors of lack of communications or road systems were a handicap, and will continue to be a problem in this work.

B. Objective

In organizing the Cooperative the main purpose has been to develop understanding and support from all those who will be served by the project. Only through understanding of the purpose of the project; its concept and design and the rights and obligations of the membership, can support be generated and sustained. We wanted the people to know that this would be their project; owned and controlled by them; operated for their benefit in accordance with good business principles and sound utility practice.

We wanted to emphasize the point that this was not a government project --- that its success was in their hands. To this end we wanted to organize from the "grass roots" upwards, rather than impose some form of management and control selected by other means or interests.

The strength of the Cooperative in meeting the challenges of the future; in remaining responsive to the needs of its membership, and fulfilling the obligations of service to new and growing loads, will in large measure lie with the support given by the members. They will support their Cooperative if they understand its dedication to their needs and believe that they are involved in and necessary to its success.

C. Procedure

Meetings were first held with Congressman Frisco San Juan of Rizal, Mayor Rogelio Flores of Cardona, Mayor Pedro Fineza of Binangonan, Mr. Vicente Lavidez and his staff of Laguna Lake Development Authority, and other interested parties. Plans then made resulted in visits to the cooperative's service area where

public meetings were held. Programs involving information and discussion were held with Barrio groups to present the concepts of the electrification proposal through a cooperative.

The service area was next divided into seven Districts. This division was made with several ideas in mind:

- (a) It would be more practical to work with sub-organizations in each of seven districts, rather than to try to maintain direct contact with the people of thirty-two individual Barrios.
- (b) By grouping the Barrios we begin to foster and encourage coordination and cooperation between them.
- (c) In forming Districts using criteria of common interests and geographic convenience for grouping the Barrios we can begin to break down old restraints based on Barrio or Municipal boundaries, and consider the Cooperative on a general overall basis.
- (d) The Districts so formed, if retained as part of the By-Law structure, can ensure local representation on the Board of Directors for all the people.

Each Barrio was then invited to select two members to join with other Barrio representatives in an "electrification committee" in each District. These committees then became vehicles for a flow of data from each District, necessary for the report compilation, and for a flow of information from the NEA/NRECA team back to the Barrios.

The seven Districts, their component Barrios, and representatives to the "electrification committees" are listed below. These people are to be commended for their willingness to serve in this important, though unpaid, work.

DISTRICT NO. 1

Bo. Limbon-Limbon

1. Guillermo Belison - Bo. Capt.
2. Mauro San Jose

Bo. Kalinawan

1. Cipriano Aniz - Bo. Capt.
2. Apolonio Cerda

- Bo. Pipindan
 1. Nicolas Unida - Bo. Capt.
 2. Leonardo Alejandro
- Bo. Ticulio
 1. Leopoldo Limpante - School Teacher
 2. Mariano Bautista
- Bo. Sampad
 1. Mariano Granale - Bo. Capt.
 2. Dalmacio Sison
- Bo. Nagsulo
 1. Buenaventura Fernandez - Bo. Capt.
 2. Apostol Paralejas
- Bo. Ithan
 1. Geronimo Lucso - Bo. Capt.
 2. Monico Ulabre

DISTRICT NO. 2

- Bo. Nabotas
 1. Arsenio Ferido - Bo. Capt.
 2. Eugenio Celosa
- From Sitio Amihanan - 3. Juan Valdez
 " " " 4. Exequiel Ferido
 " " " 5. Marciano Valdez
- Bo. Bayansubay
 1. Jose Galang - Bo. Capt.
 2. Jose Anore
- Bo. Kasili
 1. Anacleto Celestra - Bo. Capt.
 2. Juancho Sanga

DISTRICT NO. 3

- Bo. Malanggam
 1. Victoriano Candelaria - Bo. Capt.
 2. Absalom Basilia
- Bo. Boor
 1. Pedro Vocal - Bo. Capt.
 2. Alamaro Pasay
- Bo. Lambac
 1. Domingo Jaring - Bo. Capt.
 2. Bienvenido Panguito
 3. Melchor Arriola
- Bo. Calubacan
 1. Ignacio Pascual - Bo. Capt.
 2. Feliciano Esquillo

DISTRICT NO. 4

- | | |
|----------------|--|
| Bo. Bombong | 1. Mariano Tirados - Bo. Capt.
2. David Rubaya |
| Bo. Kinagatan | 1. Cerio San Agustin - Bo. Capt.
2. Sesinando Unida |
| Bo. Kinaboogan | 1. Angel Labao - Bo. Capt.
2. Frisco Silahis |
| Bo. Bañgad | 1. Pedro Francisco - Bo. Capt.
2. Juan dela Cruz - Councilman |

DISTRICT NO. 5

- | | |
|--------------|---|
| Bo. Janosa | 1. Mariano Ramos - Bo. Capt.
2. Bernardino Gondraneoz |
| Bo. Kaytome | 1. Epifanio Villadiego - Bo. Capt.
2. Fidel Añiz |
| Bo. Gulod | 1. Catalino Rivera - Bo. Capt.
2. Luis Aniaian |
| Bo. Sapang | 1. Pio Bolante - Bo. Capt.
2. Fidel Certeza |
| Bo. Buhangin | 1. Gregorio Cequeña - Bo. Capt.
2. Pedro Gondraneoz - Councilman |

DISTRICT NO. 6

- | | |
|-------------------------|---|
| Bo. Malakaban | 1. Ceferino Ulbida - Bo. Capt.
2. Estacio Ulbida |
| Bo. Pinagdilawan Aragon | 1. Leogeldo Aragonnes - Bo. Capt.
2. Deogracias Gondraneoz |
| Bo. Ginoong Sanay | 1. Diosdado Arabit - Bo. Capt.
2. Ismael Cernero
3. Marino T. Calibara - School Teacher |

Bo. Tuna
 1. Leopoldo Clarete - Bo. Capt.
 2. Moises Estrella

Bo. Balibago
 1. Candido Sta. Maria - Bo. Capt.
 2. Leonardo Simon
 3. Rizalino Martin
 4. Feliciano San Juan

DISTRICT NO. 7

Bo. Rayap
 1. Ismael Duenos - Bo. Capt.
 2. Valentin Villagracia

Bo. Tabon
 1. Atanacio Mera - Bo. Capt.
 2. Juan Arada
 3. Baldomero Mesa

Bo. Habagatan
 1. Juan Mapilisan - Bo. Capt.
 2. Sixto Silones

Bo. Binitagan
 1. Elpidio Aragonés - Councilman
 2. Maximino Raymundo

The next step in organization, concurrent with continuing meetings with each "electrification committee", was to select a "coordinating committee" for the entire project. This committee had seven members, one from each District, selected on the basis of forming a diversified, representative group. Each District nominated three people for consideration and the actual selection was then made to provide the desired diversity of interests, but ensuring one committee post to each District.

The nominees from each District, and their vocation, were as follows:

DISTRICT NO. 1

1. Leopoldo Limpante	- School Teacher
2. Agripino Unida	- Businessman
3. Nicolas Unida	- Bo. Capt.

DISTRICT NO. 2

1. Rufino Reyes, Jr.	- Businessman
2. Venancio Aviles	- School Teacher
3. Amado Trinidad	- Ex. Bo. Captain

DISTRICT NO. 3

- | | |
|---------------------|--|
| 1. Catalino Arriola | - Bo. Councilman |
| 2. Melchor Arriola | - Former School Teacher,
Religious Leader |
| 3. Alfredo Perez | - Former Seminarian |

DISTRICT NO. 4

- | | |
|---------------------|------------------|
| 1. Cristino Herrera | - School Teacher |
| 2. Pedro Francisco | - Bo. Captain |
| 3. Virgilio Rubaya | - Businessman |

DISTRICT NO. 5

- | | |
|---------------------|------------------|
| 1. Pio Bolante | - Bo. Captain |
| 2. Librado Rivera | - School Teacher |
| 3. Gregorio Cequeña | - Bo. Captain |

DISTRICT NO. 6

- | | |
|-----------------------|--------------------|
| 1. Marino T. Calibara | - School Teacher |
| 2. Juan Serafica | - School Teacher |
| 3. Emilio Raymundo | - Political Leader |

DISTRICT NO. 7

- | | |
|-------------------------|--|
| 1. Valentin Villagracia | - Religious Leader, PTA Sec.,
Bo. Secretary |
| 2. Juan Mapilisan | - Bo. Captain |
| 3. Juan Arada | - Bo. Councilman |

From these nominees the "coordinating committee" was selected:

1. Agripino Unida
2. Rufino Reyes, Jr.
3. Melchor Arriola
4. Pedro Francisco
5. Librado Rivera
6. Emilio Raymundo
7. Juan Arada

D. Incorporation

Articles of Incorporation were prepared in accordance with law, and especially with regard to R. A. 6038. More detail on this may be found in Section 3, Legal Requirements and a copy of the Articles is also included in the report Appendix.

The "coordinating committee", being the most representative group of the Cooperative and its prospective membership, signed the Articles as Incorporators. This was done on 2nd June 1970 in the Office of Governor Isidro S. Rodriguez of Rizal Province. Witnesses were Congressman Frisco San Juan, Mayor Rogelio Flores of Cardona and Mayor Pedro Fineza of Binangonan. The Articles have been submitted to the Administrator of NEA for registration in accordance with R. A. 6038.

E. Board of Directors

The Articles of Incorporation named the Incorporators as the first Board of Directors to serve until full elections may be held in accordance with By-Laws in effect for the first membership meeting.

On 16th June, 1970 the Board met and organized themselves as follows:

President	Mr. Rufino Reyes, Jr.
Vice-President	Mr. Emilio Raymundo
Secretary-Treasurer . .	Mr. Pedro Francisco

The NEA/NRECA is continuing to work with the Board of Directors to develop By-Laws, policies and procedures, and attend to those matters pertinent to an orderly and appropriate development of the Cooperative. We also hope to maintain relations with the "electrification committees" so that there will always be involvement by all the people in their cooperative.

SECTION 5

PROJECT AREA PROFILE

PROJECT AREA PROFILE

A. Site and Location

The project area consists of Talim Island (42 sq. km.) and the southern tip of Morong Peninsula (5 sq. km.), located about 43 km. southeast of Manila in Laguna de Bay. The area falls within the jurisdiction of two municipalities, Binangonan and Cardona, Rizal Province. The island has a north-south orientation, shaped somewhat like a bolo knife from which its name is derived. It is approximately 3.5 km. wide and 12 km. long.

Except for Mt. Susungdalaga, a massive intrusion in the central portion of the island reaching an elevation of 369 meters, the project area is characterized by rolling hills and irregular coastlines dotted with rock outcroppings, pinacles and promontories. Deposits of sand and pea gravel of commercial value are found on the northwestern part of the island. Along the coasts bamboo grows and is the basis of cottage industry. In the hilly areas ipil-ipil is found. However, since the war the supply of ipil-ipil has been decreasing due to use as firewood. In plateau areas, generally, upland rice and corn are cultivated or cogon grass grows wild. The latter is often used as roofing for dwellings. Mango and coconut are found around the coastline barrios. Generally, such fruit and food is locally consumed.

Laguna de Bay drains westward via the Pasig River into Manila Bay. During the past few years the water level of the lake has been subsiding, causing at times salt intrusions from the Bay. Meanwhile the lake has been polluted by industrial and thermal discharges connected with development on its western and southern shores. These factors have adversely affected the major source of income for the residents in the project area, that of fishing. Studies presently are being conducted by the U. N. to find solutions to this problem. In June 1970 plans were finalized to construct a check dam on the Pasig to regulate the lake level and to prevent saline intrusion. USAID will make funds available for this project. In reference to the lake two other facts should be noted. First, a narrow stretch of water, about 260 meters wide, separates the island from the mainland. This strait is known as Diablo Pass. It is the deepest part of the lake. Here the current is unstable and often very

treacherous. Second, when the easterly monsoon blows (January through June) the eastern side of the island experiences rough and choppy waters. When the westerly monsoon blows (July through December) the western side of the island experiences the same. On the leeward side of the island the water is generally calm. At present there are no roads in the project area. The funding of a hard surfaced road on the island and on the peninsula, however, is presently being considered by provincial officials. Concrete walkways exist in most of the barrios as do masonry storm drainage ditches in the larger barrios. No wire or radio communication systems exist in the project area. Lake travel among the barrios of the project area and with the mainland is accomplished by banca. Wharfs do exist along the coastline, but generally are equipped to handle banca traffic only.

B. Demography

The project area is composed of 32 barrios, 25 on Talim and 7 on the Morong Peninsula, all of which are situated on the coastline. At present there are about 3,500 houses or dwelling units in these barrios. About one-half of these houses are primarily wood (three or four rooms) structures. Another one-quarter are primarily nipa or bamboo (one or two rooms) structures. The remaining may be classified as concrete or sari-sari residence structures.

Unfortunately, the 1970 population census for the project area was not concluded at the time of this study. Moreover, in face of evidence that a number of barrios had less people than would be anticipated by normal growth, that of 3.5% per year since 1960, the technique of population extrapolation had to be rejected. This forced the study team to make population estimates on an individual barrio basis, based on the most recent, reliable data available; that of housecounts made by NEA of barrios on the island during 1967, even though these housecounts were not 100% complete. Moreover, for load determination purposes, it was thought prudent to project population on this base in order to maximize accuracy in estimates of barrios which experienced outmigration during the 1960s.

Thus for the purpose of this report, the present population of the project area is roughly estimated to be 20,000. This most likely is a conservative estimate. About 10,000 of these people are distributed on the western side of the island, 6,000 on the eastern side of the island, and 4,000 on the mainland.

Outmigration seems to have been most pronounced in those barrios located on the eastern littoral of the island. The search for economic opportunity is the basic root for this migration. It is reported that migration is oriented to Manila and to the logging areas of Mindanao. Unfortunately, outmigration offers no solution for these fishermen, for they lack the skills needed in the urban centers. Moreover, they must compete for already scarce jobs in these centers. This migration is also reflected in the population age pyramid of the project area.

C. Economy

The predominant occupation of the residents in the project area is fishing. The fishing season is concentrated during the seven months, from May to November. The variety of catches ranges from snails (for poultry) to "bia" a fresh water fish abounding in the lake which is marketed in Cardona and Binangonan. The method of catching varies from trawl fishing to the use of "Baklad" or bamboo enclosures to trap fishing. Many of the fishermen have part time or seasonal jobs, that provide them additional income to sustain their economic unit and cover future expenditures. Other occupations found in the project area are basket weaving, duck raising, charcoal making and cattle raising for agricultural chores. Only a few residents are fully occupied in farming.

Based on income imputations made by the Laguna Lake Development Authority and questionnaire responses gathered in the project area, we estimate that per capita incomes are ₱350 per month for households on the eastern side of the island, ₱375 per month for households on the mainland and ₱425 per month for households on the western side of the island. This indicates that economic activity in the project area is just at par with the subsistence level. Moreover, the continuing depletion of lake life has made things more difficult for the present stagnant economy.

Although it apparently seems that the present economy is at the subsistence level, there are certain factors indicating that families earn more than they claim. First is the proliferation of sari-sari stores which is one vital indicator of the purchasing power of the populace. Second is that a great number of families in the area could afford to send their children to high school and college. Third is that families consume on

the average ₱6 worth of kerosene per month. Last is the fact that other items such as wrist watches and transistor radios are purchased throughout the project area which reinforces the indication that people have the ability to save and buy.

D. Project Spillover Effects

A multitude of side benefits will be realized on Talim with the advent of electricity. Except for aesthetic disruption of the landscape and trimming of trees, "dis-economies" associated with this development input are believed negligible, and no attempt is made to conceptualize them.

Electrification will be instrumental in broadening the economic base of Talim. With electricity available new exports will be stimulated; e. g. , sand, pea gravel, tourism and new handicrafts. With the development of cold storage facilities to prevent spoilage of catches during periods of over-supply, net exports of fish should also be experienced. These developments will spurn new employment opportunities for the labor force. Income levels should rise and total spending in the project area should increase. Fuller employment and increased spending will be reinforced by the ability to work more efficiently at night. Real income will also be reinforced by the opportunity of utilizing cheap electric energy in lieu of kerosene fuel. Local demand for goods and services, thus, will increase attracting the development of tertiary industry on a broader base. Spending habits then should change. Hopefully the propensity to spend locally can be maintained or even increased. With these developments, it follows that the demand for land should increase. Moreover, such expected increases in income, money turnover and land value will improve the tax base of the project area.

Nor must the institutional and social benefits be forgotten with the advent of electricity. The cooperative will afford the citizens of the project area a new experience in direct democracy. In addition the availability of electricity will permit these citizens the opportunity of utilizing their ingenuity to develop innate skills and attain self-actualization. Through the availability and accessibility of the cooperative's communication system and the daily excursions of its maintenance vessels, communications (and its inherent benefits) will become a reality to this citizenry. Moreover, outmigration should be curtailed maintaining more closely the coveted family structure of Filipino life.

The benefits listed above are by no means exhaustive. Mention could be made of the renewed pride of the citizenry and other benefits such as conserving the scarce supply of ipil-ipil in the project area; however, the intent here is to indicate to the reader that the indirect benefits inherent in this project, in a qualitative manner, greatly outweigh the allocation of subsidized "seed" money that is necessary to make this project internally feasible.

SECTION 6

LOAD AND ENERGY FORECAST

LOAD & ENERGY FORECASTS

A. General

The objectives of this section are two. First to generate estimates of members that will connect to the proposed electric distribution cooperative during the first ten years of its operation. And two, to present estimates of how much electricity these various type members will consume. These estimates will be used later in the report as inputs in system design, system cost determination, rate schedule design, and revenue determination.

The analysis of this section was based primarily on five sources of information. First, a report on the proposed electrification of Talim Island prepared by the Electrification Administration in 1967. Second, questionnaires from head of households throughout the proposed project area completed during the spring of 1970. Third, economic and demographic data pertinent to the project area submitted by the Laguna Lake Development Authority. Four, usage data obtained from the Cardona Electric Company, a privately financed electric distribution system contiguous to the proposed project area. And five, field investigatory trips to the proposed project area.

B. Estimating Model - Member Connections:

STEP No. 1 - Domestic house count and formation. - During the last decade population trends throughout the project area have been uneven. In general it appears that the area has experienced a period of retarded growth in the main and out-migration on the northeastern part of Talim Island, especially in the barrios of Boor, Malanggam, Calubacan and Lambac. Thus it was decided to utilize the actual house count made by E. A. in 1967 as our base to determine house formation. This count also indicated that there existed a variety in the admixture of residence house types (nipa, wood, concrete, and sari-sari/residences) among the barrios on the island. This was further verified from mainland questionnaire data. In addition an approximate 1970 house count by type of structure for these mainland barrios was ascertained from questionnaires.

In view of development anticipated in the project area for the 1970's by the Laguna Lake Development Authority it was assumed that the anticipated national population rate of increase, 3.5% per year, for the 1970's would be applicable for project area domestic house formation forecasting. Further, it was assumed that during the next ten years the present respective barrio admixture of house types would remain constant. In short thus, house formation was based on house counts taken in 1967 and 1970 compounded by a 3.5% growth rate, on a barrio basis with respect to the types of houses that existed in each respective barrio. Moreover, it is anticipated that the initial distribution system of the proposed cooperative could be energized as early as 1971. In such, the ten year period covered by the report is envisioned as extending from 1971 to 1980.

