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Sustainable Rural Electrification in Developing Countries: Is it Possible?

Synopsis of Conference Proceedings March 6-7, 2003

In March 2003, the National Rural Electric Cooperative Association (NRECA) organized a two day international conference on rural electrification in developing countries. A synopsis of the conference and presentations on the role of cooperative in rural electrification is enclosed. The papers include a summary of NRECA and the U.S. coop model as well as similar cooperative systems in Bangladesh and The Philippines.

Synopsis of Conference Proceedings

NRECA organized this international conference that addressed the critical role of electricity in development, how to make it sustainable, best practices and alternative models and case studies. Rural electrification is getting more attention as a development topic because of power-sector reform, privatization and renewed emphasis on infrastructure for economic growth.

Rural electrification is more than power or energy services because it should be seen as the use of different technologies (e.g., grid, distributed) and ways to reshape social structures and relationships within communities. Electrification needs to come from inside, not outside of society. It involves core values of social justice and equality in serving less populated areas, usually requiring significant resource allocations from urban to rural areas, or from donors. Rural electric cooperatives distributions systems can spread democratic values and result in far ranging societal changes in rural societies.

Based on a massive 1-year study by social scientists, village electrification in Bangladesh has resulted in major economic development and poverty reduction including massive employment generation, increased incomes for the poor, more savings, enhanced literacy, better women's status and improved health. Another study of rural women in India found that women in electrified households had more time for reading and their work was considerably eased through electric

stoves and appliances, rather than reliance on traditional fuels such as gathering fuel wood.

Rural electricity is a risky investment due to rural poverty, lack of population density and low energy uses, mostly lighting and some productive activities. Energy demands in rural areas should include an analysis of traditional energy uses or inefficient small power generation in understanding the potential demand for rural electrification. Rural electric institutions will require extensive capacity building including overcoming a limited pool of technical expertise. Common rural electric systems standards are important for least cost options, particularly in addressing technical and non-technical losses.

Immediate demand will be very low with high investment costs in planning and starting up rural electrification programs. Usually networks can be built out from municipalities to the periphery and later from secondary towns. Thus, a skeleton system can be put in place or built upon. Centralized apex organizations, such as NRECA and rural electric boards, are helpful in promoting rural electricity and supporting decentralized distributions structures, such a cooperatives, which are a good solution to the institutional challenges.

It is difficult to minimize political interference in rural electric project selection and utility operations. Rural utility organizations need to be built simultaneously with electric extension, including setting of a rational tariff structures with collections that cover costs. Uniform construction standards achieve economies of scale. It is important to develop a “utility compact” in which the utility agrees to provide quality service in exchange for customers agreeing to pay for the service. Long-term, “patient” capital is necessary for initial construction and extension.

There are many alternative ways to electrify rural areas, but they face similar problems in sustainability. Most successful programs have adopted rural electrification plans that set priorities for villages, places with the heaviest loads first to be built, and a proper business strategy. Often, these plans and initial funding helps rural customers with upfront costs (e.g. household wiring, loans for appliances and productive uses) and engage communities in understanding billing and collection systems. Case studies were presented at the conference for Albania, Bangladesh, Bolivia, Chile, Dominica, Dominican Republic, Guatemala, The Philippines, Tanzania, Tunisia and the U.S.

Rural electric financing approaches can be broken down into supply and demand. Pre-investment analysis includes feasibility, line design, generation; grid or non-grid and financing of productive uses, such as irrigation and off farm enterprises. Financing can come from various sources: utility privatization funds, donors, revolving funds and financing corporations. Private-public partnerships are common including with commercial and development banks and donors such as the IFC or USAID. Growth-oriented power is less of a problem than access-oriented power in reaching two billion rural people without electricity. There is

ample evidence that rural electrification can be sustainable where it is approached with a strategy for creating healthy markets with properly designed, developed and motivated electricity delivery agencies, and starting from the bottom up.

