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RETROSPECTIVE ANALYSIS
NRECA'S ACTIVITIES WITH AID FUNDING
1962-1981

prepared for
National Rural Electric Cooperative Association
International Programs Division
1800 Massachusetts Ave., N.W.
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RETROSPECTIVE ANALYSIS OF NRECA'S ACTIVITIES WITH AID FUNDING

1962 - 1981

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INTRODUCTION

In March, 1981, and in the context of considering what further extension of AID support would be appropriate for international programs carried out by NRECA, AID requested and NRECA agreed to provide several reports, of which this is one.

The purpose of this report is to provide "...a retrospective analysis of activities carried out with AID funding since 1962...".¹ The report was to utilize a methodology and personnel agreed to by AID and to give particular attention to NRECA's impact on cooperative development. AID officials requested specifically that the report look ahead as well as backward and include recommendations for the future.

AID agreed the analysis would be carried out by former AID Mission Director Thomas Niblock whose services were contracted for on October 1, 1981, to extend through February 15, 1982 when the report would be due. Connie King, an intern with NRECA would assist with preparation of the report. Ms. King is a graduate student from Miami University, Oxford, Ohio.

An outline of the contemplated analysis was presented to AID and approved on October 20, 1981.

The report was prepared in the offices of the NRECA at 1800 Massachusetts Avenue, N.W., Washington, D.C., where there was free access to all reports. The resources of the AID Library were also very helpful.

¹ Amendment No. 3 to Grant No. AID/SOD/PDC-G 0076, March 20, 1981.

II. SUMMARY

It has been twenty years since the NRECA received the financial backing from AID to begin exporting the REA/NRECA pattern of rural electrification to developing countries.¹ Presidents Kennedy and Johnson strongly endorsed the undertaking which was perceived as passing along to other countries techniques developed and used successfully in the United States. Original goals focused on pilot projects as the measure of "successful cooperative rural electrification." Following this "pattern," pilot rural electric cooperatives were established in a number of countries.

Pilot Projects and National Programs

Early efforts were concentrated in Central and South America where NRECA assisted eight countries to establish one or more pilot electric cooperatives. All of the electric distribution systems constructed have continued in operation and still stand as very tangible evidence of fruitful cooperation with the United States, generally serving the planned number of customers or more. In these important respects they are successful. But the original concept of member-owned and controlled cooperatives following the REA/NRECA pattern did not expand into nation-wide networks of cooperatives. Annex "h" lists the number of cooperatives established in each country where NRECA has provided assistance.

Building upon its experience in Latin America, NRECA was successful in working with several Asian countries to design and carry out rural electrification projects which were replicated widely. These efforts were divided between helping host countries establish pilot projects on the one hand, and on the other hand helping create new

¹ REA refers to the Rural Electrification Administration, established in 1935 as an agency of the U.S. Government.

NRECA refers to the National Rural Electric Cooperative Association, a private service organization created in 1942 by independent, member-owned cooperatives.

national institutions to plan, support and manage large scale rural electrification. In Latin America an effort was made to export the REA/NRECA pattern of local cooperatives in the absence of a national organization -- such as REA in the United States -- to provide the early management services, capital financing and other support required for continuity and viability of these pilot projects and their replication and expansion.

AID's decision in October, 1967, that further technical assistance in Latin America would need to be loan rather than grant funded, was a further set-back to NRECA and rural electrification.¹ The programs in Asia were not placed under similar constraint. By contrast, the national scale programs launched in the Philippines and Bangladesh had the support of new and independent rural electrification organizations, as well as ample grant funds for technical assistance and training. In Asia, the NRECA was thus able to provide help in establishing the national supervisory authorities along with adequate management and staff development services to individual cooperatives. Judging by results in Asia, the scarcity of grant funds in Latin America for innovation and manpower development posed a serious constraint to achievement of NRECA and AID objectives. Both NRECA and AID officials in Asia have insisted such grant funds were essential for the success of programs they were assisting.

Cooperatives

Although cooperatives have been and continue to be NRECA'S preferred form of organization and ownership, NRECA has been quite flexible in recent years in responding to the host country's choice of organization when this did not include cooperatives, and has assisted with a number of non-cooperative rural electrification ventures. Nevertheless, a large number of distribution systems assisted by NRECA have been cooperatives. In Latin America, cooperatives dominated NRECA's efforts. There are

¹AIDTO Circular XA-1261, October 18, 1967

over 120 rural electric cooperatives in the Philippines and 13 local rural electric 'societies' (cooperatives) have been formed in Bangladesh and 17 more are being organized.

In Indonesia, where the final pattern of rural electrification is yet to evolve, the NRECA has helped establish three demonstration member-owned cooperatives and has helped the state power company set up seven local distribution systems as sub-districts. In India, the five pilot cooperatives assisted by NRECA continue to operate as cooperatives and a number of additional cooperatives have been funded by India's Rural Electrification Corporation, though other forms of organization predominate.

In considering the merits of cooperatives vis-a-vis other forms of organization for the local distribution of electricity, many feel local conditions should determine the form of organization to make the program most effective. While holding to this position in principle, NRECA understandably has an institutional bias favoring the cooperative approach. This predisposition is of special significance to AID since AID is committed by law and its internal policy to seek ways to respond to local needs and to seek participation of the people it is trying to help. Rural electric cooperatives have, in most cases, provided this kind of participation. AID's target population is predominantly the rural and therefore poorer sector of the economies being assisted. As its evaluation reports have revealed, AID has found it difficult to carry out assistance programs genuinely responsive to these goals. Rural electrification has proven to be one of the most effective of AID's programs in responding to Congressional strictures to serve the poor, and to do this through cooperatives where feasible. That the program is imperfect and has encountered many problems does not remove it from ranking high among AID's portfolio of projects.

Experience suggests that in choosing between cooperatives and other forms of organization for local distribution of electricity, the burden of proof should be on state power companies, and others who advocate state monopoly of power, to show that their

approach will serve purposes of equity and balanced growth between the urban, modernizing sector and the rural sector. In like manner, advocates of cooperatives must recognize this involves a serious and long-term commitment to institution building.

The rural electrification programs assisted by NRECA have implications for development which go beyond the programs funded directly by AID. They have established credibility for the cooperative approach to development in several countries where prior experience with cooperatives had been unsuccessful. This was very much the case when the first NRECA-assisted rural electric cooperatives were formed in the Philippines. Ten years later rural electric cooperatives are widely viewed in the Philippines as one of the most successful rural development efforts ever undertaken. In Bangladesh, prior experience with cooperatives had been so disappointing and cooperatives so lacked credibility that the NRECA-type cooperatives were called 'societies' to distinguish them from the image associated locally with the word 'cooperative.' And in Latin America, where state power companies have been a severe impediment to the spread of NRECA-type cooperatives, a large number of locally established distribution cooperatives have been formed and operate successfully.

Other Donors

The AID/NRECA programs have had a pronounced multiplier effect arising from the fact that institutions built for rural electrification have attracted large-scale follow-on funding from a number of other donors. Annex "d" lists non-AID, other donor funding for rural electrification in selected countries. In the Philippines, over \$300 million has been committed or is being planned for early commitment by non-AID donors to the electric cooperatives. This, together with the nearly \$100 million provided by AID, is certainly one of the largest external commitments ever made to cooperative development in the Third World and is a tribute to the effective NRECA/AID partnership with the Philippines on this major program. In Bangladesh, rural electrification, while in

an earlier stage, has already attracted over \$80 million of non-AID funding. NRECA has been asked to provide training and management assistance for the expanding program. These two programs illustrate the drawing power and ability of well-designed and launched development programs to attract capital after there is demonstration of effective local leadership and a sound institutional base has been built and staff trained.

Perhaps the characteristic which distinguishes rural electrification from some other programs assisted by AID (rural roads, small irrigation works, etc.) is the "total system" of management, technical and economic services available in package form for a local electric utility. Although circumstances vary greatly from country to country, there is a remarkable degree of transferability to the Third World of skills and technical know-how developed in the United States. Training programs are well documented, manuals have been prepared, technical specifications exist, and accounting and bookkeeping systems have been standardized. It is relatively easy to adapt these systems to other countries and NRECA is able to provide advisors who have spent many years working in comparable systems in the U.S.

Rural Energy

Where the systems approach has been followed in establishment of a local electric utility, and community participation enlisted, these management units have been able to take on additional energy-related activities. In the Philippines, the rural electrification cooperatives have received funding from non-AID sources to mount several new programs aimed at developing local and renewable sources of energy to eliminate or drastically reduce dependence upon imported oil. The dendro-thermal (tree farm) program to fuel steam plants at existing electric cooperatives is one of the most ambitious such programs underway anywhere. Other donor support has been attracted to a plan to develop small hydro-electric plants which would feed power to the electric cooperatives. The existence of a wide network of rural electric distribution systems provides the

management and distribution facilities to make development of the energy potential of small mountain streams a practical and viable program. It is reasonable to assume that other countries which establish a strong network of rural electric cooperatives or other forms of local electric distribution systems, could use these networks to take on such additional energy programs.

Probably the leading constraint to successful long-term expansion of rural electrification in the developing world is the difficulty of maintaining high quality management for local distribution systems. Whether cooperatives or otherwise, as the electric distribution systems expand their networks, their management burdens grow and the need for additional, better trained and more specialized staff increases. NRECA has developed the capacity to respond to such needs by drawing upon personnel and experience from its own network of 1,000 U.S. cooperatives as well as from private utilities and research and financial institutions with which it is affiliated.

Evaluation

Direct beneficiaries of the NRECA-assisted local electric distribution systems (homes, schools, clinics, business and commercial establishments) now exceed 2 million connections serving over 14 million people. As currently planned expansion occurs with AID and non-AID funding, the beneficiaries will be counted in many tens of millions. In most locations it is difficult and probably not feasible to isolate and measure the impact of rural electrification as a single ingredient in the modernization process. New jobs, higher crop yields and other such statistical measures of progress are functions of the composite of rural development programs and local initiatives impacting on a community. Electrification contributes to this. AID's attempts to evaluate the separate impact of rural electrification have been disappointing to some analysts and have led to confusion and uncertainty among social scientists and central planners as to the value of

this input to the development process. The reports have produced sharply conflicting findings which need to be reconciled.

Nevertheless, the four evaluations of rural electrification carried out by AID in 1980 and 1981 have identified a number of 'lessons learned.' The 'lessons' include findings that rural electrification assisted by AID/NRECA tends: to be valued highly by rural people who attach importance to electrification and will make considerable effort to pay for it; to reach the poor as well as better-off households; to provide cheaper home lighting than kerosene; to provide cheaper shaft power than small diesel plants; to function best where dealt with as one component of an integrated rural development strategy and when productive uses were emphasized and assisted; to require substantial and continuing training and management services; and to be overdesigned for some uses where line loads are low. The AID evaluations caution that rural electrification itself should not be viewed as a panacea to deal with rural poverty. But it found that economic and social benefits were very considerable in the decade following project completion.

A sometimes overlooked aspect of the NRECA/AID activities has been the positive contribution these programs have had and are continuing to have on U.S. foreign policy. All of the projects assisted have left behind a very extensive and dispersed network of electric service superior to anything existing before in the villages and countryside of the project areas. The programs have responded to very highly felt needs and desires of the rural population and they have been identified in a number of real ways with the goodwill and generosity of the American people. This is more than can be said of a great many foreign aid ventures, many of which left little behind to show for the money spent, and had little or no identification with the donor. While AID evaluation officers often have had difficulty in measuring the economic impact of rural development projects such as roads, irrigation, electrification and other basic services, the U.S. ambassadors to countries that have had major rural electrification programs report that rural electrification is a very attractive and desirable form of American

aid. It is technical assistance that is politically unobtrusive in developing countries and at the same time provides positive identification of the United States with aspirations of people in the rural areas. See Section VII for amplification of these findings.

Another dimension of cooperative rural electrification which is often overlooked is the pride a great many Americans still have in the achievements of the REA program in their own country and the belief their experience is relevant to other countries. Within the United States, NRECA represents one of the largest membership constituencies favorable to foreign aid and it works actively to keep its members informed as to its activities funded by AID. Its officials regularly appear before congressional committees on behalf of foreign assistance legislation.

Looking Ahead

Section IX suggests areas of future emphasis by AID and NRECA as they review what has been learned from their experience in working together these past twenty years, and as they consider future activities.

A central suggestion is that for the coming decade it will be important to fit rural electrification into a broader pattern of bilateral cooperation on the entire electric power sector and energy problems facing the Third World, and to do this in ways beneficial to the trade and commercial interests of the United States. During these years, many billions of dollars will be spent by developing countries in the power sector from their own resources, along with many billions of dollars of development assistance and commercial credits with or without any involvement by AID. An equitable distribution of these investments to service more than five percent of the rural populace (as is the case today) will require that some 10 percent of the total be allocated for rural distribution systems, a much higher amount than in the past. Over the past decade, the World Bank, for example, has made well over \$1 billion in loans for electric power to Indonesia with virtually no provision for rural distribution.

The national scale programs mounted in the Philippines and Bangladesh have contributed to data permitting rural electrification in the Third World to be put in perspective--both with respect to the larger power sector of which rural electrification is a part and with respect to national development budgets. It can be said that, in general, a 20-25 year phased plan to distribute electricity to all villages and the majority of farms requires about 10 percent of total investments in the power sector. The assumption is that virtually all except the few very poorest countries are now committed to modernization programs and are allocating some 20 percent of development budgets to the power sector. Per connection cost for this service has proven to be a little under \$200 in the Philippines and about \$130 in Bangladesh where the population is more dense and connections per mile are quite heavy. Experience has shown the monthly minimum cost for house lighting to be less than the real cost for kerosene and that this cost is within the means of the majority of the poor. The savings on imported fuels are substantial. It is quite significant for the future prospects of widespread rural electrification in the Third World that rural electrification is an affordable and energy-saving commodity in Bangladesh and in rural Java, Indonesia. These are two of the most dense populations of small farmers on earth.

The U.S. has demonstrated a comparative advantage in assisting developing countries with rural electrification. An active and generous role by our country i.e. providing technical assistance for rural electrification is a positive expression of concern for Third World problems and it strengthens the prospects of the U.S. playing a more active commercial role in the much larger power sector of which rural distribution is a part.

Continuing to look ahead, the NRECA could expand technical assistance even further by tapping the extensive resources available to it through its member generation and specialized services cooperatives (which include financing, computer services and special manufacturing.) These services, plus those available through NRECA's extensive

affiliation with other energy and power organizations could respond to the full range of electric power technical assistance needs of developing countries. This is particularly important as AID technical field personnel continue to decrease in numbers. To date, NRECA services have been confined largely to rural electric distribution systems. Annex "g" lists organizations with which NRECA is affiliated.

It became apparent in the process of preparing this report that different offices of AID look upon the NRECA quite differently, and that it could serve a useful purpose if these differing views were examined within AID and harmonized. To illustrate, officers concerned with rural electrification in the regional bureaus look upon NRECA much as they do many other contractors that provide technical assistance for overseas projects. The Office of Private and Voluntary Cooperation (FVA/PVC) on the other hand views NRECA primarily as an instrument to promote the role and growth of cooperatives in the development process. AID's Office of Energy holds a somewhat different view. Other central offices appear to be ambivalent in their attitude towards NRECA and somewhat vague as to its character -- a not altogether surprising situation in light of the different views held by offices most directly involved with NRECA's international activities.

NRECA should be viewed as a proven technical assistance resource to help with the task of rural electrification as there is no other source as well prepared to assist with the full range of training needs, management services and technical requirements of electric power distribution. The use of the cooperative approach for local distribution should be considered within the context of each country's situation, with NRECA playing a flexible and supporting role without insisting on any particular mode of organization. The goal, in any event, is to accelerate the process of rural development which, in AID terms, calls for economic growth within a system in which all benefit. Well-managed electric cooperatives can contribute to the realization of this goal, particularly when comprising an element of a comprehensive rural strategy and package of mutually-supporting projects.

As AID and NRECA review their relationship over the past two decades with an eye to further cooperation in the future, the experience and lessons learned should be of utmost importance. In many instances solid foundations have been laid to facilitate a broader based group of activities in the years ahead. This report identifies some of the opportunities.

III. TWENTY YEARS OF INTERNATIONAL PROGRAMS

A. How it Began

NRECA's first contract with AID was signed November 1, 1962. It was signed in President Kennedy's office by AID Administrator Fowler Hamilton and NRECA's General Manager Clyde Ellis. Following the signing ceremony President Kennedy said: "I think that we take the REA (the rural electric cooperative program) so much for granted that we ignore the extraordinary and really revolutionary increase in the electrification of American farms which occurred in almost a decade...What we have done can be done in a great many other countries with this organizational arrangement and with stimulation from both their national governments and their local communities. I don't think there is any program which will help the Alliance for Progress....more than this...." The contract provided AID funds for NRECA to employ a Coordinator to be a liaison with AID and AID's field missions concerning services to be performed under separate task orders which the Coordinator would assist AID and NRECA to prepare. The contract anticipated an active role for NRECA in undertaking country studies and planning and implementing pilot rural electric cooperative projects which would be financed by AID.

The contract or successor contracts and amendments thereto, which authorized funding for a series of separate country programs and for additions to the NRECA core support staff, have continued in force with the latest amendment extending NRECA services through February, 1982. This report is designed to document and analyze the activities of NRECA which flowed from the original and successor contract and task orders, and to look ahead to possible future activities.

For an understanding of the genesis and nature of the activities undertaken, it is essential to know something of the history of the rural electrification "movement" in the United States, particularly the establishment of the Rural Electrification Administration (REA) in 1935 as one of the economic recovery programs of the New Deal; and the subsequent formation of the National Rural Electric Cooperative Association (NRECA).

The REA was a government agency authorized to make low interest loans for rural electrification, to establish standards and specifications, etc. With such loans and accompanying technical assistance, more than 1,000 rural electric cooperatives came into being. The cooperatives then formed an association to provide a variety of management and information services and to represent their interests in the nation's Capitol.