STEP No. 2 - Domestic saturation levels. - From the information sources made available the following salient points affecting domestic demand for electric service in the proposed project area should be noted:

1. Nearly all residences use kerosene for lighting, and spend on the average about ₱5 per month for such utility.
2. Nearly all residences surveyed in 1970 indicated a demand for electric lighting and for electric appliances.
3. Income levels presently lag behind the national average but vary only slightly among the barrios of the project area, and are not grossly dissimilar from that in the poblacion Cardona.
4. In Cardona during 1969, after 7 years of service, over 80% of the residences were receiving service from the Cardona Electric Company.
5. Data from the Department of Public Works and Communications indicates that when barrios in Pangasinan, Luzon, a province approximating the income level of Talim were to be afforded low cost, 24 hour electric service, it could be realistically assumed that 90% of the concrete houses, 80% of the wood houses and 70% of the nipa dwellings would become electric consumers within the first 5 years of electrification.

6. An increase in the income levels of the people of Talim Island is foreseen.
7. Low cost, reliable electric service by the proposed cooperative and a minimum domestic rate lower than the present cost of kerosene use are foreseen.
8. Low cost electric wiring and appliance loans, on a need basis, are anticipated to be extended by the proposed cooperative.
9. Almost all residences in the project area will probably be within the connection range of the initial distribution system.

In consideration of these salient points the following assumptions affecting domestic connection are deduced:

1. Due to cost savings electric lighting will be preferred over fuel lighting.
2. It will be a few years after energization before full saturation of domestic consumers will occur.
3. Saturation domestic levels will vary among house types.
4. Long term domestic saturation levels can be expected to surpass those in Cardona and those anticipated for Pangasinan based on the anticipation of lower rates, the house wiring program and ready reserves available to the proposed cooperative for horizontal growth.

In view of these assumptions the following estimates concerning domestic connections are made:

TABLE 6 - A

DOMESTIC SATURATION ESTIMATES

	<u>Initial</u>	<u>Year 5</u>	<u>Year 10</u>
Nipa	50%	80%	80%
Wood	80%	90%	90%
Concrete	95%	100%	100%
Sari-sari Residence	95%	100%	100%

In sum, these saturation estimates were applied against the house formation estimates made in Step No. 1, on a barrio basis and such respective products (estimated domestic

connections) are summarized in Table 6-B. Based on initial, year 5, and year 10 estimates, intervening domestic connections estimates were interpolated.

STEP No. 3 - Public buildings and facilities connections. - The following public places existed in the proposed project area during 1970. It is assumed that all such buildings and facilities will require electric service.

High school	1	Reading room	1
Barrio school	68	Wharf	37
Barrio hall	7	Stage	7
Health center	16	Basketball court	19
Church or chapel	26	Rest house	1

For the purpose of ascertaining consumer growth in this classification it was assumed that public buildings and facilities were a function of barrio domestic residences receiving electric service. It is anticipated that barrios with more than 100 electrified residences in 1971 could expect the realization of three new buildings or facilities during the ten year forecast period; those with over 50 such residences two, and those with under 50 such residences one. These connections are listed on a barrio basis in Table 6-B.

STEP No. 4 - Security light connections. - For the purpose of ascertaining consumer demand and consumer growth in security lighting it was assumed that such demand and growth were the function of barrio domestic residences receiving electric service, one security light for every 50 electrified residences, with the minimum of one security light per barrio. Such estimated connections are summarized in Table 6-B.

STEP No. 5 - Small commercial connections. - According to survey information 50 estimated small retail and service (e. g.) tailor, barber, and beauty shop establishments exist in the project area, which would require electric service. Also 55 poultry and duck-houses have been located. Electricity is expected to be used in such productivity, especially during incubation and balut-making. It is anticipated that the advent of electricity will spur the establishment of additional duck-houses. An increase in the number of duck-houses or in the productive capacity of such units of at least 50% is foreseen in the project area during the ten year forecast. For convenience such growth is assumed to take place at the existing sites of poultry and duck raising. Poultry and duck-house connections estimates are grouped under small commercial, in Table 6-B, on a barrio basis.

Allocation of the 50 estimated small retail and service establishments among the barrios of the project area was made according to the estimated number of residences that will connect during the initial year of energization; 5 establishments for barrios with 150 or more such residences; 4 establishments for barrios of 125 such residences; 3 establishments for barrios of 100 such residences; 2 establishments for barrios of 75 such residences, and 1 establishment for barrios of 50 such residences. During the ten year forecast it was assumed that each barrio would add one new small retail or service connection for each increment of 25 new residential connections, commencing at a threshold of 50 residential connections. Estimated small commercial connections are summarized on a barrio basis in Table 6-B.

T A B L E 6 - BESTIMATED CONSUMER CONNECTIONS BY BARRIO - A 10 YEAR
F O R E C A S T

		(Year) 1971								1980	
		1	2	3	4	5	6	7	8	9	10 (Year)
1. Amihanan (Sitio of Nahotas)	A	19	20	22	24	26	26	27	28	28	29
	B	0	0	0	0	0	0	0	0	0	0
	C	1	1	1	1	1	2	2	2	2	2
	D	1	1	1	1	1	1	1	1	1	1
2. Balibago	A	138	145	155	165	177	185	190	200	205	210
	B	6	6	7	7	8	9	9	10	10	10
	C	10	11	11	11	11	11	12	12	12	13
	D	3	3	4	4	4	4	4	5	5	5
3. Banaba (Sitio of Rayap)	A	23	25	27	29	31	32	34	35	36	37
	B	0	0	0	0	0	0	0	0	0	0
	C	1	1	1	1	1	2	2	2	2	2
	D	1	1	1	1	1	1	1	1	1	1
4. Bangad	A	88	100	110	120	131	135	138	142	146	149
	B	5	6	6	6	8	8	8	8	8	9
	C	8	8	9	9	9	9	9	10	10	10
	D	2	3	3	3	3	3	3	3	3	3
5. Binitagan	A	51	56	61	66	71	73	75	77	80	82
	B	2	2	2	2	2	2	3	3	3	4
	C	2	2	2	3	3	3	3	3	4	4
	D	2	2	2	2	2	2	2	2	2	2
6. Bombong	A	161	185	200	215	233	240	248	255	260	265
	B	6	7	8	8	9	9	9	10	10	11
	C	8	9	9	9	9	9	10	10	10	11
	D	4	4	5	5	5	5	5	6	6	6
7. Boor	A	62	66	70	74	78	81	84	87	90	94
	B	1	1	1	1	2	2	2	2	2	2
	C	6	6	6	7	7	7	7	7	8	8
	D	2	2	2	2	2	2	2	2	2	2

		(Year) 1971								1980	
		1	2	3	4	5	6	7	8	9	10 (Year)
8. Buhangin	A	107	115	132	137	142	150	155	160	165	171
	B	6	6	7	7	8	9	9	9	9	10
	C	5	6	6	6	6	6	7	7	7	8
	D	3	3	3	3	3	4	4	4	4	4
9. Calubacan	A	15	16	16	17	18	19	20	20	21	22
	B	0	0	0	0	0	0	0	0	0	0
	C	1	1	1	1	1	2	2	2	2	2
	D	1	1	1	1	1	1	1	1	1	1
10. G. Sanay	A	82	90	98	106	114	118	123	128	132	135
	B	12	13	13	15	15	16	16	18	18	19
	C	4	4	5	5	5	5	5	6	6	6
	D	2	2	2	3	3	3	3	3	3	3
11. Gulod	A	46	50	54	58	63	65	66	68	70	73
	B	2	3	3	3	3	4	4	4	4	4
	C	2	2	2	2	3	3	3	3	3	3
	D	1	2	2	2	2	2	2	2	2	2
12. Ithan	A	65	70	80	90	99	102	105	108	110	112
	B	1	1	2	2	2	3	3	3	3	3
	C	6	6	6	7	7	7	7	7	8	8
	D	2	2	2	2	2	3	3	3	3	3
13. Jancia	A	165	177	192	209	222	230	238	246	256	265
	B	7	8	8	9	9	11	11	11	12	12
	C	11	12	12	12	12	12	13	13	13	14
	D	4	4	4	5	5	5	5	5	6	6
14. Kalinawan	A	70	75	81	86	92	95	98	103	106	109
	B	1	2	2	2	2	2	2	3	3	3
	C	5	5	5	6	6	6	6	6	7	7
	D	2	2	2	2	2	2	2	3	3	3
15. Kasili	A	20	21	23	25	26	27	28	29	30	31
	B	0	0	0	0	0	0	0	0	0	0
	C	3	3	3	3	3	4	4	4	4	4
	D	1	1	1	1	1	1	1	1	1	1

	(Year)	1971										1980	
		1	2	3	4	5	6	7	8	9	10 (Year)		
16. Kaytome	A	100	108	116	124	132	137	142	149	153	157		
	B	4	4	4	4	5	5	5	5	6	7		
	C	5	6	6	6	6	6	7	7	7	8		
	D	3	3	3	3	3	3	3	3	4	4		
17. Kinaboagan	A	69	75	82	88	95	98	101	104	108	111		
	B	5	6	6	7	7	7	8	9	9	9		
	C	4	4	4	5	5	5	5	5	6	6		
	D	2	2	2	2	2	2	3	3	3	3		
18. Kinagatan	A	69	76	84	91	99	103	106	109	112	115		
	B	4	5	5	5	6	7	7	7	7	8		
	C	6	6	6	7	7	7	7	7	8	8		
	D	2	2	2	2	2	3	3	3	3	3		
19. Lambac	A	109	118	127	135	141	145	150	155	160	165		
	B	8	8	9	10	10	10	11	12	12	13		
	C	13	14	14	14	14	14	15	15	15	16		
	D	3	3	3	3	3	3	4	4	4	4		
20. Limbon- Limbon	A	25	27	30	33	36	37	39	40	42	43		
	B	0	0	0	0	0	0	0	0	0	0		
	C	1	1	1	1	2	2	2	2	2	2		
	D	1	1	1	1	1	1	1	1	1	1		
21. Malakaban	A	78	85	91	98	104	120	135	150	160	171		
	B	2	2	2	2	3	3	4	5	5	5		
	C	6	6	7	7	7	7	7	8	8	8		
	D	2	2	2	2	3	3	3	4	4	4		
22. Malanggam	A	26	27	29	31	32	34	35	36	37	38		
	B	0	0	0	0	0	0	0	0	0	0		
	C	4	4	4	4	5	5	5	5	5	5		
	D	1	1	1	1	1	1	1	1	1	1		
23. Nagsulo	A	16	18	19	20	21	22	22	23	24	25		
	B	0	0	0	0	0	0	0	0	0	0		
	C	2	2	2	2	2	3	3	3	3	3		
	D	1	1	1	1	1	1	1	1	1	1		

		(Year) 1971									
		1	2	3	4	5	6	7	8	9	10(Year)
24. Nabotas	A	112	123	133	144	154	160	167	175	183	191
	B	6	6	7	7	9	9	9	10	10	11
	C	5	6	6	6	6	6	7	7	7	8
	D	3	3	3	3	4	4	4	4	4	4
25. Pinagdilawan	A	64	70	77	84	90	93	96	99	102	104
	B	2	2	3	3	3	3	3	3	4	5
	C	7	7	8	8	8	8	8	9	9	9
	D	2	2	2	2	2	2	2	2	3	3
26. Pipindan	A	68	74	83	91	98	101	104	108	112	117
	B	1	1	2	2	2	3	3	3	3	3
	C	7	7	7	8	8	8	8	8	9	9
	D	2	2	2	2	2	3	3	3	3	3
27. Rayap	A	50	55	60	65	70	72	74	76	78	80
	B	2	2	2	2	2	2	2	3	3	4
	C	1	1	1	2	2	2	2	3	3	3
	D	2	2	2	2	2	2	2	2	2	2
28. Sampad	A	54	61	68	75	81	84	88	90	92	95
	B	1	1	1	2	2	2	2	2	2	2
	C	5	5	5	6	6	6	6	6	7	7
	D	2	2	2	2	2	2	2	2	2	2
29. Sapang	A	81	89	97	105	113	117	121	126	131	135
	B	6	6	6	7	7	7	7	10	10	10
	C	6	6	7	7	7	7	7	8	8	8
	D	2	2	2	3	3	3	3	3	3	3
30. Subay	A	165	177	191	204	217	240	250	260	270	280
	B	9	10	10	12	12	13	14	15	15	16
	C	11	12	12	12	12	12	13	13	13	14
	D	4	4	4	5	5	5	6	6	6	6
31. Tabon	A	82	91	101	110	119	123	127	131	135	139
	B	4	4	5	5	5	6	7	7	7	7
	C	9	9	10	10	10	10	10	11	11	11
	D	2	2	3	3	3	3	3	3	3	3

		(Year)1971									1980
		1	2	3	4	5	6	7	8	9	10(Year)
32. Talim (Habagatan)	A	82	90	97	105	113	118	123	128	131	135
	B	4	4	4	5	5	6	6	7	7	7
	C	11	11	12	12	12	12	12	13	13	13
	D	2	2	2	3	3	3	3	3	3	3
33. Ticulio	A	79	86	92	98	104	108	112	116	120	123
	B	2	2	2	2	3	3	3	3	3	3
	C	4	4	5	5	5	5	5	6	6	6
	D	2	2	2	2	3	3	3	3	3	3
34. Tuna	A	65	70	74	79	83	86	89	92	95	98
	B	3	3	3	4	4	5	5	5	5	5
	C	7	7	7	8	8	8	8	8	9	9
	D	2	2	2	2	2	2	2	2	2	2

		(Year)								
		(1)			(5)			(10)		
<u>Totals</u>	A	2,503			3,424			4,106		
	B	111			144			202		
	C	187			218			255		
	D	73			84			98		

A = DOMESTIC
 B = SMALL COMMERCIAL
 C = PUBLIC BLDG. & FACILITIES
 D = SECURITY LIGHTS

C. Estimating Model --- Consumer Usage:

STEP No. 1 - Average monthly domestic consumption. - For analytical purposes the following salient points are considered assumed constraints in the estimation of domestic usage:

1. Usage should be differentiated into two components, lighting and appliance.
2. Data indicates that usage differs according to the type of domestic structure nipa, wood, concrete and sari-sari/residence.
3. In REA financed cooperatives (U. S. A.) during the late 1930's, usage of low income members increased 3 to 4 times during the first ten years of operation. (It should be noted however, that these members in the main represented farmsteads where the use of electricity had a broader potential base).
4. During its second year of operation the Cardona Electric Company experienced an average domestic usage of nearly 35 kwh per month, and in its seventh year of operation an average domestic usage of about 50 kwh per month.

From analysis of lighting demand in the project area, and lighting use in Cardona and electrified barrios in Luzon, the following domestic lighting usages are estimated:

TABLE 6 - C

ESTIMATED LIGHTING USAGES FOR DOMESTIC CONSUMERS

	<u>Average Wattage</u>	<u>Hrs. Used Per Mo.</u>	<u>Initial Kwh/mo.</u>
Nipa	60 w	150 hrs.	9.0 kwh
Wood	90 w	150 hrs.	13.5 kwh
Concrete	150 w	150 hrs.	22.5 kwh
Sari-sari/Res.	200 w	150 hrs.	30.0 kwh

Note: Nipa wattage increase is estimated at 2.5 w per year, other domestic at 5.0 w per year.

From saturation studies made of anticipated appliance usage in the project area, the following estimated domestic usages are made.

TABLE 6-D
ESTIMATED MONTHLY KWH APPLIANCE USAGES FOR
DOMESTIC CONSUMERS

	<u>Initial</u>	<u>Year 5</u>	<u>Year 10</u>
Nipa	5	14	25
Wood	10	25	50
Concrete	25	65	110
Sari-sari Res.	15	40	75

The two components of domestic KWH usage—lighting and appliance load, shown separately in Tables 6-C and 6-D, may be combined to show total domestic consumption. Table 6-E which follows, reflects this combination. These estimates generally fall within constraints and estimating parameters established earlier in this sub-section of the report. A further extension is made in Table 6-F to show estimated average KWH usage per month by consumer class for each year of the total planning period—intervening year values being determined by interpolation.

TABLE 6-E
ESTIMATED AVERAGE DOMESTIC MONTHLY KWH USAGE

	<u>Initial</u>			<u>Year 5</u>			<u>Year 10</u>		
	<u>A*</u>	<u>B*</u>	<u>C*</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>A</u>	<u>B</u>	<u>C</u>
Nipa	18.2	14.0	255	24.1	24.5	590	23.6	37.4	80
Wood	55.0	23.5	2,293	52.4	41.5	2,175	51.6	70.3	3,600
Concrete	20.4	47.5	969	18.0	90.5	1,629	19.4	139.3	2,700
Sari-sari Res.	6.4	45.0	<u>288</u>	5.5	73.5	<u>404</u>	5.4	111.8	<u>600</u>
(Average Usage)			<u>38.05 kwh</u>			<u>47.98 kwh</u>			<u>78.16 kw</u>

*A = % of domestic consumers

*B = Average kwh usage

*C = Weighted usage

D. Other Load Data:

Rice Mills. - In 1967 three rice mills existed in the project area. They are located at Subay, Janosa and Talim. These mills are assumed to operate 8 hours per day during harvest season (about 6 months per year), and are assumed to be shut down the remaining part of the year. In such, average monthly usage for lighting and the operation of the mills' 7.5 hp motors is estimated to be 700 kwh per month.

Gravel Mine. - In late 1970 the Talim Mining Corporation is expected to start operation in the extraction of aggregates for general concrete works, of pea gravel and of sand near the barrios of Subay and Nabotas. Average load of the Mining Company for 1971 and 1972 is estimated to be 125 kw with a peak load of 175 kw.

Future distributed load. - In a report, submitted by the Laguna Lake Development Authority for study and consideration, the following electric consumer activities are given excellent probabilities of developing in the project area during the next ten years: A 50-room hotel and resort house; cottage industries, especially basket weaving; refrigeration facilities for icing fish; barrio water pump drinking systems; and, some pumping stations for rice irrigation.

Roughly estimated, these activities could represent a 500 kw peak load at the end of the planning period.

T A B L E 6 - G
OTHER LOAD DATA
 (Estimated peak loads in kw)

<u>Year</u>	<u>Distributed Load*</u>	<u>Mining Co. Load</u>	<u>Total Other Load</u>
1 (1971)	25	175	200
2	50	175	225
3	100	200	300
4	150	225	375
5	200	225	425
6	260	250	510
7	320	250	570
8	380	275	655
9	440	275	715
10 (1980)	500	300	800

* Includes rice mills and other expected loads except mining.

E. Total System Load & Energy Requirements:

In estimating these loads and requirements the following assumed schedules were applied.

TABLE 6-H
SYSTEM LOAD FACTOR AND LOSSES

<u>Year</u>	<u>Load Factor</u>	<u>System Loss</u>
1 (1971)	.36	.25
2	.37	.24
3	.38	.23
4	.39	.22
5	.40	.21
6	.41	.20
7	.42	.19
8	.43	.18
9	.44	.17
10 (1980)	.45	.16

Due to the uncertainty of how the mining load will develop, service to such load in all probability will be negotiated under special contract. It will bear its own service costs, thus not affecting adversely the viability of the system, and such load was therefore not considered in the following estimates:

TABLE 6-J
TOTAL SYSTEM DEMAND
ESTIMATES PER YEAR

<u>Year</u>	<u>KWH Purchased</u> (in million) <u>1/2/</u>	<u>Annual Peak Demand</u> (in KW) <u>1/2/3/</u>
1 (1971)	1.9	605
2	2.2	680
3	2.7	820
4	3.2	955
5	3.8	1,090
6	4.5	1,270
7	5.2	1,425
8	6.0	1,620
9	6.8	1,785
10 (1980)	7.6	1,955

1/ Excludes Talim Mining Co. load.