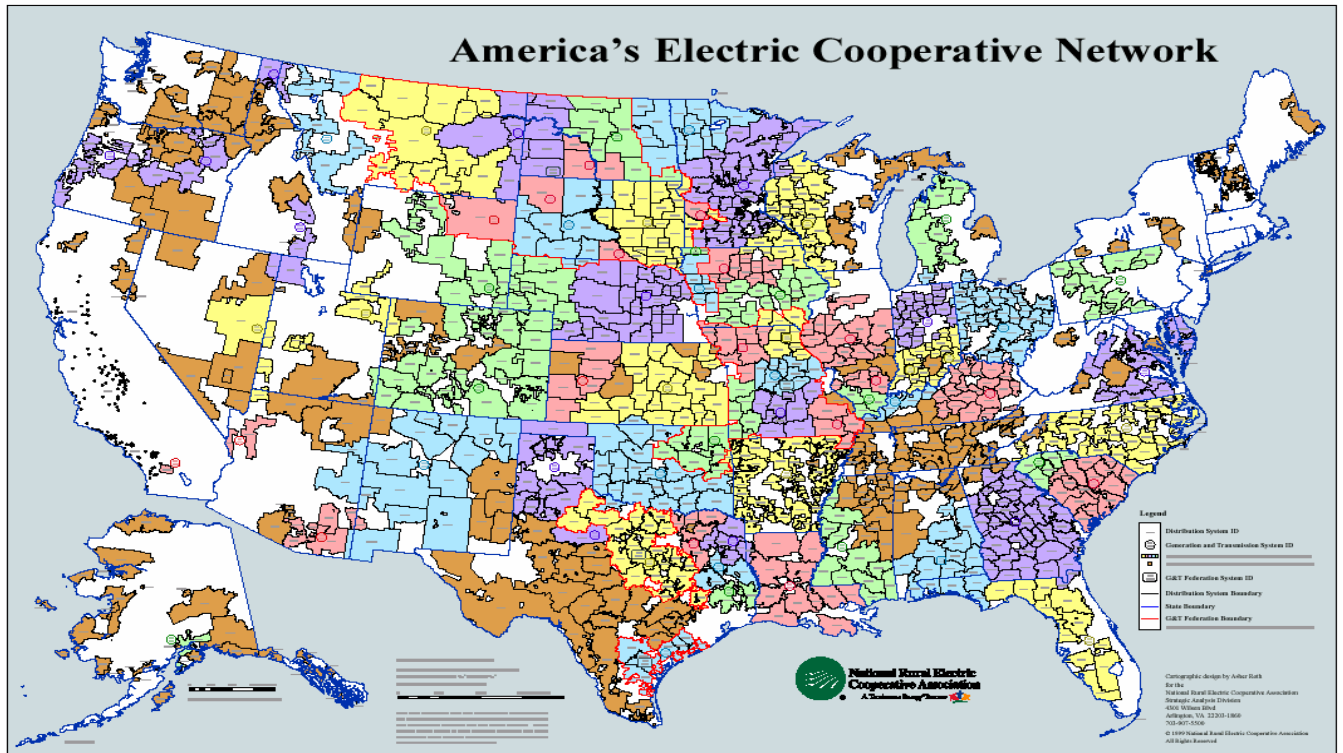
Brief History of NRECA

Jim Andrew¹, NRECA Director from State of Georgia

On behalf of NRECA and the Board of Directors, I would like to welcome you today to NRECA. I would like to start by going back to the 1930's, after we were just out of the Depression. President Roosevelt was the President, and as a child he had had a crippling case of polio. He spent his life in a wheelchair. He had a place in Warm Springs, Georgia. As the name suggests, the town had warm springs. Bathing in warm springs was a popular treatment for polio. Roosevelt built a house there, and he called it the Little White House. We are developing a wing of that White House right now that will be about rural electrification.

Roosevelt observed that his rates for electricity at that little cottage in Warm Springs were about six times higher than at his home Hyde Park, New York, which did not seem right to him. A little south of Warm Springs, there is a mountain called Pine Mountain. You can drive up to the top of that mountain and you overlook a valley down below. It is beautiful in the daytime. But when he drove up there at night, it was dark. He decided that the people there had as much right to electricity as he did in Hyde Park. So, he went back to Washington, and he formed a coalition of politicians. Congressman Raven from Texas and a Senator Norris from Nebraska wrote up a bill called the Rural

¹ Jim Andrew is a former president of NRECA and the national director from the state of Georgia. Jim is one of 47 representatives of the consumers of electric cooperatives of the United States who own this building, this organization, who direct everything we do, including our international program



Electrification Act. The Rural Electrification Act allowed utilities or organizations to borrow money for rural electrification at a very low interest rate, which was two percent.

Nobody took them up on it, because as an investor owned utility, they could not make a return on their investment for their stockholders. In my state of Georgia, the Georgia Power Company made the first loan, but it did not last.

Cooperatives were not a new idea. Farmers had cooperatives across the United States at that time. The farm cooperatives bought things like fertilizer, farm supplies, and seed. They concluded that, if they wanted electricity, they were going to have to do it themselves, so they formed cooperatives. They met in churches, they met in country stores, they met in schoolhouses, and they met all over the United States to form these cooperatives so they could have electricity in their homes. They quickly realized that they did not have the necessary business experience or technical experience. As a result, the Rural Electrification Administration, the REA, was formed. They established standards about bookkeeping, accounting, and system design and operators.

It grew from there, until today with a thousand electric cooperatives, approximately. We serving about 35 to 40 million people (see map). In my state alone, we are serving 42 cooperatives and about four million people. Cooperatives own the majority of electric distribution lines across the United States. If I remember correctly, 83 percent of the landmass of the United States is covered by electric cooperatives. The U.S. experience is an example of what many of you are going through now. So many of you are in the same position we were in 70 years ago.

In 1942, we were at war. The Secretary of Defense, a man named Kellogg, decided that the war effort needed more metal than the cooperatives needed to wire and build lines. The cooperatives from all over the country did not agree with Kellogg. So, they came to Washington and met at the Willard Hotel to form an alliance. They formed the NRECA and used their combined political power to get the rule changed. They started getting wire and building lines.

NRECA's growing political power made the utility services nervous. They started rumors that the co-ops had farmers out there climbing poles and hanging wires out of trees to scare the insurance companies. NRECA decided that best response would be to form an insurance company. The insurance companies relented when faced with the threat of losing such a big client. NRECA did eventually end up in the insurance business. NRECA has about 710 employees and about a third of them are involved in providing insurance services to the co-ops. NRECA also has departments that provide help in areas of marketing, government relations, our lobbying wing, environmental issues, and finance. We have a broad spectrum of services here at NRECA. Of a total budget of \$120 million comes from the dues of the cooperatives. The rest of it is raised in service fees and project funding. So what grew from churches and schoolhouses and country stores has become a wide electric system that we call rural electrification.

U.S. Cooperative Model

Paul Wolman², Consultant, the World Bank

I hope to give a brief view of the rural electrification effort in the U.S., sponsored by the Rural Electrification Administration and carried out by the early cooperatives. I will focus mostly on the period before the advent of NRECA, not because I do not want to discuss our hosts in front of them, but, rather, because I would like to look at the factors that shaped and enabled the U.S. program to be successful. The program's antecedents and its achievements may have some important lessons for us.

