

217
621-203
M-23

PN-ASU-46173876

RURAL

ELECTRIFICATION
IN THE PHILIPPINES

A.I.C.
Regional Center
Room 1856-13

PREPARED BY -

J. B. McCURLEY
N R E C A
August, 1971

RURAL ELECTRIFICATION IN THE PHILIPPINES

- I. Summary
- II. Introduction
- III. Characteristics of Electric Systems
- IV. Methods for Power Development of Rural Areas in the Philippines
- V. The National Electrification Administration

Prepared by:

J. B. McCurley
NRECA
August, 1971

RURAL ELECTRIFICATION IN THE PHILIPPINES

I. SUMMARY

1. The experience of power companies in the U. S. A. as well as REA shows that the electricity supply industry is characterized by:
 - (a) High investment per consumer.
 - (b) Slow turnover of capital.
 - (c) A growth in number of consumers and in the use per consumer which is more rapid than a linear relationship.
 - (d) The need for periodic injection of new capital which is linear.
2. Electrification in rural areas is consistent with the country development plan for the Philippines. Along with the other activities of the rural development program, electrification is a major element contributing to a higher standard of living for the rural people.
3. There are three possible methods of achieving rural electrification: by use of profit-motivated private capital, directly by a branch of the Philippine Government, and through electric cooperatives in cooperation with the government.
4. The private capital method is not likely to occur because of the small profits and other considerations.
5. Of the Philippine governmental agencies, NEA has been given the primary function of electrifying the country on an area coverage basis.
6. There is legislation pending that could have an adverse effect on the development of rural electrification.
7. Certain advantages exist for the rural electric cooperative method. Human resource development, nonprofit operation, local ownership, inhibiting migration to the cities, etc.
8. No administrator for NEA has been appointed. Organization is headed by an officer-in-charge who is on army staff and intends to remain with army when assignment is completed.
9. Present, and contemplated modification of, formal NEA organization and the actual or informal organization are considerably different.

10. The informal organization is non-homogeneous consisting of hold-overs from old EA, people on detail, members of the army, a number of casual or temporary employees (about 50% on other payrolls) and the NRECA feasibility team funded from an A. I. D. loan.
11. More than half of the employees are considerably less than fully employed. These should be removed or better utilized.
12. The WAPCO (Civil Service) salary scale is only about 50% of that prevailing in the private sector or in some government organizations. NEA should be removed from this limitation if they are to attract and retain competent employees.
13. There is need to update policies and procedures and to bring the formal and informal organization into line.
14. Too many decisions are made at the top levels.
15. NEA is presently more interested in project implementation than in building a long-range organization.
16. Organizational units divorced from line activities must be created if the staff activities necessary to develop a viable organization are to be accomplished. These units should be staffed by highly competent people.
17. There is a question of the in-country capability, without outside help, of completing on schedule the 36 proposed systems.
18. There is inadequate provision in the loans or of organizational units in NEA for the following functions:
 - (a) Consumer credit - appliances, etc.
 - (b) Education of consumers and load promotion.
 - (c) Local merchandising or preferably encouraging others to do this.
 - (d) Industrial development.
 - (e) Repair services for consumers' appliances and equipment or preferably training local people to do this.

The above functions tend to accelerate growth which is necessary if high rates are to be lowered.

19. If NEA is to assume the role of an intermediate credit institution which will develop cooperatives that are nontransitory, assistance in all fields and on the site will be required. This assistance should taper off as the cooperatives gain competence.
20. The REA (USA) is basically a creditor banking institution. It makes loans for 100% of the capital investment primarily to cooperative borrowers. A strong organization was established to assure loan security. If NEA is to have comparable loan security so as to attract a number of potential outside sources of funds as an intermediate credit institution, a stronger NEA organization must be developed.
21. A proposed organization breakdown is suggested which should cover most activities. There is a logical place for any additional function. Also suggested are the kind of activities to be engaged in by the five major organizational units.
22. An interchange of some functions between the four major divisions of the proposed organization may be required to conform to local laws, conditions, etc. If made, consideration should be given to checks and balances, i.e. internal controls.
23. A major training program will be required if an adequate number of linemen, engineers, contractors, competent coop board members, coop managers and coop employees are to be developed. The Philippines has the potential but lacks the experience in the field of Rural Electrification.
24. Unless there is a desire and a determination to mold a viable government organization for the electrification of the Philippines, it is doubtful that such an institution will be built.
25. If no viable governmental institution is built, there will be no intermediate credit institution and the cooperatives will not be able to grow and provide the services expected of an electric utility.

RURAL ELECTRIFICATION IN THE PHILIPPINES

II. INTRODUCTION

The conditions in the Philippines today have many resemblances to the conditions prior to 1935 in the U.S.A. Power companies served the cities but considered the sparsely populated countryside unprofitable. To build electric lines required large sums of money. Few farmers could afford the high rates which were charged to pay for constructing and maintaining lines where there would be only a few customers. Except for a few farms and other rural consumers along the urban fringes and main highways there was very little rural electrification.

An interesting experiment was conducted by a cooperating group of farm organizations, Government agencies, power suppliers, equipment manufacturers and others in the early thirties. Careful records were kept of costs and production. Farm families were shown how to use the equipment that was made available. The use of electricity increased sharply but so did the agriculture production. Expenses per unit of production dropped. The level of life on the experimental farms was happier, healthier as well as more productive. This helped to stimulate interest in electrification in the rural areas. People wanted electricity and an institution to accomplish electrification, the REA, was established in 1935.

Today, nearly everybody in rural U.S.A. has electric lights and power, thanks largely to the REA, through consumer-owned rural electric cooperatives and the stimulation provided to the private sector.

In the Philippines the availability and use of electricity could have an impact on production, make for better living conditions in the rural areas, attract new industries, create additional job opportunities and increase the income of the people.

Electricity is not the only factor but is one of the major elements contributing to a higher standard of living along with roads, housing, medical facilities, water, improved farming methods, marketing, etc.

The development of rural electrification is consistent with the country development program and could play a large part in the accomplishment of objectives.

III. CHARACTERISTICS OF ELECTRIC SYSTEMS

The electric industry is inherently a high capital investment slow turn over one. There is a need for periodic injection of new capital.

Figure 1 shows the overall experience and projected growth in consumers and in sales for REA borrowers. This is for the total of all REA systems and for systems that have already experienced considerable growth. While individual systems show different rates of growth, the characteristics shown are much the same. With growth it is necessary from time to time to add new lines and to heavy up existing lines.

Fortunately, doubling the load does not mean a doubling in investment. Based on experience of power suppliers in the U.S.A., doubling investment means a fivefold increase in load capacity. It is reasonable to assume that a similar pattern will be followed in the Philippines.