2/ Refer to REA Form 325a for appropriate calculations,
Financial Forecast Section.

3/ Assumes that the load factor remains the same each month.

SECTION 7

POWER SUPPLY

POWER SUPPLY

A. General Comments

One factor involved in the choice of Talim Island area as an electrification project was that of power supply. Criteria established by the "site selection committee" required that the various projects to be chosen under the present program offer a diversity of operating conditions so that the total data from all systems would contribute, in the most meaningful way, to future planning.

This project offers one of the few opportunities for new system development using a well qualified and substantial private utility as supplier of wholesale power. Total electrification of the Philippines can only be achieved through a combination of the efforts of all sectors of the industry --- private, government, cooperative and municipal. Talim Electric Cooperative gives an opportunity to demonstrate the benefits which can accrue to the people of the Philippines through such cooperation.

MERALCO has a power source readily available to the Cooperative and will find it a profitable venture to sell wholesale to the Cooperative its total needs for resale to the membership. The marginal feasibility of the Cooperative's service area is no inducement to the private company to extend its plant facilities and enter into direct sales to the consumers. The Cooperative, due to its non-profit nature, and lower costs of doing business, can do so, as this report shows.

The Cooperative really has two choices for power supply. One is to purchase its needs from MERALCO; the other is to generate its own needs. No detailed comparative analysis has been made to eliminate the latter. The choice has been made based on reasons already stated together with judgment of the known costs and problems involved in diesel-generation for a system with the characteristics of this Cooperative.

B. MERALCO--Power Supplies

The Manila Electric Railroad and Light Company had its beginning in 1903, soon after American rule was established for the Philippines. This company was a U. S. based utility which was formed to operate an electric street railway service and to furnish electric service for light and power in Manila and its suburbs. American ownership continued, in one form or another,

for 59 years until MERALCO was purchased by Filipinos in 1962. By this time the company was interested primarily in the electric utility business having sold off its transportation facilities after the war.

There has been a substantial growth in the company's plant in recent years so that it has been able to meet the obligations of service to Manila and adjacent areas. Generation, transmission and distribution facilities have been built to meet the rapid increase in electric power consumption in their service area and secure the company's position to meet the challenges of the future.

From generating plant capacity of 750 MW plus supplies available from NPC in 1968, the company has planned expansion to raise their own generation to 1,850 MW by the end of 1973. They now serve about 600,000 customers, including sales to several smaller independent utilities for resale to end users. About 80% of all kilowatt-hours sold in the Philippines are served to customers in MERALCO's service area.

Extensive use is being made of 20/34.5 kv. lines in the distribution system. Lines of this voltage exist near the Cooperative's service area and are planned as the power source for the project. We see no difficulties in MERALCO's ability to serve loads in the range predicted by this report.

C. Agreements with MERALCO

No formal agreements have been made between MERALCO and the Cooperative. However, there has been correspondence and staff discussion which establishes basic guidelines on which agreement will be made at an appropriate time. MERALCO has been furnished data on kw and kwh projections for the 10-year period covered by the study and will be kept informed of other pertinent data as the project review and consideration continues. The following understanding exists:

- (1) MERALCO waives any franchise rights to the unserved portion of the Municipality of Binangonan, to permit planning for service by the Cooperative.
- (2) The Cooperative will purchase its wholesale power needs from MERALCO under established rates and conditions generally available for this class of service.

- (3) If, for any reason, the Talim Electric Cooperative is unable to implement its plans, they will use their best efforts to help MERALCO recapture any rights which were waived in order to permit the Cooperative's planning.
- (4) The Cooperative will purchase power supplies from MERALCO under the company's General Power Schedule, GP-4 as may be approved by the Public Service Commission, and enter into an agreement for such sale/purchase for a term of not less than one year. A sample of such an agreement is made a part of the report Appendix.
- (5) MERALCO will extend its 20/34.5 kv line to a metering point at the boundary between Barrios Pila-Pila and Limbon-Limbon.
- (6) The metering structure, equipment, and any sectionalizing devices there will be supplied and maintained by MERALCO.
- (7) The Cooperative will purchase 3-phase power at 20/34.5 kv. and own all facilities beyond the metering point.

D. Rate Schedule and Power Costs

MERALCO's General Power Schedule, GP-4 is as follows. The company applied to the Public Service Commission for an increase in certain rates and this reflects a change included in that request. Note that the schedule is dated May 21, 1970 and it was placed in effect at that time. However, this is done only on a conditional sanction from PSC pending further study and final ruling by that body.

We have used this schedule in computing power costs, having little hope that the Commission will force any reduction. If they do it will add to the feasibility of the project.

MERALCO SCHEDULE GP-4
GENERAL POWER

AVAILABILITY:

Available in the territory served by the Company.

APPLICABLE:

To customers who guarantee a billing demand of not less than 40 kilowatts for general power, heating, and/or lighting.

CHARACTER OF SERVICE:

Alternating current, 60 cycles, phase and voltage as available and appropriate.

RATE: (Per Month)

DEMAND CHARGE:

For each kilowatt of billing demand -- ₱5.50 per kilowatt

PLUS ENERGY CHARGE:

First 200 hours use of billing demand at ...	₱0.065 per KWH
Next 200 hours use of billing demand at ...	0.060 per KWH
Next 100 hours use of billing demand at ...	0.045 per KWH
Next 100 hours use of billing demand at ...	0.038 per KWH
Excess KWH at	0.030 per KWH

MINIMUM CHARGE:

The demand charge but not less than ₱400.00 per month.

BILLING DEMAND:

The billing demand shall be determined by measurement and considered as the highest average rate at which energy is consumed during any 15 consecutive minutes of the monthly period for which bill is rendered, and shall not be less than 40 kilowatts.

POWER FACTOR ADJUSTMENT:

The rates set forth above are based upon an average monthly power factor of 85% which the customer agrees to maintain. Should the customer's average monthly power factor be less or more than 85% the kilowatt-hours metered during the monthly period shall, for billing purposes, be multiplied by the following constants:

POWER FACTOR ADJUSTMENT:

Average Monthly Power Factor	Constant
1.00	0.951
.95	0.965
.90	0.981
.85	1.000
.80	1.023
.75	1.050
.70	1.0835
.65	1.1255
.60	1.1785
.55	1.2455
.50	1.3335

For average monthly power factor between any two steps shown above, use the constant corresponding to the higher power factor.

PRIMARY METERING DISCOUNT:

A 5% discount on the combined demand and energy charge will be allowed when the customer owns the substation and energy is measured at or equivalently measured by compensation to the voltage level of the supply side of the substation.

BULK SALES DISCOUNT:

For each full hour in excess of 200 hours per month use of billing demand, the following discount on the combined demand and energy charge will be allowed when the billing demand exceeds 200 KW per month:

- (a) For number of hours exceeding 200 but not over 400 ----

$$\text{Discount (\%)} = (.06\%) \times (\text{Hours} - 200) \times \left(1 - \frac{200}{\text{Demand}}\right)$$

- (b) For number of hours exceeding 400 -

$$\text{Discount (\%)} = [12\% + (.025\%) (\text{Hours} - 400) \times \left[1 - \frac{200}{\text{Demand}}\right]]$$

Where hours = metered monthly KWH \div billing demand

TERM OF CONTRACT:

Not less than one year, automatically renewing.

MANILA ELECTRIC COMPANY

Approved by P. S. C.

Case No. 70-2966

Effective: May 21, 1970

There are three factors in this schedule which will affect the Cooperative's total power bill each month, beyond routine demand and energy computations:

- (1) Power Factor Adjustment
- (2) Primary Metering Discount
- (3) Bulk Sales Discount

In the following calculations of power costs we have assumed a power factor of 85% which gives a multiplier of unity. In view of the system load characteristics and line construction we believe this is a very conservative assumption.

The primary metering discount of 5% will, of course, apply because the source and load side voltages are identical at the metering point.

A bulk sales discount will also apply for the load factors which have been assumed in system design. The base limit of 200 hours per month use of billing demand, assuming the billing demand is the actual demand, means a load factor of only about 28%.

From Section 6 --- Load and Energy Forecasts, Tables 6-H and 6-J, we have the following data over the 10-year period for KWH, KW and Load Factor:

LOAD CHARACTERISTICS

<u>Year</u>	<u>Average Monthly KWH Purchased</u>	<u>Load Factor</u>	<u>KW Demand</u>
1	156,977	36%	605
2	180,835	37%	680
3	224,163	38%	820
4	268,238	39%	955
5	314,208	40%	1090
6	375,603	41%	1270
7	431,262	42%	1425
8	502,131	43%	1620
9	566,125	44%	1785
10	636,103	45%	1955

If the GP-4 schedule charges are applied to the above values, and allowance made for discounts, we have the following power costs:

TABLE 7APOWER COSTS

<u>Year</u>	<u>Average Cost Per KWH</u>	<u>Average Monthly Power Cost</u>	<u>Annual Power Cost</u>
1	₱ 0.0780	₱ 12,370	₱148,440
2	0.0778	14,080	168,966
3	0.0770	17,217	206,607
4	0.0757	20,325	243,905
5	0.0748	23,517	282,204
6	0.0740	27,772	332,259
7	0.0730	31,530	378,365
8	0.0722	36,275	435,299
9	0.0713	40,440	485,280
10	0.0706	44,920	539,040

SECTION 8

SYSTEM DESIGN

8.1

SYSTEM DESIGN

A. General

The area covered by the Talim Electrification Project is unique. In the island most of the barrios are isolated from each other by mountain precipices on one side and by the lake on the other side. Lateral or horizontal expansion is very difficult. This same condition exists in the barrios on the mainland.

On the sides and top of the mountains the vegetation is light; only small bamboo and some ipil-ipil trees which are being used as firewood by the barrio folks. Inside the barrios the vegetation is lush.

The system being proposed is one which will offer adequate and dependable service for the new and future loads which will be connected to the system. For its power source, the project will connect to the power lines of the Manila Electric Company at barrio Pila-Pila in Binangonan, Rizal which is available at 20/34.5 kv, 3-phase, 4-wire with grounded neutral.

Power could be delivered to all the barrios at a voltage of 7.62/13.2 kv, 3-phase, grounded wye. This is the standard distribution voltage which has been adopted by the National Electrification Administration and National Power Corporation. This system voltage is also in consonance with the U. S. Rural Electrification Administration standards. However, it would be necessary to set up a substation to step down the MERALCO voltage to the NEA standard voltage.

After weighing the advantages and disadvantages in putting up a relatively small but expensive substation, it was decided to use the 20/34.5 kv, grounded wye of MERALCO to deliver power directly to the whole project.

The Manila Electric Company has been using this voltage for its new distribution system. It has been proven to give better quality service in comparison to its old and lower primary distribution voltage.

B. Scope of the System

The design, which was based on the first five years of operation, covers the whole project area comprising seven barrios

in the mainland and the whole island of Talim. Service will be available to all who may want it.

A three-phase, 4-wire line runs from the metering point at the boundary of barrios Pila-Pila and Limbon-Limbon to barrio Bayan-subay in the island. The three phase line will cross the Diablo Pass, separating Talim Island from the mainland. A pair of double-pole or triple-pole structures will be necessary in this crossing.

From barrio Bayan-subay the high tension lines will branch to two single phase, 2-wire lines. One phase will service the eastern side and southern tip of the island. The second phase will run along the western coast of the island up to barrio Malakaban. All mainland barrios including the island barrios up to Bayan-subay will be serviced using the third phase.

After the fifth year of operation and as the load increases it will be necessary to convert the single phase lines either to V-phase or 3-phase.

Every effort has been made to balance the load between the three phases, so that there will be a minimum of unbalanced loading, and regulation improved thereby.

C. Line Protection

The solidly grounded neutral wire which is located on the top-most part of the pole will serve as a lightning shield for the live wires.

A 3-pole, gang operated disconnect switch of appropriate capacity will be installed immediately after the metering station.

Aside from the 3-pole gang operated disconnect switch near the metering station a single pole disconnect switch shall be installed on the live wire which services the mainland barrios and the northern tip of the island. Two single phase disconnect switches shall likewise be installed at Barrio Bayan-subay to control the two single phase lines running on both sides of the island.

For the sake of continuity and reliability of service, a normally open disconnect switch shall be installed between the barrios of Malakaban and Pinagdilawan, the terminal points of the two phases. This switch will be closed after isolating any trouble

in any of the single phase lines to give emergency service the rest of the affected area.

D. Pole Framing and Pole Heights

Neither the National Electrification Administration nor the U. S. Rural Electrification Administration has adopted distribution system standards for 20/34.5 kv lines. In this project we would like to introduce the use of horizontal line post insulators. These insulators eliminate the use of crossarms. Among the desirable features that led to the choice of this type of insulator are:

1. Because of the absence of crossarms, right of way problems are minimized.
2. The surface of these insulators are exposed to the natural washing of rain, hence cost of maintaining and consequent line loss is considerably lowered.
3. Radio noise associated with tie wires is eliminated.

1. Tangent and Small Angle Structure

For the tangent (straight run) and small angle structure, three horizontal line post insulators similar to A. B. Chance -- Catalog No. 43730/6006 shall be used. The topmost and lowest insulators will be located on the "streetside" of the pole and the center or middle insulator shall be located on the opposite (houseside) side of the pole. All insulators are on one plane along the length of the pole and perpendicular to the direction of the high tension wire.

On top of the pole shall be placed the solidly grounded neutral wire. This wire shall serve as a return path for the electric energy and as an overhead lightning protection for the line.

For single phase lines the two lower insulators shall not be used. These may be added as the need arises. One line post insulator and the neutral wire assembly will be sufficient for a single phase line.

2. Medium Angle Structure

With medium angle runs up to about 20° , three suspension insulators (NEMA CLASS 52-4) per line shall be used. To

gain sufficient clearance from the pole, these insulators shall be installed on angle brackets. The solidly grounded overhead neutral wire shall be located at the top of the pole.

The pole structure shall be similar to TS-3G, Electric Transmission Specifications and Drawings (REA Form 805).

Single phase structures will not have the two sets of lower insulators.

3. Large Angle and Deadend Structures

Large Angle and Deadend Structures will be similar to Medium Angle Structure, except that there will be no angle brackets. These structure is also similar to TS-5G, Electric Transmission Specifications and Drawings (REA Form 805).

4. Other Pole Framings

Pole framings for guys, anchors, grounds, etc. shall be in accordance with REA standards "Specifications and Drawings for 7.2/12.5 kv Line Construction (REA Form 804)."

5. Secondary Line Framings

Due to very light loadings in the service area and the unavailability of transformers smaller than 15 kva, a single transformer will service as many customers as the allowable secondary-line voltage drop of 7% will allow.

In view of these limitations, secondary lines shall be installed on insulated secondary racks with a spacing of 12 inches between wires. No. 2 ACSR insulated wire will be used. Insulated secondary wires will minimize expensive cutting of trees for the right of way.

The framings for a straight run secondary line will use an insulated secondary rack which is bolted in the upper portion and a lag screw is used to fasten the lower portion to the pole. For medium angles the insulated secondary rack will be bolted in the upper and lower portion.

For the deadend and very large angles, secondary lines will be fastened to poles using insulated swinging clevises for each line. The spacing between clevises shall also be 12 inches. During the preparation of a detailed and final design of this project, drawings of these pole framings shall be made.

6. Pole Heights

The U. S. National Electrical Safety Code requires a clearance of 22 feet for 34,500 volt lines. For 240 volt lines a clearance of 18 feet is necessary.

To attain these clearance requirements 55-foot poles for large angle and deadends shall be used when carrying primary lines. Straight run and small angle structures will be carried on 40-foot poles. Pure secondary lines will be carried on 25-foot poles. Communication lines may also be underbuilt safely on these poles.

Voltage Regulation

A. First Five Years

In view of the very light loading in the area we have not made any detailed computation on the voltage drop in the different sectors of the distribution system.

A rough estimate on the voltage regulation of the line is presented here with the following assumptions:

1. The total 5th year projected load distributed in three phases was assumed concentrated in barrio Bayan-subay.
2. For the single phase lines, the 5th year total single phase load was assumed concentrated two-thirds the distance out along the line.
3. Power is delivered at a lagging power factor of 85%. It is to be noted that the main bulk of the load is lighting.
4. Equivalent spacing of conductors is 6.3 feet.
5. The size of wire used was No. 4ACSR (6/1).

The voltage regulation at three points of the line are presented below:

1. Voltage Regulation (V. R.) at Bayan-subay

$$\begin{aligned}
 \text{Voltage Drop (V. D.)} &= (18.2 \angle -31.7^\circ) (0.527 \angle 22.1^\circ) (18.45) \\
 &= 177 \angle -9.6^\circ \text{ volts} \\
 \text{V. R.} &= \frac{177 \sqrt{3}}{34,500} \times 100 \\
 &= 0.889\%
 \end{aligned}$$

2. Voltage Regulation (V. R.) at Pinagdilawan

$$\begin{aligned} \text{V. D.} &= (18.85 \underline{/ -31.7^\circ}) (0.51) \underline{/ 17.40^\circ} (87.48) (2) (2/3) \\ &= 1123 \underline{/ -14.3^\circ} \text{ volts} \end{aligned}$$

$$\begin{aligned} \text{V. R.} &= \frac{1123}{19,823 - 1123} \times 100 \\ &= 6.0\% \end{aligned}$$

$$\begin{aligned} \text{Total V. R.} &= 6 + 0.889 \\ &= 6.889\% \end{aligned}$$

3. Voltage Regulation at Malakaban

$$\begin{aligned} \text{V. D.} &= (20.2 \underline{/ -31.7^\circ}) (0.511) \underline{/ 17.4^\circ} (46.2) (2) (2/3) \\ &= 644 \underline{/ -14.3^\circ} \text{ volts} \end{aligned}$$

$$\begin{aligned} \text{V. R.} &= \frac{644}{19,823 - 644} \times 100 \\ &= 3.36\% \end{aligned}$$

$$\begin{aligned} \text{Total V. R.} &= 3.36 + 0.889 \\ &= 4.249\% \end{aligned}$$

Even under worst condition (i. e., loads are concentrated at the ends of the lines), the voltage regulation does not exceed 7%.