The RE program started in 1935 from nothing. By 1950, the program had almost three-and-a-half million consumer members on its rolls and 1.1 million miles of distribution line, built at costs that were about half the price that the utilities had been charging consumers. The cooperative's costs were around \$800 per mile of distribution line as opposed to the utilities' \$1500. When the program started, the US had only two cooperatives and some experimental

² Paul Wolman is the senior policy analyst at the National Education Association. He works on trade union and education issues. He has edited the S-Map Connection, a newsletter on energy alternatives for the lowest-income countries, Energy Notes, and the energy series technical papers for the World Bank. He is the author of "Most Favored Nation" and a co-editor of "Teacher Unions and Education Policy."

cooperatives before that. The energy cooperatives were the first with any significant scale and success. By 1950, the Rural Electrification Administration had approved more than 2.3 billion in net loans to many of the one thousand cooperative borrowers with few defaults and some ahead-of-schedule repayments.



These pictures are from the mid 1930s and are from North Carolina, but similar scenes could be observed all over the South, Midwest, and West, and parts of the Northeast. Hopefully, looking at these will help you understand why we are comparing rural electrification in the U.S. to rural electrification in developing countries. The U.S. is a very large country, and some areas of it are quite remote. Human power was used for almost everything; fields were cleared entirely by hoe and mule. This was common in the U.S. agricultural sector during the '20s and the '30s. So, we can look at the United States as a developing country. Note that the development of the U.S. was extremely uneven. The U.S. population in 1930 was still 44-percent rural, which amounts to about 50 million people of a total population of 126 million. Also contributing to this imbalance, were the high levels of farm mortgage debt and foreclosures and the common practice of sharecropping and tenancy. Tenancy is of particular interest because tenants are not often motivated to invest or improve upon infrastructure. It has to be done for them.

The U.S. rural areas had other related problems, such as poor health care, malnutrition, poor sanitation, low population densities, isolation, and poor work conditions for women and children. Women, like those in other developing countries, spent great amounts of time fetching water and gathering wood for cooking and heating. A European woman who toured areas of Tennessee and Kentucky during the late 1930s, to some American resentment, compared the condition of some of the denizens of that area to that of peasants in medieval Europe. To understand the condition of life in the United States, we must note

that the levels of farm electrification were about 10.4 percent in 1930 and about 12.6 in 1935, as opposed to 84 percent in the non-farm and urban areas.

One important thing to note is that the 1930 U.S. census defined the farm and rural category as unincorporated areas of populations of 1500 and less. Rural areas had populations up to 2500. Populations higher than that were classified as non-rural. This is interesting and important because it was the sub-1500 population, unincorporated area that became the jurisdiction for the Rural Electrification Administration when it was founded in 1935.

Driving inequalities were large energy companies. By 1924, the top 16 holding companies controlled 75 percent of U.S. generation capacity, the top seven of which controlled 40 percent. The utilities were not interested in rural electrification, from a business standpoint. They did not consider it profitable. One utility official called rural electrification "a relatively unimportant and very difficult business undertaking, if not an outright utopian ambition to remake rural life." Another one said, "It would be unfortunate to raise in the breast of the farmer any false hopes with regard to electrical supply." Those are some of the more poetic expressions, but they were fairly typical of the utilities' attitudes at that time.

While the cooperatives did start with nothing on the ground, from a historian's perspective, many things facilitated the rural electrification program in the U.S. I am going to skip over the Newlands Act of 1902 and the Country Life Commission movement and focus particularly on the "Giant Power" plan of Morris Cooke and Gifford Pinchot. Pinchot, was a forester and friend of Theodore Roosevelt. He was on the Country Life Commission.

In 1923, when he was elected Governor of Pennsylvania, he appointed Morris Cooke as the head of the Giant Power Board. They had rather extravagant names for things in those days. The Giant Power Board was conceived as an answer to the utility industry's Super Power Board. They never had a hands-on conflict, except in legislature, and Super Power won. The interesting part of the Giant Power Board was that it took plans by the Super Power planners to rationalize generation, transmission, and distribution but added to them a component for rural electrification that stressed regulation of the utilities. They added to it the goal of serving both urban and rural customers. They argued in their manifesto that the public interest in rural electrification required an investment in distribution lines, even if that investment did not meet the private market's standards of return. To moderate the risk, they proposed pooling the risk among the utilities. The board intended the utilities to participate in this through the "gentle persuasion" of regulation. They wanted them to serve the less profitable areas, but to avoid being damaged too much by sharing the risk, as in typical insurance schemes. The Giant Power Board featured an egalitarianism that was not evident in the Super Power industry plan. In fact, the Administrations of Coolidge and Hoover lobbied against it, which was the

beginning of Morris Cooke's break with the Hoover Administration and his later alliance with Franklin Roosevelt.

I won't say much about the TVA, except that David Lilienthal, one of the first directors, created the Electrical Home and Farm Authority, which helped subsidize consumers' acquisition of home appliances. Lilienthal was looking for a way to build demand for TVA-generated electricity, so he created a plan better than the commercial terms of lending, which were then about two years. Lilienthal's plan extended payments up to five years.

All of this leads directly to the election of Franklin Roosevelt. Franklin Roosevelt had the "vision thing." He had a social vision of rural electrification. In addition to supporting both the TVA and REA, he supported limits on corporate utilities through the Public Utility Holding Company Act of 1935. You can get some sense of Roosevelt's social philosophy from his own words on Roosevelt Day, November 18th, 1934, when he spoke in Tupelo, Mississippi and dubbed electricity "a means toward human happiness." He went on to say that it amounted to essentially a kind of social revolution. He believed that electricity was important in unifying the country.

In 1935, Roosevelt established the REA as a relief agency. The following year, it became a development agency with a ten-year mandate. REA could borrow 50 million a year, and then, subsequently, 40 million a year. This is where the coops became part of the federal cooperative joint effort. Morris Cooke, who was the first head, did not envision the coops as being part of this, but he was unable to persuade the utilities to participate. At the same time, the TVA was sponsoring the Alcorn Coop in Northeast Mississippi. This is a quintessentially political process. The Alcorn coop was, in fact, smack in the middle of the district of John Elliott Rankin, who was one of the co-sponsors of the TVA bill. That was obviously not accidental. The Alcorn Coop revealed, in terms of the incomes that the coop was getting, that it could be self-supporting, and it encouraged the REA to adopt a cooperative model, for want of any other way, as a means of bringing electrification to rural areas.