Nevertheless, the rapid growth in sales has meant a plant investment that is linear or, putting it another way, the same amount of money must be forthcoming year after year once a stable system is established. Figure 2 shows this for the REA cooperatives. The rapid growth of loads, however, has the effect of making more revenue available to support this growth, and, in fact, the investment per kwh sold continually decreases. The load factor goes up with loads and the energy loss in percent goes down as shown in Figure 3.

All expenses per kwh go down as the load increases, with the result shown in Figure 4. Revenue was not shown. If the rate structure is maintained, the margin between revenue and expense increases rapidly. This makes possible reductions in rates and the investment of larger sums in the revenue producing system. Where self-generation is planned the maximum sized units possible should be used to minimize the operating costs.

The primary purpose of this discussion is to attempt to give some indication of the behavior pattern of coops once they have been established.

However, Figure 5, taken from a paper by Dr. H. S. Person published in the April 1950 edition of Agricultural History, shows the early experience of REA. The start was slow and far from spectacular. Growth was then rapid only to be interrupted by World War II. After the war growth was very rapid making up for the slowdown.

While this discussion is based on experience in the U.S.A., experience in the Philippines should follow the same patterns. However, the magnitudes and

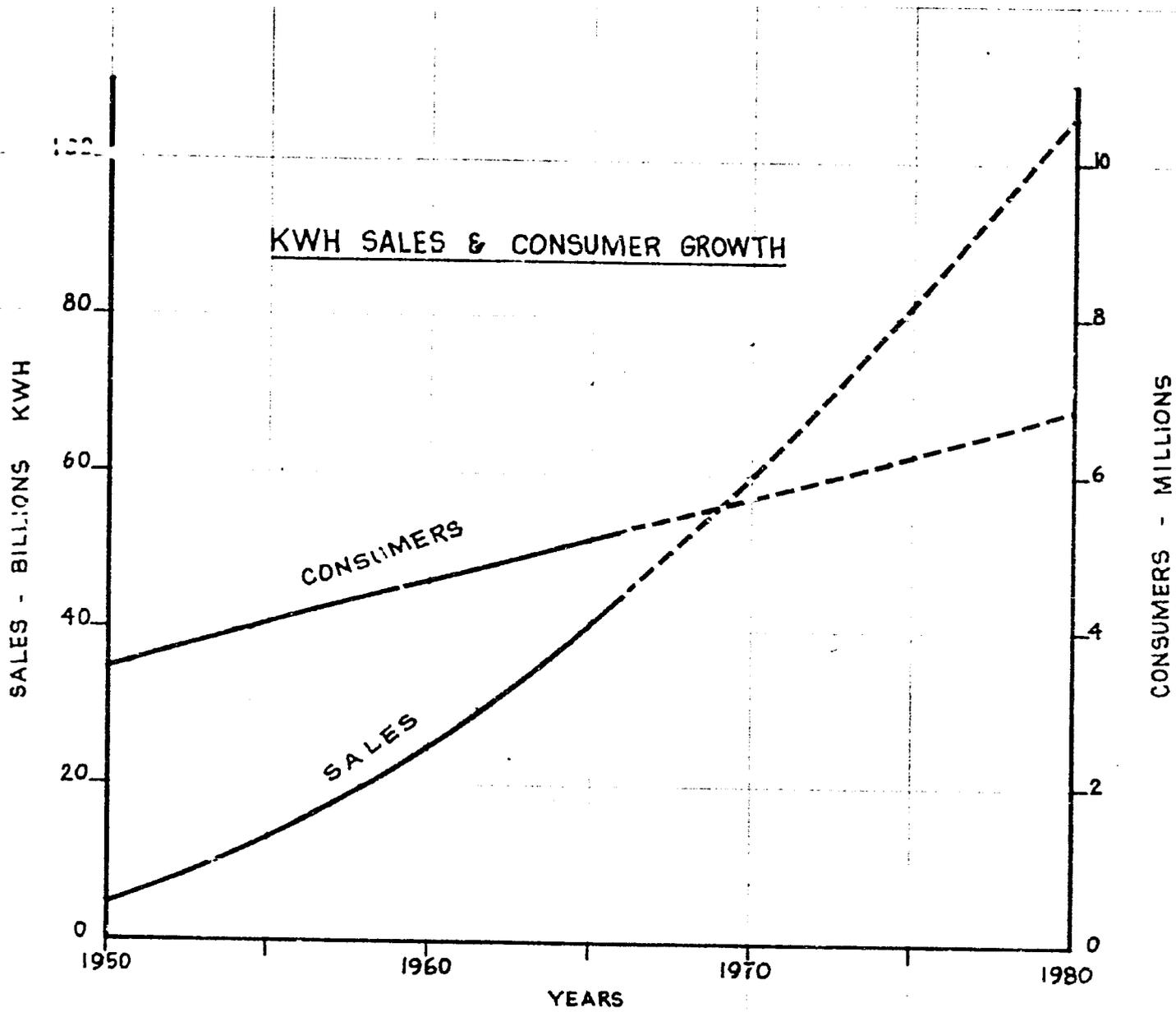


FIG. 1

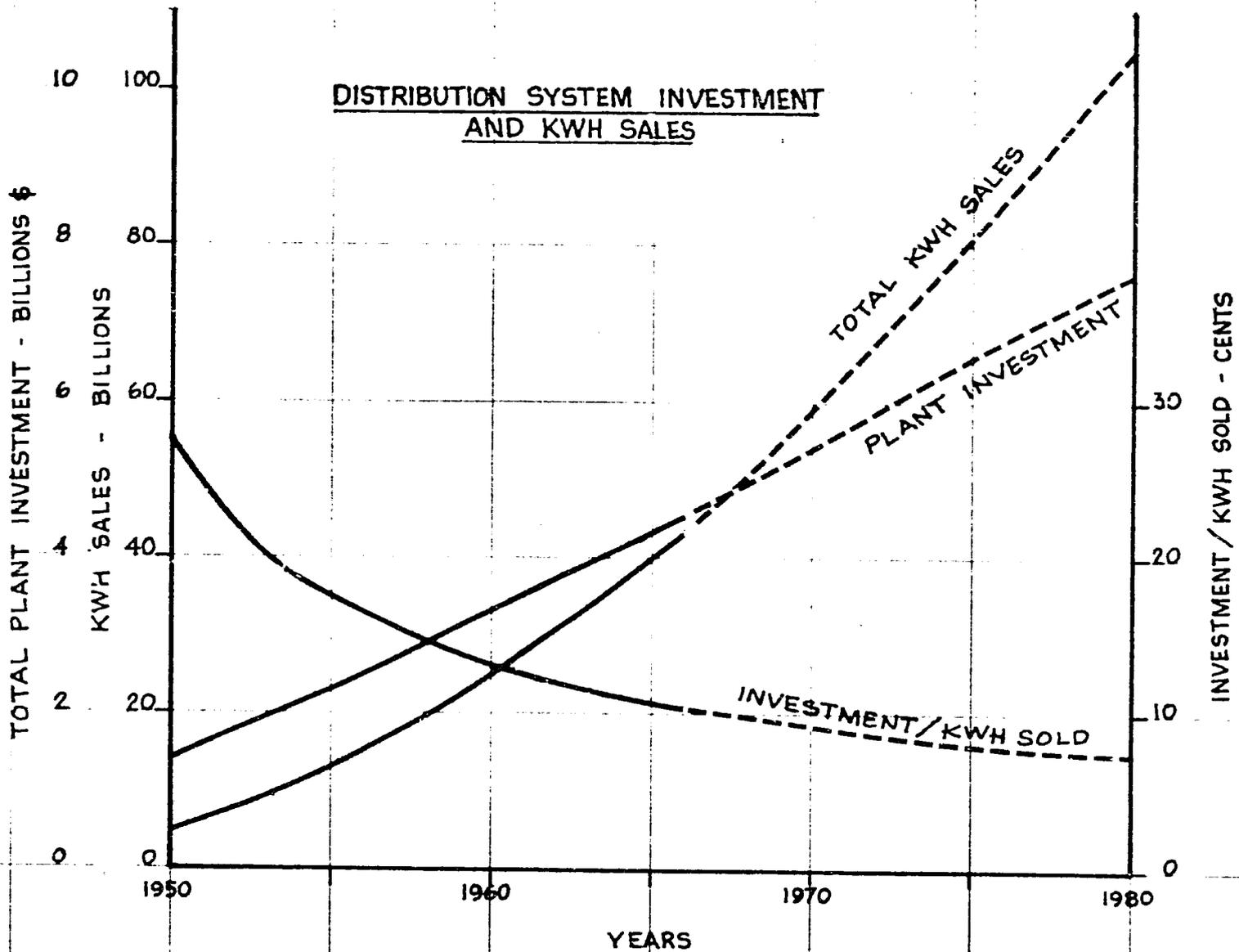


FIG. 2

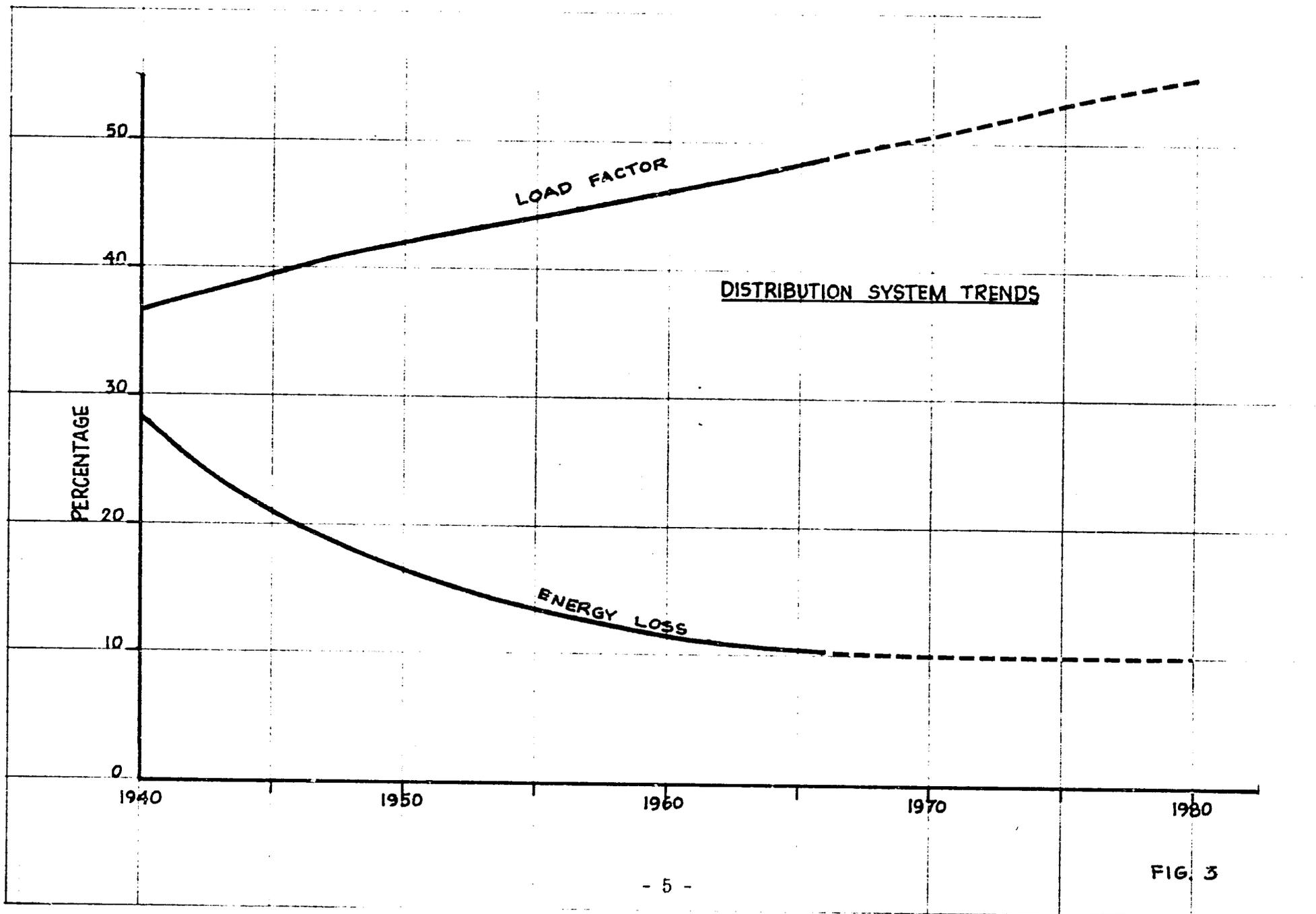
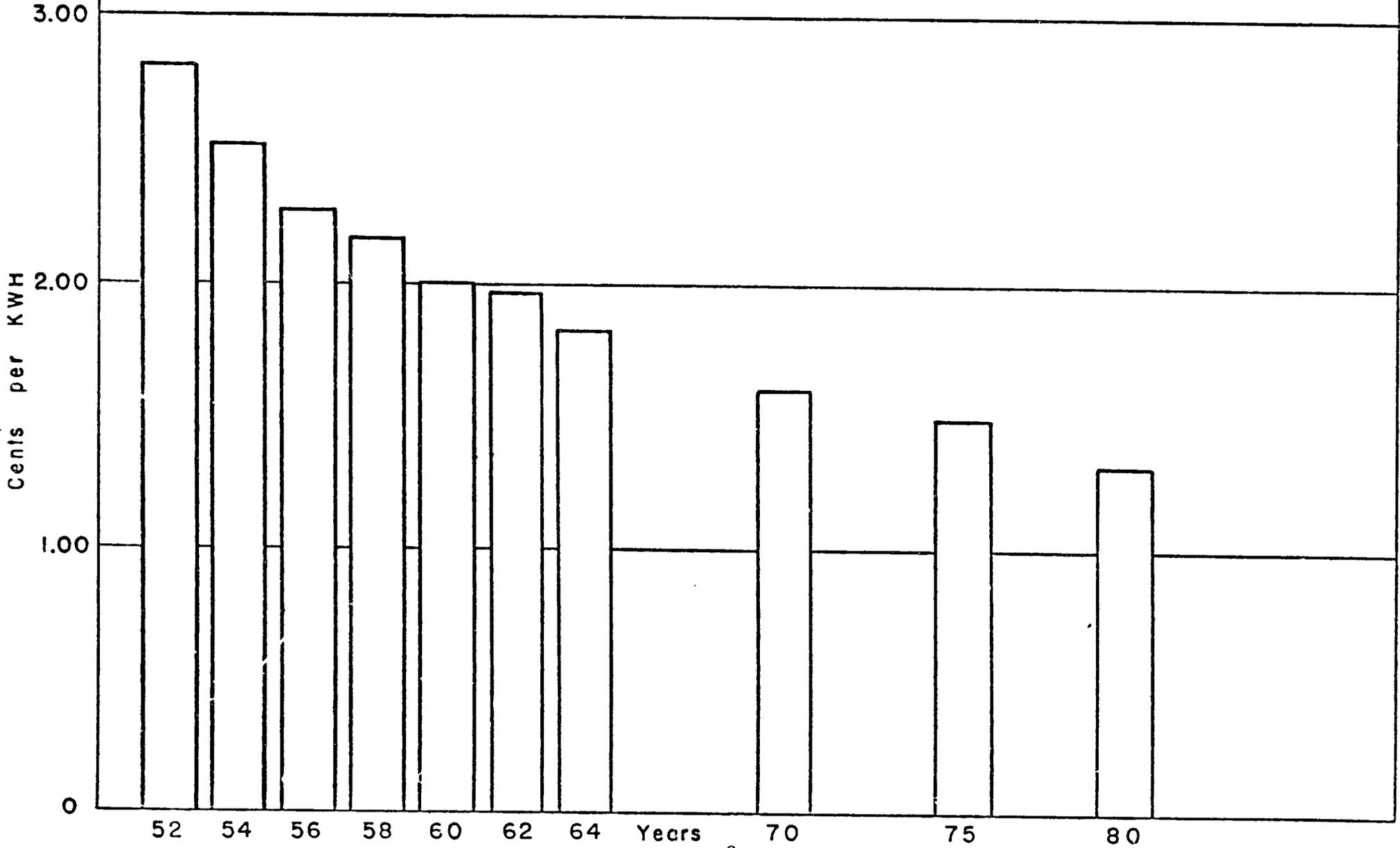
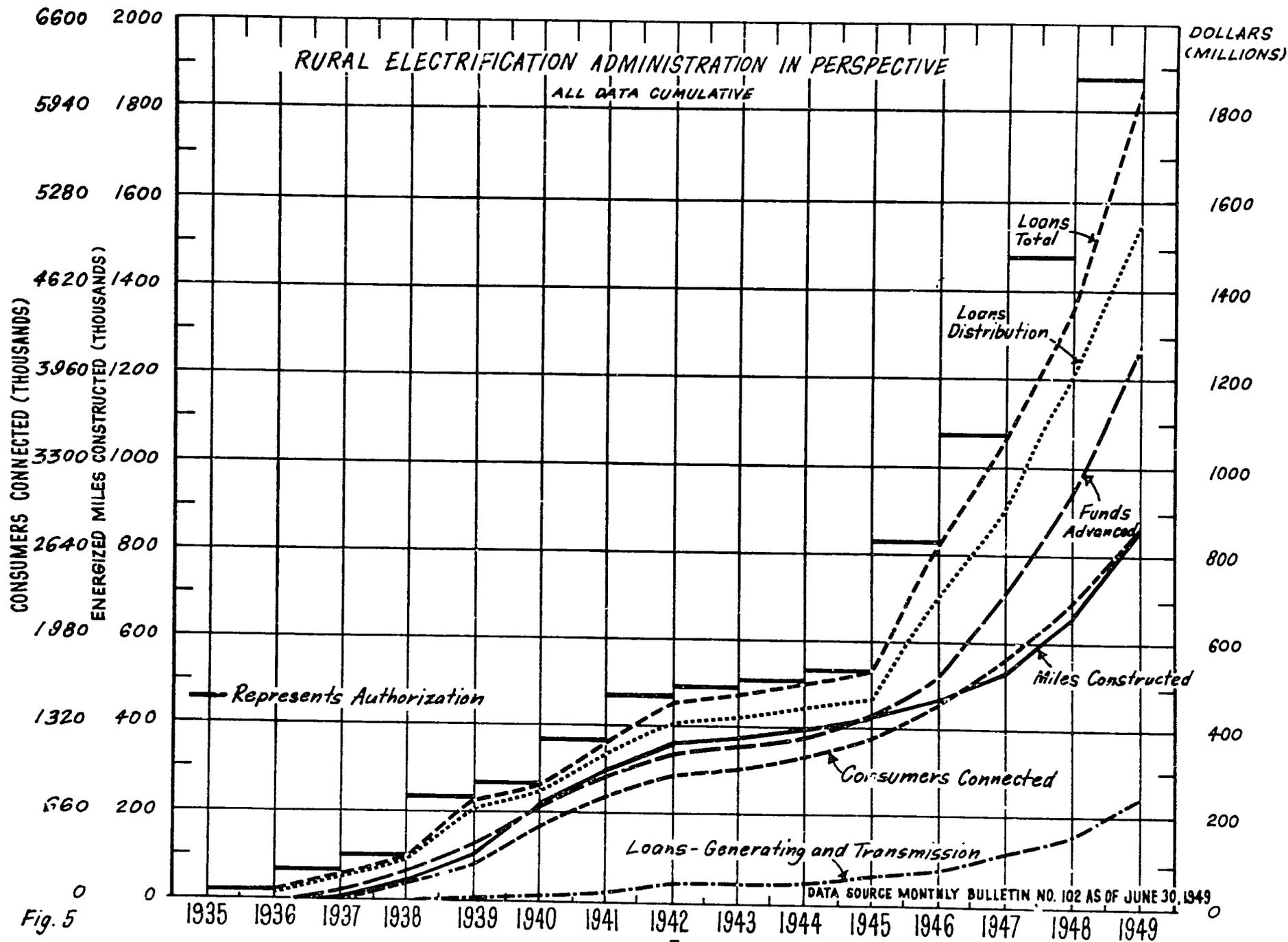


FIG. 3

Figure 4
Expenses in cents per KWH



-6-



rates of change will be different. This assumes a viable organization similar to REA to provide the technical, financial, and managerial assistance required. After the early difficulties have been mastered, the systems should become economically self-sufficient.