B. Second Five Years

For purposes of comparison, voltage drop computation, similar with the initial five-year load is presented below:

1. Voltage Regulation at Bayan-subay

$$\begin{aligned} \text{Voltage Drop (V. D.)} &= (34.2 \underline{/ -31.7^\circ}) (0.527) \underline{/ 22.1^\circ} (18.45) \\ &= 332.5 \underline{/ -9.6^\circ} \text{ volts} \end{aligned}$$

$$\begin{aligned} \text{V. R.} &= \frac{332.5 \sqrt{3}}{34,500} \times 100 \\ &= 1.67\% \end{aligned}$$

2. Voltage Regulation at Pinagdilawan

$$\begin{aligned} V. D. &= (35.9 / \underline{31.7^{\circ}}) (0.51 / \underline{17.40^{\circ}}) (87.48) (2) (2/3) \\ &= 2140 / \underline{-14.3^{\circ}} \text{ volts} \end{aligned}$$

$$\begin{aligned} V. R. &= \frac{2140}{19,668 - 2040} \times 100 \\ &= 12.14\% \end{aligned}$$

$$\begin{aligned} \text{Total V. R.} &= 12.4 + 1.67 \\ &= 13.81\% \end{aligned}$$

3. Voltage Regulation at Malakaban

$$\begin{aligned} V. D. &= (40.3 / \underline{-31.7^{\circ}}) (0.511 / \underline{17.4^{\circ}}) (46.2) (2) (2/3) \\ &= 1287 / \underline{-14.3^{\circ}} \text{ volts} \end{aligned}$$

$$\begin{aligned} V. R. &= \frac{1287}{19668 - 1287} \times 100 \\ &= 7.03\% \end{aligned}$$

$$\begin{aligned} \text{Total V. R.} &= 7.03 + 1.67 \\ &= 8.70\% \end{aligned}$$

The voltage regulation at the ends of the lines in Pinagdilawan and Malakaban have exceeded the allowable 7% drop. It will therefore be necessary to start converting the single phase lines to V-phase after the fifth year of operation.

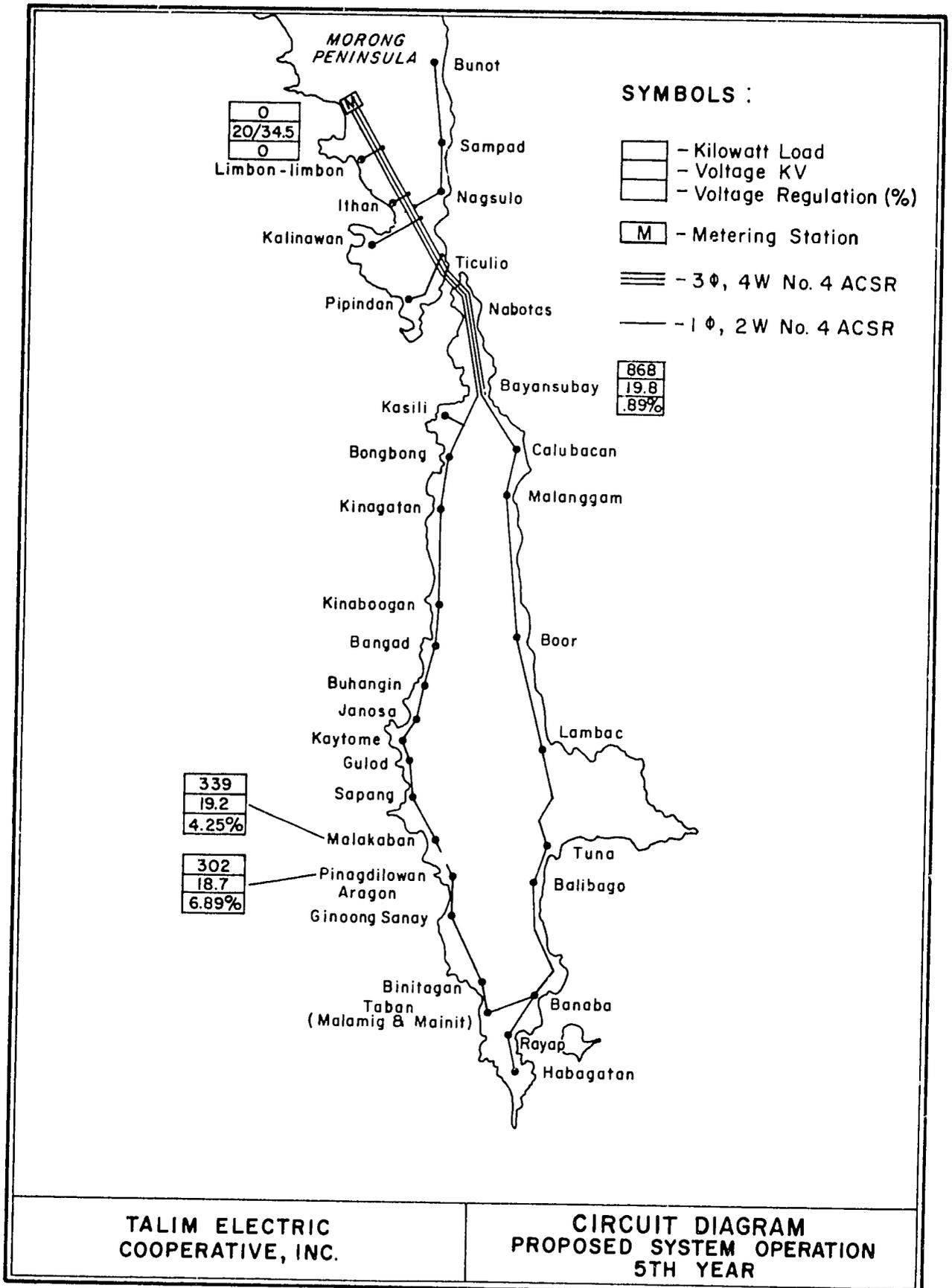
Design for the 5th Year

The circuit diagram of the electric system is shown in the next page. Line loading is based on projected consumer count and appropriate energy consumption.

1. Primary Lines

Conductor sizes and distances of primary lines are summarized as follows:

- a. From the metering point at the boundary of barrio Pila-Pila and Limbon-Limbon up to barrio Bayan-subay, a 3-phase, 4-wire, 20/34.5 kv, No. 4 ACSR, bare wire shall be used. The length of the 3-phase line is 3.5 kilometers. (USE 4.0 kilometers).



- b. All single phase 2-wire taps shall be No. 4 ACSR, bare. The total length of tap lines serving all barrios in the mainland and barrios up to Bayan-subay is 6.075 kilometers.
- c. The single phase line passing along the east coast of the island down to the southern tip shall be No. 4 ACSR, bare 2-wires. The total length is 16.540 kilometers.
- d. Along the western coast of the island up to barrio Malakaban, a single phase 2-wire, No. 4 ACSR, bare wire shall be used. The total length of this line is 8.870 kilometers.
- e. The total single phase lines in the whole project area has been rounded to 35 kilometers to take care of the rolling terrain and other possible errors in measurements.

2. Secondary Lines

Secondary lines shall be No. 2 ACSR, polyethylene insulated and mounted on insulated racks spaced 12 inches apart. The distances of secondary lines are as follows:

Separate secondary lines 20 km.
Underbuilt secondary lines 12 km.

3. Transformers

Despite the very small loadings in each barrio, 15 and 25 kva transformers are specified, because the smallest 20 kv transformer of standard manufacture is 15 kva. Summarized below are the transformer requirements of the project.

15 kva 8 units
25 kva 33 units

4. Service Assemblies

Service assemblies for each customer includes a two-separate conductor service drop wire, a No. 12-2 wire flexible metallic conduit (BX-wire) and a Japanese or equivalent low priced watthourmeter. The metallic conduit shall start from the terminal point of the service drop wire and terminate at the "Line" side of the main switch of the customer after passing through the watthourmeter which is located outside the customer's residence.

Normally service entrance materials are provided by the customer. Under this program, these materials will be supplied by the Cooperative, for the following reasons:

1. The Cooperative can have a good control on the energy being used by the customer which is measured by a wathour meter owned by the Cooperative. Tampering of the service entrance wire and wathour meter could be minimized if not eliminated.
2. The burden on the initial cost of wiring a customer's residence will be lightened.

The number of Service Assemblies shall equal the projected number of customers, thus:

First Year		2,503 sets
2nd "		148 "
3rd "		321 "
4th "		229 "
5th "		223 "
	T o t a l . .	<u>3,424 sets</u>

SECTION 9

CONSTRUCTION STANDARDS AND COSTS

CONSTRUCTION STANDARDS AND PROJECT COST ESTIMATE

A. General

Rural electrification systems are beset with problems of marginal feasibility due principally to the very light loads and a high cost of investment per consumer. In this study, we have endeavored to minimize the initial cost of the electric system without sacrificing adequacy, reliability, safety and simplicity of operation and maintenance.

Although the construction standards proposed here may not be commonly used in rural electrification, it is our firm belief that this design will offer the same degree, if not better reliability and safety in operation and maintenance than the standard constructions now in vogue. Advance research in insulation technology will support this contention.

The construction standards to be used should be in accordance with the pole framings discussed under System Design. Other pole framings shall be standard and in accordance with R. E. A. Form No. 804.

During the final and detailed design of this project, the designing engineers shall prepare the primary line pole framings in accordance with the descriptions contained in Section 8 of this report. The standards shall guarantee the minimum mechanical and electrical qualities for items of materials. All materials shall, as much as possible be in accordance with or equivalent to R. E. A. specifications.

The prices used in the following estimates are rational values obtained from records available at NEA and quotations taken from regular suppliers of REA quality electrical line materials.

Republic Act No. 6038 exempts electric cooperatives from the payment of taxes and customs duties. The unit prices presented here include all taxes and customs duties normally levied for such materials. It is necessary therefore to deduct 15% from these prices to remove taxes and customs duties.

To take care of the cost of installation and other minor overhead charges a factor of 25% was added to the cost of materials.

B. Summary of Unit Costs and Standard Kilometer Costs

<u>Poles</u>	<u>Unit</u>	<u>Cost</u>
25' 0"	Apitong Lightweight	P 139.00
30' 0"	" Standard weight	225.00
40' 0"	" " "	360.00
50' 0"	" " "	530.00
 <u>Pole Top Units</u>		
Single Phase	Tangent Structure	P 270.54
" "	Medium Angle Structure	252.76
" "	Dead End & Large Angle	250.78
Three Phase	Tangent Structure	736.40
" "	Medium Angle Structure	676.48
" "	Dead End & Large Angle	741.26
 <u>G u y s</u>		
E1 - 2		P 52.56
E2 - 2		91.09
 <u>Anchor</u>		
F1 - 2		P 64.30
 <u>Secondary Units</u>		
Straight Run		P 42.70
Medium Angle		50.90
Large Angle & Dead End		70.36
Straight Run with Tap		101.96
 <u>Miscellaneous</u>		
M2 - 12		P 71.42
 <u>Standard Kilometer Costs</u>		
Single Phase #4 ACSR		P10,100.00
Three Phase #4 ACSR		16,600.00
Secondary Underbuilt #2 ACSR		11,000.00
Separate Secondary #2 ACSR		8,400.00
 <u>Service Units</u>		
Per Customer		80.00

C. Material Item Costs

<u>Items</u>	<u>Description</u>	<u>Unit Price</u> <u>(FOB, Manila)</u>
c	Bolt, machine 5/8" x 6"	P 3.10
	" " 5/8" x 8"	3.66
	" " 5/8" x 10"	4.23
	" " 5/8" x 12"	4.80
	" " 5/8" x 14"	5.20
	" " 5/8" x 16"	5.97
d	Washers, square 2 1/4" x 2 1/4" x 13/16"	.79
	" " 4" x 4"	2.99
j	Screw, lag 1/2" x 4"	1.25
k	Insulator, suspension EE1 - NEMA Class 52-4	48.00
l	Clamp, dead end #4 ACSR	19.20
m	Clamp, suspension #4 ACSR	24.00
o	Bolt, eye oval 5/8" x 10"	8.50
p	Connectors	6.55
s	Clevis, secondary swinging	17.60
u	Dead end for guy strand	12.00
v	Guy attachment for 5/8" bolt	4.10
x	Rod, anchor, single guy 5/8" x 8'0"	34.80
y	Steel strand, 3/8" S.M. galvanized	0.40/ft.
z	Anchor, expansion 8 M lb.	34.80
	" " 10 M lb.	35.40
aa	Nut, eye 5/8"	6.30
ab	Nut, thimble eye 5/8"	7.56
ae	Lightning arrester, Distribution, 25 kv	409.80
af	Cutout, open link fuse support	350.00
ai	Rods, ground	49.50
an	Transformers, distribution, 20 kv, 15 kva	2,300.00
	" " " 25 kva	5,100.00
av	Conductor, ACSR #4-6/1 bare	246.00/M'
	" " #2-6/1 polyethylene covered	569.00/M'
	" AL #4 Polyethylene insulated solid	270.00/M'
	" " #8 Polyethylene insulated solid	80.00/M'
ba	Bolt, angle eye 5/8" x 8"	14.50
bn	Clamp, loop dead end	8.13
bs	Bolt, single upset, insulated 5/8" x 8"	14.55
av	Conductor, AL #10 Polyethylene Ins. Solid	65.00/M'

<u>Items</u>	<u>Description</u>	<u>Unit Price</u> <u>(FOB, Manila)</u>
bs	Bolt, single upset, insulated 5/8" x 10"	P 16.44
ck	Clamp, anchor rod bending	2.48
dh	Butt type grounding device	9.87
dp	Clamp, ground wire	2.24
ea	Insulator, Post type ABC 43730/6006	225.00
ef	Bolt, clevis 5/8" x 10"	2.17
eh	Hook Ball	8.38
ei	Aluminum alloy, suspension clamp w/con. piece	42.00
ej	Aluminum alloy, dead end clamp w/con. piece	60.00
ek	Locknuts	0.16
ga	Watt-hourmeters (Japanese)	32.00
sb	Switch, disconnect 34.5 kv, 100 A, single pole	3,600.00
	" " " " three pole	20,000.00
	Secondary rack, insulated 12" spacing	32.00

D. Standard Unit Costs and Specifications

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 kv

Primary, Single Phase Small Angle

<u>Item</u>		<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
dp	Ground wire clamp	1	₱2.24	₱ 2.24
ed	Ground wire cable support	1	3.76	3.76
m	Ground wire suspension clamp	1	24.00	24.00
c	Bolt, machine 5/8" x 10"	3	4.23	12.69
d	Washer, square 2 1/4" x 2 1/4" x 3/16"	3	.79	2.37
ek	Locknuts for 5/8" bolts	3	.16	.48
ea	Insulator, line post	1	225.00	<u>225.00</u>
TOTAL (FOB, Manila)				<u>₱ 270.54</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Primary Single Phase, Medium Angle

<u>Item</u>		<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
ef	Clevis Bolt 5/8" x 10"	3	₱2.17	₱6.51
cr	Angle bracket 3/4"	1	15.20	15.20
d	Washer, square 2 1/4" x 2 1/4" x 13/16"	3	.79	2.37
ek	Locknuts for 5/8" bolts	4	.16	.64
k	Insulator, suspension 10" dia.	3	48.00	144.00
eh	Suspension hook	1	8.38	8.38
ei	Alum. alloy suspension Clamp	1	42.00	42.00
ed	Ground wire cable support	1	3.76	3.76
m	Ground wire suspension clamp	1	24.00	24.00
dp	Ground wire clamp	1	2.24	2.24
d	Washer, square 4" x 4" x 1/4"	2	1.83	3.66
TOTAL (FOB, Manila@				<u>₱252.76</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Primary Single Phase, Large Angle and Single Dead End

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
o	Bolt eye, shoulder 5/8" x 10"	1	₱8.50	₱8.50
k	Insulator, suspension 10" dia.	3	48.00	144.00
eh	Suspension hook	1	8.38	8.38
ej	Alum. alloy Dead End clamp	1	60.00	60.00
l	Ground wire dead end alu. clamp	1	19.20	19.20
dp	Ground wire clamp	3	2.24	6.72
ek	Locknuts for 5/8" bolts	2	.16	.32
d	Square washer 4" x 4" x 1/4"	2	1.83	3.66
TOTAL (FOB, Manila)				<u>₱ 250.78</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Primary, Three Phase, Tangent and Small Angles
Armless Single Primary Support

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
dp	Ground wire clamp	1	₱2.24	₱ 2.24
ed	Ground wire cable support	1	3.76	3.76
m	Ground wire suspension clamp	1	24.00	24.00
c	Machine bolt, 5/8" x 10"	6	4.23	25.38
d	Square washer 2 1/4" x 2 1/4" x 3/16"	6	.79	4.74
ek	Locknuts for 5/8" bolts	8	.16	1.28
ea	Insulator, line post	3	225.00	<u>675.00</u>
TOTAL (FOB, Manila). . .				<u>₱ 736.00</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Primary, Three Phase, Medium Angle
Armless Single Primary Support

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
ef	Clevis bolt 5/8" x 10"	6	₱ 2.17	₱ 13.02
cr	Angle bracket 3/4"	3	15.20	45.60
d	Square washer 2 1/4" x 2 1/4" x 3/16"	6	.79	4.74
ek	Locknuts for 5/8" bolts	8	.16	1.28
k	Insulator, suspension 10" dia.	9	48.00	432.00
eh	Suspension hook	3	8.38	24.14
ei	Alum. Alloy Suspension clamp	3	42.00	126.00
ed	Ground wire cable support	1	3.76	3.76
m	Ground wire suspension clamp	1	24.00	24.00
dp	Ground wire clamp	4	2.24	9.96
d	Square washer 4" x 4" x 1/4"	6	1.83	<u>10.98</u>

TOTAL (FOB, Manila).... ₱ 696.48

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Primary, Three Phase, Large Angle and Single Deadend
Armless Single Primary Support

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
o	Shoulder eye bolt 5/8" x 10"	8	₱ 8.50	₱ 68.00
k	Insulator, suspension 10" dia.	9	48.00	432.00
eh	Suspension Hook	3	8.38	25.14
ej	Alum. Alloy dead end clamp	3	60.00	180.00
l	Ground wire dead end clamp	1	19.20	19.20
dp	Ground wire clamp	4	2.24	8.96
ek	Locknuts for 5/8" bolts	4	.16	.64
d	Square washers 4" x 4" x 1/4"	4	1.83	<u>7.32</u>
TOTAL (FOB, Manila).....				<u>₱ 741.26</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

E1 - 2 Single Down Guy, Through Bolt Type

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
c	Bolt, machine 5/8" x 10"	1	P 4.23	P 4.23
d	Square washer 2 1/4" x 2 1/4" x 3/16"	1	.79	.79
m	Deadend for guy strand	2	12.00	24.00
v	Guy attachment	1	4.10	4.10
y	Guy wire S.M. 7-strand, 3/8"	42 ft	.40	16.80
ck	Clamp, anchor rod bending	1	2.48	2.48
ek	Locknut for 5/8" bolt	1	.16	<u>.16</u>
TOTAL (FOB, Manila)				<u>P 52.56</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

E2 - 2 Single Overhead Guy Through Bolt Type

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
d	Curved Washer 3" x 3" x 5/16"	1	₱ 1.83	₱ 1.83
n	Deadend for guy strand, heavy duty	2	12.00	24.00
y	Guy wire, S.M. 7-strand, 3/8"	70 ft.	.40	28.00
ab	Nut, thimble eye 5/8"	1	7.56	7.56
ba	Bolt, thimble eye 5/8" x 12"	1	16.44	16.44
p	Connectors	2	6.55	13.10
ek	Locknuts for 5/8" bolts	1	.16	<u>.16</u>
TOTAL (FOB, Manila)				<u>₱ 91.09</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

F1 - 2 Line Anchor Assemblies (8,000 lbs. holding power)