Two aspects of the early REA are worth particular attention. One is that it did it is heaviest lending in the lowest populations densities.. That was its first criterion, to attack or aid the most difficult cases first. The second, was to undertake a plan that aimed at area coverage. That meant that it would not go in, as the utilities had done, and cherry-pick only the middle-income farmers, but that it had to incorporate a blend of middle-income and lower-income farmers.

I am going to say a quick word about the cooperatives and what they did. We can get a sense of what the typical cooperative was like. They were mostly nonprofits, in terms of their organization and on the Rochdale principles of cooperation. They had about \$400,000 of capitalization, a distribution system of about 425 miles of line, about a thousand members, and monthly bills of \$5 to \$6

for a hundred kilowatts. There was a minimum take of 60 kilowatts per month required, but, for the lower-income farmers, this was slightly modified. The lower-income farmers paid minimal-use charges. This was typically about a dollar per month for the first 11 kilowatt hours, and they made total payments of about \$2 a month. They also had plans for the lowest-income households, such as the Arkansas Plan, for home wiring. This was a plan that allowed low-income householders to put down one dollar on a total cost of \$10 for a home-wiring system that they could install or that they could have installed for them. Then they amortized the cost at a 10-cents-a-month charge added to their electricity bill.

The REA also used sweat equity, particularly in the earliest stages in the building of the lines. REA trained crews to draft local labor, usually members from the cooperatives, to put up poles and also to tear down poles put up by the utilities when they tried to come into the districts and cherry-pick the better customers. This was what might be considered "midnight policy discussions."

I do not want to present a misleading picture of the cooperatives. Most members were passive consumers, particularly the less well-off farmers. If you're out hoeing a field or plowing with a mule, you do not have a lot of time to sit in on daytime policy discussions. However, whether active or passive, many farmers saw the coops as the only way to get power and as a door into modernity and convenience, which was now becoming increasingly apparent in the cities.

We have to remember that this period was one in which labor-saving appliances, like irons, washing machines, and electric stoves, were only beginning to gain mass markets in the urban areas. These things were just gaining mass markets in the 1920s and '30s, so it was the influx of luxuries into the cities and the communication of the advantages of them that helped stimulate the rural demand. In part, this also explains also the lag in rural demand, because the rural demand is more a household demand. It cannot be easily separated, or it could not at that time, be easily separated from the farm demand.

The rural people very frequently expressed a great deal of gratitude to the REA and to the cooperatives for bringing electricity to them. "We do not see how we lived with out it." "We never would have had it if it had not been for the cooperatives." They were enthusiastic participants. Some members of cooperatives held mock funerals for the kerosene lanterns that they had used.

REA also brought around something called a "traveling electric circus." We would probably call this now a "load-intensification fair." "Traveling circus," I like better. The purpose of this was, as you might expect, to demonstrate electrical appliances and also farm equipment. That is the picture on the left. Small radios and electric irons, apparently, were among the first appliances picked up. In the North, washing machines were in big demand, and refrigeration

was featured in the South. I do not know why washing machines only in the North, but I assume that the South had other methods of personal hygiene.

Another significant milepost in the REA's history was the passage of the Pace Act. The essence of the Pace Act was to institutionalize the REA, to continue its funding, to institutionalize the commitment to area coverage, and to allow the cooperatives to move into generation and transmission as well as the distribution.

To sum up, the factors that made the cooperatives successful, in the early period, at least, were the simplicity and appeal of the Rochdale principles, the low-cost financing from the government, particularly for appliances and home wiring, the assurance of low-cost power in the areas of TVA watershed, the regulation of utility pricing, and the extension into generation. Generation was important because a number of cooperatives in the early period wanted to control the wholesale costs of the electricity that they were buying. The REA centralized the resources. I heard it referred to as being an "apex organization," and it served that purpose by designing common transformers and pole configurations. Finally, I think the electric utilities have to be thanked for their opposition to the coops, because it probably did more to solidify the public support of the cooperatives than many other factors.

U.S. AID's Approach to Rural Electrification
Dr. Griffin Thompson³, Director EGAT/ENV/EET

It is difficult to raise the visibility of energy within a development assistance community because of competing interests from health, education, economic growth, gender equity. Yet, energy is inextricably linked to these other issues.

Rural electrification is more significant than electrical power and energy services; it is the accumulation and distribution of economic and political power. Technologies, energy or otherwise, embody specific forms of power and authority. Our choice of the kinds of technologies and the accompanying technological systems are powerful forces in reshaping the social structures and power relations within communities. In many respects, the construction of technological systems entails the reconstruction of social roles and relationships.

³ *Griffin is the energy team leader for USAID's Office of Energy Information Technology. This office is responsible for providing strategic and intellectual leadership for the agency on matters of energy and development. He has previously held positions as vice president of the Civil Engineering Research Foundation, as the director for Asia programs for the U.S. Export Council for Renewable Energy, and on a business council representing more than 1500 U.S. companies specializing in renewable energy and advanced energy efficiency technologies. Griffin was at Ganzaga University, and he has his doctorate from Georgetown University here in Washington D.C.*

This has significant implications for our work in energy and development. In *Electrifying America*, David Nye said: "Electrification is not an implacable force moving through history, but a social process that varies from one time period to another, from one culture to another."

In the United States, electrification was not a thing that came from outside society; rather, it was an internal development shaped by its social context. Electricity is an extension of human lives. Someone makes it, someone owns it, someone opposes it, many use it, and all interpret it.