The basic role of the cooperatives was to distribute electric power. Most of the power was purchased in bulk from private utilities or other sources and provided to rural communities on lines built by the cooperatives. While accounting for but a small part of total power consumed in the United States, the cooperatives serve half of the nation's land mass. With the advent of alternating current to move power long distances with relatively small power loss, the job was technically feasible, but the cooperatives were needed to actually carry out the process.

The 'typical' electric cooperative in the United States initially served some 4,000 members at a per-member (household) cost of \$300-\$400, requiring an investment of about \$1 million per cooperative. None of the cooperative systems established in the United States has been abandoned or 'failed.'

More than 200 rural electric systems have been established in foreign countries with technical assistance from NRECA. 'Typical' cooperatives or other forms of electric distribution in the Third World serve a larger membership than the U.S. cooperatives due to population density, and the costs are lower, about \$200 per connection.¹ None of the foreign systems have been abandoned and on the average, they serve more customers

¹ This estimate is based on experience in the Philippines where through 1980 the 1.4 million connections under the program have cost 1,500 pesos per connection or just about \$200, assuming the exchange rate to be 7.50 : \$1.00.

than originally anticipated, although some management problems and financial difficulties have been experienced.

In spite of very real and continuing management problems, the electric cooperatives in developing countries that have been established following the REA pattern have a better financial and operating record than do most other forms of rural based cooperatives. The landscape of the developing world is littered with such cooperatives, many of which were supported by AID. The truth is management problems have plagued most rural development efforts - both those which are centrally-controlled and those which are decentralized such as cooperatives. It is important therefore to keep the management problems of all rural development efforts in perspective as this underscores the real nature of the task being undertaken - to come to grips with profoundly difficult cultural, educational and political problems associated with the modernization process in traditional societies. Rural development programs in the United States have experienced their share of management problems as well, including electric cooperatives.

Nevertheless, the achievements of the REA programs in the United States were substantial--virtual total farm electrification by 1960 compared to only 10 percent in 1935 when the program began. (Some of this accelerated coverage was provided by private utility companies encouraged by competition to expand their service to the rural areas as the REA program got underway.) Management problems surfaced early. The package of management services and training programs developed for the cooperatives in the United States is probably the most useful part of the REA/NRECA system to the Third World.

From the outset, the program received a high level of political support and in many localities it was quite active. Yet electricity per se was not viewed by national administrators of the 'New Deal' as a panacea. Instead it was undertaken as one of a wide range of rural 'recovery' (development) programs which included expanded farm loan

programs, research and extension services, improved roads, better irrigation and soil conservation and others. While some of the programs were dropped, few can match the record of growth and sustained appeal of rural electrification. The program has received funding and support from every Congress since 1935, even though low interest loans from the federal budget have been largely phased out and superceded by insured or guaranteed loans.

Given the success of rural electrification in the United States, it is not surprising that by the early 1960's, when the Kennedy Administration set about to overhaul and strengthen the foreign aid apparatus, NRECA volunteered to help take the benefits of rural electrification to developing countries. The following sections will take a retrospective look at these activities.

B. Pilot Projects

The NRECA international staff formally began work on overseas projects promptly after AID financing began. A five-step process was designed and used for the next decade as the pattern to export the REA/NRECA model of cooperative. The pattern called for the following phases: 1. a country survey by NRECA staff; 2. organization of the cooperatives with help of NRECA specialists; 3. preliminary engineering, economic feasibility analysis and loan application criteria; 4. construction by private firms and management help from NRECA; and 5. periodic follow-up consultation from the NRECA staff.

Projects developed with NRECA's help followed rather closely the electric cooperative pattern in the United States where essential features were low-cost loan financing of member-owned cooperatives; deferred payment of principal until revenues built up; physical plant designed to REA standards; selection of managers based upon qualifications; and a complete system for management—from training courses for all levels of skills to operations, finance and accounting.

Ecuador began the pilot project pattern that reappeared in many countries. Under Task Order #2 (AID/csd 225), the NRECA team was to:

Study existing rural conditions relative to establishing a rural electric cooperative and select the most favorable areas for organizing pilot rural electrification projects.¹

Forthcoming task orders were quite limited in scope, especially in the early months of NRECA involvement (1962-1964). This pattern held for virtually all of Latin America as individual task orders were issued for each phase of the pilot project's development. Later, this approach changed to one in which all of the services and technical assistance required to initiate and operate a rural electric system were lumped under one loan, contract or task order. Today, comprehensive country projects are being carried out under a single contract.

In some respects, Latin America served as a proving ground for the notion that the U.S. rural electrification experience could be transferred to developing countries. AID seemed to be hesitant, desiring proof that the country conditions were indeed favorable for rural electrification, before sinking a great deal of time and effort into large-scale systems, or national electrification programs. The same pattern of investment appeared in the actions of the development banks in their contribution to rural electrification programs. It can be said, then, that NRECA's successful establishment of pilot projects in Latin America provided not only the impetus for local expansion, as in Bolivia and Nicaragua, but also provided valuable lessons for the spread of rural electrification schemes around the world. Therefore, by the time Asian and other world leaders were in a position to consider the idea, the way had been paved for acceptance of the rural electrification idea, as presented by NRECA.

Over the years, changes occurred in the procedures outlined by AID and in the programs implemented by NRECA. The pattern of establishing pilot projects was altered

¹ Article I--Scope of Work. (AID/csd 225, Task Order #3) January 1963, p.2

significantly by AID in 1967 when the Latin American bureau phased-out Task Order #9 (AID/csd 225) that provided grant funds for NRECA to provide technical assistance. AID determined that funding for the engineering, construction, management and operation of the pilot rural electric cooperatives within individual countries was not to be accomplished with grant funds, as anticipated under the task order.¹ It seems AID wanted only to grant-fund the feasibility studies to determine the location of a pilot project, without moving ahead with other technical assistance for activation of the system. This set back the step-by-step structure of NRECA's pilot project involvement, making it more difficult for the host countries in Latin America to receive funding and technical assistance that would have enabled them to move from the study phase to the construction, operation, and eventually the effective management of the system. In Asia, grant funds were made available for all phases of NRECA's work. The results in Asia appear to justify the decision in the Asian Bureau of AID to provide grant funds for management and other technical services.

In less than 20 years, NRECA provided formal assistance for the establishment of rural electric systems in over 35 countries around the world and approximately 20 other countries have had other studies done by NRECA. In Latin America, 9 pilot projects were set up in the 1960's from which 33 cooperatives were established. Pilot projects initiated the country programs of India and the Philippines. Altogether 19 pilot projects have been funded at least in part by AID and were carried out with technical assistance from NRECA. Summary statements of the experiences of selected countries is given in Section VIII.

¹AIDTO Circular XA-1261, October 18, 1967.

C. National Programs

Nationwide rural electrification -- as contrasted with pilot projects-- was certainly an end goal of the NRECA pioneers in international programs. This is evident from the statements of Clyde Ellis and other NRECA officials who viewed the export of the REA/NRECA model for rural electrification as a tool not only to promote economic development for its own sake, but as a means of spreading democratic values and as a way of combatting the spread of subversion stemming from rural poverty.

In the early 1970's, with assistance of NRECA, the Philippines launched the first cooperative program of national scope modeled along the lines of the REA pattern. It is not clear why no programs of national scope modeled on the REA pattern came about in Latin America where the NRECA concentrated its efforts for the first decade. Several explanations have been advanced:

(1) the failure of NRECA and AID to press at ministerial levels in Latin America for establishment of a separate entity to manage an expanded program of rural electrification, i.e., NRECA and AID undertook to export what was essentially the REA model for rural electrification but without due consideration for the need of something approximating the REA to be established at the national level to administer a new approach to rural electrification. The absence of any specific mention of need for an REA-type financing and management organization, or the role such national organizations play, in the NRECA's "Phases and Steps for Organizing, Establishing, and Operating an Initial Rural Electric Cooperative Project in a Newly Developing Country," (July 1963, revised January 1971) suggests an unfortunate gap in realizing the dimension of the undertaking being launched;

(2) the reluctance of state power companies to accept a large role for cooperatives which would have amounted to an encroachment on what they felt to be their domain;

(3) the neglect by AID to follow up the establishment of pilot projects with large-scale funding for rural electrification.

(4) the preoccupation of NRECA with implementation of pilot projects together with having underestimated the period required for pilot projects to be completed and;

(5) the failure of the NRECA pilot projects to become identified early-on as shared enterprises of USAID field missions, rather than being looked upon as projects promoted from outside the missions.

There is little doubt but that the presence of pilot projects in Latin America assisted by NRECA has been a positive force and stimulation for increased emphasis upon rural electrification, even though the pilot projects were only replicated in Bolivia and Nicaragua. It is intriguing to speculate how much more advanced these programs might be had national REA-type institutions been established and had the NRECA been invited to play a more substantial role.

It is also pertinent to ask what further role or renewed effort by NRECA and AID might be appropriate in Latin America, in view of the massive task of electrification still facing the region. Should some of the countries in Latin America decide to strengthen and possibly accelerate rural electrification, increased domestic allocations and international bank borrowing will be needed. AID grant funding of such technical assistance could make an important contribution to the institutional base (national, state and local) for successful electrification. Section IX contains some specific recommendations based on NRECA's experience. By the 1970's most developing countries were already committed to the principle of rural electrification and were making heavy allocations from national resources to develop their electric power sectors. Yet rural areas were not receiving allocations of these resources adequate to ensure an "equitable" availability of electric service between urban and rural populations. The location of industry and non-agricultural jobs tended to follow availability of reliable electric power and to be sited in urban areas. Social and political

pressures generally arise from prolonged disparity between urban and rural areas of such public services as electricity and this is one reason most developing countries are committed in principle to extend electric service to the rural areas. Rural electrification should therefore be considered as an important component of national energy and electric power programs and not as a separate undertaking.

D. Costs

Typically Third World countries spend upwards of one-fifth of their development budgets for electric power. The great bulk of this investment is for power generation and transmission, urban distribution and to serve industrial needs. This has resulted in electricity for 40-60 percent of the urban population but only about five percent of the rural population. Furthermore, there has been little incentive for industry to locate in rural areas.

A World Bank study of rural electrification in developing countries concluded in 1975¹ that something in the neighborhood of 10 percent of total power sector investment was being allocated for rural electrification but this was concentrated in the wealthier countries, such as Korea. To permit a steady spread of electric service in poorer countries, they also would need to apply at least 10 percent of power sector investment to rural areas. Only by doing this could rural service reach perhaps half of rural population within 20 years. The percentage of the population served would depend, of course, upon the rate of population growth. The bank's 10 percent estimate for rural electrification is borne out in the Philippine case where the rural electrification budget is just under 10 percent of the budget for power generation and transmission. Yet within these limits, the Philippines is well on the way toward 'total' spread of rural electrification within the framework of a 20-year program launched in the early 1970's.

In the Philippines, for the first one million household and other connections, the

¹Rural Electrification, A World Bank Paper; World Bank, Washington, D.C.; October, 1975.

cost of rural distribution averaged \$200 per connection. Over the ten year period 1978-89, rural electrification is projected to receive funding of \$773 million or nine percent of the \$8.4 billion investment in the power sector. As a component of overall investment in the energy sector, even the ambitious rural electrification program in the Philippines shrinks to under six percent. Viewed in the context of a "fair share" of total investment for energy and power, the question becomes: Can a developing country afford not to put 10 percent of its investment in the power sector into electric service to its rural population which account for 60-80 percent of the population? Unfortunately, the institutional base does not exist in a number of developing countries to permit them to absorb even 10 percent of power sector investments for rural electrification. State power companies find it far easier to spend available resources on large generation and transmission schemes (often implemented under turn-key foreign contracts) than to cope with the difficult organizational and management problems of village level distribution of electricity. As indicated earlier, the NRECA is in position to provide technical assistance to deal with these institutional constraints.

It is not necessary to find by some complex process of ranking that rural distribution has a higher priority than power generation or transmission, or that electrification is of more value than say rural roads or schools. What is feasible and needed is to make a rational and politically sensitive determination that a nation's available resources will in general be equitably apportioned to serve the needs of all sectors of the population, and that the rural areas will not lag far behind the urban areas in their claim on resources and vital services. Such an approach will probably result in allocations for electric power in general and rural development in particular being divided in a way so as to expand investment for rural electrification.

National planners and their political leaders will make the basic decisions on such priorities. At the same time in those countries which rely heavily upon international banks and bilateral aid agencies to help finance development programs, these bodies must

necessarily be concerned that their assistance is used in such a way as to encourage balanced growth, stable conditions and equitable distribution of assistance funds.

It would be difficult to conclude that the World Bank's massive lending to the power sectors in developing countries has in fact been guided by a concern for equitable- or politically sensitive-sharing of electric power service between the rural poor and the urban and relatively small modern sectors. Rural distribution of electricity has expanded as an identifiable component of the World Bank and Asian Development Bank portfolios as the banks have taken up follow-on funding for AID/NRECA initiated rural electrification programs. Rather than criticize the banks and other donors for slighting the rural population, it is more productive to review the circumstances which result in the international banks rather belatedly turning to the funding of rural electrification.

Bank lending for rural electrification is occurring primarily in those countries in which the NRECA with AID grant funds has been effective in helping establish a strengthened institutional base to extend electric service to rural areas. Such institutional development has been most pronounced in the Philippines, Bangladesh and India. Section VIII reviews the record country-by-country. Annex "d" provides a listing of non-AID funding for rural electrification. A major conclusion of this study is that the NRECA and AID have demonstrated the capacity to help developing countries plan and get underway significant programs of rural electrification which can then qualify for large scale capital financing by developing banks and be a sound and balanced investment of scarce funds.

E. Rural Energy

In May of 1980, NRECA entered into an agreement with AID to enhance NRECA's technical capabilities in the area of small (1 megawatt or less) decentralized hydropower (SDH) and to make this expertise available to developing countries AID would provide

\$1.2 million for an initial 18-month period. Additional funds extend the program through July, 1982.

During the first 18 months, NRECA recruited a team of six specialists plus support staff and consultants, and initiated the following activities: gathered state-of-the-art data on small hydropower including information on equipment supplied by various U.S. manufacturers and a list of small hydropower specialists who might be available for technical assistance assignments; organized and led regional workshops in Latin America and Asia; provided teams to conduct country assessments and identify possible SDH projects (Peru, Zaire, Morocco, Ghana, Panama, Togo, Dominican Republic, Dominica, Bangladesh, Rwanda); and developed training proposals. In addition, a number of special studies were commissioned to examine further some of the issues identified in the regional workshops and many planning sessions held in the United States. The studies covered financing considerations peculiar to SDH; regulatory problems; environmental impact; technical design; and analyses of operating SDH programs such as in Pakistan.

For a program with ambitious goals such as that of the SDH program (providing reasonably priced hydropower to sites beyond reach of central station power, and of a technical quality adequate for productive uses such as running of motors) and given the problems to be overcome, the preparatory activities noted above should be viewed as necessary background rather than a measure of the program's prospect. To date, the country studies and program recommendations to AID missions have not resulted in any new programs being launched with assistance of NRECA. AID has approved an SDH program for Peru using other sources of technical assistance. There should be a review of why NRECA has not been called on to provide technical assistance for country SDH programs. Certainly AID has made a large investment in developing the International Programs Division of NRECA. And, as reported elsewhere in this paper, the institutional capabilities of the NRECA to provide technical assistance in the power field have progressed and broadened over the years with this assistance from AID.

The NRECA was no doubt selected by AID to carry out the SDH program in the developing world because of the NRECA's unrivaled experience with rural energy programs in the United States, and the recognition that small hydropower is one component of rural electrification - basically an alternative fuel supply to accomplish the same equity and development goals as other rural electrification efforts. The growing interest among a number of NRECA's member cooperatives in exploring local and renewable energy sources and in developing hydroelectric sites in order to feed power into their distribution grids is a particularly good reason for NRECA's selection to be AID's contractor for SDH development. Fourteen U.S. electric cooperatives managed and operated small hydro electric plants in 1981. One-hundred additional small hydro projects have been proposed by 32 cooperatives. By mid-1981 these projects were in various stages of application for license, review and approval. This experience is available and more is being gained from within the NRECA system. This SDH activity is certainly among the most extensive in the United States in this field and is the only program targeted specifically on rural areas.

A much larger number of U.S. cooperatives are involved with other alternative energy programs such as solar thermal and photovoltaics; peat fired power plants; geothermal; unconventional gas; and biomass; both wood-fired power plants and refuse combustion. While NRECA member systems are by no means the major operators in these fields, close relationships are maintained with the many organizations (municipal and private) who are deeply engaged with research and operational programs and, again, the NRECA programs present a rural service orientation. For example, there are more small hydropower plants operated by municipalities in the U.S. than by rural electric cooperatives, yet NRECA is the only source of technical assistance for rural management and distribution services.

A review of NRECA's experience over the past 20 years with rural electrification programs in some 30 countries should be helpful in planning the next steps with the SDH (and other rural energy) programs.

Experience has taught that rural electrification is as much a management task as a technical task. This was also the case with electric cooperatives in the U.S. The most promising approach this experience suggests is that existing rural electric systems in developing countries should add small hydro plants to their system as is being done by the electric cooperatives in the U.S. This would substitute water power for imported fuel by displacing diesel engines. And it would eliminate the need for new institutions and management--the commodities that are the most scarce in developing countries. Another way to deal with the operating and management problem would be to help existing institutions in remote areas (hospitals and mission stations in Africa have been suggested) to acquire small hydro plants to satisfy current and future demand, for which the institution would be responsible.

The alternative (i.e., locating small hydro systems remote from existing support institutions) is institution-building within developing countries to service SDH programs from the national level and at the project site level. In most cases this requires the training of not only local operators and managers, but will involve some form of community participation as well. Something akin to the current NRECA role in assisting larger-scale cooperatives will be needed. Failure to come to grips with these requirements could well result in non-operation of SDH plants and dashed hopes for this effort to help the poor. As brought out in AID's own evaluations of rural electrification, success calls for careful attention to all aspects of the undertaking.