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
x	Rod, anchor, thimble eye 5/8" x 7'0"	1	₱ 29.50	₱ 29.50
z	Anchor, expanding type	1	34.80	<u>34.80</u>
TOTAL (FOB, Manila)				<u>₱ 64.30</u>

F1 - 3 Line Anchor Assemblies (10,000 lbs. holding power)

x	Rod, anchor twin eye 3/4" x 8'	1	₱ 29.80	₱ 29.80
z	Anchor, log dia. 10" x 5'0" long	1	33.00	<u>33.00</u>
TOTAL (FOB, Manila)				<u>₱ 62.80</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Secondary Assemblies (Insulated Racks)
Straight Run and Small Angles

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
d	Square Washer 2 1/4" x 2 1/4" x 3/16"	1	₱ .79	₱ .79
ek	Locknut for 5/8" bolt	1	.16	.16
c	Machine bolt 5/8" x 10"	1	8.50	8.50
j	Screw, lag 1/2" x 4"	1	1.25	1.25
	Insulated rack, 12" spacing	1	32.00	<u>32.00</u>
TOTAL (FOB, Manila)				₱ 42.70

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Secondary Assemblies (Insulated Racks)
Medium Angle Run

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
c	Square washer 2 1/4" x 2 1/4" x 3/16"	2	₱ .79	₱ 1.58
ek	Locknut for 5/8" bolt	2	.16	.32
d	Machine bolt 5/8" x 10"	2	8.50	17.00
	Insulated rack, 12" spacing	1	32.00	<u>32.00</u>
TOTAL (FOB, Manila)....				<u>₱ 50.90</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Secondary Assemblies (Insulated Racks)
Large Angle and Dead End

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
d	Square washer 2 1/4" x 2 1/4" x 3/16"	2	₱ .79	₱ 1.58
ek	Locknut for 5/8" bolt	2	.16	.32
o	Bolt, eye 5/8" x 10"	2	8.50	17.00
s	Clevis, secondary, swinging, insulated	2	17.60	35.20
bn	Clamp, loop dead end	2	8.13	<u>16.26</u>
TOTAL (FOB, Manila)....				<u>₱ 70.36</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Secondary Assemblies (Insulated Racks)
Straight Run With Tap

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
d	Square washer 2 1/4" x 2 1/4" x 3/16"	2	₱ .79	₱1.58
ek	Locknut for 5/8" bolt	2	.16	.32
c	Machine bolt 5/8" x 10"	2	8.50	17.00
aa	Nut, eye 5/8"	2	4.80	9.60
s	Clevis, secondary, swinging, Insulated	2	17.60	35.20
bn	Clamp, loop deadend	2	8.13	16.26
	Insulated rack 12" spacing	1	32.00	<u>32.00</u>
TOTAL (FOB, Manila)				<u>₱ 101.96</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

Service Assemblies (Two-Single service wires)

<u>Item</u>	<u>M a t e r i a l</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
	Bi-metal connectors, No. 3 AL/ 12 cu	2	₱ 3.50	₱ 7.00
ar	Wireholder	2	4.40	8.80
	Wattourmeter, 10A, 240v, JAP	1	32.00	32.00
	Flexible metallic cable (BX-wire) No. 12/2	18 ft.	.72	10.80
	BX Cable angle connector 1/2"	1	.65	.65
	BX Cable Straight Connector 1/2"	2	.45	.90
	Service entrance cap 1/2"	1	1.35	1.35
	BX Cable strap	15	.15	<u>2.25</u>
TOTAL (FOB, Manila)				<u>₱ 63.75</u>

CONSTRUCTION STANDARD
DISTRIBUTION LINE
20/34.5 KV

M2 - 12 Grounding Assemblies

<u>Item</u>	<u>M a t e r i a l</u>		<u>Unit Cost</u>	<u>Extended Cost FOB, Manila</u>
p	Connector	1	₱6.55	₱6.55
	Ground Wire No. 6 S. D. Copper	50 ft.	1.10	55.00
dh	Butt type grounding device	1	9.87	<u>9.87</u>
TOTAL (FOB, Manila)				<u>₱71.42</u>

E. Cost Estimates for 20/34.5 KV Lines

ONE KM - SINGLE PHASE ARMLESS VERTICAL CONSTRUCTION
 #4 ACSR AVERAGE SPAN - 111 METERS (9 SPANS/KM)

<u>Items</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
1 Poles			
30'0" Long Apitong Standard Wt.	2	P 225.00	P 450.00
40'0" " " " "	6	360.00	2,160.00
50'0" " " " "	3	530.00	1,590.00
2 Pole Top Framing :			
Tangent and Small Angles	6	270.54	1,623.24
Medium Angle	2	252.76	505.52
Large Angle and Dead End	1	250.78	250.78
3 G u y s			
E1 - 2	4	52.56	210.24
E2 - 2	2	91.09	182.18
4 Anchors			
F1 - 3	4	62.80	251.20
5 Grounds			
M2 - 12	9	71.42	642.78
6 Conductors			
#4 ACSR (6/1) bare	6,560 ft.	246.00/M'	1,613.76
7 Miscellaneous			
Splicing Sleeves	4	21.45	<u>85.80</u>

TOTAL (FOB, Manila) P 9,565.50
 LESS: 15% Est. Taxes & Duties . . . 1,434.75
 NET (C & F, Manila) P 8,130.75
 ADD 25% LABOR 2,032.56
 TOTAL LABOR & MATERIALS . . . P10,163.31
 U S E P 10,100.00

ONE KM - THREE PHASE ARMLESS VERTICAL CONSTRUCTION
 #4 ACSR AVERAGE SPAN - 111 METERS (9 SPANS/KM)

<u>Items</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
1 Poles			
30'0" long, Apitong Standard Wt.	2	₱ 225.00	₱ 450.00
40'0" " " " "	6	360.00	2,160.00
50'0" " " " "	3	530.00	1,590.00
2 Pole Top Framings			
Tangent and Small Angles	6	736.40	4,418.40
Medium Angle	2	696.48	1,392.96
Large Angle and Deadend	1	741.26	741.26
3 Guys			
E1 - 2	6	52.56	315.36
E2 - 2	3	91.09	273.27
4 Anchors			
F1 - 3	4	62.80	251.20
5 Grounds			
M2 - 12	9	71.42	642.78
6 Conductors			
#4 ACSR (6/1) bare	13,120 ft.	246.00/M'	3,227.52
7 Miscellaneous			
Splicing Sleeves	8	21.45	<u>171.60</u>
TOTAL (FOB, Manila) ...			₱ 15,634.35
LESS: 15% Est. Taxes & Duties ...			<u>2,345.15</u>
NET (C & F, Manila)			₱ 13,289.20
ADD: 25% LABOR			<u>3,322.30</u>
TOTAL LABOR & MATERIALS ...			₱ 16,611.50
U S E			<u>₱ 16,600.00</u>

ONE KM - UNDERBUILT SECONDARY LINES WITH SINGLE PHASE
PRIMARY INTERMEDIATE POLES #2 ACSR POLYETHYLENE
INSULATED 55 METERS PER SPAN

<u>Items</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
1 Poles 40'0" long Apitong Standard Wt.	9	P360.00	P 3,240.00
2 Primary Pole Top Framings Tangent Structure	9	270.54	2,434.86
3 Secondary Framings Tangent & Small Angles	14	42.70	597.80
Medium Angle	1	50.90	50.90
Deadend	2	70.36	140.72
Tangent with Tap	1	101.96	101.96
4 G u y s E1 - 2	3	52.56	157.68
E2 - 2	2	91.09	182.18
5 Anchors F1 - 3	1	62.80	62.80
6 Grounds M2 - 12	9	71.42	642.78
7 Conductors #2 ACSR (6/1) Insulated	6,560 ft.	409.00/M'	2,683.04
8 Miscellaneous Tie wire #4 AL SS	150 ft.	0.27	40.50
Splicing Sleeves (Connectors)	4	21.45	<u>85.80</u>
TOTAL (FOB, Manila)			P 10,421.02
LESS: 15% Est. Taxes & Duties ..			<u>1,563.15</u>
NET (C & F, Manila)			P 8,857.87
ADD: 25% LABOR			<u>2,214.47</u>
TOTAL LABOR AND MATERIALS			P 11,072.34
U S E			<u>P 11,000.00</u>

ONE KM - SEPARATE SECONDARY LINES #2 ACSR POLYETHYLENE
INSULATED, ON INSULATED RACKS AVERAGE SPAN-
55 METERS (18 SPANS/KM)

<u>Items</u>	<u>Qty</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
1 Poles 25'0" long Apitong Lt. Wt.	18	₱ 190.00	₱ 3,420.00
2 Pole Tap Framings			
Tangent and Small Angles	11	42.70	469.70
Medium Angles	3	50.90	152.70
Large Angle & Single Deadend	2	70.36	140.72
Tangent with Tap	2	101.96	203.92
3 G u y s			
E1 - 2	6	52.56	315.36
4 Anchors			
F1 - 2	6	64.30	385.80
5 Conductor			
#2 ACSR (6/1) Polyethylene Insulated	6,560 ft.	409.00/M'	2,683.04
6 Miscellaneous			
Tie Wire #4 AL SS Poly. Ins.	150 ft.	0.27	40.50
Connectors	4	21.45	85.80
			<u>₱ 7,897.54</u>
			LESS: 15% Est. Taxes & Duties .. <u>1,184.63</u>
			NET (C & F, Manila) ₱ 6,712.91
			ADD: 25% LABOR <u>1,678.23</u>
			TOTAL LABOR & MATERIALS.... ₱ 8,391.14
			U S E <u>₱ 8,400.00</u>

SERVICE MATERIALS - PER CUSTOMER

<u>Item</u>	<u>Qty.</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
1 Service Units Service Assembly	1	₱ 63.75	₱ 63.75
2 Conductor			
No. 8 Aluminum wire, solid polyethylene insulated	165 ft	0.65	<u>10.72</u>
TOTAL (FOB, Manila)			₱ 74.47
LESS: 15% Taxes & Duties			<u>11.17</u>
NET (C & F, Manila)			63.30
ADD: 25% LABOR			<u>15.82</u>
TOTAL LABOR & MATERIALS . . .			₱ 79.12
U S E			<u>₱ 80.00</u>

F. System Costs During Years 5 Through 10

The initial loan will build the basic system and provide for growth through the fifth year. This is an unusual arrangement, but reasonable because of the unique condition which prevail for this system. The backbone primary system will be adequate and growth will be met by the addition of transformers, secondaries and services. Incremental costs will be modest so that it just becomes more expedient to finance the system this way than to plan small new capital loans every two years or so.

However, regulation calculations show that although the initial system is good through five years it will soon thereafter need improvement to maintain adequate regulation. There will also be a continuing need for addition to transformer capacity, and secondary and service extensions. We propose to take care of the regulation problem by converting the single-phase lines to V-phase. During the second five-year period therefore we expect the following expenditures:

1. Conversion of Single Phase, 2-wire to V-phase 3-wire (i. e. Add 2nd "Hot wire") 30 km @ ₱2,519.00	=	₱75,000
2. 14 pcs - 15 kva and 8 pcs - 25 kva transformers including cutouts and lightning arresters	=	90,000
3. Secondary Line	=	<u>50,000</u>
Total Cost of Materials (C&F Manila)	=	215,000
Labor (25%)	=	<u>55,750</u>
		₱270,750
4. Service Drop Materials, 1200 customers @ 80.00 installed		<u>96,000</u>
TOTAL		<u>₱366,750</u>

For planning purposes we have shown this as an annual expense of \$74,000 for years 6 through 10 - or a total of P370,000. Once the system is built and short range engineering studies show the actual need for system improvements and additions, these figures may well be refined. We show this need being met from cash margins without the need for new borrowings. Planning and orientation of the Cooperative's activities should be dedicated to this end if prudent and feasible in the light of actual conditions.

SECTION 10

RATE SCHEDULES AND REVENUES

10.1

RATE SCHEDULES AND REVENUES

A. General Comments

Rate schedules are usually determined with several factors interacting to produce a compromise which contains at least two main elements. The schedules must be tied realistically to the economic limitations of the people who must pay the bill and must produce, when applied to the usage characteristics, enough revenue to meet the debt obligation, pay for operation and maintenance, perhaps provide some measure of self-generated capital for expansion, and develop prudent reserves for the cooperative. There must also be an incentive component to the schedule to encourage consumers to make a more abundant use of electricity. They must believe that their investment in a greater use of electricity is well worthwhile when equated to the social and economic benefits derived from that use.

If the rate schedules are too low, so that even fixed costs of the system cannot be met, no volume of abundant usage will rescue the cooperative from its problems. Schedules which are too high will generally depress consumption, and lead to consumer dissatisfaction, rather than give any significant increase in revenue.

Talim Electric Cooperative is a very simple and unsophisticated system. The majority of consumers will have very low monthly kwh consumption. Consumption ranges being considered by this report are so small and demands negligible, that a very simple approach to rates is taken at this time and for computations in the report. We propose few schedules, simplistic in nature, and commend them to the Board of Directors and NEA's consideration. We really don't have much to go on except judgment. As projects come into operation and experience is gained it may be possible to establish rate schedules on a more statistical and learned basis. At least our proposals should be easy to explain to the membership and changes can always be made in the future. We have no doubt that as the system matures; new loads develop; average consumption increases; and diversified commerce and industry comes to the area there will be a need to establish different schedules for application to new consumer classifications. Existing schedules may become more sophisticated to properly respond to the cooperative's and the consumer's interests. All of this lies within the responsibility and authority of the Board of Directors. We are

content to leave it this way and presume that prudent changes will be made, responsive to all parties' interests, when necessary and appropriate.

A general service schedule is established for application to all domestic service, combined homes and sari-sari type stores, schools, public buildings and facilities. The great majority in this general classification is domestic service. The remainder have consumption estimates in a similar low range, and in any case should probably be given the advantage of the lowest possible rate. There is a minimum monthly charge of ₱3.50 for which 15 kwh are made available. Energy use beyond that level is blocked so that increased consumption will result in lower average kwh costs. All service will be metered and no distinction made between lighting and appliance load. We believe that the ₱3.50 minimum bill is less than most families now pay for kerosene or other fuel for lighting and that the 15 kwh provided for this sum will cover reasonable lighting to the average small home.

A security light program is also proposed. The standard 175 w., 7000 lumen, photo-cell controlled mercury-vapour unit will be used for dusk to dawn service. Lights will be installed and maintained by the cooperative with power unmetered and its cost included in a fixed monthly charge for each installation. Each barrio should make use of these units for general lighting and security. They should also be installed at public buildings, schools, business and other location with similar needs for light and security.

The only other category of consumer considered in the load survey is that of commercial or industrial use. There is insufficient data from which to determine either the number or characteristics of such loads. There is no doubt that these loads will develop and allowance has been made for them by adding a block of KWH to the system's total needs. A rate schedule, probably of the demand and energy type, will have to be developed later, but this can be done better when load characteristics are known.

For the purpose of this report we have assumed that each KWH in this category will retail for 15 centavos. This is undoubtedly a conservative figure and feasibility should not be jeopardized by any reasonable schedule developed later.

B. Rate Schedules

Two rate schedules follow for use by the Cooperative in establishing formal rates when the system becomes operational. Feasibility computations of revenue from the sale of electricity are based on these schedules. As discussed in the preceding narrative we have devised no schedule for commercial/industrial sales at this time.

SCHEDULE A**RESIDENTIAL AND GENERAL SERVICE****Availability:**

In the area covered by the Cooperative's distribution system.

Applicability:

To be applied to the following consumers classifications:

- (a) Residential - lighting and appliances
- (b) Sari-Sari type businesses; combination home/store; small commercial
- (c) Schools, churches, public buildings and facilities.

Service Characteristics:

220 volts, 60 cycle, single-phase, metered.

Rate per Month:

Minimum Bill - ₱3.50

For the first 15 kwh or less	₱3.50
For the next 35 kwh	20¢/kwh
For the next 50 kwh	18¢/kwh
For the next 100 kwh	15¢/kwh
All excess over 200 kwh	12¢/kwh

SCHEDULE B

SECURITY LIGHT SERVICE

Availability:

In the area covered by the Cooperative's distribution system.

Applicability:

To be applied, by contract request, to any location where service is also rendered by the Cooperative under other schedules.

Service Characteristics:

175 watt, approximately 7000 lumen rating; mercury-vapour type; photo-electric cell control; short bracket mounting.

The lamp remains the property of the Cooperative.

Rate per Month:

For each unit installed on an existing pole where secondary voltage supply is already available - ₱12.00

At this rate the Cooperative will maintain the facility and provide its energy needs.

Installation at other locations is available as may be negotiated with the Cooperative.

C. Revenues from Electric Sales

Application of the above schedules to the KWH usage developed in Section 7, as distributed among the various classifications of service, gives the following annual revenues:

TABLE 10-A

ANNUAL REVENUES FROM ELECTRIC SALES

<u>Year</u>	<u>KWH Sold</u>	<u>Revenue</u>
1	1,412,796	₱ 294,451
2	1,649,220	339,353
3	2,071,272	417,622
4	2,510,712	497,470
5	2,978,688	581,884
6	3,605,796	694,998
7	4,191,876	794,676
8	4,940,976	926,465
9	5,638,608	1,046,383
10	6,381,684	1,172,164

SECTION 11

WIRING PROGRAM

11.1

HOUSE WIRING PROGRAM

A. General

Many of the Cooperative's prospective consumers are in low-income groups. Although they manage on a day-by-day basis, and will be able to afford the modest cost of electric power for their homes each month, they lack savings which can be applied to the cost of wiring the home for lights and appliance use.

It is important for two reasons that some help be given to this problem. First, the Cooperative is being conceived for the benefit of the residents of the area and they should be helped, if necessary, so that they are in a position to enjoy the benefits which electric power will offer to them. Second, the feasibility of the cooperative depends on the abundant use of electricity, and connections to the system must be made as soon as possible in order to begin revenue production essential to meeting financial obligations for operation, maintenance and debt service.

B. The Program

Section 9 of R. A. 6038 is concerned with loans for electric-related purposes. The Board of Administrators of NEA is empowered and directed to make loans, out of the revolving fund, for the purpose of financing the wiring of premises of persons to be served as a result of project loans made under Section 7 of the Act.

We propose that the cooperative make use of this program, for the benefit of the system and its members. Therefore the following plans are included in this report.

- (1) The Cooperative should borrow funds under Section 9 of R. A. 6038, on a five-year term at an appropriate interest rate (not to exceed 6% according to the Act). This borrowing should be repaid in one lump sum at the end of the period, with interest being paid during that time on a current basis. This will permit the cooperative to revolve the funds and obtain maximum benefit from them.
- (2) Loans should be made to members for a period which has a terminal date not later than the due date of the coopera-

tive's note to NEA. Interest charged to the members should be equal to the prime loan rate plus 2%. This increment in interest will pay for the cooperative's costs of operating the program and also establish a reserve for losses.

- (3) To simplify the implementation and control of the program there should be a "standard" wiring loan used. This should be adequate to satisfy the needs of the average small home. If other homes need more extensive wiring then perhaps the owner should be required to pay the difference from his own resources.
- (4) Repayment of loans should be made by an addition to each monthly power bill - perhaps in an amount of about \$2.00 to cover principal and interest obligation.
- (5) The capital required, and its amortization, are presumed to be self-liquidating within the period of the loan and are not to be included in income or expense projections for the Section 7 loan.