For most of us, the core values of social justice, liberty, and equity capture much of what we are seeking in sustainable rural electrification. I want to talk briefly about the relationship between democracy and development, which is a topic of significance that has been sorely ignored by many of us. Technology plays a role in the promotion or the thwarting of the democratic values that animate our individual and collective behavior. I will discuss energy technologies and their expansive technological systems as they relate to the development challenge of rural settlements. Finally, I will relate these thoughts to the United Nations World Summit on Sustainable Development in the form of the Clean Energy Initiative and the Global Village Energy Partnership, which the U.S. committed to at Johannesburg.

The past 50 years can be referred to as the Decades of Democracy, because the number of nation states that have cast off their totalitarian shackles and embraced democratic rule has grown from 22 to 120. It is being suggested by some in this area that within a few months, we should be revisiting that number. That means that over 60 percent of the world's population dwells within lands where popular rule, free speech and assembly, legal entitlements, transparency of law are the reigning values for political governance. There have been setbacks, and those notable states which have remained immune to the democratic wave that has swept across the globe. I am acutely aware that there is a huge difference between procedural democracy and substantive democracy. Democratic procedures, in themselves, do not create jobs, educate people, clean the air and the water we breathe and drink, lift up our individual or collective souls or put food on the table. Democratic mechanisms, however, are our best hope to achieve these human development goals. Democracy is a complex and thorny thing that is as enriching in its impact as it can be elusive in its realization. In the most recent wave of democratic fervor, we have witnessed the resurrection of the old concept of civil society and its recognition that true democracy comes from the people themselves, not their government representatives or attendant institutions. The art of democracy is most brilliantly played out in our informal associations and relations with one another. What better defines civil society and the contributions to democracy than the electric cooperatives that form the heart of the NRECA experience? In the words of NRECA's CEO, Glenn English, "At the coop, business as usual means accountability to member consumers, it means democratic control and oversight

of a business that is owned and operated by those it serves, and it means doing business in your community with folks you know and can trust." As the video showed, the people have the power. Now, that quote of Glenn English is pregnant with a number of key themes surrounding the pursuit of democratization, such as civil society, local ownership, and trust. These are increasingly being referred to as "social capital."

Cooperatives are at the heart of civil society. Civil society is defined as space within which individuals mediate in open and free political discourse in order that the person qua individual can actualize his or her needs and interests while at the same time serving the community as an individual. Civil society consists of a wide range of intermediate institutions, such as electric cooperatives, that operate independently between the individual and the government and are recognized as the cornerstone of a vibrant democratic culture. Furthermore, social and economic development of the poor is a precondition to a flourishing democratic society.

I maintain that the choices we face surrounding the provision of energy services such as lighting, heating, cooling, motors, and cooking affect and are affected by the manner in which we fashion our social organizations in a civil society. The social and civic scaffolding we erect and the public/private partnerships we form are critical to our ability to expand access to modern energy services to rural communities around the world. Part of that scaffolding consists of technologies. In pursuing the democratic path to development, too little attention has been paid to the impact of our technological choices. Technological devices are developed and diffused in response to problems or needs of society. They answer questions posed by society. While this is a relatively straightforward and benign truism, the repercussions of the technical answers given to political questions are not politically sterile. Invariably, the devices result in systems and networks that affect the social organization of power and authority either by design or by accident. Not all technologies possess such catalytic power; many are quite innocuous. The economist, Thurston Bevin, refers to technological adoption as "changes in the habits of thought." I believe that the changes in the habits of thought brought about through the introduction of energy technologies, particularly in the ownership patterns represented by cooperatives, ultimately lead to what the French historian, Tocqueville, refers to as the "habits of the heart." Put more simply, cooperatives facilitate the acceptance of civil attitudes and behavior, and the strengthening of civil society. In this fashion, energy technologies constitute political things. The discoveries of new energy sources and technologies translate into new patterns of discipline, authority, and economic and political organization. Certainly, the history of electrification in the U.S. supports this claim; those of you who work overseas certainly see the same dynamic in play.

Jim Andrew opened this session up with a distillation of rural electrification history in the United States. One can clearly see the economic and the political

ramifications of that effort. Electric cooperative structure, wherever it has been adopted, should be celebrated not only for lighting up homes, farms, and factories but also for strengthening civil society, social capital, and democratic cultures.

Starting with Abul Barkat, we will hear of the tremendous success the cooperative system has had in Bangladesh. A recent report evaluating the economic and social impact of the rural electrification program in Bangladesh stated, "Electricity facilitates people's participation in political as well as local governance-related activity. People spend longer periods in union, council, clubs, cooperatives, and strongly participate in local-level decision-making since electricity created congenial environments for political, social gathering, community, and courtyard meetings." The point is not just that electricity provides the services that facilitate enhanced social interaction, but that the provision of electricity in certain models requires local groups to choose, finance, operate, and maintain the technological systems that provide those services.

The provision of electricity, particularly through the cooperative ownership structures, requires the community to organize effectively to make decisions. It requires the citizenry to practice the fine art of democracy and exercise the skills of cooperation, consensus building, compromise, and conflict resolution. The significance of the electric technological system is that the community has an incentive to act cooperatively based on the collective desire for energy services. Perhaps even more importantly, individuals have the motivation to cooperate and communicate with their neighbors. An individual cannot purchase, operate, and maintain these systems alone. He or she requires the assistance and the comity of his or her neighbors. The pursuit of autonomy and liberty, principal values of democratic culture, spreads through the community. This will have particular relevancy for countries that are trying to widen their sphere of electrical access and deepen their democratic cultures.