F. Looking Ahead

The twenty-year overview of NRECA's activities provided above suggests five items for special consideration by AID and NRECA as they look ahead to possibilities for

future collaboration. Altogether, a great deal has been learned from the AID-NRECA partnership that will be helpful in planning future projects.

1. The concept of rural electric cooperatives (or non-cooperative management arrangements involving participation by local communities) should be broadened to encompass all types of rural energy which might usefully be managed by rural electric cooperatives. As noted in Section D. above, where rural electric cooperatives exist or can be formed they could provide the essential management ingredient for small hydroelectric plants. The same is true for wood-fired power plants. Both small hydro and dendro-thermal tree farms are being integrated successfully into rural electric cooperatives in the United States. The Philippines engages in major dendro-thermal and small hydro programs through its network of rural electric cooperatives. These patterns should be studied for relevance elsewhere. The concept of 'energy' coops should encompass other forms of rural energy such as peat fired power plants, solar generation, wind power and other currently exotic forms of energy, all of which are of interest to the electric cooperatives in the United States and are being studied and developed through research institutes with which the NRECA is affiliated. Looking ahead, rural 'electric' cooperatives may well see their role if not their title changed to that of rural 'energy' cooperatives. It is important for AID, the recognized leading innovator in development assistance, to lead and not follow this development and thereby determine the shape of this one important spectrum of future lending by the international development banks.

2. There should be much more calculated specialization and division of labor between U.S. bilateral funding for technical assistance in the power sector, and international bank funding for capital (construction) costs. A greater and more purposeful concentration of the relatively limited AID funds on technical assistance may be the only way in the future for AID and its partners in the U.S. private sector to

remain relevant to the developing world. This is due both to the strategic role played by technical assistance as undertaken by AID and its private sector collaborators (a resource unmatched elsewhere in the world) and to the special importance grant aid plays in the process of bringing about innovation and change. It has been demonstrated clearly that AID funds and NRECA technical assistance can succeed in helping countries with their rural electrification programs. This has been done most successfully in these cases where AID contributed both adequate amounts of grant technical assistance and low interest capital funds to get major programs well launched. In the future, as AID commands relatively fewer dollars, the challenge to AID and its private sector collaborators will be to find effective ways to match grant funds for technical assistance with far fewer AID dollars for construction with the relatively abundant funds from international development banks. Formal co-financing will be possible in some cases. At the same time, experience has shown that in most cases where AID steps out in front to help build institutions, train people, and get a new program going, the IFI's are more willing to follow with capital for expansion. This situation is favorable particularly in the power sector where the IFI's are making massive investments in electric power for urban and industrial needs and have very few opportunities to finance rural energy projects. The current ratio of such investments is more than 9:1 in favor of the urban sector. The exceptions are largely the opportunities for investment in rural energy 'developed' for the banks by AID.

3. U.S. trade and commercial interests will probably benefit when future approaches to rural electrification place greater emphasis on rural electrification as one component of the broader energy and electric power sectors. Unless this is done, AID will find itself busy with at most the 5-10 percent of the energy/power sectors of developing countries. A broader role more calculated to benefit U.S. trade and commerce will be possible if AID's technical assistance funds are used to finance power

sector studies in the least developed countries and for development of power sector projects (generation, transmission and distribution) for financing by the IFI's, export credits and commercial loans. Even within the limits of rural electrification, it will prove useful for AID to involve U.S. manufacturers of equipment and household appliances as it develops projects.

4. The attraction that electrification programs hold for rural populations, and the need for the Third World's hard-pressed governments to show they can deliver visible evidence of progress, suggests that the political dimension both for host countries and the United States should be given due weight when making choices between alternative investments in rural development. Often strong development cases can be made for more than one use of AID funds. Review of NRECA's international experience indicates that rural electrification programs rank high in political benefits to host countries and the United States. For the U.S., rural electrification provides a politically unobtrusive intervention and an unusually high and positive identification with the donor country and its people compared with some alternative projects. The NRECA overseas staff provides a qualitative difference because of its service-oriented motivation in most cases.

In the developing world, rural electrification is not subject to as serious abuse in implementation as some other projects because of its well-defined physical characteristics, close monitoring, and the accompanying institutional development and management and technical training programs incorporated for all skills needed. The systems approach followed by NRECA has proved to be effective in the majority of cases in providing for long term successful operation of the systems built. It will be useful to AID to review this aspect of rural electrification and to include in the review the American ambassadors and private sector Americans overseas who have become familiar with NRECA's major international programs.

5. It will be beneficial to AID and to NRECA at some point to negotiate a blanket "collaborative agreement" encompassing and harmonizing the varied activities now being carried out by NRECA under separate agreements: with AID's Office of Private and Voluntary Cooperation to strengthen the role of cooperatives in international development; with the Office of Energy to facilitate use of small hydroelectric sources of energy; and with the Regional Bureau's/Country Missions to provide technical assistance for national rural electrification and other energy programs. Negotiation of a new-style "collaborative agreement" would no doubt take some months. In the meantime, the existing agreements contracts can proceed without interference, but with an improved understanding of the package of service now being provided to AID by NRECA and available for use in the future.

6. The NRECA is an active member of the Electric Power Research Institute (EPRI) and supports an in-house research program as well. NRECA is in a good position to be a link between EPRI and other energy research programs and AID's field missions. A systematic approach to gathering data on energy research and transmitting it through AID to developing countries could be done by NRECA. Much of the research going on in renewable energies is of particular importance to the developing world. EPRI, for example, is currently sponsoring a multi-million dollar program in seven different solar power systems.

7. Some of the approaches being tried and developed in the U.S. to meet the financial needs of smaller utilities may be of interest to Third World countries. This includes the NRECA's experience with the National Rural Utilities Cooperative Finance Corporation (CFC) which was established to provide new funds to rural utilities to augment, among other things, the diminishing Congressional appropriations for REA. The CFC is in a position to provide financial advisory services to developing country

utilities. The NRECA is a convenient channel for such services as the NRECA's General Manager sits on the CFC Board of Directors, as he does on a number of other organizations which could be expected to cooperate with expanded technical assistance in the energy field.

IV. THE ROLE OF COOPERATIVES

Cooperatives have come to play a role in rural electrification largely to fill a void. This was the case in the United States in the 1930's when neither private power companies nor municipal utilities were prepared to extend transmission and distribution lines to thinly populated rural areas where very low power loads were forecast. Today in the developing world where state power companies are dominant and funds are scarce, the situation and attitude toward rural electrification somewhat parallels that of the private and municipal utilities in the United States 40 years ago. The rural population of America was pressing for electrification by the 1930's and a number of rural communities were organizing small electric cooperatives. The TVA made the first public loans to several experimental cooperatives in the South. When President Roosevelt established the REA by Executive Order in 1935, local groups in America were encouraged to apply for loans to establish cooperatives to distribute power they would purchase in bulk from large private utilities or from the major public power suppliers such as the TVA. The nearly 1,000 rural electric distribution cooperatives which were formed in the United States with funding from REA came to serve over half of the nation's land mass. REA power lines entered 80% of the counties of America.

The "typical" electric cooperative in the United States initially served some 4,000 members at a per-member (household) cost of \$300-400 requiring an investment of about \$1 million per cooperative. "Typical" cooperatives or other forms of electric distribution in the Third World serve a larger membership due to population density and at lower costs, about \$200 per connection. While the NRECA does not insist upon the cooperative mode of organization for its technical assistance, the majority of electric systems it has assisted overseas are in fact organized as membership cooperatives. In determining its own criteria for membership, the NRECA has not insisted upon the cooperative form of organization. Forty-two of its members are organized as Public Utility Districts and not

cooperatives. The Public Utility Districts do, however, retain a local character responsive to an elected board of directors and are generally not for profit.

Not one of the cooperatives' systems established in the United States has been abandoned or "failed." Nor have any of the more than 200 rural electric systems established in foreign countries with technical assistance from the NRECA been abandoned. On average, they serve more customers than anticipated. On the other hand, NRECA-assisted foreign cooperatives have frequently experienced management problems and financial difficulties. In spite of these very real and continuing management problems, the electric cooperatives established following the REA pattern have a better financial and operating record than do most other forms of rural based cooperatives many of which have been assisted by AID. Furthermore, the electric cooperatives appear to have fewer management problems than other kinds of rural development programs supported by AID. As pointed out earlier, it is important to keep the management problems of all rural development efforts in perspective and to be aware of the real nature of the task being undertaken--which is to come to grips with profoundly difficult cultural, educational and political problems associated with the modernization process in traditional societies.

In considering the merits of cooperatives vis-a-vis other forms of organization for local distribution of electricity, there is a rather broad consensus that local conditions will determine the most effective approach to follow. While holding to this position in principle, the NRECA understandably has an institutional bias in favor of the cooperative approach. This predisposition is of special significance to AID since AID is committed by law and policy to seek ways to respond to local needs and to seek participation of the people it is trying to help. AID's target population is predominantly the rural and therefore the poorer sector of the economies being assisted. AID has found it quite difficult to carry out assistance programs genuinely responsive to these goals.

Based on reports from U.S. ambassadors and overseas AID missions and from its own evaluations, the rural electric cooperatives assisted by NRECA and AID in a number of countries have proven to be one of AID's most effective instruments in fulfilling its policy goals. From this point of view, the burden of proof should be on state power companies and others who advocate state monopoly of power that their approach will serve purposes of equity and balanced growth between the urban/modernizing sector and the rural sector. In like manner advocates of the use of cooperatives must recognize that their approach involves a serious and long-term commitment to institution building.

Annex "h" identifies the cooperatives by country which have been assisted by NRECA.

In addition to assisting with development of individual rural electric cooperatives and with national REA-type governmental administrative bodies, the NRECA has encouraged and/or assisted with formation of national and regional private associations/federations of cooperatives.

A national Federation of Electric Cooperatives of the Philippines (FECOPHIL) was formed in 1979 just ten years after groundbreaking for the first cooperative. This followed closely the pattern of establishment of NRECA itself in the U.S. NRECA maintains fraternal relations with the Federation and their officers and staff exchange visits. In 1981, the former Administrator of the International Programs Division of NRECA spent three months in the Philippines on detail to FECOPHIL to assist with some of their procedures and member service programs. FECOPHIL is now providing much the same member services to its members as NRECA provides to its members: a pooling of insurance risks, negotiation of reduced bulk rates for purchased electricity and a package of management and training services.

Other national federations of electric cooperatives have been formed in Argentina, Brazil and Chile. The NRECA maintains fraternal links with each of these federations.

In June of 1981, the NRECA became a founding member of the Organization of American Cooperatives of Electricity (OACE) which is devoted to unifying the electric cooperatives' movement in the Americas; promoting the exchange of ideas, technology and personnel among their cooperatives; promoting the development of new electric cooperatives; giving electric cooperatives a stronger voice in energy policies and policy development; and making the public more aware of the impact and achievements of electric cooperatives. The movement with which NRECA is collaborating is a very large one -- the cooperatives of the founding members (Argentina, Bolivia, Brazil, Chile, Costa Rica and Ecuador) together have 878 electric cooperatives with 1,047,567 members -- and a venerable one, the earliest cooperative in Argentina dating back to 1926. NRECA is open to opportunities to contribute to strengthening the cooperative movement in other regions of the world.

V. RELATIONSHIPS WITH AID

A. Funding

1. For NRECA International Programs Staff

From an initial grant in 1962 of \$235,995 to finance NRECA's first full-time staff member for support of international programs, core funding by AID rose to \$600,000 in 1980 and 1981. This institutional grant remains vital to the international programs assisted by the International Programs Division of NRECA. This is the case even though these programs have received a growing level of funding from project specific country contracts funded by other AID and non-AID sources. These project and country specific contracts do not provide for overall program planning and general evaluation costs; for follow-up training and management activities after projects are technically completed; nor do they allow for support for U.S./LDC cooperative-to-cooperative activities or other new or innovative activities. Nevertheless, it is encouraging that by 1981 AID's core grant had declined from nearly 100% of costs of NRECA's international activities to under 20%. A listing of the most recent sources of income for the International Programs' Division is in Annex "e".

2. For Rural Electrification Programs

Several attempts have been made to calculate the amount of AID funding for rural electrification. Estimates do not agree largely because of the difficulty in identifying the rural electrification component of some power projects which include a number of elements: urban distribution, generation and transmission. Nevertheless, it is safe to say AID funding for rural electrification over the past 20 years, since NRECA activities began, is in the order of \$20 million per year on average. AID's records do not identify any specific rural electrification projects before that time. A total project list is included at Annex "c".

This constitutes but a tiny fraction (less than 1%) of the more than \$50 billion of bilateral aid provided by the U.S. over the last 20 years. Examined on a year-by-year

basis, these figures reveal a still modest but accelerated level of funding for rural electrification since the NRECA and AID initiated programs to build or strengthen institutions capable of efficient provision of electric service to rural areas. In many cases, this process was dependent upon AID's prior investments in power generation and transmission systems so there would be something to distribute. The perceptible rise in AID funding for rural electrification which occurred during the 1970's no doubt also reflected the higher priority the Congress and the Executive Branch accorded rural development programs designed to alleviate rural poverty, along with AID's sharp reduction in funding of major capital projects such as large power generating plants and transmission grids.

B. Communications

While quite good overall, communications between AID and NRECA have been uneven over the years. This seems to have been related to the relatively frequent staff changes within AID; to the varied type of assignments carried out by NRECA for different organizational components of AID; and to the feeling by some AID officers that NRECA's performance on some assignments was below expectations.

As to performance, NRECA's records reveal an off-setting number of comments to the effect anticipated AID or AID Mission support was lacking or slow in coming. Perhaps it would be useful at some point for AID to compare the relative performance of a number of its technical assistance contractors and grantees. The NRECA staff with whom the authors of this report talked, believe that NRECA's performance would rank high judged by visible results of their work, institution building, and long-term benefits for economic development. Criticisms from AID staff focused on weaknesses of some of NRECA's personnel assignments, and on difficulty in evaluating benefits for the poor as discussed below.

As to staff changes and the problem of keeping NRECA's varied assignment for

AID in perspective, there is need for better communication between all the parties involved. Within AID, these parties include among others the Office of Private and Voluntary Cooperation; the Office of Energy; the Contract Management Office and the four regional bureaus. As of the end of 1981, four contracts of one kind or another were in force between the NRECA and AID. It might serve a useful purpose if some form of collaborative agreement were entered into between AID and NRECA which would encompass and harmonize these activities.

C. Evaluation

1. Latin American Cooperatives Evaluation - 1971

In 1971, AID commissioned a comprehensive "Evaluation of AID and AID Contractor Programs in Promoting Cooperatives in Latin America." The evaluation was carried out by the American Technical Assistance Corporation (ATAC). A summary report was prepared along with separate volumes on the six countries visited: Costa Rica, Peru, Bolivia, Colombia, Honduras and Ecuador.

The evaluation concluded it was basically sound policy for AID to support cooperative activity as a means of contributing to economic development in Latin America in a manner which served the then Title IX (F.A.A.) objective of increasing popular participation in the development process. In appraising performance of the half dozen U.S. cooperative organizations working with AID funds in Latin America, the ATAC evaluation found there was no need for significant departure from the pattern of rural electrification being promoted by NRECA. The evaluation did not make recommendations for major modification of NRECA's approach and programs as were recommended for the other U.S. cooperative organizations. The key recommendation addressed to NRECA was that its programs be continued but with more emphasis given to marketing in its feasibility studies and management training. Subsequent evaluations by AID as noted below also found greater evidence of progress in strengthening training and

management than in marketing (productive uses).

The ATAC report concluded that strengthening agriculture was the most important need in Latin America and that strengthened agricultural cooperatives were the best hope to achieve this. Ironically, the ATAC report also concluded that no country in Latin America has a good working model of agricultural cooperatives for widespread replication. AID was advised to give priority "... to devise and perfect models of agricultural cooperatives for small farmers that lead to effective results." Retrospective appraisal of this recommendation suggests that citing needs is one thing, but it is better to be able to match the "need" with a proven development model which the United States has the capability to help others replicate. Perhaps in the future as AID plays a smaller proportional role in development assistance, AID should concentrate on activities which both respond to key needs on the one hand and to distinctive American capabilities on the other hand. By this criteria, technical assistance for rural electrification based on the NRECA model would command high priority.

2. NRECA Evaluated in 1976

AID contracted in 1976 with Development Alternatives, Inc. (DAI) to carry out "An Evaluation of the Program Performance of the International Program Division (IPD) of the National Rural Electric Cooperative Association". From its report, "The major conclusions reached by AID are that IPD has been very successful in accomplishing most of the assignments called for in the task order and the OPD." In this context, the report noted constraints beyond IPD control which had impeded performance. It concluded "DAI believes that IPD is aggressive and competent, perhaps even peerless, in the fields of promoting rural electrification and in offering program planning and consulting services to developing countries." As with other evaluations, DAI pointed out the need for greater attention to training for productive use of electric power. The DAI study of three country programs found the electric cooperatives "working rather well in the

Philippines" where it found indications community benefits were actually occurring. DAI's observation of cooperatives in Nicaragua anticipated the possibility of ultimate take-over by the Government, and noted the limited role cooperatives play in Bolivia.

3. AID Impact Evaluations - 1980/81

Since 1963 when AID resources were redirected to give more emphasis to the "poor majority," AID has been concerned with and attempting to assess the relative benefits to the poor from its various projects. Within this context, AID has sought the answer to what priority rural electrification should have in investments for rural infrastructure (relative to roads and irrigation for example), and how to rank benefits to the poor from infrastructure projects with alternative investments in social services such as education and health. Existing evaluations were found by AID to be inclusive. During 1980 and 1981, the Bureau of Program and Policy Coordination (PPC) of AID undertook four country studies to attempt to measure the impact on the poor of AID support for rural electrification.