C. Wiring Detail

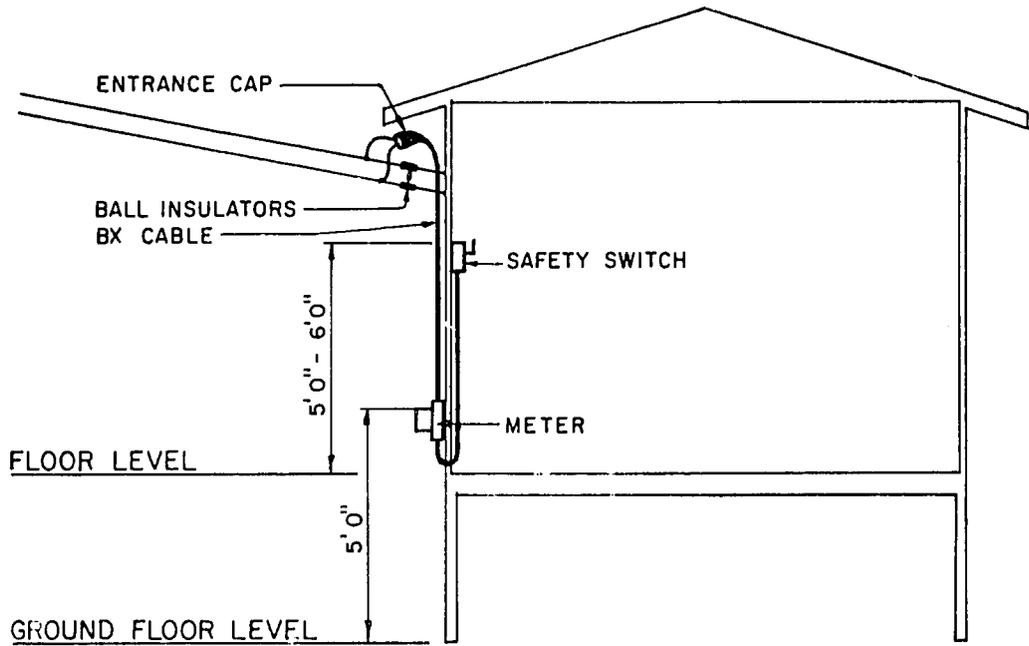
A sketch, which is part of this section of the report, shows an average, small two room house. Consideration has been given to the type of construction and the needs of the occupants. We believe that two lights and one convenience outlet will meet the initial need of such a consumer.

We propose that the electrical materials from the line side of the main switch up to the service cap be included in the service drop provided by the cooperative. This will do two things - it will help reduce the cost to the home owner, and will also give the cooperative a greater measure of control against tampering with the meter and its associated cables.

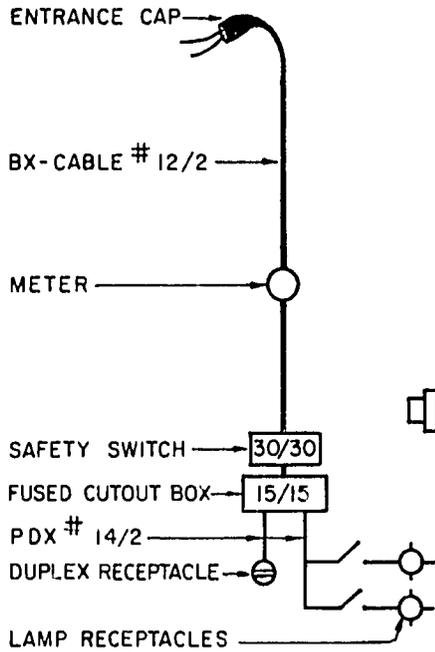
The cooperative may wish to participate in formulating agreements between contractors and members for this wiring work. This would undoubtedly help protect the interests of the members - ensure a prudent use of the loan funds - and establish standards of quality for materials and workmanship before loan funds be released.

A Bill of Material with estimated cost for a typical wiring installation in accordance with the sketch, is as follows:

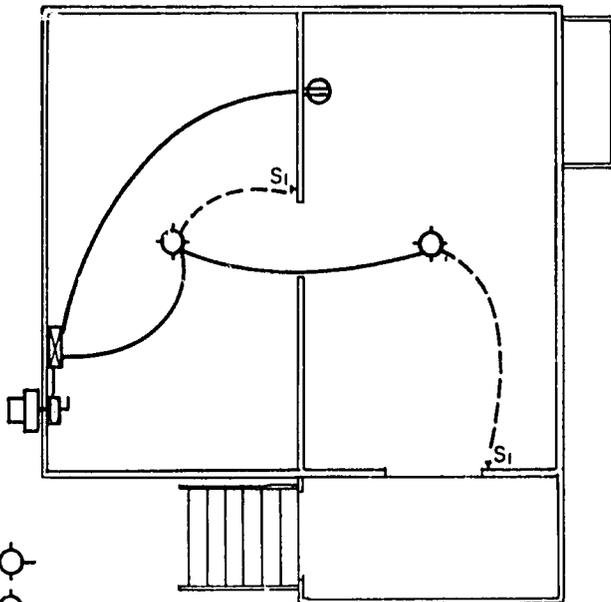
TYPICAL HOUSE WIRING PLAN



ELEVATION



RISER DIAGRAM



FLOOR PLAN

HOUSE WIRING MATERIALS

<u>Item</u> <u>No.</u>	<u>D e s c r i p t i o n</u>	<u>Qty.</u>	<u>Unit</u> <u>Cost</u>	<u>Total</u>
1	PDX wire #14/2 (Non-Metallic Sheath)	75 ft	₱0.35	₱26.25
2	Ceiling receptacle, 4"	2 pcs.	1.50	3.00
3	Duplex receptacle, flush type	1 pc.	4.00	4.00
4	Toggle switch, flush type SPST	2 pcs.	2.20	4.40
5	Bakelite Wall plate for Duplex Receptacle, brown	1 pc.	1.00	1.00
6	Bakelite wall plate for Toggle switch	2 pcs.	1.00	2.00
7	Romex Ceiling box 4" x 1 1/2" deep	2 pcs.	3.50	7.00
8	Romex handy box 2 1/2" x 4" x 1 1/2" deep	3 pcs.	2.40	7.20
9	Porcelain cutout 30 amp. /250 volts 2 pole	2 pcs.	2.00	4.00
10	Cutout box 3" x 6" x 11"	1 pc.	2.60	2.60
11	Insulated Staples (100 pcs. box)	1 box	1.50	1.50
12	Incandescent bulbs 50 W/220 V	2 pcs.	1.20	1.20
13	PVC Tape 3/4" (10 mt/roll)	1 rl.	0.70	0.70
14	Safety Switch, 30 amp., 250 volts, DPST	1 pc.	13.50	<u>13.50</u>
				₱ 79.55
	LABOR - ONE (1) MAN/DAY @ ₱10.00			<u>₱ 10.00</u>
				TOTAL..... ₱ 89.55
				S A Y <u>₱ 90.00</u>

D. Loan Estimate

It is estimated that there will be an initial requirement for this loan program to 2000 members. The total loan estimate, at ₱90 per installation is therefore ₱ 180,000.00.

SECTION 12

FINANCIAL FORECAST & CAPITAL BUDGET

12.1

FINANCIAL FORECAST & CAPITAL BUDGET

A. GENERAL

The following pages contain a ten year financial forecast of the proposed Talim Electric Cooperative. For convenience the forecast has been computed on Forms recommended by the Rural Electrification Administration, U. S. A. It should be kept in mind that the analytical methodology structured in these Forms reflect the peculiarities of electric cooperative accounting and the unique inductive - deductive logic used by the electric cooperative industry to ascertain requirements. Of significance these Forms make allowance for decision making in key potential problem areas. For example, in the forecast, "General Funds Summary", budgeting of excess funds may be planned.

B. FORECAST ASSUMPTIONS

1. Determination of Load (see Table 12-3).

For estimates of number of consumers, average monthly usage and annual power requirements refer to Section 6, "Load and Energy Forecast."

2. Plant Additions & Replacements (see Table 12-4).

For these estimates refer to Section 9, "Construction Standards & Costs". During the planning period plant retirements are assumed negligible.

3. Determination of Operating Revenue (see Table 12-5).

Electric operating revenues were based on rate schedules recommended in Section 10. Average kwh selling price, other load consumption, is estimated to be 15¢. A membership connection fee of ₱5 is assumed and is treated as other operating revenue. It is estimated that there will be 5 other load consumers in the initial year of operations, and that 5 such consumers will be added to the system per year through the forecast.

4. Determination of Operating Expenses (see Table 12-6).

Estimates of power costs were determined in Section 7, "Power Supply." A weighted average depreciation rate was computed for the proposed plant according to guidelines recommended in REA Bulletin 183-1 "Depreciation Rates and Procedures." This composite rate, 4.5% of total plant per year, is used in the forecast. Based on estimates of manpower requirements, anticipated plant maintenance costs, and overhead expenses for the proposed cooperative, a composite rate for operational maintenance and general administration expenses was estimated. This rate was estimated to range from 5% to 6% of total plant per year. Because of aging of plant and anticipated increases in labor costs over the planning period, it was decided to set this rate at 5.1% for the initial year of operations and to increase it gradually to 6.0% during the tenth year of operations. According to R. A. 6038 a cooperative shall be exempt from all taxes. Tax expenses were treated as such in the forecast.

5. Debt Service (see Table 12-6).

For the purpose of determining debt payments for the cooperative the following assumptions were made:

Loan interest = 4% per annum

Loan maturity = 30 years

Principal deferment = 5 years from date of note

Principal repayments = equal repayments, 25 years

Interest deferment = 2 years upon energization

Recapitalization of deferred interest = 6%, 2 years upon energization, full advance of "A" loan at time of energization

Initial working capital = capitalized upon energization

Design and construction period = 1 year (1971) anticipated

6. Investment Income (see Table 12-1).

It is anticipated that the cooperative will invest its excess cash in grade "A" securities such as DBP Progress Bonds, and should realize a return of at least 7% on these investments per year. It is also anticipated that the cooperative will maintain ₱50,000 in cash as working capital at all times.

7. Reserve Funds.

In addition to working capital the cooperative should reserve funds for contingencies. A level of ₱250,000 for such funding is considered adequate.

8. Franchise Rights and Goodwill (see Table 12-2)

For pro forma balance sheet purposes it was assumed that the cooperative would accrue goodwill and value from its franchise rights. Such goodwill and value is estimated to total ₱25,000 during the first year of operation, ₱35,000 in the fifth year, and ₱50,000 at the end of the planning period.

C. MAJOR FORECAST FINDINGS

1. Economic viability of the proposed system is based on two crucial assumptions. First, anticipated reasonable power costs i. e. , power supply from Meralco. Second, the structuring of a loan agreement incorporating a low interest rate with deferment of both interest and principal payments. Concerning the latter, upward manipulation of the interest rate seems to affect financial viability more adversely than a shorter loan term. For example, using the same forecast assumptions with the exception of increasing the interest rate from 4% to 6%, the proposed system would experience a cash deficit during its sixth year of operations.
2. Presuming that the forecast assumptions are valid the following four salient points can be made. First, cash margins will be realized during each year of the forecast period. Second, in the fifth year of operation the cooperative will start to realize accrued margins. Third, due to the peculiarities of the system, e. g. , its size and the almost immediate saturation of the service area, it is anticipated that an initial loan will allow the system to achieve self-feasibility. In other words the system should be able to generate adequate internal capital to cover its future needs. Last, due to increased system usage and efficiencies envisioned during the planning period, the cooperative should have adequate funds to build up a "cushion of credit" consisting of two years advance repayment on its loan, and to consider a rate reduction for its members during the end of the planning period.

TABLE 12-1

USDA - REA FINANCIAL FORECAST (IN PESOS)		DATE JUNE 1970		BORROWER DESIGNATION T E C O						
SEE REA BULLETIN 105-3										
A. STATEMENT OF OPERATIONS										
ITEMS	19 YEAR 1 ¹	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
1. ACCRUAL BASIS										
a. OPERATING REVENUE (REA Form 325c, Item 3).....	308,846	340,248	419,307	498,780	583,074	695,933	795,056	927,735	1,047,123	1,172,919
b. COST OF POWER (REA Form 325d, Sec. A, Item 1. c).....	148,440	168,966	206,607	243,905	282,204	332,259	378,365	435,299	485,280	539,040
c. OPER. MAINT. AND GEN. ADM. (REA Form 325d, Sec. A, Item 2. c).....	107,426	109,533	111,639	113,746	115,852	122,102	128,501	135,047	141,742	148,584
d. DEPRECIATION (REA Form 325d, Sec. A, Item 2. e).....	94,788	94,788	94,788	94,788	94,788	98,118	101,448	104,778	108,108	111,438
e. TAXES (REA Form 325d, Sec. A, Item 2. g).....	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
f. INTEREST (REA Form 325d, Sec. B, Item 2. f).....	-0-	-0-	94,367	94,367	94,367	90,592	86,817	83,043	79,268	67,944
g. TOTAL OPERATING EXPENSES (Sum of Items 1. b thru 1. f).....	350,654	373,287	507,401	546,806	587,211	643,071	695,131	758,167	814,398	867,006
h. OPERATING MARGINS (Item 1. a less 1. g).....	(41,808)	(33,039)	(88,094)	(48,026)	(4,137)	52,862	99,925	169,568	232,725	305,913
i. NON-OPERATING MARGINS (Estimate - consider interest & merchandizing revenues, etc.).....	-0-	209 ²	4,546	5,333	8,979	9,348	8,785	11,710	19,948	20,206
j. TOTAL ACCRUED MARGINS (Items 1. h plus 1. i).....	(41,808)	(32,830)	(83,548)	(42,693)	-4,842	62,210	108,710	181,278	252,673	326,119
2. CASH BASIS										
a. TOTAL ACCRUED MARGINS (Item 2. j above).....	(41,808)	(32,830)	(83,548)	(42,693)	-4,842	62,210	108,710	181,278	252,673	326,119
b. DEPRECIATION (Item 1. d above).....	94,788	94,788	94,788	94,788	94,788	98,118	101,448	104,778	108,108	111,438
c. INTEREST (Item 1. f above).....	-0-	-0-	94,367	94,367	94,367	90,592	86,817	83,043	79,268	67,944
d. TOTAL (Sum of Items 2. a thru 2. c).....	52,980	61,958	105,607	146,462	193,997	250,920	296,975	369,099	440,049	505,501
e. LESS: SCHEDULED DEBT SERVICE PAYMENTS (REA Form 325d, Sec. B, Item 2. e).....	-0-	-0-	94,367	94,367	188,734	184,959	181,184	177,410	173,635	162,311
f. CASH MARGINS AFTER SCHEDULED DEBT SERVICE (Item 2. d less 2. e).....	52,980	61,958	11,240	52,095	5,263	65,961	115,791	191,689	266,414	343,190
B. GENERAL FUNDS SUMMARY										
1. WORKING CAPITAL AND RESERVE FUNDS - BEGINNING OF YEAR (Item 5 below - prior year. First year must agree with Sec. C, Item 4 "Last Year" amount.).....	-0 ³	52,980	114,938	126,178	178,273	183,536	175,497	217,288	334,977	338,657
2. CASH MARGINS AFTER DEBT SERVICE (Sec. A, Item 2. f above).....	52,980	61,958	11,240	52,095	5,263	65,961	115,791	191,689	266,414	343,190
3. TOTAL AVAILABLE (Items 1 plus 2).....	52,980	114,938	126,178	178,273	183,536	249,497	291,288	408,977	601,391	681,847
4. PROPOSED USES (Refer to REA Bulletin 1-7, "General funds"):										
a. Systems improvements.....						74,000	74,000	74,000	74,000	74,000
b. Advance repayments, 2 years.....									188,734	
c.										
d.										
e. TOTAL PROPOSED USES.....	-0-	-0-	-0-	-0-	-0-	74,000	74,000	74,000	262,734	74,000
5. WORKING CAPITAL AND RESERVE FUNDS - END OF YEAR (Item 3 less 4. e).....	52,980	114,938	126,178	178,273	183,536	175,497	217,288	334,977	338,657	607,847

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¹Estimated as 1972, first full year of operation.²Interest income, 7% on working capital in excess of P50,000.³Loan working capital assumed capitalized during construction period.

TABLE 12.2

C. PRO FORMA BALANCE SHEET

ITEMS	YEAR 1	19 YEAR 5	19 YEAR 10
ASSETS			
1. TOTAL ELECTRIC PLANT (REA Form 325b, Item 3d)	2, 106, 400	2, 106, 400	2, 476, 400
2. LESS: ACCUMULATED PROVISION FOR DEPRECIATION ("Last Year" amount plus Item 2c, Sec. A, REA Form 325d less Item 2, REA Form 325b)	94, 788	473, 940	997, 830
3. ELECTRIC PLANT LESS DEPRECIATION (Item 1 less 2)	2, 011, 612	1, 632, 460	1, 478, 570
4. WORKING CAPITAL AND RESERVE FUNDS (Sec. B, Item 5j)	52, 980	183, 536	607, 847
5. OTHER ASSETS AND DEBITS (For future years use "Last Year" amount)	25, 000 ^{1/}	287, 768 ^{1/2/}	302, 768 ^{1/2/}
6. TOTAL ASSETS AND OTHER DEBITS (Sum of Items 3 thru 5)	2, 089, 592	2, 103, 764	2, 389, 185
LIABILITIES AND NET WORTH			
7. PATRONAGE CAPITAL AND OPERATING MARGINS ("Last Year" amount plus appropriate amounts from Item 1, Sec. A less Capital Retirements as shown in Item 4, Sec. B)	(41, 808)	(215, 104)	645, 889
8. NON-OPERATING MARGINS AND OTHER EQUITIES ("Last Year" amount plus appropriate amounts from Item 1, Sec. A)	25, 000 ^{1/}	54, 067 ^{1/}	139, 064 ^{1/}
9. LONG-TERM DEBT (REA Form 325d, Sec. B, Item 3e)	2, 106, 400	2, 264, 801	1, 604, 232
10. CURRENT LIABILITIES AND OTHER CREDITS (For future years use "Last Year" amount)	-0-	-0-	-0-
11. TOTAL LIABILITIES AND OTHER CREDITS (Sum of Items 7 thru 10)	2, 089, 592	2, 103, 764	2, 389, 185
CUSHION OF ADVANCE PAYMENTS ("Last Year" - REA Form 691; future years add amount shown in Item 4, Sec. B plus interest earned)	-0-	-0-	194, 396
RATIOS			
INVESTMENT PER KWH SOLD (Item 1 above + Item 4a, REA Form 325a)	¢1. 49	¢0. 71	¢0. 39
ACCUMULATED PROVISION FOR DEPRECIATION TO TOTAL PLANT (Items 2 + 1 above)	4. 5%	22. 5%	40. 3%
WORKING CAPITAL AND RESERVE FUNDS TO TOTAL PLANT (Items 4 + 1 above)	2. 5%	8. 7%	24. 5%
LONG-TERM DEBT TO ELECTRIC PLANT LESS THE DEPRECIATION (Items 9 + 3 above)	105%	139%	108%
NET WORTH TO TOTAL ASSETS (Items 7 plus 8 + 6 above)	(0. 8%)	(7. 6%)	32. 9%

REMARKS:

^{1/} Includes estimated franchise rights and goodwill.