The lesson NRECA and the cooperative model have demonstrated may be even more valuable in the future, given the increased attention many are paying now to distributed generation. Distributed generation will not displace the existing grid systems, but it will play an increasingly important role in the years ahead, particularly in those regions of the world currently suffering from energy poverty. The utility industry is currently undergoing turbulent changes in the way it does business. In addition to the global trend of privatization of the utilities and unbundling of generation transmission distribution systems, there is a trend of downsizing of power-generation capabilities. The average size of generating units in the United States has dropped dramatically over the past 15 years. Improvements in micro-turbine efficiency, forms of renewable energy technologies, such as solar wind, biomass, small hydro, and the prospect of fuel-cell technology all suggest that localized power generation will constitute a vital component of the utility paradigm of the future. This is a new way of generating electricity, and of distributing it. Curiously enough, distributed neighborhood

power is precisely what Thomas Edison envisioned when he threw the first switch in the historic Pearl Street Generating Plant in New York City over 120 years ago.

In many cases, distributed generation is the best hope of reaching the nearly 2 billion people without electricity and in ensuring better service delivery to the millions upon millions of individuals in rural and semi-urban settlements, who, although connected to the grid, suffer under the of antiquated and overburdened power distributed systems. The shift to distributed generation does not mean a replacement of the existing large-scale system, and much work needs to be done in order to make the distributed generation live up to it is potential. Distributed generation, most realistically, should be viewed as a way to supplemented current grid systems, rather than supplanting them. Electrical engineers may be fascinated with the efficiency of this utility transformation, but utility managers see this trend as thoroughly disruptive.

The intriguing thing about distributed power is its contribution to yet another global trend. This trend, when coupled with a downsizing of the electricity-generating technology, is inspiring and revolutionary: the devolution and decentralization of political and administrative power to the sub-national units. Local political decision-making is a result of several things, ranging from the recognition that central states cannot adequately provide requisite services to the pipelines, to the resurgence of local cultural, ethnic, and political voices making claims on their right to autonomy, liberty, and sovereignty. The symmetry of these two trends foretells the possibility of stronger, more vibrant democratic cultures in the future, cultures that can capture the synergistic benefits of these two trends whereby electrical power translates into political, economic, and social power for the local communities. Local communities can now take control of the lifeline of infrastructure service delivery and match it to their own social, economic, and political circumstances.

One could argue that individual liberty and social justice can best be actualized when decision-making structures are closest to the individual, the principle of subsidiary. The adoption of distributed energy systems offers the opportunities for municipalities to enter into civic covenants with one another and practice democratic politics. Thus, distributed generation meets distributed governance. With democracy as the outcome and liberated people the winners, an electric cooperative provides a model that complements the technological and political localism of these two trends. Unfortunately, history is replete with examples of local elites stealing the show. They have been every bit as tyrannous as the despot residing in the faraway national capital. Still, the potential for a more democratic and development-enhancing scenario exists. It will be up to us to see to it that the promise, not the perils, of this opportunity become reality. The issue of scale, the merit is of localism, and the technological interface is fortuitous and relevant. Here, the cooperative experience may be the most important lesson of all.

The USAID energy office has worked hard to illuminate all aspects of energy and the development goals of the agency. Our view in the office is that energy is at the center of everything, and our office should be the most important office in the agency. Not everybody within the agency embraces that view, but we are working hard to convert them. We are continually searching for ways to strengthen the links between energy and health, education, economic growth, environmental stewardship, gender equity, and democratization. We are working hard to demonstrate that energy interventions will make development goals more achievable. Few, however, acknowledge the connections, and it is our job in the energy office to make those connections clear. We continually point out that energy is the path to the broader goal of sustainable development.

One important event that has helped our cause is the U.N. World Summit on Sustainable Development, which focused on the issues of energy and water. This is the first time in decades that we have seen this type of visibility given to the issue of energy, via sustainable development. The United States launched the President's Clean Energy Initiative, which is a three-part initiative designed to increase access to modern energy services, improve the efficiency with which energy is generated and used, and improve the health impacts of energy use. The most relevant element of the Clean Energy Initiative is the Global Village Energy Partnership, which is designed explicitly to increase access to energy services in participating countries around the world. The USAID energy office has the lead in implementing the Global Village Energy Partnership. It is working hard with The World Bank, UNDP, UNEP, a number of European bilateral donors, a large NGO community, and industry. NRECA will be playing a large role in helping us initiate and implement this critical initiative. GVEP and the entire Clean Energy Initiative is devoted to the principles of public/private partnerships and the leveraging, both intellectual and financial, of potential that is created by working with other participants. Official development assistance is not going up. The real money lies in catalyzing domestic markets and foreign direct investment. In the Global Village Energy Partnership, we are trying to combine these two streams of financial flows to make a more effective synergy. We can use official development assistance in a way that will encourage the types of private-sector investment that we desperately need.

The private/public partnership theme is also central to Administrator Natsios' Global Development Alliance at the agency. The public/private partnerships that punctuated the summits proceedings gave us glimpses of hope. The U.S. Government understands the need for collaboration. Through our initiative, we will be seeking to address the dimensions of energy and poverty problems and to strive to significantly increase access to modern energy services. We understand that we can only do this through a network of public/private partnerships and by drawing on the social capital that is increasingly in greater supply. Partnerships such as the Global Village Energy

Partnership manifest the essence of distributive power, both electric and political and the thirst for a more democratic future.

We need to continuously rethink the way we do our business. In addition to the economic, social, environmental, and political dimensions of sustainable development, there is the epistemological that encourages us to re-evaluate what constitutes knowledge. Solutions found from models and perceptions of reality from the industrial age are not enough for the problems confronting us in the age of the network.

Ultimately, we are judged not by our words, but by our deeds. St. Francis said, "Preach always, and, if necessary, use words." I look forward to listening to the words that express the good works in which you all have taken part. We in USAID, look forward to working with you in the future as we tackle the challenge of rural electrification.