The studies were made in the Philippines, Costa Rica, Bolivia and Ecuador. Following completion of the studies, the Evaluation Office of PPC held a "sector meeting" in September 1981, to review findings and conclusions. As of the end of 1981, AID was still reviewing the results of the meeting. The unresolved issues, as discussed at the meeting, focused on: the role of cooperatives as democratic institutions; the need to stress productive use of electricity; and the pros and cons of central station versus auto-generation of power. It was brought out by the AID staff paper prepared for the meeting that rural electrification projects tended to have a number of purposes and that "AID should clarify what it expects from its rural electrification projects before it can reasonably evaluate the usefulness of the NRECA model in its overseas programs."¹

¹"Draft" Rural Electrification Sector Paper; Alice Davenport July 1981.

Given the limited nature of impact evaluations (three week studies focused on impact on the poor), and the concentration on limited geographic areas (as in the Philippines where 3 of the 4 cooperative sites were in "poor" areas which fitted the scope of the study but were not necessarily typical of the 117 Philippine cooperatives) the studies should be used with caution in making generalizations on rural electrification. They do, nevertheless, contain much useful information, identify lessons learned and raise questions for further study. And though some findings varied markedly from country to country, there tended to be agreement that rural electrification as assisted by NRECA and AID: (a) is valued highly by rural people who attach importance to electrification and will make considerable effort to pay for it; (b) reaches the poor as well as better off households; (c) provides cheaper home lighting than kerosene; (e) functions best where dealt with as one component of an integrated rural development strategy and when productive uses are emphasized and assisted; (f) requires substantial and continuing training and management services; and (g) is oversized for some uses where line loads are low. The AID evaluation cautions that rural electrification itself should not be viewed as a panacea to deal with rural poverty. But it found that social benefits were frequently high and that long-term economic benefits were very considerable in the decade following project completion.

The most positive of the country studies was Costa Rica where rural electrification was judged to be an almost unqualified success. The impact on the poor in Ecuador was found to be quite substantial with the study concluding, "We were at times astonished by the lack of sophistication of AID's early efforts and alternately impressed with undeniable positive results."¹ The Bolivia study, while noting it may be too early to ascertain the impact of the loans being studied (the projects looked at had not been

¹ AID Project Impact Evaluation Report No. 21, "Ecuador: Rural Electrification" (June 1981)

physically completed), did find major positive impact on social conditions, and reduced costs for home lighting while raising questions about the low usage for industry and economic development, and questioned if design standards were not too high. It recommended a vigorous program to encourage productive uses of electricity.

The Philippine study is the most difficult of the impact evaluations to characterize, in large part because the study included but a small part of the national program, all of which had received assistance. The Philippine study was the most unstructured of the group and it did not make use of statistical data questionnaires as was the case in Costa Rica and Ecuador. A more reliable assessment of impact on the poor in the Philippines should become available from the extensive data collection exercise by the U.S. Bureau of the Census, still to be analyzed, and from a carefully designed survey now underway (December, 1981). The survey questionnaire was prepared with AID's help following the impact studies and focuses on seven cooperatives in the Philippines.

4. Other Evaluations

In addition to the three special evaluations commented on above, there have been a number of other studies and/or evaluations of AID-supported rural electrification. Several important studies are in progress. The latter include AID funded studies undertaken by Resources for the Future, the Bureau of the Census and NRECA. Perhaps the most complete review of such studies was prepared by AID in September, 1981, in connection with its impact evaluations. A copy of that compilation appears in Annex "k". A significant omission from that list is the ATAC study commented on above. Nor does the annex list describe the evaluation activities now underway by NRECA itself.

In addition to arranging for the collection of hard 'impact' data from the Philippines, NRECA will be submitting semi-annual reports to AID's Office of Private and Voluntary Cooperation which will monitor the activities of its overseas projects. A

format was prepared for use by all of the U.S. cooperative organizations funded by AID and should provide a rather complete and objective picture of program benefits and accomplishments. The format was prepared for AID by the firm of Development Associates, Inc. NRECA has itself secured the services of the firm, Practical Concepts, Inc. to strengthen its in-house capability to conduct socio-economic impact studies, as well as conduct project operations viability studies.

No one of the studies, nor the studies collectively, will answer all the questions that have been raised about rural electrification. Nevertheless, they do represent an important contribution to what appears to be emerging consensus in the development community on many aspects of rural electrification, and the place of rural electrification in a sound rural development strategy.

Two recent studies are indicative of the growing interest of aid organizations and researchers in improving their understanding of rural electrification. As they are not yet widely available, the reports are summarized below.

Findings of the first study are considerably more affirmative than the rather equivocal AID impact study. The new study is based on extensive research and is a case study of 10 municipalities and connecting rural populations which was carried out by Father Francis C. Madigan, S.J., Xavier University, in the Philippines. Father Madigan's report was unequivocal in establishing association between cooperative rural electrification and a very marked increase in rural incomes and boost in rural employment in the areas electrified compared to the non-electrified control area. Significantly, none of the other attempts at evaluation of rural electrification utilized control areas and some, as with the impact study in the Philippines, did not gather other than selective interview and anecdotal data on which to base findings.

The Xavier University study was able to utilize a professional native staff of data gatherers which has been studying rural electrification in the area since 1975. The study was made possible by an AID grant but was carried out exclusively by the University

under Father Madigan's supervision. Its purpose was to examine the relationship between "cooperative rural electrification, income distribution, employment and (human) fertility." The 10 municipalities and connecting populations were electrified in late 1971 and 1972. The control area covered a very similar, near-by coastal region which had received virtually no electrification by the time survey data was gathered in late 1978. The findings of the Madigan study were made public in mid-December, 1981 at the General Conference of the International Union for the Scientific Study of Population. The study found off-family farm business and industrial enterprises rose from under 300 at the beginning of the project to a surprising 1,966 by 1979. Only 14.5 percent of all persons employed in the electrified areas on the interview dates in 1978 were working in off-farm, non-family enterprise which had begun before 1970. Household incomes in the electrified areas were found to have doubled in the areas electrified compared with the non-electrified areas. Poor households benefited from electrification as did higher income households. And while not as dramatic as changes in jobs and income, the birth rate was lower in the electrified areas than the non-electrified areas. The study related this decline in fertility to the need of families to save to pay electricity bills and purchase new consumer goods such as irons.

A second recent effort to appraise the impact of rural electrification was prepared by Ms. Janice Brodman who spent a number of months visiting and gathering data on the impact of electricity on small businesses in the Klaten area of Central Java. The three villages surveyed were the first to receive electricity under the AID-assisted rural electrification program in Indonesia. The villages had been connected to electric service one year at the time of the survey. With respect to the small businesses the survey found: consumption by business customers accounted for 57% of the total kWh consumption in the "RE" area; the "direct benefits" derived from electric lights clearly exceed those from kerosene lamps; customers felt they were "getting their money's worth"; working hours were extended in 19% of businesses surveyed and 15%

used the electricity for equipment not formerly used. Ms. Brodman found, however, a substantial further potential for expanded use of power for productive uses. She recommended that rural credit be improved for small to medium businesses and that assistance be provided to small producers to market their products, perhaps through marketing cooperatives. She reported average increase in output of electric sewing machines over pedal machines was 50% per standardized day, and that 80% of the businesses in the area had an increase in profits due to electricity use. She found very small enterprises expanded profits the same rate as larger businesses.

VI. OTHER DONORS

Development assistance bodies -- whether bilateral or multilateral -- find truly attractive rural development projects to be quite scarce if measured by the readiness to efficiently absorb large blocks of funding. Few if any donors, other than the United States, have resident staff that is able to help developing countries create the institutions and model programs to effectively utilize their funds.

Rural electrification stands out as one of the rural development activities assisted by AID that has attracted generous and even enthusiastic support of other donors. Although AID's own technical assistance capabilities, especially its in-house capabilities, have been declining, AID's provision of technical assistance in this particular field has been sustained and multiplied by the high motivation of the NRECA and its member cooperatives. Few alternative technical assistance programs are backed-up by such a committed constituency.

Large-scale funding has been attracted to many of the rural electrification programs launched or strengthened with help from AID and NRECA. A country-by-country list of such funding appears in Annex "d". In countries where AID has been able to take the lead in helping to prepare programs which can efficiently absorb larger amounts of funds, the international financial institutions and other donors have generally been more than willing to provide funds for expansion and replication. Certainly some lending would have occurred for rural electrification without any of the way being paved by AID. Yet the coincidence is quite remarkable of international banks and other donors initiating or accelerating their lending for follow-on funding for rural electrification institutions strengthened by AID and NRECA. Several examples are discussed below.

A. AID's first large financial commitment to rural electrification was in the Philippines. From an initial feasibility survey by NRECA in 1967 through its last obligation of funds in FY 1979, AID obligations have totaled over \$93 million (\$4 million

in grants for technical assistance and \$87 million in loans). In addition, AID channeled some \$10-15 million of excess U.S. Government property to the program which facilitated early start-up. Other donors began to support Philippine rural electrification in the mid-1970's. By the end of 1981, non-AID development loans were more than three times the AID participation in the program, as shown in the table below. The Asian Development Bank (ADB) loan of December 1981 equalled the total of the five large development loans provided by AID. The confidence the donor community has shown in the Philippines' National Electrification Administration and in the network of local cooperatives distribution systems leads one to expect that this source of funding will continue for some years. The table lists separately external funding for mini-hydroelectric and dendro-thermal projects which are an integral part of rural electrification in the Philippines.

A. <u>External loans/grants for Philippine Rural Electrification</u>		
AID grants and loans	\$ 93	million
IBRD loan	60	"
ADB loan	88	"
OECF-Japan (at Y 220 = US \$1)	45	"
West German Loan (at DM 2.25 = US \$1)	22	"
France (at FF 5.85 = U.S. \$1)	14	"
	TOTAL	\$322 "
<u>Mini-hydroelectric projects</u>		
United Kingdom	\$33	million
China	30	"
West Germany	2	"
France	19	"
	TOTAL	\$84 million

Dendro-thermal projects

France.....	\$19 million
United Kingdom	20 "
Subtotal.....	\$39 million
TOTAL	\$445 million

B. AID's largest commitment to rural electrification has been in Bangladesh, where since the first obligation of funds in 1976, the program has received \$119 million from AID, mostly in the form of grants. Closely following the Philippine experience in concept and organization, the program began to receive funding from other donors in 1978.

External loans/contracts

AID grants.....	\$119 million
IBRD loan	40 " (pending)
Kuwait	30 "
Finland	6 "
	<hr/>
Subtotal	\$195
Bangladesh Government participation	<u>36</u> "
TOTAL	\$231 million

Bangladesh's national program is beginning to spread widely and will require large-scale follow-on funding for a decade or more to achieve the government's goal of full initial coverage of all villages. The institutional base for this is being formed and staff trained to permit this expansion, viewed as a centerpiece of national rural development strategy.

C. Another large-scale lending effort has occurred in Indonesia where the first major rural electrification effort was launched with support of AID and NRECA in the mid-1970's. From the outset, the program was co-financed with Canada and The Netherlands, as shown below.

External loans/contracts

AID grants and loans.....	\$41 million
Canada grant and loans.....	25 " (estimate)
Netherlands loan	5 "
	Subtotal
	\$71
Indonesian government participation	<u>21</u> "
	TOTAL
	\$92 "

Although delayed in implementation, the Indonesian program is now entering its major construction phase with four pilot projects in operation. Six-hundred villages and surrounding farms will be electrified. The institutional requirements for widespread expansion of rural electrification are still under development. Indonesia and the donor community will no doubt assess experience with this initial effort at accelerated rural electrification in deciding next steps. However, the present level of rural electrification service is so limited that the Indonesian government will no doubt undertake some form of expanded program and will benefit from experience with this initial project.

D. As described earlier, the efforts of AID and NRECA in Latin America concentrated on pilot projects which, although they did not lead directly to national level organizations and large networks of cooperatives, did lead to heightened interest in rural electrification throughout Latin America and in the rest of the developing world. The Inter-American Development Bank and the World Bank have made a number of loans specifically for rural electrification, some of which were direct follow-on investments to

the pilot projects assisted by AID. Other loans were to state power companies which benefitted from the experience of the NRECA-assisted pilot projects.

As revealed above, the international development banks have been ready and willing to follow AID and NRECA's institution building efforts with substantial loans for system expansion. A large part of the bank's portfolios for rural electrification are based on the early work and financing of AID and NRECA. Where such pioneering work by AID has not occurred, the banks and other bilateral donors as well have for the most part restricted their lending in the power sector to existing plans of national power companies. Not much "area coverage" rural electrification has resulted. This was true even though most development lenders are concerned to some degree with the end-use and equity impact of their assistance, as well as the prospects for repayment.

In recent years, NRECA assisted projects for village and farm level electrification have been designed and carried out with end-use of the assistance as a high priority. The end-use activities funded and carried out, however, were still quite modest and probably insufficient. One of the special characteristics of AID/NRECA assisted rural electrification is that it is possible to examine and evaluate electrification, in detail, as has been demonstrated by the impact and other evaluation activities described in Section V. C. Not many projects assisted by AID are susceptible to such close scrutiny over a period of years and it is rare for other donors to have projects that provide for such clear and visible linkages between aid provided at the top and end-use at the village level. Given the institution building and staff training that precedes the other donor financing, it is highly probable that the return on such investment is high in proportion to investments in village level projects without such an institutional foundation.

VII. RELEVANCE TO FOREIGN POLICY

A recent American ambassador to Indonesia, when asked his view as to the relevance of rural electrification to U.S. foreign policy, replied in substance as follows:

Now that agricultural problems have received a great deal of attention and agricultural production is rising nicely, the largest problem facing Indonesia is that of finding productive employment for the two million new entrants to the labor force each year. Capital-intensive large industries do not employ many people. The solution must lie in a rapid expansion of small, labor-intensive industries. Rural electrification is an essential precondition for rapid expansion of off-farm employment. It is important to the United States as well as to other countries that Indonesia find productive employment in the rural areas for this large and fast-growing mass of people. Other things will need to be done as well, but electrification is a must.

Another United States Ambassador who has observed rural electrification programs in Asia commented in these terms:

AID's "new directions" mandate to work with the poor often runs the risk of placing AID staff or contractors in the position of becoming inappropriately involved in local politics and sensitive issues. Rural electrification is a very tangible, technical program to build and operate a physical plant. As such it is politically unobtrusive and avoids political entanglements, and has a better chance of surviving changes of government than some other programs. The U.S. Government's long-term interests in developing countries call for projects that are likely to survive political changes at the top. Village electrification treads that fine line between supporting a basic need of the poor on one hand and supporting the political establishment on the other hand.

A third American ambassador from a country which has recently launched a large rural electrification program put it this way:

Basic to all sound development programs is 'commitment' by a country's leadership. Given 'commitment', rural electrification is one of the very best programs to support. It has good visibility, both for the leadership of the developing country and the United States. There is a proven U.S. 'model' to work from which has now been proven to be adaptable to Third World countries. Through the NRECA, technicians can be provided who are able to really be helpful since they have done similar jobs at home. Host country leaders can get behind rural electrification with confidence it will work and not be a 'flash in the pan'. That cannot be said of too many other projects. Another thing, a measure of decentralization in the decision making process is important to development of many countries. Cooperative rural electrification encourages an acceptable form of such decentralization. I have seen local and village leadership respond to and grow by involvement in local distribution of electricity and by participation in the side benefits it brings. I know AID and other development institutions want to help the poor and this is right. Unfortunately, the United States does not have great expertise in many fields of direct relevance to the poor. Our basic education programs no longer fit the developing country needs, and our help may not be wanted in such sensitive areas. Our farm level agricultural practices in the United States now bear little resemblance to the situation found at the farm level in most developing countries. On the other hand, we have a 'fit' in rural electrification.

VIII. PERFORMANCE AGAINST AID TASK ORDERS/CONTRACTS

A. By the International Programs Division

NRECA's involvement in the establishment of rural electric systems in developing countries has been funded primarily by AID. In recent years technical assistance provided by NRECA has also been financed by international development banks, programs within the United Nations and by the host country governments themselves. Such non-AID funding has amounted to approximately \$5 million since 1968. Annex "c" and "d" provides detailed record of NRECA's international activities, by funding source.

Beginning in 1962, the NRECA's International Programs Division entered into an agreement (AID/csd 225) with AID to provide technical assistance for rural electrification projects. The initial ordering agreement was signed in November 1962 and eventually contained 58 task orders, before it was superceded by AID/csd 1504 in March 1967. Fifteen task orders were forthcoming under AID/csd 1504 which was superceded by AID/pha-BOA 1090 (December 1975) that extended to May 1978. AID/SOD/PDG-G-0076 picked up the administrative functions in 1978 and is the contract under which this document was requested. It remains in effect until February 1982.

The general objectives of the basic ordering agreements were to "promote rural electrification, rural industries and community facilities in various countries."¹ As AID's contractor, NRECA was to make available to the cooperative countries the qualified personnel to assist in the establishment and successful operation of rural electric cooperatives. Specific countries were served under the task orders, which contained more detailed work descriptions to meet the different country's level of need. The directives were both general and specific, requiring NRECA to do special studies and to provide special reports, in addition to semi-annual reports to AID. The agreements have

¹Contract between the United States of America and the National Rural Electric Cooperative Association, AID/csd 225 (November 1, 1962) p2.

been broadly interpreted by both parties which has provided the flexibility necessary to respond to changing conditions in host countries.

Although NRECA has been involved in rural electrification primarily through cooperative development, not all the task orders have called for this approach. The situation has varied with the host country conditions. Many of the initial task orders called for NRECA consultants to make the following studies:

1. (a) Examine existing and proposed laws to determine if a rural electric cooperative could be organized and managed within these laws.
- (b) Investigate and analyze the existing economic, social, and political conditions relative to the organization and operation of a rural electric cooperative and determine what contribution such a program might make to social and economic development.¹

Depending on whether the cooperative approach did or did not appear to be the best way to proceed, follow-up procedures were often included in the task orders.