^{2/} Includes recapitalized deferred interest.

TABLE 12-3

 USDA - REA
 FINANCIAL FORECAST - DETERMINATION OF LOAD

ITEM	PREVIOUS YEARS		CONSTRUCTION 19 71 (EST)	FUTURE YEARS									
	19 70	19 71		19 YEAR 1	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
1. NUMBER OF CONSUMERS	Enter monthly averages of the "Number of Consumers" and "Average Monthly Usage" for three previous years to establish trends; data may be obtained from Monthly Operating Reports and Annual Supplements. Make estimates for each year of the forecast period. Estimates previously approved by the board and REA should be used unless determined to be no longer valid. Consumer classifications should be broken down by rate schedules or large power consumers listed individually when necessary to make reasonable estimates of revenue.												
a. Domestic			2503	2,651	2,972	3,201	3,424	3,576	3,630	3,853	3,980	4,106	
b. Small Commercial			111	127	130	142	144	167	173	187	190	202	
c. Public Buildings			187	197	202	213	218	221	229	237	247	255	
d. Security Lights			73	73	76	81	84	88	91	95	98	98	
e. Other Load			1/	1/	1/	1/	1/	1/	1/	1/	1/	1/	
f.													
g.													
h.													
i.													
j.													
k. TOTAL			2,874	3,048	3,380	3,637	3,870	4,052	4,123	4,372	4,515	4,661	
2. AVERAGE MONTHLY USAGE													
a. Domestic			38	40	42	45	48	54	60	66	72	78	
b. Small Commercial			45	50	55	60	70	80	90	100	110	120	
c. Public Buildings			35	38	42	46	50	55	60	65	70	75	
d. Security Lights			63	63	63	63	63	63	63	63	63	63	
e. Other Load			2/	2/	2/	2/	2/	2/	2/	2/	2/	2/	
f.													
g.													
h.													
i.													
j.													
3. AVERAGE MONTHLY SALES	"Average Monthly Sales" is product of "Number of Consumers" and "Average Monthly Usage".												
a. Domestic			95,114	106,040	124,824	144,045	164,352	193,104	217,800	254,298	286,560	320,268	
b. Small Commercial			4,995	6,357	7,150	8,520	10,080	13,360	15,570	18,700	20,900	24,240	
c. Public Buildings			6,545	7,486	8,484	9,798	10,900	12,155	13,740	15,405	17,290	19,125	
d. Security Lights			4,599	4,599	4,788	5,103	5,292	5,544	5,733	5,985	6,174	6,174	
e. Other Load 3/			6,480	12,960	27,360	41,760	57,600	76,320	96,480	117,360	138,960	162,000	
f.													
g.													
h.													
i.													
j.													
k. TOTAL			117,733	137,435	172,606	209,226	248,224	300,483	349,323	411,748	469,884	531,807	
4. ANNUAL POWER REQUIREMENTS	For Previous Years: Data may be obtained from Operating Report and Annual Supplements. For Future Years: a. kwh sold - 12 times Item 3, k above; b. system loss - Estimate and enter as a decimal, i.e. .16, not 16%; c. kwh purchased - kwh sold + (1.00 - system loss)												
a. KWH SOLD			1,412,796	1,649,220	2,071,272	2,510,712	2,978,688	3,605,796	4,191,876	4,940,976	5,638,608	6,381,684	
b. SYSTEM LOSS			.25	.24	.23	.22	.21	.20	.19	.18	.17	.16	
c. KWH PURCHASED (generated)			1,883,728	2,170,026	2,689,963	3,218,861	3,770,491	4,507,245	5,175,155	6,025,580	6,793,503	7,597,242	

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¹ Load distributed; see Load & Energy Forecast, section 6.² Footnote 1/; estimated average kwh at 15¢.³ See footnotes 1/ and 2/.

TABLE 12-5(a)

 USDA - REA
 FINANCIAL FORECAST - DETERMINATION OF OPERATING REVENUE (IN PESOS)

ITEM	PREVIOUS YEARS		CONSTRUCTION	FUTURE YEARS									
	19	19	19 71 (EST)	19 YEAR 1	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
ESTIMATED REVENUE BY **SLIPPAGE METHOD**	<i>Revenues can be estimated by classes of consumers according to the rate schedules, by classes of consumers according to the operating reports, or by total number of consumers. Systems whose kwh sales to commercial and other consumers total 20% or less of farm and residential sales for both prior and future years will probably find it satisfactory to make their revenue estimates as though all consumers were on a farm & home rate. Systems with a greater percentage will probably desire to make separate estimates by classes of consumers. In general, as average consumption increases, the difference between the charge as per rate schedule and the actual average revenue tends to decrease. Systems which have special block rates for water heaters or other uses generally should make special analyses of estimated revenue based on these factors.</i>												
DOMESTIC													
a. AVG. MO. KWH PER CONSUMER (REA Form 325a, Item 2)				38	40	42	45	48	54	60	66	72	78
b. CHARGE AS PER RATE SCHEDULE (For kwh shown in Item a)				21.30¢	21.25¢	21.19¢	21.11¢	21.04¢	20.77¢	20.50¢	20.27¢	20.08¢	19.92¢
*c. % AVG. MO. REV. PER CONS. IS TO CHARGE AS PER RATE SCHEDULE				-	-	-	-	-	-	-	-	-	-
**d. AVG. MONTHLY REVENUE PER CONSUMER				8.10	8.50	8.90	9.50	10.10	11.22	12.30	13.38	14.45	15.54
e. ANNUAL REVENUE PER CONSUMER (12 times Item d)				97	102	107	114	121	135	148	161	174	186
f. AVG. NUMBER OF CONSUMERS (REA Form 325a, Item 1)				2,503	2,651	2,972	3,201	3,424	3,576	3,630	3,853	3,980	4,106
g. ANNUAL REVENUE (Item e x f)				242,791	270,402	318,004	364,914	414,304	482,760	537,240	620,333	692,520	763,716
SMALL COMMERCIAL													
a. AVG. MO. KWH PER CONSUMER (REA Form 325a, Item 2)				45	50	55	60	70	80	90	100	110	120
b. CHARGE AS PER RATE SCHEDULE (For kwh shown in Item a)				21.11¢	21.00¢	20.72¢	20.50¢	20.14¢	19.87¢	19.66¢	19.50¢	19.09¢	18.75¢
*c. % AVG. MO. REV. PER CONS. IS TO CHARGE AS PER RATE SCHEDULE				-	-	-	-	-	-	-	-	-	-
**d. AVG. MONTHLY REVENUE PER CONSUMER				9.50	10.50	11.40	12.30	14.10	15.90	17.70	19.50	21.00	22.50
e. ANNUAL REVENUE PER CONSUMER (12 times Item d)				114	126	137	148	169	191	212	234	252	270
f. AVG. NUMBER OF CONSUMERS (REA Form 325a, Item 1)				111	127	130	142	144	167	173	187	190	202
g. ANNUAL REVENUE (Item e x f)				12,654	16,002	17,810	21,016	24,336	31,897	36,676	43,758	47,880	54,540
EST. REV. BY **REV. PER KWH SOLD METHOD**	<i>For irrigation consumers, extremely large power consumers and similar classifications if not estimated above, it may be preferable to base revenue estimates on revenue per kwh sold.</i>												
a. TOTAL MONTHLY KWH SOLD (REA Form 325a, Item 3)													
b. TOTAL ANNUAL KWH SOLD (12 x Item a)													
*c. AVERAGE REVENUE PER KWH SOLD													
**d. ANNUAL REVENUE													
1. TOTAL REV. FROM SALE OF ELEC. ENERGY (Total amt. rev. estimated above)													
2. OTHER OPERATING REVENUE (For prev. yrs. - system's records; forecast future yrs.)													
3. TOTAL OPERATING REVENUE (Items 1 and 2)													

TABLE 12-5(b)

 USDA - REA
 FINANCIAL FORECAST - DETERMINATION OF OPERATING REVENUE (IN PESOS)

ITEM	PREVIOUS YEARS		CONSTRUCTION 1971 (EST)	FUTURE YEARS									
	19	19		19 YEAR 1	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
ESTIMATED REVENUE BY "SLIPPAGE METHOD"	Revenues can be estimated by classes of consumers according to the rate schedules, by classes of consumers according to the operating reports, or by total number of consumers. Systems whose kwh sales to commercial and other consumers total 20% or less of farm and residential sales for both prior and future years will probably find it satisfactory to make their revenue estimates as though all consumers were on a farm & home rate. Systems with a greater percentage will probably desire to make separate estimates by classes of consumers. In general, as average consumption increases, the difference between the charge as per rate schedule and the actual average revenue tends to decrease. Systems which have special block rates for water heaters or other uses generally should make special analyses of estimated revenue based on these factors.												
PUBLIC BLDGS. & FACILITIES													
a. AVG. MO. KWH PER CONSUMER (REA Form 325a, Item 2)				35	38	42	46	50	55	60	65	70	75
b. CHARGE AS PER RATE SCHEDULE (For kwh shown in Item a)				21.42¢	21.31¢	21.19¢	21.08¢	21.00¢	20.72¢	20.50¢	20.30¢	20.14¢	20.00¢
c. % AVG. MO. REV. PER CONS. IS TO CHARGE AS PER RATE SCHEDULE				-	-	-	-	-	-	-	-	-	-
**d. AVG. MONTHLY REVENUE PER CONSUMER				7.50	8.10	8.90	9.70	10.50	11.40	12.30	13.20	14.10	15.00
e. ANNUAL REVENUE PER CONSUMER (12 times Item d)				90	97	107	116	126	137	148	158	169	189
f. AVG. NUMBER OF CONSUMERS (REA Form 325a, Item 1)				187	197	202	213	218	221	229	237	247	255
g. ANNUAL REVENUE (Item e x f)				16,830	19,109	21,614	24,708	27,468	30,277	33,892	37,446	41,743	48,195
SECURITY LIGHTS													
a. AVG. MO. KWH PER CONSUMER (REA Form 325a, Item 2)				63	63	63	63	63	63	63	63	63	63
b. CHARGE AS PER RATE SCHEDULE (For kwh shown in Item a)				19¢	19¢	19¢	19¢	19¢	19¢	19¢	19¢	19¢	19¢
c. % AVG. MO. REV. PER CONS. IS TO CHARGE AS PER RATE SCHEDULE				-	-	-	-	-	-	-	-	-	-
**d. AVG. MONTHLY REVENUE PER CONSUMER				12	12	12	12	12	12	12	12	12	12
e. ANNUAL REVENUE PER CONSUMER (12 times Item d)				144	144	144	144	144	144	144	144	144	144
f. AVG. NUMBER OF CONSUMERS (REA Form 325a, Item 1)				73	73	76	81	84	88	91	95	98	98
g. ANNUAL REVENUE (Item e x f)				10,512	10,512	10,944	11,664	12,096	12,672	13,104	13,680	14,112	14,112
EST. REV. BY "REV. PER KWH SOLD METHOD"	For irrigation consumers, extremely large power consumers and similar classifications if not estimated above, it may be preferable to base revenue estimates on revenue per kwh sold.												
OTHER LOAD													
a. TOTAL MONTHLY KWH SOLD (REA Form 325a, Item 3)				6,480	12,960	27,360	41,760	57,600	76,320	96,480	117,360	138,960	162,000
b. TOTAL ANNUAL KWH SOLD (12 x Item a)				77,760	155,520	328,320	501,120	691,200	915,948	1,157,760	1,408,320	1,667,520	1,944,000
c. AVERAGE REVENUE PER KWH SOLD				15¢	15¢	15¢	15¢	15¢	15¢	15¢	15¢	15¢	15¢
**d. ANNUAL REVENUE				11,664	23,328	49,248	75,168	103,680	137,392	173,664	211,248	250,128	291,601
1. TOTAL REV. FROM SALE OF ELEC. ENERGY (Total ann. rev. estimated above)				294,451	339,353	417,622	497,470	581,884	694,998	794,676	926,465	1,046,383	1,172,164
2. OTHER OPERATING REVENUE (For prev. ¹ yrs. - system's records; forecast future yrs.)				14,395	895	1,685	1,310	1,190	935	380	1,270	740	755
3. TOTAL OPERATING REVENUE (Items 1 and 2)				308,846	340,248	419,307	498,780	583,074	695,933	795,056	927,735	1,047,123	1,172,919

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*For previous years, Item d - b; forecast for future years.

**For previous years, System's Records; for future years, Item b times c.

¹Membership fees only, P5 per connection, 5 other load connection assumed per year.

TABLE 12-6

USDA - REA

FINANCIAL FORECAST - DETERMINATION OF OPERATING EXPENSES & DEBT SERVICE

A. OPERATING EXPENSES (IN PESOS)														
ITEM	PREVIOUS YEARS			CONSTRUCTION	FUTURE YEARS									
	19	19	19	71 (EST.)	19 YEAR 1	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
1. COST OF POWER														
a. KWH PURCHASED (generated) (REA Form 325a, Item 4. c)					1,883,728	2,170,026	2,689,963	3,218,861	3,770,491	4,507,245	5,175,155	6,025,580	6,793,503	7,597,242
b. AVG. COST PER KWH (For previous yrs. - Item c ÷ a; for future yrs. - estimate)					.0780	.0778	.0770	.0751	.0748	.0740	.0730	.0772	.0713	.0706
c. COST OF POWER (For previous yrs. - System Record; future yrs. - Item a × b)					148,440	168,966	206,607	243,905	282,204	332,259	378,365	435,299	485,280	539,040
For previous years: (1) Enter Data for Items c, e and g. Data may be obtained from December Monthly Operating Reports. (2) Determine Items c, e and g as percent of plant, end of year, and enter percents in Items b, d and f respectively. For future years: (1) Forecast Items b, d and f for each year of the forecast period. (2) Multiply Item a, by Items b, d and f and enter products in Items c, e and g respectively.														
2. OTHER OPERATING EXPENSES														
a. PLANT END OF YEAR (From REA Form 325b, Item 3. d)					2,106,400	2,106,400	2,106,400	2,106,400	2,106,400	2,180,400	2,254,400	2,328,400	2,402,400	2,476,400
b. OPER. MAINT. & GENERAL ADM. AS % OF PLANT					5.1%	5.2%	5.3%	5.4%	5.5%	5.6%	5.7%	5.8%	5.9%	6.0%
c. OPER. MAINT. & GEN. ADMINISTRATIVE (Incl. power sales expense)					107,426	109,533	111,639	113,746	115,852	122,102	128,501	135,047	141,742	148,584
d. DEPRECIATION AS % OF PLANT					4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
e. DEPRECIATION					94,788	94,788	94,788	94,788	94,788	98,118	101,448	104,778	108,108	111,438
f. TAXES AS % OF PLANT														
g. TAXES					(None)									
B. DEBT SERVICE (See reverse side for instructions) (IN PESOS)														
1. APPLICATION OF REQUIRED LOAN FUND ADVANCES TO NOTES					FUTURE YEARS									
					19 YEAR 1	19 YEAR 2	19 YEAR 3	19 YEAR 4	19 YEAR 5	19 YEAR 6	19 YEAR 7	19 YEAR 8	19 YEAR 9	19 YEAR 10
NOTE NO. ¹	DATE OF NOTE	BASIS DATE	AMOUNT	PREV. ADVANCES										
"A"	1971 (Est.)	1976 (Est.)	2,106,400	2,106,400 ²										
	Recapitalized deferred interest					252,768								
2. DETERMINATION OF DEBT PAYMENTS														
a. TOTAL PAYMENTS DUE BEGINNING OF YEAR					-0-	-0-	94,367	94,367	94,367	90,592	86,817	83,043	79,268	67,944
b. PLUS: INTEREST PAYMENTS ON ADVANCES DURING THE YEAR					-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
c. PLUS: ADDITIONAL PRINCIPAL PAYMENTS BECOMING DUE DURING THE YEAR					-0-	-0-	-0-	-0-	94,367	94,367	94,367	94,367	94,367	94,367
d. LESS: TOTAL ANNUAL PAYMENT ON NOTES RETIRED DURING THE YEAR					-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
e. TOTAL PAYMENTS DUE, END OF YEAR					-0-	-0-	94,367	94,367	188,734	184,959	181,184	177,410	173,635	162,311
f. LESS: CURRENT INTEREST FOR THE YEAR					-0-	-0-	94,367	94,367	94,367	90,592	86,817	83,043	79,268	67,944
g. AMORTIZATION OF OUTSTANDING DEBT					-0-	-0-	-0-	-0-	94,367	94,367	94,367	94,367	94,367	94,367
3. DETERMINATION OF OUTSTANDING DEBT														
a. OUTSTANDING DEBT BEGINNING OF YEAR					2,106,400	2,106,400	2,359,168	2,359,168	2,359,168	2,264,801	2,170,434	2,076,067	1,981,700	1,698,599
b. PLUS: LOAN FUND ADVANCES					-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-
c. LESS: SCHEDULED PAYMENTS					-0-	-0-	-0-	-0-	94,367	94,367	94,367	94,367	94,367	94,367
d. LESS: ADVANCE PAYMENTS					-0-	-0-	-0-	-0-	-0-	-0-	-0-	-0-	188,734	-0-
e. OUTSTANDING DEBT, END OF YEAR					2,106,400	2,359,168	2,359,168	2,359,168	2,264,801	2,170,434	2,076,067	1,981,700	1,698,599	1,604,232

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¹30 year loan, 4% interest per annum, 5 year deferment of principal after date of loan, 2 year interest deferment after energization and 6% recapitalization of this interest after energization, 25 year equal repayment schedule.²The advance most likely will be made during Year 1, however for computational purposes it has been treated as such.

SECTION 13

LOAN APPLICATION

LOAN APPLICATION

A. Construction Loan Application

The Talim Electric Cooperative Inc., Province of Rizal, Municipalities of Cardona and Binangonan, being incorporated in conformance with R. A. 6038 and with registration requested under the same Act, herewith makes application to the National Electrification Administration for a loan in the amount of ₱ 2,106,400 for construction of system facilities described in this report and detailed below.

It is requested that the initial note for this loan shall be for the full amount and provide for the following:

- (a) Interest not to exceed 4% per annum on outstanding balances.
- (b) Interest payments deferred for two years after energization of the system, with the amount so deferred being capitalized at that time.
- (c) Principal repayments being deferred for five years from the date of the note and then scheduled in equal installments over a period not less than 25 years.