IV. METHODS FOR POWER DEVELOPMENT OF RURAL AREAS IN THE PHILIPPINES

Electric power development in rural areas could be attempted in three ways:

- A. Through the profit-motivated, private financing;
- B. Through governmental agencies;
- C. Through consumer-owned government and development bank-financed cooperatives.

A. The first method, the private capital approach, is not likely to be available. Even today in the United States the relationship between revenue to capital investment for rural distribution systems is relatively poor as indicated below:

COMPARISON OF REVENUE TO CAPITAL INVESTMENT

<u>CLASSIFICATION</u>	<u>REVENUE EQUALS ASSETS</u>
Rural Distribution Systems	Once every 55 months
Investor-owned Electric Utilities	Once every 44 months
Railroads	Once every 38 months
Primary Iron & Steel	Once every 13 months
Chemicals & Allied Products	Once every 11 months
All Manufacturing, Except Newspapers	Once every 9 months
Motor Vehicles & Equipment	Once every 8 months
Food and Related Products	Once every 5 months

The greater rate of turnover of capital in other fields makes investment of capital in these fields more attractive.

B. Governmental agency. The second approach, through a governmental agency, would of necessity be through the GOP as the provincial agencies are ill-equipped for this activity.

If rural electrification is to be accomplished by a governmental organization, the National Electrification Administration (NEA) is presently the vehicle as it has been given this responsibility by the Philippine Government.

Three potential problems could arise and their effect should be considered.

There is legislation pending that would authorize the National Power Corporation (NPC), another government agency, to build distribution lines. This poses a potential threat to the feasibility of the NEA cooperatives because there could be duplication of effort, particularly if NPC picks off the better loads adjacent to the roads and its lines leaving only the marginal or sub-marginal loads for others. This happened in the U. S. A. when many commercial power companies "skimmed the cream".

There are holders of Congressional electric service franchises, who have not the financing nor the intent of serving their franchised areas that are unwilling to waive their rights to cooperatives. This also occurred in the U. S. A. and inhibited the formation or growth of some cooperatives.

There is another proposal before the Congress that would include NEA in a multi-purpose supra-cooperative agency. If this is passed and NEA becomes a part of this government agency, careful consideration should be given to the impact on NEA.

C. Electric Cooperatives. There are a number of advantages in forming consumer-owned government-sponsored electric cooperatives in the Philippines. As such cooperatives are formed, they should contribute to the development of industry, commercial establishments and improvement in processing of farm products.

This should increase the income in an area as well as contribute to the development of the area's human resources. Cooperatives develop community leaders, teach people to work together for the common good, foster an understanding of the democratic process, and create new rural job opportunities.

Electricity makes possible the production of more and higher quality products. This in turn increases income thus building a market for urban products.

Electricity in rural areas tends to inhibit the migration of low-income farmhands to the urban areas where they increase the problems inherent in overcrowding and the finding of work for unskilled people.

V. THE NATIONAL ELECTRIFICATION ADMINISTRATION

Republic Act No. 6038 established the National Electrification Administration. This was "An act declaring a national policy objective for the total electrification of the Philippines on an area coverage service basis, providing for the organization of the National Electrification Administration, the organization, promotion and development of electric cooperatives to attain the objective . . . ". Among other things NEA inherited the assets and liabilities (including human) of the now defunct Electrification Administration.

The powers conveyed by the Act are vested in and exercised by a Board of Administrators composed of a Chairman and four members, one of whom shall be the Administrator of NEA as ex-officio member. The Act provides for an Administrator. He has not been appointed. Instead there is an Officer-in-Charge, Colonel Pedro G. Dumol, a highly intelligent, dynamic and capable individual. He is the driving force in NEA and is responsible in large measure for the present accomplishments in NEA.

He is still a part of the army staff. It is a relatively safe assumption that he will not be interested in becoming administrator.

Present Organization:

The official approved organization chart, Figure 6, and Plantilla (approved staffing) is out of date and is for 1969-70. The new budget is not approved to date, 9/3/71. Approval of the new budget should allow more flexibility in staff organization. Figure 7 shows changes that are contemplated.

The actual organization does not conform to either chart and is nonhomogeneous. There are about 104 out of an original group of 132 people who came from the old EA staff. There are about 54 casual or temporary employees. There are 8 people on detail from other organizations. The Army Engineers provides 6 men. This is a total of about 172 identifiable people. About 50% of the casual employees are on the payroll of NEA. The army detail and the balance of the casuals are on other payrolls. In addition there are three NRECA people who are working with NEA pursuant to a GOP-U.S.A. loan agreement. The army provides additional assistance over and above that listed.