Not all of the task orders dealt with individual countries or the activities of the NRECA home office. Task Order #7 (AID/csd 225) called for a survey trip to Latin America so that consultants could visit at least 12 countries to discuss the potential for rural electrification with AID mission representatives, host-country personnel and local leaders. Similar fact-finding and information-dissemination trips were made to Africa and Asia as well. This type of work also occurred under the administrative task orders in some instances.

Other task orders dealt specifically with equipment and construction materials procurement. In Task Order #23, NRECA was to investigate and undertake the possibility of assisting rural electric cooperatives overseas in the purchase of equipment from domestic cooperatives. NRECA was to work out the logistics with international agencies and encourage the participation of U.S. cooperatives. In Peru, U.S. rural

¹Task Order #20 (AID/csd 225) between the U.S.A. and NRECA. Guatemala (March 13, 1964).

electric cooperatives contributed more than 1,500 transformers, at a cost only of their repair and transportation.¹

Training seminars or management institutes were held for many countries or groups of participants from different countries. Again, specific task orders were issued to this end. Task Order #12 (AID/csd 225) called for a six-day management institute to teach management functions in the cooperative context. Task Order #25 outlines both a Washington-based management institute and field training in order to introduce the cooperative philosophy to local people and cooperative employees, within the context of their local situation. With funding from the AID mission, two such management-training activities dealing directly with the day-to-day operation of the cooperative were usually included in the overall management services provided under Phase IV project activities.

As experience increased and countries began to launch large-scale electrification programs, the pattern of issuing separate task orders for each phase of each system changed. The smaller, detailed task orders were superseded by longer-term loans, contracts or task orders that provided for a broad range of technical assistance activities.

B. By Selected Country Examples

1. Latin America

Initial interest in rural electrification projects abroad came from a 1961 Western Hemisphere conference in Bogota, Colombia. Latin American countries began to submit requests and altogether NRECA has provided technical assistance under contracts to 17 Latin American countries. Brief sketches of NRECA's involvement in 7 of them follow.

¹An Evaluation of AID and AID Contractor Programs in Promoting Cooperatives in Latin America, Field Trip Background Report on PERU. American Technical Assistance Corp., Washington, D.C. (June 1971), p.63.

a. Nicaragua

The first request for NRECA assistance came from Nicaragua shortly after the Bogota conference, and even before the contract between AID and NRECA was in effect. NRECA recruited two men for preliminary surveys which were carried out under personal services agreements with AID/Managua. Official NRECA involvement began in June 1963, under Task Order #13 (AID/csd 225) with assistance in the development of a pilot rural electric cooperative, CAEER #1. As a result of the technical assistance given, the first AID loan agreement for rural electrification was made in May 1964, for \$460,000. CAEER #1 proved to be a successful pilot project as original performance estimates were exceeded. The cooperative sold far more energy than had been predicted, operated on its own from its first year rather than the fourth year as estimated, and attracted two large industries to the service area.

Expansion from the pilot project began with Task Order #3 (AID/csd 1504) in April, 1967. After feasibility studies were conducted, three additional sites were selected for rural electric cooperative development and financed by an AID loan of \$10.2 million. Task Order #6 (AID/csd 1504) of March, 1968, provided the engineering feasibility studies, together with management, construction, technical operation and maintenance duties. In early 1969, NRECA entered into a contract with the national utility, ENALUF, the prime borrower under the AID loan. During the five year-term of this contract, NRECA provided consulting assistance in the areas of management development, accounting, member relations, power use and institutional consulting for the development of four large rural electric systems which were to serve more than 55,000 consumers in most of the agricultural areas of Nicaragua. An additional loan (524-L-007, 524-L-021) was for \$4.3 million to provide funding for one new cooperative and extensions of the other four. NRECA specialists worked with the cooperatives in many areas: general management; maintenance and operations; financial management;

promotion and marketing; rate policy; policy standards; accounting; and equipment and tools.

For many years the five independent cooperatives operated successfully, providing service to rapidly increasing demand. CAEER #1 had been operating for 13 years when the country experienced revolution. In 1979, as a result of the political changes, all the cooperatives were integrated into the national utility, Instituto Nacional de Electricidad.

b. Colombia

The first country-specific task order was issued in November 1962 for Colombia, Task Order #2 (AID/csd 225). NRECA'S formal assistance under the order was preceded by work done by an NRECA consultant who recommended that assistance be given two potential areas for rural electric cooperative development. Task Order #2 called for the development of cooperatives in the states of Norte de Santander and Cundinamarca. According to the final report, "after reporting the feasibility problems facing an electric cooperative in the (desired areas), Colombia AID officials asked that a study be made of the possibility of a project in the CVC area in the State of Vallen.¹ CVC is a regional power authority, similar to the U.S.'s Tennessee Valley Authority. The NRECA specialist then investigated the possibility of a project in the area around the town of Sevilla, and then later CVC officials decided that the town of Calcedonia should also be included in the project area.

Task Order #6 (AID/csd 225), January 1963, called for NRECA personnel to begin engineering and economic studies in the initial two project areas. According to the final report, the team examined four possible cooperative site two in the Norte de Santander (Palermo and Tibu), one in the state of Valle (Sevilla-Caicedonia) and one in the state of Cundinamarca (San Francisco). The report shows the increased focus: "...it must be

¹ Strong, Louis B. Phase III Final Report, (AID/csd 225, Task Order #2) 5 April 1963, p12.

noted that the original intent was to only work on two projects and then the plans were changed and enlarged to include two additional projects..."¹ Loan applications were prepared for all but the San Francisco project as a local engineer was going to complete the project.

In May 1964, AID approved a loan (514-L-035) to the Government of Colombia's acting borrowing agent, Electragras, which turned the funds over to the regional power authority, CVC. It sub-loaned the funds to the cooperative at Sevilla-Caicedonia (SECA). The Palermo cooperative was also given funding but did not develop as a cooperative. Instead it operated under the jurisdiction of the local power authority, Centrales Electricas de Norte de Santander. Construction was done at both sites, but delays in the process for SECA's funds occurred, although they had been officially registered as a cooperative in December 1964. Construction began in May 1966 and, in accordance with the loan agreement, Electragras contracted with NRECA to provide technical assistance for remodeling the existing distribution facilities and construction of new lines in the rural areas. The NRECA specialist also provided assistance in organizing the cooperative and training both management and technical personnel.

Task Order #14 (AID/csd 1504), October 1970, provided for a 5-day management seminar conducted by an NRECA management consultant. In October 1973, an NRECA consultant visited the cooperative to report on the status of the cooperative, both to NRECA and AID/Washington. The report, funded under administrative Task Order #1 (AID/csd 1504), shows that the consultant saw progress and some problems, for which he made recommendations. In December 1975, another NRECA staff member visited the cooperative and found that many in the local area thought it was in poor shape, both managerially and financially. The report included examples such as: the cooperative had

¹Robinson, Lyle M. and Maxwell D. Rhodes. Phase III Final Report (AID/csd 225, Task Order #6) 29 May 1962, p1.

17 managers in 10 years, and the two major towns had not paid their bills to the cooperative.

By 1975 the cooperative was serving some 8,000 consumers. But in December 1976, after some years of internal problems, the membership decided to liquidate the cooperative. Operation of the system was taken over by the regional power authority in 1977. Recent reports indicate that the system continues to expand and serve a growing number of rural consumers in the Sevilla-Calcedonia project area.

c. Ecuador

In January 1963, under Task Order #3 (AID/csd 225), an NRECA advisor joined an AID survey team in gathering background information and surveying four areas for possible development of rural electric cooperatives. The Santo Domingo de los Colorados site was chosen as the first cooperative project, organized on the foundation of a previously existing savings and loan cooperative.

A feasibility study for Santo Domingo was prepared under Task Order #16 (AID/csd 225), August 1963 and AID loan 518-L-017 of \$650,000 was signed in August 1964. Technical assistance in the construction and management of the pilot project was carried out under Task Order #21 (AID/csd 225), March 1964. The cooperative also received assistance in the form of materials from rural electric cooperatives in the State of Kentucky. The Kentucky cooperatives contributed over 30 tons of material which were used to expand and improve the system. It was the first system to be energized, in March 1964, with NRECA assistance.

A second project, the Daule Rural Electric Cooperative Ltd., further spread the idea of rural electric cooperatives' viability in Ecuador. In August 1964, an AID loan (518-L-023, 518-L-025) was signed to provide for construction materials and supervision for the new cooperative, and for an NRECA specialist to assist the cooperative in training supervisory and management personnel, and in signing up new members.

After a favorable evaluation of the first loan, AID authorized another loan in June 1970, in the amount of \$3.5 million for the expansion of two existing cooperatives, for six electric companies and the planned development of two new cooperatives. The loan was not signed, however until May 1972, because of political problems between the two countries. Then, because of further difficulties, funds were not released until late 1975, by which time the Daule cooperative had been absorbed into the national utility. Only a small portion of the allotted funds was budgeted for technical assistance.

AID's recent evaluation found that rural electrification "... played a substantial role in building market towns and regional service centers ... and has contributed to increases in electricity-based service to industry and commerce."¹ The Santo Domingo cooperative, having received little assistance since 1966, has survived to this point and now serves some 67 agricultural and industrial plants and over 14,000 families in a thriving agricultural community.

d. Costa Rica

Beginning in 1963, initial task order (AID/csd 225, #11, #29), directed NRECA to establish three rural electric cooperatives as pilot projects in widely separated locations. Phase I activities in preparation of the country survey and Phases II and III in preparation of the engineering and organizational studies, paved the way for managerial advising functions of Phase IV. These activities, the actual construction and operation of the systems, were funded under AID loan 515-L-015, March 1966. NRECA's direct assistance was concluded after approximately two years with a commendation from the Banco Nacional. It is worthy to note that project construction was completed on schedule.

¹ AID Project Impact Evaluation Report No. 21, Ecuador: Rural Electrification, (June 1981) pp ii, 14.

The three initial cooperatives are thriving today, operating on their own funds and managerial strength. NRECA specialists have conducted three evaluation studies in Costa Rica to ascertain the quality of management of each cooperative and to measure its effectiveness in achieving goals, especially those of reaching and improving the lives of the rural poor. Management training seminars have been conducted and additional training programs have been coordinated under NRECA guidance.

A fourth cooperative has been established, with the help of the Arkansas Electric Cooperatives Incorporated, an example of cooperation between U.S. electric systems and those in developing countries. The Arkansas statewide cooperative organization also built a small transformer manufacturing and repair plant that now does business not only with the local electric companies, but with utilities throughout Central America.

The Costa Rican cooperatives were reviewed by AID in 1980 and were found to be in excellent health and providing reliable service to their members. The AID reviewers commented on the remarkable effectiveness of the pilot projects, despite their dissimilarities from the original project design. The AID review also cited the timely completion of the task orders by NRECA personnel, the accurate, real demand for electricity and the service to the rural population exceeding that of other distribution systems.¹

e. Bolivia

AID's initial grant for rural electrification in Bolivia occurred under Task Order #8 (AID/csd 225), May 1963. The order was to provide NRECA assistance in improving the organization and advising on future operation of the recently formed Santa Cruz cooperative. Financial information and schedules were prepared and loan applications

¹ AID Project Impact Evaluation Report No. 22, The Product is Progress: Rural Electrification in Costa Rica (September 1981).

made that resulted in additional funding. Implementation was done without NRECA assistance.

In July 1970, NRECA contracted with AID under Task Order #12 (AID/csd 1504) to provide services to the Government of Bolivia in the establishment of another rural electric cooperative. Two years later, the task order was amended (Amendment #3, June 1972) to reflect the Bolivians' growing interest in rural electrification projects as another area, Cochabamba, was to be included in the preparation of economic and technical feasibility studies. Unique to this task order, also covered in Amendment #3, was a call for a 10-year demand analysis to be prepared to each major category of customers, and a sensitivity analysis for the full range of possible deviations from the proposed rates.

On the basis of the Santa Cruz electrification experience, AID authorized loans 511-L-046 and 511-L-049 in July and November 1973 to extend electric service to the rural areas in the highlands and valleys and to extend additional lines to the rural areas surrounding the Cochabamba and Santa Cruz projects. The funds given to Empresa Nacional de Electricidad (ENDE) were for design, engineering and construction of the systems, and included technical assistance provided by NRECA. The May 1975 contract between NRECA and ENDE called for technical and administrative assistance to the sub-borrowers of the program, and for the organization and development of a rural electric cooperative at La Paz.

Most of the distribution network of the four cooperatives and three other systems was in place, and about half of the systems had been energized by 1979. The primary use of the rural electricity has been for household lighting, which has caused revenues to be lower than projected. This in turn has left the cooperatives unable to reach financial viability. According to a 1980 review by AID, the predominance of household lighting, rather than uses that would generate income, was the major problem of the Bolivian

rural electric system.¹ To deal with this problem, the Cooperative Rural de Electrificación, Ltda. at Santa Cruz has recently undertaken a program called "Electro Agro" to encourage more productive uses of electricity.

f. Peru

Rural electrification in Peru has occurred with AID funding and assistance from NRECA provided under numerous task orders. At least seven separate orders were prepared for various states of the development of the single pilot project at Huancayo in the Mantaro Valley.

The country survey to determine the best area for the pilot cooperative was carried out under AID/csd 225, Task Order #15, June 1963. The organization of the local people into an effective, self-help institution, Phase II, took place under Task Order #32 in the fall of 1964. Feasibility studies that were to include the preliminary engineering, economic feasibility and loan application criteria were to have been done under Task Order #42, in the summer of 1966. However, Task Order #50 and #51 were needed to complete the feasibility studies. Task order #56 called for NRECA assistance in securing additional funds for the cooperative for Phases IV and V. These funds were forthcoming under AID loan 527-L-046 in January 1967. Phase IV activities included construction of the system and establishing proper management of it. Phase V included the periodic consultation of NRECA specialists to help with final organization of the system, staffing and training in all areas necessary for initial and continued operation of this project.

An accounting survey was done by NRECA experts to assist the cooperative in meter installation and bill collection. Part of the funding for this study was secured under the administrative duties of AID/csd 1504, Task Order #1.

¹ AID Project Impact Evaluation Report No. 16, Bolivia: Rural Electrification (December 1980) p iv.

According to a 1971 review, the Peruvian project "...seems to be working satisfactorily. The cooperative is well organized and providing services to about 10,000 members. Membership continues to increase as more uses of electricity are found in a farming area with agro-industrial potential."¹

Although the cooperative was functioning technically as planned, its management was never given legal title by the national utility, ELECTROPERU. Due to this problem, which made it difficult to pay off outstanding debt, the cooperative was taken over by ELECTROPERU in June 1976. It operates under their control today.

2. Asia

Under the first administrative task order (AID/csd 225) NRECA staff made a survey trip to Asia to take an inventory of existing electric service and to forecast future needs and the costs required to meet those needs. From that survey, assistance has been supplied to twelve Asian countries and rural electrification projects have been implemented in four. Two of the four, Bangladesh and the Philippines, share the unique distinction of being the only developing countries that have adopted cooperative rural electrification as the primary means of providing electric service to their rural populations. Five examples of NRECA's participation under AID funding in the Asian region follow, in chronologic order.

a. Philippines

In September 1964, NRECA entered into an agreement with AID, under Task Order #34 (AID/csd 225) to carry out an electric power industry survey which involved the total electric needs of the islands. Five areas for rural electric cooperative

¹An Evaluation of AID and AID Contractor Programs in Promoting Cooperatives In Latin America, Field Trip Background Report on PERU. American Technical Assistance Corp., Washington, DC. (June 1971) p64.

development were recommended. Task Order #58 (AID/csd 225), February 1967, called for a feasibility study for two pilot cooperatives. An AID loan, 492-H-025, provided some of the funds for the two systems. Task Order #10 (AID/csd 1504), March 1969, was used to carry out Phase II and Phase III activities, the technical assistance in organizational structure development, construction of the growing cooperative movement in the country, management training seminars and other activities.

Even before the two pilot projects, VRESCO and MORESCO, were completed, the National Electrification Act was established in July 1969. This legislation was drafted with NRECA guidance and closely followed the U.S. model with appropriate changes to fit the Philippines' situation. In December 1969, NRECA began work under another AID contract, EA-90, which called for NRECA assistance in the government's program for complete electrification of the islands. Initial feasibility studies were done to determine the basis for 30 new cooperatives.

The Philippines is an example of the success of pilot projects leading, quickly in this case, to a national electrification program. The scope of the work broadened to the degree that all areas of the islands were surveyed. Now more than 120 cooperatives have been formed and over 1.8 million connections made. The cooperatives have their own national organization, the Federation of Electric Cooperatives of the Philippines (FECOPHIL), which is becoming active in member relations, training and evaluation projects. The cooperatives have begun to develop alternative energy supplies such as dendro-thermal and small-scale hydropower.

According to an AID evaluation of 1980, the cooperatives are well-managed and capable of handling their own operations. This success was attributed to sufficient emphasis placed on attracting and training qualified personnel and providing guidance over a long enough period of time so that the institutions were properly developed.¹

¹AID Project Impact Evaluation Report No. 15, The Philippines: Rural Electrification, (December 1980).

b. Vietnam

Initial task orders from April 1964 and January 1966 (AID/csd 225, Task Order #40, #46) were not available for inspection, but according to later reports, it was possible to infer that Phase I and Phase II activities were carried out under the first task order. Three sites were selected, the organizational and personnel structures set up and the background information and institutional details worked out. Phase III work was carried out in the interim, between Task Order #40 and the time #46 was actually signed. The signing was delayed, although eventually made retroactive, and the delay was mentioned in two of the team members' reports as having caused a problem. They also referred to AID's apparent slowness in processing their part of the documentation and failure to provide previously agreed upon services such as translating and duplication.