Bangladesh Rural Electric Cooperative Experience

Zeal I. Choudury⁴

The Rural Electrification Board has a good name in Bangladesh, but all that glitters is not gold. We have problems, we have deficiencies, and we are aware of huge future challenges. NRECA advises us on all issues, because we have fully adopted the American model. Our constitution states that everyone should have access to electricity. In practice, however, only 30% of rural people have electricity. We have covered many villages, but not all in the village have electricity.

Often, independent, non-government organizations like the Power Development Board provide electricity to towns and cities. None of the villages, with the exception the areas surrounding the city, had electricity. The electricity programs extended 12-15 km of lines outward as cities gradually expanded, but we had no government program for rural electrification.

The idea that rural electrification program is associated with the development of the socioeconomic status of a country is commonly accepted. In 1976, the government decided to create a total rural electrification program. USAID was contacted to undertake a feasibility study. Starting a rural electrification program, from a Bangladeshi point of view, could not have been done without help. The ordinance was formulated in 1977, and the master plan began in phases. The coops were semi-autonomous bodies that operated independently with minimal government oversight. The governmental control is

⁴ . Mr. Choudhury is the 6th REB Chairman. Mr. Choudhury was a career government servant and had worked in a number of different ministries before coming to the Rural Electrification Board. He has finished his government service but was requested by the government to continue serving as the REB chairman. He and I have spent many hours discussing many issues, and he brings a dynamic spirit to the rural electrification board.

primarily through financing, so our rural electrification program is very similar to the program in United States. We have a chairman, full members, and division heads all of whom are responsible for approximately 1,000 employees.

Generation, transmission, and distribution are the established functions as well as developing monitors, providing cooperatives additional funding, loan processing, power supply, and access to the national grid. The REB Board of Directors is similar to the US system. Consumer members of cooperatives elect a president or director to represent them. An elected director cannot be an official from a political party and cannot participate in any political activities. We do not allow unions to operate in our cooperatives. People have tried to create unions, but we are very strong. We have a lot of political support to continue maintaining apolitical cooperatives. This helps us with line extension, because, in third world countries, extension influences people and politics. Avoiding politics contributes to our economic viability.

The standards are very high in our country primarily due to NRECA's influence. When you go to an American town and a Bangladesh village, you see similar wooden poles and system drops. We do not purchase every item from other countries, but our items must fit NRECA's standards. For example, to purchase a three-phase meter or cables we need materials certified by KMEA or CPR of India. Standardized materials are very important for that matter. The day before yesterday when we were visiting those exhibitions we met one of the experts of timber. We are now slightly confused with what are an Australian timber, an American timber, and a Chilean timber, about the strength and other things. We have referred to NRECA and they are solving our problems we have, for example: three phase meters, a theft guard, required to be or not required to be, it may be ABB, simmers, sumberger. We survived the advice of NRECA.

When I reach my office specifically I see the Ford Jeep is very much there, but Mr. Ford is not available, if you search around you see that he's working with the workers, he's not in a meeting with the bosses, but if you need him, he is immediately available. This is very important for us because NRECA was with us for our anniversary, we celebrated 25 years last year and I'm very happy and very grateful to USAID and NRECA that they have extended this program for another five years. And our success story is very much related to USAID and our success story is very much related to NRECA.

A question may arise, with 25 years are you not that mature enough to run your own business? Yes, partially yes, partially no, because we have a lot of job to do only that 30% of rural electrification program is there, we are getting bigger working with 200 million dollars for five years projects, we are taking over new lines from that government organization of power development board whose main job is number one: to cut the system loss. You would be shocked and surprised to know that system loss with these organizations are 50% to 70% which in Indian language is theft and decrease of electricity. You may put the

question: is it that honest? Yes in the village areas everybody is known to each other. If somebody has a bill of three dollars and somebody is paying five dollars immediately puts a question to his neighbors, how come you are paying three dollars and how come you are paying five dollars. They would immediately try to make a difference. The subsequent bill would reveal that the guy who is paying five dollars has an electric motor that is drawing water from the river or from the ponds so he is paying more. But in the city areas nobody knows each other, so theft is there so we are taking over huge lines over 10,000 kilometers of line from the power development board especially in the rural areas it will be all with REB. It is a big job to be done. The main concern is to take the system loss to REB standard 16% loss to 7%.

We have our own board to take our decisions. We do not have to go to the government in any way. So in that matter our job is very simple. We believe we are very much transparent in the sense that it is very simple reason is this when standardization of the products are there, when standardization of line extension is there, we have got local consultants they fix up the revenue criteria lines with numeric lists, number one, number two, number three, even as a chairman I cannot just shift from the serial number. A question may arise in third world countries how do you face the pressure? Yes, sometimes we yield very frankly speaking up to what extent maybe one pole, there so no more than this, because a book is declared at the start of the year economical criteria is very much there, lines are designed and it is an open secret that everybody knows that in this year what line we are going for. So this is very much transparent and the success story is that we go on revenue criteria. Monitoring of PBS distributions operations we do it. We do not need government sanctions, more lines more stuff, more officials. The system is very much there, NRECA knows it, we know it, it is standardized, and more lines more stuff, more linemen, and more officials. So we don't have to go study that.

A question may arise do we have some interference with the recruitment? Yes we have, we have in the sense from our experience we have seen so far as appointments are concerned, sometimes cooperatives are pressured with the local people, so we have very much a central system where all the cooperatives come, we put question papers with collaboration with them. Examination is held on a yes/no system and the result is out within three or four hours, so the pressure automatically goes. That much we have done and very successfully we have done. But unfortunately, this system has a bad effect in the sense you see that often three or four months; people start leaving REB to look for better jobs. That is why selection standards are very high. So nowadays what we have done is that we keep a waiting list for that.