NATIONAL ELECTRIFICATION ADMINISTRATION ORGANIZATION CHART

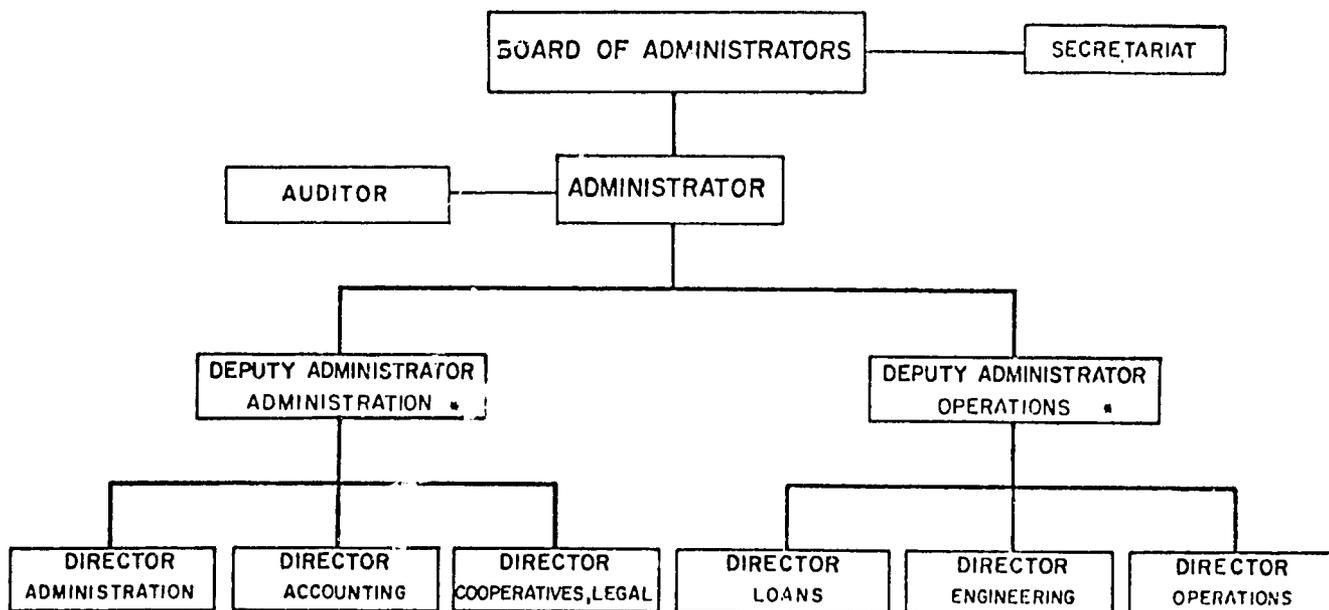


Fig. 6

CHANGE IN
PRESENT
NATIONAL ELECTRIFICATION ADMINISTRATION
ORGANIZATION CHART

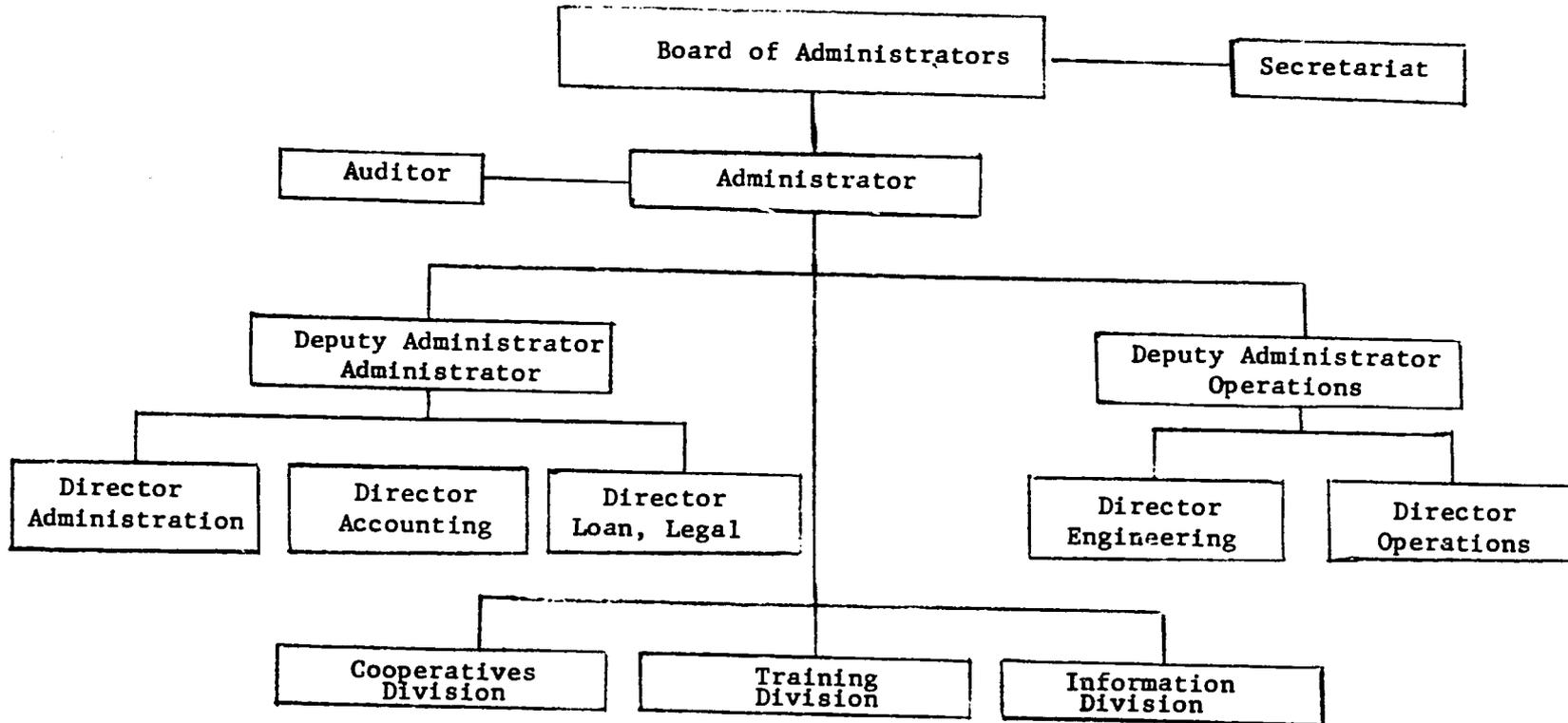


Fig. 7

There seems to be general agreement that more than half of the employees are considerably less than fully employed. This is due partially to the fact that some of the EA holdovers do not fit the requirements of NEA. NEA's objective is different from and broader than the old EA's. An example is the large number of credit investigators, a function not needed for cooperatives. A number of employees have been shifted to positions where they can be better utilized, for example - to the feasibility team. Even some members of the feasibility team are not fully utilized although the workload is there.

There is therefore a need to remove or better utilize a large number of present employees and to hire capable people qualified to man the activities required of NEA.

Supplementing the actual organization the Officer-in-Charge is able to call on the resources of a number of governmental organizations both civil and military and without charge to the NEA.

One of the largest obstacles to obtaining and retaining capable people is the WAPCO salary system. This limits pay to about 50% of the going rate of the private sector or of a government organization such as the National Power Corporation. It is recommended that an effort be made to remove NEA from the WAPCO limitations. Higher salaries would attract and hold better qualified people.

The NEA is more interested in project implementation than in building a long-range organization. The Officer-in-Charge believes that continuing and increased support from the G.O.P. will be forthcoming only if results are shown in the form of cooperatives organized, lines built, and power made available to the people. He may be entirely correct in this assumption. For the intermediate period there is every indication that as long as Col. Dumol is in charge the informal organization is capable of building systems and putting them into operation. Without him the organization could easily fall apart.

There is a real question of the capability of the present organization to accomplish, on schedule, the feasibility studies, the organization, architectural and engineering, and construction of the 36 proposed systems. For example, on the surface the feasibility studies are on schedule. However, there is a need to re-do some studies as the scopes are changed to fit the realities of money available.

There is a need to update and set in writing policies, procedures, job descriptions, job specifications, organization charts and personnel lists looking toward the long term operation. Also needed is a system of checks and balances, i.e. internal control.

Too many decisions are made at the top level consuming time that could be spent to better advantage.

If there were clear policy statements, a clear understanding of the role of each employee and channels marked out to accomplish the necessary functions, much of the work could be carried out at the lower levels, reducing workload of higher levels.