Task Order #46, according to an NRECA paper, was to implement the development of the selected project areas. The scope of work included supervision of construction of the distribution system and provided for training and cooperative management. Additional services were also performed:

Under the latter provision (Task Order #46), the NRECA team provided many services and performed many duties contributing to the overall objectives of the program but assigned to them only because of the urgency of the work and the lack of qualified USAID technicians or other contractors normally performing these functions...endeavored to fulfill the requests for extra activities, recognizing that at times...the project could not have continued without this special help.¹

One of these projects was the development of a large pole-treating plant which helped reduce the cost of previously imported materials.

Task Order #8 (AID/csd 1504), signed in August 1968, called for the continuation of work begun under the previous task orders. The orders provided greater emphasis on

¹NRECA Final Report, Task Order #46 (AID/csd 225). June 1968.

institutional development and training. According to the reports, the assignments were covered in depth. More than 20 NRECA specialists served in the country, resulting in the formation of systems at Dalat, Long Xuyen and Ho Nai which together served nearly 30,000 connections. The three cooperatives were operating well on an independent basis when the U.S. evacuation occurred. Their status today is not known.

c. India

In June 1966, NRECA specialists carried out a country survey of India to select potential rural electric cooperative sites, under Task Order #53 (AID/csd 225). In five states, pilot projects were established and financed with local currencies generated from U.S. PL 480 agricultural commodity sales. These and subsequent much larger amounts of U.S. PL 480 derived funds were made available to India's Rural Electrification Corporation. Task Order #5 (AID/csd 1504), August 1967, called for NRECA assistance with institutional studies and management instruction. The individual cooperatives were provided with guidance in management, operation, maintenance and necessary training under the next order, Task Order #11 (AID/csd 1504) of June 1969.

Assisted by the five-member NRECA team of specialists, all five demonstration cooperatives were operational by March 1971, under the preceding task order. Later, in June 1973, NRECA staff left the country when AID activities were suspended in the country. No more assistance has been given by NRECA since that time, but the Rural Electrification Corporation has organized eight additional cooperatives and plans have been made to add 30 more to the national system.

d. Indonesia

In order to determine potential areas for the establishment of rural electric cooperatives, a four-month study by NRECA staff with support from the Indonesian State Electricity Enterprise (PLN) and the Director General for Cooperatives was undertaken,

under Task Order #2 (AID/pha-BOA 1090), February 1976. Another NRECA team was sent to prepare preliminary engineering and financial feasibility reports under Task Order #4 (AID/pha-BOA 1090), November 1976. Ten project areas, three in the Outer Islands and seven in Central Java, were selected for development.

Social and cultural impact studies, as well as the economic impact of electricity on the people and their communities, were included in the studies done in each of the areas. Training seminars and a five-year training program for rural electric cooperative development were also prepared. Task Order #5 (AID/pha-BOA 1090), March 1977, continued the effort in the project areas.

An AID grant (497-0267) and loan (497-T-052), both of June 1978, provided funds for construction of the ten rural electric systems. The Governments of Canada and the Netherlands also provided financial support. NRECA assistance was given under contract ASIA-C-1347, (August 1978), and was directed to both the national power company and the cooperatives. The cooperatives are under the management and regulation of an ad hoc government agency set up specifically to run the cooperatives. A 1981 AID audit of the program pointed to organizational problems that seemed to center on this governmental agency.

Village demonstration projects in each of four sites have been energized and construction work is proceeding on the ten larger systems. Eventually, the ten systems are expected to serve 50,000 connections in 600 villages.

e. Bangladesh

A comprehensive feasibility and organizational study for implementing a national rural electric program was arranged under an AID/Host Country agreement of October 1976. The loan, 388-0021, provided for an extensive field survey taken from twelve distinct study areas. The combined engineering and social studies gave conclusive evidence that many benefits could be accrued from a national program that could provide

low-cost electrical service. The study areas were ranked and thirteen were selected on the basis of the study. The Rural Electrification Board was formed by the Government of Bangladesh in October 1977 to assume responsibility for the implementation.

Construction was carried out under AID loan 388-0054, signed in January 1978. Under the agreement, which extends to January 1984, the first system was energized in a presidential ceremony. NRECA continued to provide technical assistance through the services of ten long-term personnel. They work with the thirteen established cooperatives and the national electrification board, which is scheduled to oversee the complete electrification of Bangladesh by 1993. The World Bank, the Kuwait Fund and the Government of Finland have provided funds for the project.

3. Africa and the Middle East

NRECA's AID-funded involvement in this region has been limited because the rural electrification process has proceeded much more slowly than elsewhere. The needs of the larger cities have preempted the needs of the rural areas and, coupled with tight national budgets, the isolated settlements desiring electricity have been forced to rely on small diesel generators. NRECA's activities have been limited to survey trips, familiarization visits and pre-feasibility studies primarily. Feasibility studies have been conducted in the Ivory Coast, Liberia, Morocco, Sierra Leone and Tanzania. Technical assistance, provided under AID funding, was provided to Tunisia alone. NRECA's heaviest involvement in the region has not been funded by AID, but by the development banks.

a. Morocco

Task Order #54 (AID/csd 225), July 1966, was given to NRECA to conduct a reconnaissance survey of Morocco. The task order refers to a rural electric cooperative pilot project, to be selected on the basis of the study results. The cooperative approach

was not mentioned specifically in the task order as in others. From the final report, it was obvious that the assumed means for carrying out an electrification plan, cooperative development, was not clearly understood beforehand by the Moroccans. The team found the government skeptical and very slow in providing the team's needed information. For example, it refused to provide the government-set electric utility rates which the team desired as a basis for recommendations. Due to this inability to obtain necessary background information and the lack of understanding regarding rural electric cooperatives, the team was unable to carry out an effective survey. No systematic rural electrification plan exists in Morocco to this day.

b. Tunisia

In August 1970, NRECA sent on specialist to Tunisia under AID/csd 1504, Task Order #13. The objective of the assignment was to instruct installation and operations personnel from the national utility in the application and use of electric distribution materials. The materials were purchased under AID-financed loans and were needed for constructing new electric distribution systems and for repairing and rehabilitating electric installations damaged by flooding. According to the final report, sessions were conducted with the installation personnel in each of the country's districts and recommendations given for future use. Special regard was given for adapting the materials to the local situation's needs. Some of the problem, interestingly enough, centered on U.S. materials which had instructions only in English which could not be read by the field crews.

Since that time, NRECA's involvement has been limited to two short visits, at the request of the AID mission. Both trips were funded under the prevailing institutional support grants, combined with other projects in the region. One of the trips was a simplified pre-feasibility study to determine rural electrification potential and the other involved alternative energy sites operated cooperatively.

C. Non-AID Funded Projects

1. Funding Institutions

In addition to funding provided by AID, NRECA has worked with other funding sources for the organization of rural electric systems in developing countries. The World Bank has financed over \$2.5 million of technical assistance for rural electrification projects through NRECA. The Inter-American Development Bank provided funds for rural electrification in Argentina that used NRECA services and the United Nations Development Programme provided funds for a country survey of The Gambia. In addition, the host countries themselves have provided direct funding for NRECA's participation in rural electrification projects. The following examples describe some of NRECA's experience in the non-AID sector.

2. Country Examples

a. Papua New Guinea

With funds supplied by the Government of New Zealand, Papua New Guinea, through the Papua New Guinea Electricity Commission, contracted with NRECA to provide technical assistance. The contract, in three parts, was signed in April 1975, and called for an institutional study to determine the potential in the country for cooperative development and other Phase I activities. Phase II called for a training project to teach the host country personnel how to set up their own systems that the previous phase addressed. Phase III assistance provided for loan application preparation. Extra studies were prepared, along with detailed engineering and socio-economic studies of each area under consideration.

Due to administrative changes in the country, the loan application was never pursued.

b. The Gambia

Under funding from the United Nations Development Programme, NRECA carried out a country survey, setting up areas to be electrified. A 12-18 month plan for rural electrification was prepared and the training needs for the operation and maintenance of the system were outlined. The short final report stated that existing management problems stood in the way of successful implementation of a rural electrification program. After submission of the report to the UNDP, no follow-up work was done.

c. North Yemen

A national rural electrification survey was called for under the first part of an agreement between NRECA and the North Yemen Government, signed in August 1979. Financed by a World Bank loan, the NRECA team completed the feasibility study in September 1980. Twenty-one regional projects were identified for consideration by the government's Yemen General Electricity Corporation.

In March 1981, a 30-month extension was approved, also under World Bank funding. NRECA specialists prepared detailed engineering designs, and bids for materials for project construction were issued in mid-1981. NRECA personnel will assist the Yemen General Electricity Corporation in supervising the project's actual construction.

d. Egypt

Under a December 1979 contract funded by the World Bank, five NRECA rural electrification specialists are providing assistance to the Egyptian Rural Electrification Authority. The contract between NRECA and the Egyptian Electrification Authority called for financial, organizational and management assistance so that the generation, transmission and distribution system already in place could be more effectively utilized and maintained. NRECA's specific duties include outlining operation and maintenance policies and procedures, setting up five regional distribution companies and getting them

operational. Training the needed supervisory staff and providing instruction and electricity's productive end uses is also included.

The contract for over \$1 million became effective in June 1980 and will extend to May 1982, at which time extension or renewal is expected.

IX. CONCLUSIONS AND RECOMMENDATIONS

A. The concept of rural electric cooperatives should be broadened to encompass various types of rural energy which might be usefully managed by rural electric cooperatives, or non-cooperative forms of management, where flexibility and local participation are present. Rural electric cooperatives in the U.S. play an active role in developing new sources of energy at the local level. This role could be gradually expanded internationally.

B. Rural electrification cooperatives should be viewed as a very desirable vehicle to strengthen community participation in the development process and to provide local management for distribution of electricity. With AID obligated by Congress to encourage cooperatives and to be concerned with the grass-roots impact of its aid, as a group, rural electric cooperatives have proved over the years to be one of the most effective instruments available to AID to carry out its mandate.

C. Productive uses of electricity at the village and farm level should be accorded higher priority in future electrification schemes. New ideas and approaches are needed which will encourage the private manufacturing sector in the Third World to follow electric power lines into the rural areas where labor supply is plentiful. Rural electric cooperatives should play an active role and, in some instances, take the lead in this effort to create rural jobs and expand income.

D. Future plans for rural electrification should envision multi-donor undertakings with AID playing a leading technical assistance, institution building role and with the international financial institutions and others providing capital. Building on the success of the REA model in the U.S., AID's unique capabilities for institution building can be

effectively utilized. As discussed previously, this division of labor and financial responsibility has been demonstrated to be workable, and to bring worthwhile development to rural populations.

E. Rural electrification programs should devote more attention to preparation of commercial possibilities of mutual benefit to the developing country and to the U.S. from follow-on funding by the international banks and from new business opportunities emerging in the electrified areas. In the past, rural electrification programs have been pursued primarily for the economic and social benefits they could bring to developing countries. Relatively little attention was devoted to the possible commercial benefits to the U.S. beyond project materials supplied directly from the U.S.

F. As rural development planners in the U.S. select projects for funding, they should give more weight to projects which have a positive impact on the image of the U.S. as a friend of the developing country and its people. For very apparent reasons, helping to bring electric power to villages and farms ranks high by this criterion. The personal and institutional identification of NRECA and AID staff members with this much-desired, village-based service lasts for many years and makes this choice of project support especially attractive for bilateral aid.

G. Planners should exercise caution when considering proposals for rural electrification projects which have no link to sound management and financing at the national level. The best results in rural electrification schemes have been experienced when pilot projects were developed more or less simultaneously with strong supervisory and financing organizations such as the REA-type national supervisory body. Large projects that have a secure funding base will attract good quality personnel for management and supervisory positions, further adding to the likelihood of success.

H. Developing countries not interested in using rural electric cooperatives to strengthen community participation in the development process nevertheless can benefit from the management and training services, consumer education methods and design standards developed for REA/NRECA systems in the U.S. These management and technical services should continue to be provided to requesting countries, with appropriate adaptations to meet the needs of each situation.

I. Evaluation of rural electrification in developing countries, while substantial within AID in respect to direct benefits to the rural poor, nevertheless is not definitive, and has not examined adequately the purposes and linkages to the larger power sector and the wide spectrum of rural development activities. There would be value in a broad-based study of rural electrification to be undertaken by the multilateral development banks as these institutions will likely be the largest external source of financing for rural electrification in the future.

J. Rural electrification is of interest to a number of separate organizational units within AID where it is seen as serving different purposes depending on the special concerns of the offices. It should be beneficial for these varied interests to be harmonized within the framework of a collaborative agreement under which specific working task orders and contracts are carried out.

K. AID should take more advantage of some of its most valuable resources available to it through association with NRECA. To date this has not happened and this is in spite of the fact AID finances NRECA's core international staff. This results from the different views of NRECA held by different offices of AID. The view of NRECA as a private contractor competing for business once a project has been designed in the field and approved in Washington, fails to make use of NRECA's accumulated experience with,

and capabilities for, project planning. A more productive view of NRECA is that of a specialized PVO working in collaborative style along side and augmenting AID staff. This latter relationship would also be conducive to AID's ready access to the large body of expertise available from NRECA's membership and affiliation with a wide spectrum of energy-related research and operational bodies. It could open to AID Missions the expertise not only from the vast rural electric cooperative community in the U.S., but also from a very large group of investor-owned utilities, municipal utilities and public power districts enabling responses to virtually any request for technical assistance in the energy field.

ANNEXES

Annex "a"

NRECA TASK ORDERS

<u>AID Contract</u>	<u>Task Order</u>	<u>Country</u>	<u>Initial date</u> (in months)	<u>Duration</u>	<u>Amount</u>
AID/csd 225	1	Global: Administrative	Nov. 1962	46	235,995
	2	Colombia	Nov. 1962	3	19,100
	3	Ecuador	Jan. 1963	1.5	5,830
	4	Brazil	Jan. 1963	8.5	20,000
	5	cancelled			
	6	Colombia	Jan. 1963	10	28,300
	7	Latin America Regional	Jan. 1963	10	14,000
	8	Bolivia	May 1963	10	18,000
	9	Latin America Regional	May 1963	55	239,911
	10	Latin America Regional	May 1963	1	1,000
	11	Costa Rica	June 1963	3	6,000
	12	Latin America Regional	June 1963	3	9,850
	13	Nicaragua	June 1963	50.5	79,540
	14	Uruguay	June 1963	2	6,000
	15	Peru	June 1963	2	6,130
	16	Ecuador	Aug. 1963	7	19,000
	17	Chile	Aug. 1963	6	9,945
	18	Panama	Sept. 1963	1	2,943
	19	Uruguay	Oct. 1963	7.5	17,070
	20	Guatemala	Mar. 1964	1.5	4,540
	21	Ecuador	Mar. 1964	24	53,000
	22	Venezuela	Apr. 1964	2	6,000
	23	Miscellaneous	Apr. 1964	1	3,500
	24	Asia Regional	Apr. 1964	1	4,500
	25	Latin America Regional	May 1964	2	9,265
	26	Latin America Regional	Apr. 1964	24	36,000
	27	Latin America Regional	June 1964	9	3,562
	28	Brazil	July 1964	48	108,940
	29	Costa Rica	July 1964	8	18,500
	30	El Salvador	July 1964	4	5,240
	31	Korea	Sept. 1964	5	18,500
	32	Peru	Sept. 1964	4	10,520
	33	Paraguay	Sept. 1964	2	5,350
	34	Philippines	Sept. 1964	5	20,000
	35	Africa Regional	Nov. 1964	1	6,432
	36	Venezuela	Mar. 1965	6.5	36,500
	37	Asia Regional	Feb. 1965	1	3,600
	38	Latin America Regional	Mar. 1965	5	4,250
	39	Sierra Leone	Apr. 1965	4	6,500
	40	Vietnam	Apr. 1965	6.5	111,500
	41	Thailand	May 1965	2	7,500
	42	Peru	June 1965	4	5,930
	43	Laos	June 1965	1	8,000
	44	Thailand	Oct. 1965	7	23,100
	45	cancelled			

<u>AID Contract</u>	<u>Task Order</u>	<u>Country</u>	<u>Initial date</u>	<u>Duration (in months)</u>	<u>Amount</u>
AID/csd 225	46	Vietnam	Dec. 1965	32.5	458,000
	47	Honduras	Mar. 1966	9.5	6,000
	48	Brazil	Jan. 1966	1	1,700
	49	Paraguay	Feb. 1966	6	29,547
	50	Peru	Feb. 1966	3	4,500
	51	Peru	Feb. 1966	6	2,800
	52	Latin America Regional	May 1966	3	4,000
	53	India	June 1966	6	16,000
	54	Morocco	July 1966	1	4,600
	55	Iran	Sept. 1966	2	5,027
	56	Peru	Aug. 1966	1	3,500
	57	Thailand	Oct. 1966	4	8,593
	58	Philippines	Feb. 1967	36	158,040
	AID/csd 1504	1	Global: Administrative	Mar. 1967	105
2		Brazil	Apr. 1967	1	8,012
3		Nicaragua	Apr. 1967	12	26,000
4		Panama	June 1967	4.5	9,000
5		India	Aug. 1967	11	95,160
6		Nicaragua	Mar. 1968	5	12,882
7		Afghanistan	Apr. 1968	2	5,027
8		Vietnam	Aug. 1968	39.5	824,525
9		Ecuador	Feb. 1969	11	9,141
10		Philippines	Mar. 1969	76.5	628,781
11		India	June 1969	46	493,000
12		Bolivia	July 1970	39	75,695
13		Tunisia	Aug. 1970	1.5	3,124
14		Colombia	Oct. 1970	2	1,700
15		Pakistan	Feb. 1971	5.5	10,900
AID/East Asia 90		Philippines	Dec. 1969	27.5	254,775
AID/pha-BOA 1090	1	Global: Administrative	Dec. 1975	30	554,694
	2	Indonesia	Feb. 1976	6	94,880
	3	Pakistan	Aug. 1976	4.5	45,000
	4	Indonesia	Nov. 1976	2	9,575
	5	Indonesia	Mar. 1977	18	410,000
AID/SOD/PDG-G-0076		Global: Administrative	June 1978	45	2,037,500
AID/ASIA 1347		Indonesia	June 1978	48	1,740,000
TOTAL					\$10,551,611