PROJECT COST ESTIMATES

A. Distribution System

I Primary Lines

1. 4.0 km. of 3 phase, 4-wire, 20/34.5 kv
lines @ ₱ 16,600 per km. ₱ 66,400.00
2. 35.0 km. of single phase, 2-wire, 20 kv
lines @ ₱ 10,100.00 per km. 353,500.00

II Secondary Lines

1. 12 km. of underbuilt, 2-wire
240 V, lines @ ₱ 11,000.00 per km. 132,000.00
2. 20 km. of separate secondary, 240 V,
2-wire lines @ ₱ 8,400.00 per km. 168,000.00

III Transformers, Cutouts & Sectionalizers

1.	33 units, 25 kva, transf.	@ ₱ 5,100	₱ 168,300.00
2.	8 " 15 " "	@ ₱ 2,300	18,400.00
3.	41 " Cutouts	@ ₱ 350	14,350.00
4.	41 " lightning arresters	@ ₱ 410	16,810.00
5.	1 Set, 3-pole, gang- operated Sectionalizer		20,000.00
6.	4 sets, 1-pole, single throw Sectionalizer	@ ₱ 3,600	<u>14,400.00</u>

T O T A L (FOB, MANILA)..... ~~₱~~ 252,260.00

LESS: 15% Est. Taxes..... 37,839.00

NET (C & F, Manila)..... ~~₱~~ 214,421.00

ADD: 25% Labor..... 53,605.00
~~₱~~ 268,026.00

U S E ~~₱~~ 268,000.00

IV Security Lights

123 sets @ ~~₱~~ 250.00..... ~~₱~~ 30,750.00

Labor @ 25%..... 7,687.50
~~₱~~ 38,437.50

U S E ~~₱~~ 38,500.00

V Service Drop and Service Entrance

Materials Including Watthourmeters

3500 Consumers @ ~~₱~~ 80.00 ₱ 280,000.00

TOTAL, DISTRIBUTION SYSTEM..... ~~₱~~ 1,306,400.00

B. Office Site

One hectare Lot in Barrio Navotas..... ~~₱~~ 10,000.00

C. Structures and Improvements

1. Fencing	₱ 10,000.00
2. Road Surfacing	2,500.00
3. Bodega.....	20,000.00
4. Office Building.....	25,000.00
5. Outside Storage Facilities	5,000.00
6. Water System.....	<u>5,000.00</u>
TOTAL, STRUCTURES & IMPROVEMENTS..	₱ <u>67,500.00</u>

D. Office Furniture and Linemen's Tools

1. Office Equipment.....	₱ 25,000.00
2. Linemen's Tools and Equipment.....	<u>25,000.00</u>
T O T A L.....	₱ 50,000.00

E. Transportation Equipment

1. 1-motorboat.....	₱ 10,000.00
2. 1-Self-propelled barge.....	100,000.00
3. 1-Jeep.....	15,000.00
4. 1-Jeep Trailer.....	<u>2,500.00</u>
T O T A L.....	₱ 127,500.00

F. Communications Equipment..... ₱ 90,000.00

G. Others

1. Line Materials inventory.....	₱ 35,000.00
2. Working Capital.....	100,000.00
3. Payment of Right-of-way.....	50,000.00

4. Engineering Services.....	₱ 90,000.00
5. Contingency.....	<u>180,000.00</u>
T O T A L.....	₱ <u>455,000.00</u>
T O T A L L O A N....	<u>₱ 2,106,400.00</u>

B. Board Resolution - Construction Loan

RESOLUTION

WHEREAS, the Board of Directors of Talim Electric Cooperative, Inc., has on this the 16th day of June, 1970 reviewed the "Engineering-Feasibility and Loan Application Report," and

WHEREAS, it is the opinion of the Board that the construction of this electric cooperative would make a wonderful contribution to the economic and social well-being of the people in this area, now therefore:

ON MOTION by Mr. Pedro Francisco, duly seconded by Mr. Emilio Raymundo and unanimously adopted, it is

RESOLVED that the "Engineering-Feasibility and Loan Application Report" dated June, 1970 be accepted, and

BE IT FURTHER RESOLVED, that Talim Electric Cooperative, Inc. make application to the National Electrification Administration for a loan to be used to finance rural electric facilities as detailed in the "Engineering-Feasibility and Loan Application Report", dated June, 1970 in the amount of ₱ 2,106,400.00 summarized by purpose as follows:

1. Distribution Facilities.....	₱ 1,306,400.00
2. Office site, structures and improvements, office furniture, transportation equipment, communication facilities and others.....	<u>800,000.00</u>
	₱ 2,106,400.00

BE IT FURTHER RESOLVED, that the loan shall provide for principal payments to begin 5 years from the date of the note, shall be for a period of not less than thirty (30) years including the grace period, at an interest rate not to exceed four (4%) percent per annum.

I, Pedro Francisco, Secretary-Treasurer of Talim Electric Cooperative, Inc. do hereby certify that the above is a true and correct copy of a resolution contained in the minutes of the meeting of the Board of Directors of TECO, held on the 16th day of June, 1970 at which meeting a quorum was present.

/s/ Pedro Francisco
PEDRO FRANCISCO

C. Wiring Program Loan Application

The Talim Electric Cooperative Inc. herewith makes application to the National Electrification Administration for a loan in the amount of ₱ 180,000 to be used for re-lending to members. in accordance with details given in this report, for wiring installations.

It is requested that the initial note for this loan shall be for the full amount and provide for the following:

- (a) Interest not to exceed 4% per annum.
- (b) The principal to be repaid in one lump sum 5 years after the date of the note.

D. Board Resolution - Wiring Program

RESOLUTION

WHEREAS, it will be necessary to provide help in wiring some members premises because many of the Cooperative's prospective member-consumers are in low income situations, and

WHEREAS, the cooperative is being conceived for the benefit of the residents of the area and they should be helped so that they will be in a position to enjoy the benefits which electric

power will offer to them, and

WHEREAS, the feasibility of the cooperative depends on the abundant use of electricity, and connections to the system must be made as soon as possible in order to begin revenue production, the house wiring loans will make it possible for many residents to receive electric service when the cooperative lines are first energized, now therefore

ON MOTION by Mr. Agripino Unida, duly seconded by Juan Arad; and unanimously adopted, it is

RESOLVED, that the Talim Electric Cooperative, Inc., herewith makes application to NEA for a loan in the amount of ₱ 180,000.00 to be used as detailed in the "Engineering-Feasibility and Loan Application Report", to finance electric house wiring facilities for cooperative members.

BE IT FURTHER RESOLVED, that the initial note for carrying out the house wiring program be in the full amount of the loan and provide for an interest rate not to exceed 4% and also provide for the principal payment to come due five (5) years from the date thereof and to be repaid in one lump sum. Interest to be paid each year as due. The monies loaned for the wiring program shall be relaned to the members at an interest rate not to exceed 6%.

I, Pedro Francisco, Secretary-Treasurer of Talim Electric Cooperative, Inc. do hereby certify that the above is a true and correct copy of a resolution contained in the minutes of the meeting of the Board of Directors of TECO, held on the 16th day of June, 1970 at which meeting a quorum was present.

/s/ Pedro Francisco
PEDRO FRANCISCO

SECTION 14

APPENDIXES

14.1

ARTICLES OF INCORPORATION
OF THE
TALIM ELECTRIC COOPERATIVES, INC.

KNOW ALL MEN BY THESE PRESENTS:

That we, the undersigned, all of whom are of legal age, Filipino citizens and residents of the Philippines, have this day voluntarily associated ourselves together for the purpose of forming a non-stock, non-profit membership electric cooperative under the laws of the Republic of the Philippines, more particularly under Republic Act No. 6038.

AND WE HEREBY CERTIFY:

1. That the name of the Cooperative shall be TALIM ELECTRIC COOPERATIVE, INC. ;
2. That this Cooperative is formed primarily for the purpose of supplying, promoting and encouraging the fullest use of, electric service to its members on an area coverage basis, pursuant to the provisions of Republic Act No. 6038.
3. That the Cooperative shall have its principal office at Barrio Nabotas, Municipality of Binangonan, on Talim Island, Province of Rizal.
4. That the term for which said Cooperative is to exist is perpetual, from and after the date of incorporation.
5. That the names and residences of the incorporators of said Cooperative are as follows:

<u>N a m e</u>	<u>Nationality</u>	<u>Address (Rizal Province)</u>
1. AGRIPINO UNIDA	Filipino	Bo. Pipindan, Binangonan
2. RUFINO REYES, JR.	Filipino	Bo. Nabotas, Cardona
3. MELCHOR ARRIOLA	Filipino	Bo. Lambac, Cardona
4. PEDRO FRANCISCO	Filipino	Bo. Bañgad, Binangonan
5. LIBRADO RIVERA	Filipino	Bo. Gulod, Binangonan
6. EMILIO RAYMUNDO	Filipino	Bo. Balibago, Cardona
7. JUAN ARADA	Filipino	Bo. Tabon, Binangonan

6. That membership to this Cooperative shall be open to any person, firm, association, corporation, or body politic or subdivision thereof, qualified under the By-Laws and Rules prescribed by the Cooperative, who may avail of the services of the Cooperative within the area of Talim Island and the barrios of Pipindan, Limbon-Limbon, Kalinawan, Ithan, Ticulio, Sampad and Nagsulo, all in the municipalities of Binangonan and Cardona, Province of Rizal, and of any additional area which may hereinafter be serviced by the Cooperative.

7. That the number of directors of the said Cooperative shall be seven (7), and the names and residences of the Directors of the Cooperative who are to serve until their successors are elected and qualified as provided for in the By-Laws are:

<u>N a m e</u>	<u>Address</u> (Rizal Province)
1. AGRIPINO UNIDA	Bo. Pipindan, Binangonan
2. RUFINO REYES, JR.	Bo. Nabotas, Cardona
3. MELCHOR ARRIOLA	Bo. Lambac, Cardona
4. PEDRO FRANCISCO	Bo. Bañgad, Binangonan
5. LIBRADO RIVERA	Bo. Gulod, Binangonan
6. EMILIO RAYMUNDO	Bo. Balibago, Cardona
7. JUAN ARADA	Bo. Tabon, Binangonan

IN WITNESS WHEREOF, we have hereunto set our hands on this 2nd day of June, 1970, at Pasig, Province of Rizal.

s/ Agripino Unida
AGRIPINO UNIDA

s/ Pedro Francisco
PEDRO FRANCISCO

s/ Rufino Reyes, Jr.
RUFINO REYES, JR.

s/ Librado Rivera
LIBRADO RIVERA

s/ Melchor Arriola
MELCHO ARRIOLA

s/ Emilio Raymundo
EMILIO RAYMUNDO

s/ Juan Arada
JUAN ARADA

SIGNED IN THE PRESENCE OF:

s/ Isidro S. Rodriguez
ISIDRO S. RODRIGUEZ

s/ Frisco San Juan
FRISCO SAN JUAN

s/ Rogelio Flores
ROGELIO FLORES

s/ Pedro Fineza
PEDRO FINEZA

A C K N O W L E D G E M E N T

REPUBLIC OF THE PHILIPPINES)
 MUNICIPALITY OF) S. S.
 PROVINCE OF RIZAL)

BEFORE ME, a Notary Public, in and for the Rizal,
 Philippines, personally appeared on this 15th day of June, 1970,
 the following persons with their respective Residence Certificates
 as follows:

<u>N a m e</u>	<u>Res. Cert. No.</u>	<u>Date & Place of Issue</u>
1. Agripino Unida	A-4032826	June 2, 1970 - Binangonan, Rizal
2. Rufino Reyes, Jr.	A-4085591	Jan. 16, 1970 - Cardona, Rizal
3. Melchor Arriola	A-4086943	June 2, 1970 - Cardona, Rizal
4. Pedro Francisco	A-4028977	Jan. 14, 1970 - Binangonan, Rizal
5. Librado Rivera	A-402916	Jan. 16, 1970 - Binangonan, Rizal
6. Emilio Raymundo	A-4086944	June 2, 1970 - Cardona, Rizal
7. Juan Arada	A-4032805	June 2, 1970 - Binangonan, Rizal

all known to me and to me known to be the same persons who executed
 the foregoing Articles of Incorporation and who acknowledged to me
 that the same are their free and voluntary act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and seal
 on the date and at the place first above written.

s/ Florencio Landrito
 FLORENCIO LANDRITO
 Notary Public
 Until December 31, 1971

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Series of 1970

REPUBLIC OF THE PHILIPPINES
MUNICIPALITY OF CARDONA
PROVINCE OF RIZAL
OFFICE OF THE SECRETARY

EXCERPT FROM THE MINUTES OF THE SPECIAL SESSION OF
THE MUNICIPAL COUNCIL OF CARDONA, RIZAL, HELD ON
MAY 22, 1970, AT ITS SESSION HALL IN THE MUNICIPAL
BUILDING, 8:00 O'CLOCK IN THE EVENING.

PRESENT:

- Dr. Rogelio C. Flores Municipal Mayor
- Dr. Mariano F. Felix Mun. Vice Mayor
- Mr. Leodegario Rivera Mun. Councilor
- Mr. Remigio San Juan Mun. Councilor
- Mr. Elias Capistrano Mun. Councilor
- Mr. Briocio Dionisio..... Mun. Councilor
- Mr. Lamberto Alejo Mun. Councilor
- Mr. Emiliano Panguito..... Mun. Councilor
- Mr. Inocencio Candelaria Mun. Councilor
- Mr. Frisco L. Concepcion Mun. Councilor

ABSENT:..... N O N E

RESOLUTION NO. 12. -S. -1970

GRANTING MUNICIPAL FRANCHISE TO THE TALIM
ELECTRIC COOPERATIVES, INC. SO AS TO PROVIDE
ELECTRICITY TO ITS MEMBERS IN TALIM ISLAND
WITHIN THE MUNICIPALITY OF CARDONA, RIZAL,
AND IN CONNECTION THERETO, TO ALLOW SAID
COOPERATIVE TO INSTALL, ERECT, AND CONNECT
WHATEVER INSTALLATIONS, POSTS, AND WIRES NEEDED
FOR THE PURPOSE IN ANY PART OR PLACE IN TALIM
ISLAND AND ITS BARRIOS AND SITIOS WHERE ELECTRIC
SERVICE IS NECESSARY.

WHEREAS, electric service in this part of the country has
for a considerable length of time been a dream to practically almost
if not all of the residents of Talim Island, within the Municipality of
Cardona, Province of Rizal, Republic of the Philippines;

WHEREAS, a good number of the residents of Talim Island,
within the Municipality of Cardona, Province of Rizal, have already

signified their intentions to serve as members of the TALIM ELECTRIC COOPERATIVES, INC. as evidenced by their signatures in the membership list forms;

WHEREAS, the presence of electric service in Talim Island, within the Municipality of Cardona, Province of Rizal, will for certain contribute considerably to the promotion of the well-being and better if not best economic conditions of its people;

WHEREAS, the electric service has already been considered a prime necessity in our present move to possibly industrialize the nation,

WHEREAS, this being a rare opportunity granted through the help of the United States government to our people; NOW THEREFORE.

ON JOINT MOTION presented by Councilor Emiliano Panguito, Councilor Elias Capistrano, and Dr. Mariano F. Felix, the Vice Mayor, in the Special Session assembled, it was;

RESOLVED. to grant as it is hereby granted, a Municipal Franchise to the TALIM ELECTRIC COOPERATIVES, INC. so as to provide electricity to its members in Talim Island, within the Municipality of Cardona, Province of Rizal, Republic of the Philippines, and in connection thereto, to allow said cooperative, to install, erect, and connect whatever installations, post, and wires needed for the purpose in any part of the Talim Island within the Municipality of Cardona, Province of Rizal, Republic of the Philippines, and its Barrios and sitios where electric service is necessary;

RESOLVED FURTHER, to furnish as it is hereby furnished, the TALIM ELECTRIC COOPERATIVES, INC. Copy of this resolution for their information and guidance.

UNANIMOUSLY APPROVED: MAY 22th, 1970.

I HEREBY CERTIFY to the correctness of the foregoing resolution.

s/ Policarpio R. Concepcion
POLICARPIO R. CONCEPCION
Municipal Secretary

APPROVED:

s/ Dr. Rogelio C. Flores
DR. ROGELIO C. FLORES
Municipal Mayor

RCF/prc

REPUBLIC OF THE PHILIPPINES
MUNICIPALITY OF BINANGONAN
PROVINCE OF RIZAL
OFFICE OF THE SECRETARY

EXCERPT FROM THE MINUTES OF THE REGULAR SESSION OF THE MUNICIPAL COUNCIL, BINANGONAN, RIZAL, HELD AT THE MUNICIPAL SESSION HALL, ON JUNE 13, 1970, AT EXACTLY 9:15 IN THE EVENING.

PRESENT:

Pedro T. Fineza	Mayor
Zoilo S. Estacio	Vice-Mayor
Nestor Mechilina	Councilor
Pedro Vital, Jr.	Councilor
Monico Tirana	Councilor
Mariano Erasga.....	Councilor
Macario Cenidoza.....	Councilor
Romulo de los Reyes.....	Councilor
Angel Maybituin	Councilor
Reynaldo Aralar.....	Councilor

ABSENT:..... N O N E

RESOLUTION NO. 33. -S. -1970

GRANTING MUNICIPAL FRANCHISE TO THE TALIM ELECTRIC COOPERATIVES, INC. SO AS TO PROVIDE ELECTRICITY TO ITS MEMBERS IN TALIM ISLAND WITHIN THE MUNICIPALITY OF BINANGONAN, RIZAL, AND IN CONNECTION THERETO, TO ALLOW SAID COOPERATIVE TO INSTALL, ERECT, AND CONNECT WHATEVER INSTALLATION, POSTS, AND WIRES NEEDED FOR THE PURPOSE IN ANY PART OR PLACE IN TALIM ISLAND AND ITS BARRIOS AND SITIOS WHERE ELECTRIC SERVICE IS NECESSARY.

WHEREAS, electric service in this part of the country has for a considerable length of time been a dream to practically almost if not all of the residents of Talim Island, within the municipality of Binangonan, Province of Rizal, Republic of the Philippines;

WHEREAS, a good number of the residents of Talim Island, within the Municipality of Binangonan, Province of Rizal, have already signified their intention to serve as members of the TALIM ELECTRIC COOPERATIVES, INC. as evidenced by their signatures in the membership list forms;

WHEREAS, the presence of electric service in Talim Island, within the Municipality of Binangonan, Province of Rizal, will for certain contribute considerably to the promotion of the well-being and better if not best economic conditions of its people;

WHEREAS, the electric service has already been considered a prime necessity in our present move to possibly industrialize the nation;

WHEREAS, this being a rare opportunity granted through the help of the United States government to our people; NOW THEREFORE..

ON MOTION presented by Councilor Mariano Erasga, seconded by Councilor Angel Maybituin, in the Regular Session assembled, it was

RESOLVED, to grant as it is hereby granted, a Municipal Franchise to the TALIM ELECTRIC COOPERATIVES, INC. so as to provide electricity to its members in Talim Island, within the Municipality of Binangonan, Province of Rizal, Republic of the Philippines, and in connection thereto, to allow said cooperative, to install, erect, and connect whatever installations, post, and wires needed for the purpose in any part of the Talim Island within the Municipality of Binangonan, Province of Rizal, Republic of the Philippines, and its Barrios and sitios where electric service is necessary;

RESOLVED FURTHER, to furnish as it is hereby furnished, the TALIM ELECTRIC COOPERATIVES, INC. copy of this resolution for their information and guidance.

APPROVED UNANIMOUSLY.

JUNE 13, 1970.

I HEREBY CERTIFY to the correctness of the foregoing resolution.

s/ Tranquilino P. Sison
TRANQUILINO P. SISON
Municipal Secretary

NATIONAL ELECTRIFICATION
ADMINISTRATION ACT

R.A. 6038
Chapter I, Section 2

A Declaration of National Policy

“The total electrification of the Philippines on an area coverage basis being vital to the welfare of its people and the sound development of the Nation, it is hereby declared to be the policy of the State to pursue and foster, in an orderly and vigorous manner, the attainment of this objective. For this purpose, the State shall promote, encourage and assist all public service entities engaged in supply electric service, particularly electric cooperatives, which are willing diligently to pursue this objective.”