There is no organizational unit in NEA to promote load growth, educate the consumer in uses of electric power or to encourage expansion of existing industries and attract new ones in the areas served.

In general, it is best for the cooperatives not to merchandise. However, if equipment and appliances are not available to potential users growth is inhibited. It is therefore suggested that consideration be given to the merchandising aspects. Preferably this should be in the form of encouraging others to do the job and then fill the gaps only as needed.

Consideration is not being given to consumer credit for appliances. It is generally recognized that one of the reasons for the success of the REA program was the availability of such credit. There are several ways it could be administered. One would be loans directly from the cooperatives with payback through the power bill. Another way would be for the cooperatives to guarantee that the seller will ultimately be paid for his merchandise if the buyer defaults. It is therefore strongly recommended that such credit be made available. As a guide to how much -- in the first twenty years -- REA loans to borrowers for such credit averaged 1% of the loans for distribution. In Arkansas, for many years a relatively poor State, the consumer credit amounted to slightly over 4%. It should be higher in the Philippines and be based on the judgment of the local AID staff and the NEA.

Another factor is the availability of repair services for appliances and equipment used by the consumer. Training of one or more persons in simple repairs is desirable.

It is felt that the recommendations concerning promotion of loads, education of consumers, establishment of local sources for appliances and equipment, and consumer credit, are essential if the high cost of power to the consumer is to be reduced. Only through growth can rates be lowered.

Line type activities have a way of absorbing the full time of the people responsible for these functions if the staff work is to get done. There is a tremendous amount of work to be done by NEA, and a way must be found to provide organizational units whose sole responsibility is staff work. These

staff people need to be at least as technically qualified as the line people and should preferably be more so.

If NEA is to assume the role of an intermediate credit institution and is to be successful in developing cooperatives that are not transitory, continued assistance to the cooperatives from NEA will be needed in the fields of finance, engineering, general management, power use, member education, technical operations, standards, job training, safety, legal, accounting, etc.

This assistance should be provided at the site by field engineers, field management and operations specialists and by field accountants who visit the cooperatives periodically. There will also be a need for organizational units composed of specialists to provide assistance to the cooperatives in areas beyond the competence of the field representatives, and who work through and with the field representatives.

As the cooperatives gain competence routine assistance should diminish and help with only the more difficult and complex problems should be required.

Basically REA is a credit or banking institution. Until recently loans were made to finance 100% of the facilities covered in the loans. The loans were to be paid back with interest. REA's record of loans totalling over 7.6 billion dollars with a loss of principal of only 37 thousand dollars is remarkable and probably is unmatched by any other lending institution. This record was made possible only by the organization set up to assure loan security. Assistance was given where necessary to the borrowers, mainly cooperatives, in all fields of business management including financing, promotion, legal, engineering, accounting, etc.

If NEA is to develop into the intermediate credit unit that will electrify the Philippines, they will have to develop an organization that will insure the security of their loans.

Figure 8 is a suggested organization for the NEA to work toward. It is recognized that the present organization cannot be transformed overnight to such a pattern. However, all the listed elements will be encountered and provision will have to be made to accommodate these elements. The arrangement of functions is such that there are built-in checks and balances. Following the chart is a series of statements representing the activities of each of the five major organizational units, i.e., Administrator and the four directors.

It is recognized also that there will need to be sub-organizations for each of the directors. No attempt to set up such subunits should be made before the

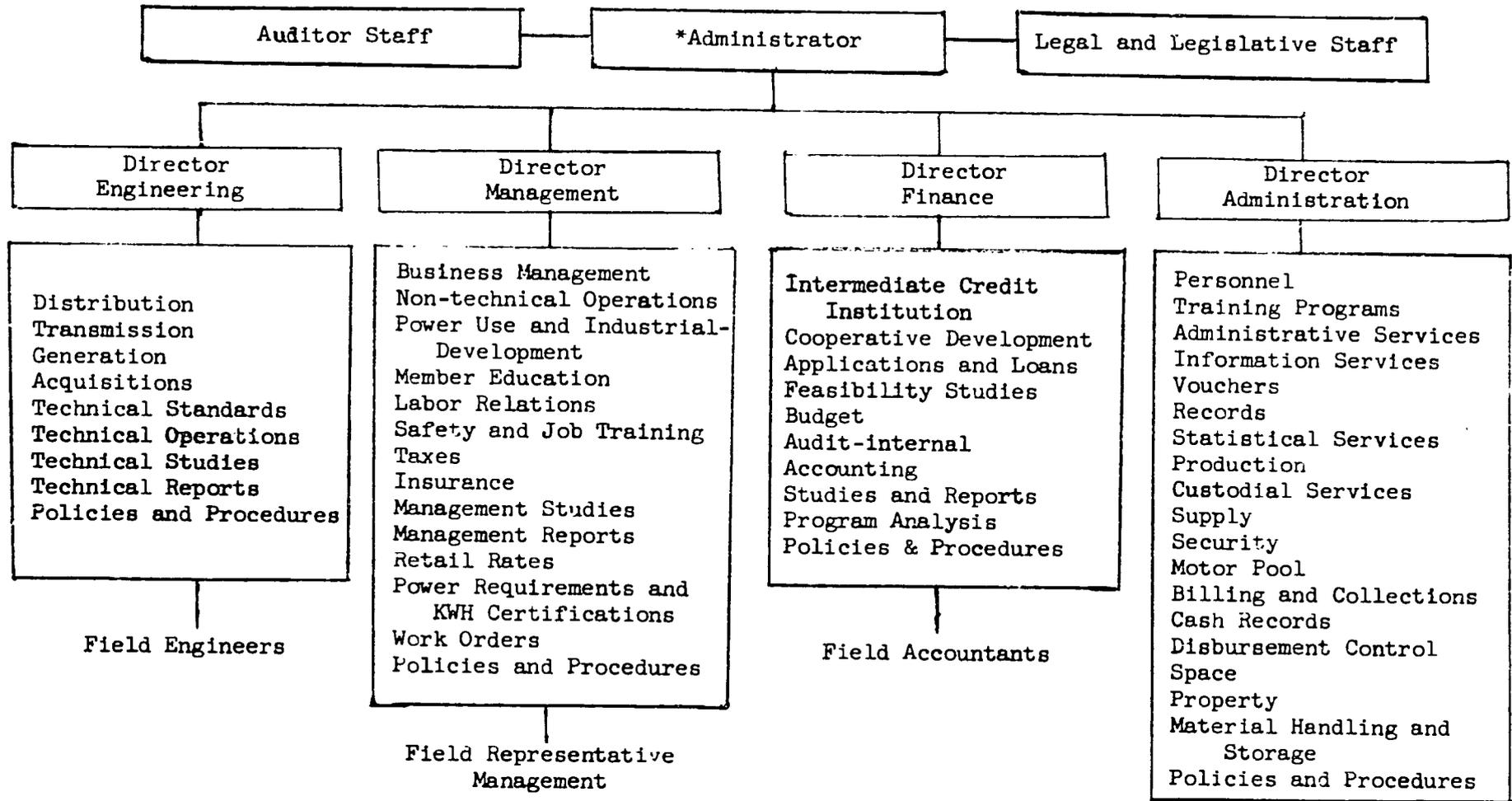
detailed breakdown such as shown in Figure 8 is decided upon.