Annex "b"

CONTRACTS

a) AID/Host Country Contracts

<u>Country</u>	<u>Loan Number</u>	<u>Initial Date</u>	<u>Duration</u> (in months)	<u>Amount</u>
Brazil	512-L-014	July 1965	29	\$ 20,992
Chile	513-L-024	Oct. 1965	55	61,811
Costa Rica	515-L-015	Mar. 1966	42	87,007
Colombia	514-L-035	May 1966	36	139,499
Feru	527-L-046	Oct. 1966	38	95,460
Nicaragua	524-L-007/021	Oct. 1968	82	371,550
Philippines	429-H-025/026	Apr. 1973	82	2,704,591
Ecuador	518-L-035	Aug. 1973	40	28,000
Bolivia	511-L-046/049	May 1975	51	368,701
Bangladesh	388-0021	Oct. 1976	15	283,900
Bangladesh	388-0054	Jan. 1978	72	4,825,000
Indonesia	497-80-100.6T	1979	3	80,090
Bolivia (grant)	511-0534-026-HHH	Jan. 1980	11	81,823
Indonesia	497-80-100.64	1980	2.5	81,150
			TOTAL	<u>\$9,229,574</u>

b) Non-AID Funded Contracts

<u>Country</u>	<u>Funding Source</u>	<u>Initial Date</u>	<u>Duration</u> (in months)	<u>Amount</u>
Argentina	Inter-Am. Dev. Bank	June 1968	18	\$89,751
Papua New Guinea	Govt. of PNG	Apr. 1975	8	16,364
Papua New Guinea	Govt. of PNG	Feb. 1976	22	43,646
Malaysia	Govt. of Malaysia	Feb. 1976	33	88,800
Papua New Guinea	Govt. of PNG	Oct. 1976	12	42,631
Liberia	Govt. of Liberia	Oct. 1977	12	34,000
The Gambia	U.N. Dev. Programme	Sept. 1978	12	11,317
North Yemen	World Bank (IBRD)	Aug. 1979	20	1,156,000
Jamaica	World Bank (IBRD)	Aug. 1979	26	496,202
Egypt	World Bank (IBRD)	June 1980	26	1,077,985
North Yemen	World Bank (IBRD)	Mar. 1981	39	1,833,600
			TOTAL	<u>\$4,890,296</u>

Annex "c"

AID FUNDING FOR RURAL ELECTRIFICATION¹

<u>Country</u>	<u>Project No.</u>	<u>Amount</u>
Philippines	025,026,027,028,034,036	\$89,200,000 loan 4,000,000 grant
Bangladesh	012,013,021,054	34,000,000 loan 55,300,000 grant
Indonesia	267,283	30,000,000 loan 11,000,000 grant
Bolivia	046,049	22,050,000 loan
Guatemala	214,248	15,590,000 loan
Ecuador	099	3,413,000 loan
Costa Rica	015	3,300,000 loan
Vietnam	-	5,000,000 grant
Paraguay	093	390,000 loan
Peru	119 226 - Small Hydro-electric - Small Hydro-electric	1,594,000 loan 9,000,000 loan 1,000,000 grant
Nicaragua	078,096	14,499,000 loan
Colombia	035	1,300,000 loan
Honduras	138	10,000,000 loan
Chile	-	3,100,000 loan
Syria	018	34,700,000 loan
India	(U.S. owned rupees) 200,225	(131,200,000) grant 58,000,000 loan
	Total	\$398,336,000 (131,200,000)
	GRAND TOTAL	\$529,536,000

Annex "d"

1. INTERNATIONAL FUNDING FOR RURAL ELECTRIFICATION BY DONOR AGENCY
 FY 1972-FY 1978¹

<u>Source</u>	<u>No. of Projects</u>	<u>Amount</u>	<u>% of Total Energy Lending</u>
World Bank	7	252.0	4.40
Asian Development Bank ²	0	0	0
Inter-American Dev. Bank ³	8	181.5	6.60
UNDP	4	.7	0.54
European Development Fund	2	2.8	1.90
CIDA-Canada	6	7.5	8.20
France	2	7.4	2.60
West Germany	3	25.7	1.20
Kuwait Fund	2	25.9	4.80
Netherlands	8	42.7	21.50
(USAID-see Annex "c")	--	--	--
Totals	—	—	—

¹ Source: The World Energy Triangle: A Strategy for Cooperation, Brian Johnson and Thomas Hoffman, Ballinger Publishing Co. 1981. Tables 4 and 5.

Annex "d"

II. INTERNATIONAL FUNDING FOR RURAL ELECTRIFICATION
(EXCLUDING U.S.) BY RECIPIENT COUNTRY AND SOURCE¹

<u>Africa</u>				
<u>Country</u>	<u>Donor</u>	<u>Year</u>	<u>Amount</u> (U.S. \$ millions)	
Botswana	SIDA	1977	1.12	
Burundi	EDF	1978	1.42	
Kenya	W. Germany	1978	0.78	
	SIDA	1973	0.70	
	CIDA	1979-82	0.57	
Rwanda	SIDA	1977	0.31	
Sudan	Switzerland	1979	7.94	
Tanzania	WB	1973	42.00	
	WFP	1973	2.30	
Ivory Coast	W. Germany	1979	11.10	
	CIDA	1978-80	0.22	
<u>Asia</u>				
Fiji	Canada	1977	0.02	
Indonesia	CIDA	1978-82	15.91	
	Netherlands	1977	4.07	
Laos	U.K.	1974	0.12	
Philippines ²	WB	1978	60.00	

¹Source: Tables developed by the International Institute for Environment and Development, Washington, D.C. Funding data does not cover one consistent chronological period for all agencies. Multilateral data reflects the period FY 1972-1978. USAID data is for FY 1978-FY 1980 only. Canadian data is for 1978/79 and 1979/1980. French data is for 1976-1979 only.

²Data for these countries has been updated to include knowledge of recent funding. The Philippine data should be further updated to include an additional \$84 million from the U.K. (\$33); China (\$30); W. Germany (\$2) and France (\$19 mil) for small hydro projects plus \$39 million from France (\$19) and the U.K. (\$20) for dendro-thermal projects - all

Asia (Continued)

	ADB	1981	87.50
	OPEC	1981	20.00
	Norway	1981	5.00
	W. Germany	1978	13.90
	France	1974	14.00
Thailand	WB	1978	25.00
	Kuwait Fund	1976	3.50
	CIDA	1978-82	7.49
	OPEC	1979	7.00
Western Samoa	UNDP	1979	0.08
New Caledonia	France	1977	0.80
Polynesia	France	1976	6.56
Bangladesh ²	Kuwait Fund	1975	22.40
	WB		
India ²	WB	1975	57.00
	WB	1980	175.00
Pakistan	UNDP	1979	0.41

Middle East, North Africa, Europe

Portugal	W. Germany	1977	13.90
Syria	WB	1978	40.00
Tunisia	Netherlands	1977	1.61
	SIDA	1977	0.25

Latin America

Except in Mexico, Trinidad and Tobago, all non-AID funding expressly for rural electrification has been from the Inter-American Development Bank. See part III of this Annex for a country breakdown of this funding.,

Mexico	WB	1977	120.00
	WB	1975	110.00
	WB	1974	50.00
Trinidad and Tobago	CIDA	1976	0.87

administered through the small electric cooperatives.

Annex "d"

III. INTER-AMERICAN DEVELOPMENT BANK FUNDING FOR RURAL
ELECTRIFICATION BY COUNTRY TOTALS. NUMBER OF PROJECTS AND
PROJECT COSTS¹

1961-1978

(US\$ thousands or equivalent)

<u>Country</u>	<u>Numbers of Projects</u>	<u>Number of Loans</u>	<u>Total IDB Amount of Loans</u>	<u>Total Project Cost</u>
Brazil	6	8	\$140.2	\$442.5
Paraguay	4	6	103.5	177.5
Argentina	3	3	63.0	156.0
Colombia	4	6	43.9	33.4
Costa Rica	3	3	20.0	31.6
Nicaragua	1	1	16.5	20.9
Jamaica	2	2	11.7	17.2
Chile	1	1	8.0	19.6
Dominican Republic	1	1	7.5	12.7
TOTALS	25	31	\$414.1	\$961.4

¹Source: Inter-American Development Bank, Washington, D.C.

Annex "e"

BUDGETED SOURCES OF INCOME OF NRECA'S
INTERNATIONAL PROGRAMS DIVISION

1982

Specific Support Grant from AID	\$ 625,000
Indonesia Contract (AID)	715,224
Bangladesh Contract (AID)	1,225,000
Yemen Arab Republic Contract (IBRD)	221,094
Egypt Contract (IBRD)	270,920
Small Hydropower Contract (AID)	1,232,740
TOTAL	<u>\$4,289,998</u>

Comments:

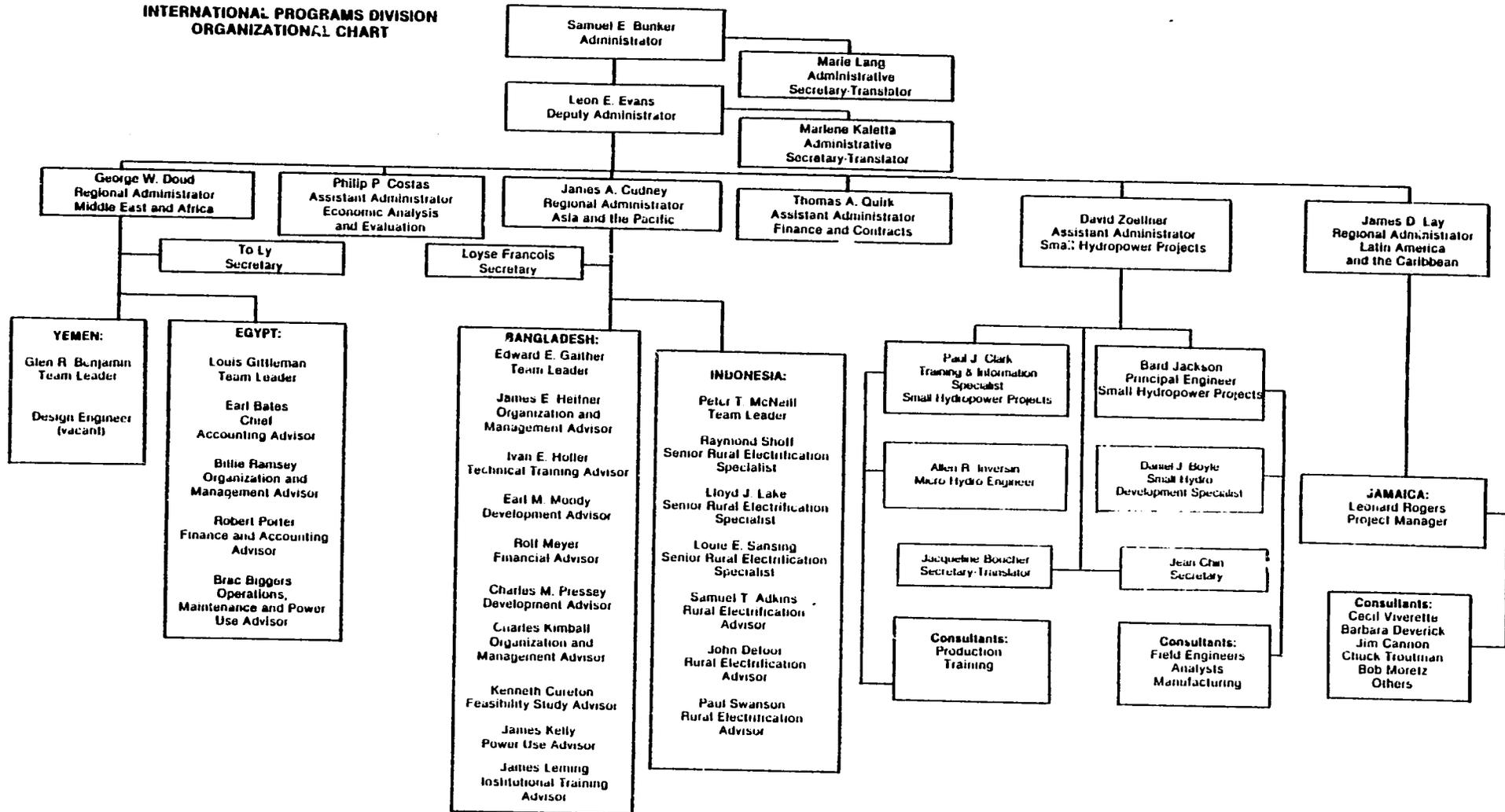
1. AID's Specific Support Grant to NRECA in 1982 would amount to 14.6% of total income

$$\frac{\$ 625,000}{4,289,998} = 14.6\%$$

2. Income from non-U.S. Government sources (IBRD) in 1982 would amount to \$492,104, which equals 78% of AID's Specific Support Grant.

ANNEX "f"

INTERNATIONAL PROGRAMS DIVISION
ORGANIZATIONAL CHART



Annex "g"

ORGANIZATIONS WITH WHICH NRECA IS AFFILIATED

Agricultural Council of America
Agricultural Hall of Fame
American Institute of Cooperation
American Nuclear energy Council
American Public Power Association
American Society of Agricultural engineers
Americans for energy Independence
Consumer Federation of America
Consumer Energy Council of America
Cooperative League of the USA
Electric Power Research Institute
Food and Energy Council (formerly Farm Electrification Council)
4-H Clubs of America
Future Farmers of America
National Rural Utilities Cooperative Finance Corporation
National Safety Council
National Telephone Cooperative Association
Organization of the Cooperatives of America
Thomas L. Strokes Award
United Givers Fund
Utilities Telecommunications Council
Volunteer Development Corps
Western States Water and Power Conference
World Energy Conference

Annex "h"

RURAL ELECTRIC COOPERATIVES ASSISTED BY NRECA

By Country

<u>Country</u>	<u>Number</u>	<u>Presently Operating*</u>
N.E. Brazil	12	12
Chile	14	14
Colombia	1	1
Costa Rica	4	4
Bolivia	5	5
Ecuador	1	1
Nicaragua	5	0
Peru	1	1
Venezuela	1	1
India	5	5
Vietnam	3	0
Philippines	121	121
Bangladesh	13	13
Indonesia	<u>3</u>	<u>3</u>
TOTAL	189	181

* Presently operating as an independent cooperative.

Annex "j"

PILOT PROJECTS

<u>Country</u>	<u>Project</u>
Bolivia	Santa Cruz
Colombia	Cooperatives de Electrificacion Sevilla-Calcedonia, Ltda.
Costa Rica	Guanacaste San Carlos Can Marcos de Tarrazu
Ecuador	Santo Domingo Electric Cooperative
Nicaragua	CAEER #1
Peru	Mantaro Valley Rural Electric Cooperative
Venezuela	Panalver-Bruzual-Guariba
India	State of Mysore State of Gujerat State of Maharashtra State of Andhra Pradesh State of Uttar Pradesh
Philippines	MORESCO VRESCO
Vietnam	Duc Tu Cooperative An-Giang Cooperative Tuyen-Duc Cooperative

TOTAL: 19 PILOT PROJECTS

Annex "j"

NRECA STAFF AND ADVISORS¹

<u>Name</u>	<u>Country Served</u>
Able, Kirby	Columbia, Costa Rica, Ecuador, Nicaragua
Adam, Hobert	Indonesia
Adams, W.E. (Tommy)	Guinea-Bissau, Philippines
Adkins, Samuel T.	Indonesia
Alexander, G.T.	Honduras
Ammons, Johnnie M.	Vietnam
Anderson, Jerry L.	Vietnam
Arnn, Edgar	Philippines
Askergaard, David	Egypt
Aultz, Clyde	Brazil, Chile, Colombia, Costa Rica, Vietnam
Ballard, Ernest J.	Peru
Bates, Dick	Bangladesh
Bates, Earl	Argentina, Egypt, Indonesia
Bear, John	Vietnam
Bellgowan, Jon	Philippines
Benjamin, Glen	Costa Rica, Nicaragua, North Yemen, Panama, Tanzania

¹Listed are individuals and their places of assignment for NRECA staff and advisors who worked under Task Orders and Contracts.

Berlin, George	India
Biggers, Brac	Egypt
Blish, Ervin	Ecuador, Peru
Bristol, Everett C.	Brazil, Ecuador, Panama
Bunker, Samuel E.	IPD Administrator
Bush, Hubert L.	Bolivia, Kenya, Korea, Papua New Guinea, Philippines, Syria, Vietnam
Cadden, James F.	Bolivia, North Yemen
Campbell, James	India, Uruguay
Cannon, Jimmy	Colombia, Jamaica
Carlton, Welborn C.	Costa Rica, India, Venezuela
Cefalu, J.	Haiti
Chambless, Jesse R.	India
Chapman, David	Bangladesh
Cheney, John A.	Venezuela
Clapp, Norman	Argentina, Chile, Ecuador, Egypt, Peru
Cobb, James	Guatemala
Coca, Robert R.	Chile, Costa Rica, Ecuador, Nicaragua, Peru
Cooper, Donald	Indonesia, North Yemen, Philippines
Cornog, George W.	Indonesia, Philippines

Costas, Philip P.	Assistant Administrator for Economic Analysis and Evaluation: Bangladesh, India, Indonesia, Nepal, North Yeman, Philippines
Cowden, Jean	Costa Rica, Nicaragua
Crespin, Tom	Colombia, Peru
Cruz, Thomas	Nicaragua
Cudney, James A.	Regional Administrator for Asia and the Pacific
Cureton, Kenneth W.	Bangladesh
Dage, Gary D.	India
Deans, Michael John	North Yemen
De Foor, John	Indonesia
Deverick, Barbara	Bolivia, Indonesia, Jamaica, Philippines
Dickason, James R.	Liberia
Dolinger, John R.	El Salvador
Doud, George W.	Regional Administrator for The Middle East and Africa
Draheim, Alan H.	North Yemen
Drum, Bruce	Jamaica
Eickelman, Douglas	Panama
Ellis, Clyde	Far East, Latin America, Middle East
Endall, Lowell	Colombia, Ecuador, Vietnam
Espinoza, Gus	Bolivia, Nicaragua, Peru

Evans, Leon E.	IPD Deputy Administrator; Latin America
Farell, T. Colman	Argentina, Philippines
Flynn, Walter	Bangladesh
Ford, A. T.	India
Forrest, Leo	Chile, Colombia
Franke, Claude	Indonesia
Frayette, Fred	Colombia
Fritz, Dale	Philippines
Funston, Curtis	India, Pakistan
Gaither, Edward	Bangladesh
Gittleman, Louis	Egypt
Grant, Richard W.	Vietnam
Griggs, William	Indonesia
Hall, Burton	Chile
Ham, Charles	Indonesia, Malaysia, Philippines, Uruguay, Vietnam
Hamil, David A.	India, Philippines
Heifner, James	Bangladesh
Herriott, Lyle	Nicaragua, Vietnam
Herriott, Virgil	Indonesia
Hicks, Jack	Papua New Guinea
Hienton, Truman	Argentina, Uruguay
Hinkle, William H.	India
Holcomb, Charles	Paraguay
Holler, Ivan	Bangladesh
Hood, Joan	Chile, Costa Rica

Horney, Henry	Philippines
Jorgenson, David	Indonesia
Jourdain, Robert	North Yemen
Kabat, Robert I.	Africa Survey, Indonesia, Philippines
Kane, Frederick J.	Sri Lanka
Kelly, James	Bangladesh
Keller, Wayne	Jamaica
Kemp, John E.	Jamaica
Key, Fred	Venezuela
Kiley, James M.	Indonesia, Liberia
Kimball, Charles	Bangladesh
Knight, Dalton L.	Bangladesh
Knouse, Ron	Bolivia
Lake, Lloyd	Bolivia, Brazil, Colombia, Indonesia, Nicaragua
Lasater, Jay D.	India, Philippines
Lay, James D.	Regional Administrator for Latin America and The Caribbean; Nepal
Leming, James	Bangladesh
Letey, Alviro J.	Brazil
Lisenbee, Bailey	Vietnam
Loafman, A. Wayne	India
Lorenzen, L.M.	Bangladesh, Ivory Coast, Papua New Guinea, Philippines, Thailand, Vietnam

Lucero, Frank	Bolivia, Ecuador, Nicaragua
Luse, R. Powers	Argentina, Costa Rica, Philippines, Vietnam
McCurley, James	Philippines
McDonald, Ray	Liberia
McLeod, Eugene M.	Bangladesh
McNeill, Peter	Indonesia, Korea, Philippines
Manning, Robert	Vietnam
Manon, Myk	Bolivia, Ecuador
Martin, Edward C.	Vietnam
Mast, Wilfred	Nicaragua
Meyer, Rolf	Bangladesh
Miller, J.R.	Laos
Mitchell, Troy L.	Peru
Moody, Earl	Bangladesh, Vietna## *
Moody, Marvin E.	Bangladesh
Moon, Gilbert	Bolivia, Costa Rica, Ecuador, Nicaragua, Peru
Moore, Charles H.	Vietnam
Moretz, Robert	Bolivia, Jamaica
Morriss, James	Costa Rica
Myhre, John	Costa Rica, Nicaragua
Nandy, Jane P.	Philippines
Nicholson, J.E.	Venezuela
Odgen, Jesse	Afghanistan
Orr, Vesta Lee	Vietnam

Overcash, Betty	Bolivia
Overman, Charles	Jamaica, Liberia, Philippines, Sri Lanka, Indonesia
Palmerston, C.L.	Venezuela
Park, Harold	Philippines
Parker, Henry	Bolivia
Parker, Philip	Philippines
Partridge, Robert D.	India, Indonesia, Philippines
Peabody, William	Afghanistan, Vietnam
Peyton, Arthur H.	Morocco, Sierra Leone
Porter, Alex G.	Thailand
Porter, Robert	Bangladesh, Egypt
Pressy, Charles M.	Bangladesh
Quirk, Thomas	Assistant Administrator for Finance and Contracts; Bolivia, Indonesia, Philippines, Thailand
Ramsey, Billie	Colombia, Egypt, Nicaragua, Peru
Reed, William	Liberia
Rhodes, Maxwell D.	Colombia
Richter, Paul	Bolivia, India, Venezuela
Roberts, William	Philippines
Robinson, Clayton E.	Philippines
Robinson, Lyle M.	Colombia, India, Vietnam
Rodriguez, Jose	Colombia, Costa Rica, Nicaragua

Roesch, Robert	Argentina
Rogers, Leonard	Jamaica
Romney, Nanton	Nicaragua
Ross, George	Vietnam
Ross, James E.	Bolivia, Colombia, Ecuador, Nicaragua
Roybal, Orlando	Bolivia
Sahlman, Frank	Colombia
Sansing, Louis F.	India, Indonesia, Nicaragua, Philippines, Tunisia, Vietnam
Schwartz, Marion	Argentina, Indonesia
Scoltock, John	Bangladesh, Indonesia, Pakistan, Panama
Searls, Dean L.	Guatemala, Papua New Guinea, Vietnam
Sheppard, Riggs	India
Shoff, Raymond	Indonesia, Philippines, Vietnam
Sjoberg, Paul J.	Paraguay
Sloan, Joseph	Bolivia
Smith, Earl J.	Nicaragua
Smith, Hugh W.	Egypt
Smith, J.K.	Thailand
Sorensen, Alton H.	Paraguay
Stary, Paul J.	North Yemen
Stewart, Charles M.	Ecuador
Stivers, O.O.	Bolivia, Chile
Strain, Richard	Belize

Strampher, Clayton W.	Afghanistan
Strong, Louis B.	Colombia
Strunk, Frank	Ecuador, Nicaragua
Swanson, Alan	Papua New Guinea
Swanson, Paul	Indonesia
Taylor, James A.	Argentina, Bangladesh, Bolivia, Chile, Ecuador, Papua New Guinea, Peru, Vietnam
Taylor, John	Bangladesh, Ecuador, India, Peru, Vietnam
Thiesfeld, Harry	Bangladesh, Indonesia, Nepal
Tidwell, Paul	Pakistan, Peru
Treadway, Hamilton	Nicaragua
Troutman, Charles	Bolivia, Jamaica
Turner, Robert E.	India
Venables, Thomas M.	Africa, Far East, Latin America, Middle-East
Viverette, Cecil	Bolivia, Jamaica
Wachner, Albert	Argentina
Wampner, Jerry	Sri Lanka
Wattenbarger, Charles	India
Weaver, Charles	Brazil
Weaver, Leon E.	Paraguay
Weinberg, Max	Dominican Republic
Wenner, William C.	Brazil, Indonesia, Philippines
Williams, Fred R.	Belize
Williams, Robert W.	Iran, Philippines

Wolfe, S. Dean

Jamaica, Liberia,
Vietnam

Wright, Arlis D.

India

Yarbrough, R.A.

India, Uruguay

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Annex "k"

A REVIEW OF SELECTED RURAL ELECTRIFICATION STUDIES¹

A number of studies have been undertaken on rural electrification in developing countries. These studies and the resulting conclusions and recommendations are understandably oriented towards the primary purposes and interests of the sponsoring organization. This section offers a review of some of the most helpful of these studies.

One of AID's first attempts to analyze the impacts of rural electrification projects was "Rural Electrification Cooperatives in Country Development" (1965, no author given). Since the first AID/NRECA rural electric cooperative had only been set up in the previous year, this 1965 report was more on the order of a discussion paper (raising point for consideration) than it was an evaluation of a rural electrification program.²

Another early study was "Cooperative Rural Electrification: Its Implications for International Development." James E. Ross of NRECA submitted this study to AID in April 1966. This was a look at the first five pilot rural electric cooperatives to be assisted jointly by AID and NRECA -- located in Colombia, Nicaragua and Ecuador.

Ross found positive linkages between cooperative rural electrification and raised income levels; and between rural electrification and economic and social change. Ross stressed, however, that cooperative rural electrification in itself would not trigger development in the area. He felt its role was that of catalyst:

Implications of the study are that the institutional arrangement of cooperative can provide the framework for carrying out development needs which will become evident to the community as it is exposed to the conveniences of electricity and a better way of life.

¹Prepared in AID as part of draft rural electrification sector paper, September 1981.

²International Cooperative Development Service, Office of Material Resources, AID, "Rural Electric Cooperatives in Country Development," April 1965, (no author given).

In 1973, the University of Florida produced a study for AID, "Rural Electrification: An Evaluation of Effects on Economic and Social Changes in Costa Rica and Colombia." Up to that time, the report found, rural electrification feasibility studies had been based largely on financial projections. But financial costs and benefits are not necessarily an adequate indication of the socio-economic impacts of rural electrification.

The study's objective was to examine the social and economic impact on selected areas in Costa Rica and Colombia, looking at such issues as rural electrification and infrastructure development, the comparative effectiveness of various lending patterns, the development of research instruments to measure the impact of rural electrification, etc.¹

In 1974 Gilbert Moon (NRECA) published a study for the World Bank Group, "A Report on Rural Electrification: The Costs, Benefits, Usages, Issues and Developments in Five Countries." This report evaluated AID/NRECA rural electrification projects in five countries,² focusing mainly on cost and financial viability issues, but with some discussion of usage patterns.

The Moon/NRECA report concluded that in capital-short countries with many infrastructure needs, rural electrification is a marginal program if measured only in direct monetary returns:

Since it is a program which requires grass-roots support and often experiences a time lag between established goals and accomplishments, rural electrification is better handled as a basic ingredient or essential part of a total development program.³

¹University of Florida (J. Michael Davis, John Saunders, Glen C. Moses, James E. Ross. Center for Tropical Agriculture/Center for Latin American Studies), "Rural Electrification...Costa Rica and Colombia," 1973, p. xvii.

²The five countries were Nicaragua, Ecuador, Costa Rica, India and the Philippines.

³Gilbert Moon/NRECA, "For the World Bank Group: A Report on Rural Electrification--The Costs, Benefits, Usages, Issues and Developments in Five Countries", July 1974, p. 137. Historical information for the report was obtained from NRECA files; forecast statistics were prepared on project sites by NRECA specialists as a local coop management tool.

The report makes a number of specific recommendations which the author believes are necessary for a successful (e.g. technically and financially viable) rural electrification project.

In 1974 the International Bank for Reconstruction and Development (IBRD) of the World Bank Group put out "Issues in Rural Electrification". This report was based on an El Salvador research study, on field trips to four countries, and on correspondence with over twenty countries in Africa, Asia, EMENA, and Latin America.

IBRD was concerned with several main issues: the prospects for successful investment in rural electrification; the best approach to this investment; and the implications for Bank policies and procedures.¹ The report is not, nor was it meant to be, primarily an evaluation of the socioeconomic impacts of rural electrification.

In June 1979 the Inter-American Development Bank (IADB) released its "Evaluation Report on Rural Electrification and Energy." This is a general review encompassing most IADB field operations (31 in all), most IADB field technical consulting operations, and field trips to 48 project sites in 9 countries.

The report discusses the economic and social impacts of rural electrification but finds that existing evaluation data is not sufficient for definite conclusions along these lines. IADB found data limited on the socioeconomic background of users and the socioeconomic benefits of rural electrification.²

In 1977 Development Alternatives Inc. (DAI) submitted a report to AID: "An Evaluation of the Program Performance of the International Program Division of the National Rural Electric Cooperative Association". The study was not primarily an

¹International Bank for Reconstruction and Development (World Bank Group), "Issues in Rural Electrification", July 24, 1974, p.i.

²Inter-American Development Bank, the Group of Controllers of the Review and Evaluation System, "Evaluation Report on Rural Electrification and Energy", June 1979, pp. 26, 29 and 31.

evaluation of rural electrification as a project activity. However, DAI looked closely at available studies and found that often preliminary or tentative impact studies had been presented as convincing demonstrations of support for rural electrification as a development tool.¹

DAI reported that it could not find documented evidence in academically sound, theoretically solid impact assessments for the hypothesis that rural electrification is universally applicable and beneficial to AID's target population, the poor majority of developing countries.²

Another study, funded by AID at about this time, was "Patterns in Electrification Projects: An Analysis of AID's Automated Data" (Dec. 1978) prepared by Practical Concepts Inc. (PCI). This study was an overview of AID-funded projects which in some manner involved rural electrification. Thirty two projects were identified -- including completed, active, and planned projects.

PCI reported that most projects were in the Asia and Latin America Bureaus. And although the number of projects financed by each of these Bureaus was similar, the average size of a Latin America Bureau project was half that of an Asia Bureau project. PCI found that the Near East Bureau had displayed little activity in the rural electrification as a project activity. Total AID allocation for rural electrification 1961 to 1977 was found to be \$209.6 million.³

¹Development Alternatives, Inc. "An Evaluation of the Program Performance of the International Program Division of the National Rural Electric Cooperative Association" Jan 28, 1977, p. 88.

²Ibid. p. 84.

³Practical Concepts Inc., "Patterns in Electrification Projects: An Analysis of AID's Automated Data", Dec. 12, 1978.

In September 1979 Robert R. Nathan Associates submitted a report to AID, "Contribution of AID Documentation to the Evaluation of its Rural Electrification Sector Projects". AID had requested this study to determine the extent existing documentation could contribute to an evaluation of AID-funded rural electrification projects.

Nathan Associates reviewed project documents for seven countries -- Bolivia, Colombia, Costa Rica, Ecuador, Guatemala, Nicaragua, and the Philippines. The major conclusion of the study was that existing AID project documents did not provide adequate information for a full evaluation of the effects of rural electrification projects.¹

In response to New Directions conceren for the impacts of AID programs, AID produced a series of discussion papers meant to stimulate thought and dialogue on development problems, and to encourage experimentation. The papers are intended to be a "mix of what is known (from experience and evaluation evidence) and what needs to be known from future evaluative studies".²

As part of this series, Judith Tendler produced "Rural Electrification: Linkages and Justifications" in April 1979. Tendler took up a number of rural electrification issues including "Household consumers and the rural poor", "Flat vs. metered charges", "Autogeneration vs. central-station systems", etc. Tendler's paper was based on 40 interviews conducted in Washington, D.C. in the spring of 1978, with additional information from discussions with AID staff and from literature sources.

In 1979 Elizabeth Cecelski (Resources for the Future) released "Draft: The Role of Rural Electrification in Development". This working paper presented some limited conclusions based on scattered data and anecdotal evidence. Cecelski found that although large sums of money had been spent on rural electrification, information was lacking on its impact on economic development.

¹Robert R. Nathan Associates, Inc. "Contributions of AID Documentation to the Evaluation of its Rural Electrification Projects", Sept. 21, 1979 (Vol. I & II).

²Judith Tendler, "Rural Electrification: Linkages and Justifications", April 1979, "Preface" p.ii.

She recommended further research and analysis in several areas: alternatives to electrification; alternatives to the central grid model; the issue of subsidies and the true cost of rural electrification; analysis of direct and indirect benefits to recipients; and necessary pre-conditions for successful rural electrification projects.¹

The U.S. Bureau of the Census (BUCEN) provided training and technical support to the Philippines National Electrification Administration to conduct a project level evaluation that would provide insights into the household impact of the rural electrification programs in the Philippines.²

To provide data for this evaluation, two large-scale household surveys have been conducted. Findings from a 1977 survey were released in 1978. On March 19, 1981, BUCEN release some initial findings from its 1980 survey, "Philippine Rural Electrification Evaluation: Preliminary Results of the 1980 Household Survey".

This survey project had several major components and purposes:

- 1) The development of comprehensive data on the socioeconomic characteristics of households that connected versus those that did not connect;
- 2) The identification of the uses made of electricity and the changing pattern of use over time;
- 3) The identification of the extent to which rural electrification reached the poor majority as opposed to upper - and middle - income groups;

¹Elizabeth Cecelski, "The Role of Rural Electrification in Development", Resources for the Future, Washington, D.C., July, 1979, p. 91 ff.

²U.S. Bureau of the Census, "Philippine Rural Electrification Evaluation: Preliminary Results of the 1980 Household Survey", March 19, 1981, p.1.

4) The magnitude of the demand for electricity.³

In response to the requirements of the third AID/NRECA funding mechanism (the 1981 Specific Support Grant), NRECA has developed a preliminary analytic rationale and framework for developing and implementing impact analysis. NRECA has produced a preliminary draft of findings from a study of rural electrification in Costa Rica. In addition, NRECA hopes to conduct an evaluation study during 1981 in the Philippines.¹

* * *

In reviewing existing evaluations of rural electrification projects, it is important to remember that the term "evaluation itself is open to widespread interpretation.

Nathan Associates found:

To date, there is an overabundance of definitions and far too little consensus on what actually constitute an evaluation. Some persons use the term in reference to pre-project cost-benefit analysis. during a project, or after it is implemented, the term may refer to a range of project reviews -- from short run studies (several weeks) gauging overall project progress or only as one aspect of a project (i.e. and audit) but without resort to sophisticated research methods, to long-run impact measurement studies, or program effectiveness studies utilizing econometric or survey and statistical techniques.¹

³BUCEN, p. 31

¹NRECA/IPD "Rural Electrification in Costa Rica: Viability Concepts and Evaluations" Nov. 1980 (Draft). A letter from S. Bunker (NRECA/IPD) to J. Shaffer (AID, Coordinator of Cooperative Development) dated June 1, 1981 proposed this Philippine study. In a June 23, 1981 telephone conversation, Phil Costas (NRECA/IPD) indicated that NRECA would go ahead with the project after certain funding questions had been solved, and after the Philippine government had given its approval for the project.

¹Nathan, I, p. 16.

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