There may be local laws, conditions, or reasons requiring an interchange of functions between directors. Such changes, if made, should consider checks and balances, i.e., internal controls.

Unless there is a desire and determination to work toward an organization such as shown or toward something similar, it is doubtful that a viable intermediate credit institution capable of electrifying the Philippines can be built.

Without a viable organization at the national level to assist them, the co-operatives will not be able to grow and provide the services expected of an electrical cooperative.

PROPOSED ORGANIZATION FOR THE NATIONAL ELECTRIFICATION ADMINISTRATION



*Includes a Deputy Administrator and an Executive Officer.

Fig 8

Office of Administrator, NEA

1. Policy and Program Formulation: Formulates long-range and current policies and plans concerning the administration of the National Electrification Administration Act as applied to the segment for which the National Electrification Administration is responsible.
2. Executive Direction: Directs the administration of the agency's program and administrative functions necessary to meet agency requirements.
3. Policy and Program Review: Reviews agency policies and programs to determine the most effective and economical method of administration.
4. Liaison:
 - a. Maintains favorable relations with agency to which attached, with legislative and executive branches of the appropriate governmental bodies, and with other related institutions, organizations, and associations.
 - b. Administers services to provide information to the public concerning the program.

Director Engineering

Within the scope of NEA programs and policies is responsible for:

1. Program Execution:
 - a. Plans, coordinates and executes all architectural and engineering activities related to the design, construction, technical operation and maintenance of borrowers' systems, including -- equipment, materials, pole inspection, plans and specifications, and contracts.
 - b. Obtains market and price information. Reviews and approves technical aspects and cost estimates in loan applications.

- c. Approves advance of loan funds.
 - d. Approves long-range engineering plans.
 - e. Evaluates proposed acquisitions and recommends appropriate action.
 - f. Assists in wholesale power negotiations, procurement, and development.
2. Technical Assistance and Consultation: Provides advice and assistance to other organizational units and to borrowers.
3. Staff Activities:
- a. Technical Standards -- standards and specifications for equipment, materials and facilities used on borrowers' systems.
 - b. Technical studies -- conducts studies and prepares reports on new types of equipment or facilities and the solution of technical problems such as sectionalizing, voltage regulation, corrosion, and lightning protection.
 - c. Works with manufacturers and others in developing new items, improving existing items and reducing the cost of equipment.
 - d. Advises and assists Administrator and other organizational units in formulating and developing related plans, policies, standards and procedures.
4. Liaison: Maintains liaison with manufacturers, educational institutions, government agencies, professional and other technical organizations and associations.

Director Management

Within the scope of NEA programs and policies is responsible for:

1. Program Execution:
- a. Plans, coordinates and executes all general management activities relating to non-technical operations, including power use, industrial development, member education, labor relations, safety and job

- training, taxes, insurance, retail rates, power requirements, KWH certification, work orders, approval of contracts between borrowers and others.
- b. Obtains market and price information. Reviews and approves non-technical aspects and cost estimates in loan applications.
 - c. Approves advance of funds for non-technical purposes.
 - d. Approves long-range financial plans.
 - e. Evaluates proposed acquisitions and recommends appropriate action.
2. Management Assistance and Consultation: Provides advice and assistance to other organizational units and to borrowers.
 3. Staff Activities: In the field of General Management:
 - a. Develops performance standards, techniques and methods.
 - b. Conducts studies and prepares reports.
 - c. Works with manufacturers and others to develop new or improved items of office equipment, markets for consumer appliances and equipment, industrial development, etc.
 - d. Advises and assists Administrator and other organizational units in formulating and developing related plans, policies, standards, and procedures.
 4. Liaison: Maintains liaison with manufacturers, educational institutions, government agencies, professional and other organizations and associations.

Director: Finance

Within the scope of NEA programs and policies, is responsible for:

1. Program Execution:
 - a. Plans, coordinates and executes activities directed toward obtaining funds through the medium of an Intermediate Credit Institution.

- b. Promotes cooperative development, assists potential borrowers with and approves feasibility studies.
 - c. Assists potential borrowers with their applications for loans and submits loan applications to Administrator for approval.
 - d. Conducts audits of borrowers' expenditure of loan funds and assists them to develop adequate and uniform systems of accounts.
2. Assistance and Consultation: Provides advice and assistance to other organizational units and to borrowers on matters relating to finance and accounting.
3. Staff Activities:
- a. Determines requirements for other sources of funds and develops standards, techniques, methods and procedures for compliance with requirements and for obtaining such funds.
 - b. Develops uniform system of accounts, work order procedure, etc. for borrowers.
 - c. Assembles and submits the agency budget to the Administrator for approval.
 - d. Makes internal audit and appropriate recommendations for improvement.
 - e. Acts as program analyst.
 - f. Conducts studies and prepares reports.
 - g. Advises and assists Administrator and other organizational units in formulating and developing related policies, standards and procedures.
4. Liaison: Maintains liaison with banking institutions, educational institutions, government agencies, professional and other organizations and associations.

Director Administration

Within the scope of NEA programs and policies, is responsible for:

1. Program Execution:
 - a. In the field of information services - disseminates information designed primarily for borrowers and the public concerning the status and progress of the electrification program. Prepares various types of material and literature designed specifically to assist borrowers in their activities concerning cooperative principles and practices, management practices, and applications of electric power to farm and home operations.
 - b. In the field of billing and collecting - maintains NEA accounts and records of all loan fund disbursements, repayments of principal, and interest payments to and by borrowers and of any other cash receipts or expenditures outside of agency.
2. Advice and consultation: Provides advice, consultation, and assistance to other organizational units on matters relating to the scope of activities assigned.
3. Staff Activities:
 - a. Personnel - conducts all matters connected with the classification of positions, employment, employee relations and counseling, training, health and general welfare of all employees and relations with employee organizations, and conducts investigations concerning personnel problems in connection with management of borrower's systems.
 - b. Vouchers and disbursement control.
 - c. Records.
 - d. Statistical services.
 - e. Procurement of supplies and reproduction services.
 - f. Custodial services, motor pool, security guards, material handling and storage.
 - g. Space and property management.
4. Liaison: Maintains liaison with the various Communications media, printing and reproduction services, office supply and equipment establishments, educational institutions, government agencies, professional and other organizations and associations.