Training and development of personnel is very important. I welcome you to visit Bangladesh and see, especially those that are involved, that we have a wonderful part-time system of training. We have copied what is in America the standards are exactly the same. Linemen are trained specifically. We start bright

in the morning we have a central system of training. Many of the cooperatives those that do not have the facilities send those guys to our central systems which, not in those that are ahead but in those cooperatives that are well developed and therefore have a training system. We have management now undertaken by new management in generating finances, consumer relations, performance, which is very important. Performance is based on the background of the cooperatives. Questions may arise, is it compulsory? Yes, it is very much compulsory and it is also rewarding those that do better are rewarded, those that cannot do, are punished. Punished in the sense that their status, etc. we will immediately make it down, so with this there is a total standard in working system.

Problems are there even at some cooperatives where we have very good people, trained people, they cannot do much, the simple reason is economic viability. A question may arise then, if a cooperative is not economically viable, then why have you established it? The main reason is consumer mix. You are going miles, though Bangladesh is an overpopulated country, but there are people who do not like to come under REB program. The reason is simple, the thing why you should pay compulsory payment every month against electricity program and remain in darkness don't come within the view of the semi-government organization where there is a compulsory payment. But very fortunately these things are changing every day. When somebody gets power he never leaves it. Things are changing there are lack of communications we are trying to improve it.

You would be very surprised to know that in the last 25 years we have got support from all political parties. I did not say that they do not interfere, they interfered. But the system is such that it never walked. Very frankly speaking new political parties coming in power, we get the pressure for the first few months. But with our donors from Japan International Corporations, Netherlands, USAID, and everybody involved with REB we could resist all those pressures, which come at the start of every political party coming into power. The pressure is only one: construct new lines in my areas. We say that new lines are being constructed in your areas but according to our map. We could resist very well. With very few exceptions I've told you this is one pole to another pole: Just going from one house to another house. But we could resist very much and this is one of the main reasons we could succeed in developing rural electrification programs in a very systematic manner.

I'm going to name some difficult points that are hard to achieve. Out of 67 cooperatives economic viability does not exist in more than 20. A question may arise, how are you surviving? We are surviving because economic viability in total standards is considered fine for new extensions. With the donors, with the government, we are developing but to obtain economic viability we believe the assistance of the World Bank will help us in a big way. A few days back we took about 100 kilometers of lining one in the district in the rural village area. The

system loss was 59%, means part of the development board and individually used to collect money and give 50% to the government and 50% elsewhere to divide amongst themselves. After taking over we put a sort of mother meters we asked the people, we contacted them and we told them to pay. We were surprised it revealed that they are not making a bad payment, they are making the payment but it is eaten up by the intermediaries and you would be very surprised and slightly scared from 59% system loss, in 3 months time the system loss came to 8%. And I was very surprised and shocked and my secretary was telling that you must hold it. The whole thing is communication and we are striving very hard to take about 14,000 kilometers of rural electrification lines which the power development board is having for last 30 or 40 years and they are developing non-standard lines so it is a great responsibility and it is a great challenge and we are to face this challenge in 3 to 4 months. The challenge is very simple to drag down the system loss to 13 to 14%, number one, and number two I've already told you, that out of the 67 PBSS cooperatives only 20 are economically viable. But I can assure you that by taking over those lines we can double our standards of economically viable from 20 to 40 in another six to seven months time. And if we can do it, I believe we would have such a standard that rural electrification board, with its own standard, will improve and the government has already given an order that areas and municipalities with three megahertz and less will be with the rural electrification board so with their standard maybe 75% of their total of Bangladesh will be with the rural electrification program.

But our challenge is very big and we have to face it. We have a big problem of consumer mix in Bangladesh, the cooperatives which are having a consumer mix like small industries and also the domestic are very good and are economically viable and you would be very happy to know that some of the cooperatives not only are maintaining their own lines but are participating in new construction of lines without any sort of government help without any sort of donor's help, so this is something very big. And if you can develop the consumer mix, with the development of small scale industries plus convincing consumers to take connections more and more connections and the utilization of more power. In the village areas I've told you, they are having one valve and one connection. But things are changing, they are putting small televisions, small radios, small motors, in many of the areas we have electricity but consumption rate is very much limited but things are changing every day and we hope this consumer mix through communication will increase and our main attempt economic viability will derive from it.

There are still problems to solve in the cooperatives. The development boards are reluctant, but fortunately, the World Bank interference with financing is helping us in a big way in taking these transfers of these lines to us rapidly. Still it is slow, but I'm sure in the next three to six months there will be a rapid handing over of those lines, repairs, maintenance of lines to be standardized and will go for such an operation that in the next three to six months I'm sure we'll

improve in such a manner that economic viability of many of the cooperatives will come up in a very good standard.

The Philippines Electric Cooperative Experience

Burt Bosick⁵ , *Cooperative Manager*

The electrification program of the Philippines started back in 1962. That was when the electric administration was created to carry out the country's electrification policy. Unfortunately, nothing happened because the focus of the electrification program then was more on electrifying the cities and the municipalities. In 1964 a team from USAID came to the Philippines to study how we could go on with electrification programs of our country. This team from USAID recommended the adoption of the rural electric cooperative system for electrification.

In 1964 the status of electrification was that only 23% of the homes had electricity, 63% were in the cities, and unfortunately only 5.8% of rural homes were electrified. So in 1969, through the sponsorship of then Senator Emanuel Pelias who became the vice-president of the Philippines and later became the Ambassador of our country to the United States, he sponsored a bill, Decree. # 6038 that declared as a national policy the total electrification of the country on the area coverage basis. This law also created the national electrification administration as the primary agency to implement the rural electrification program. The law also provided for the organization and supervision by non-profit electrification programs to be established nationwide.

In 1971, two pilot electric coops came into operation; one is in Mindanao and the other in Negros. These two electric cooperatives are still working and one is generating its own power. On August 6, 1973 with Presidential Decree #269, the NAYAI was transformed into a government corporation. It was empowered to issue orders, rules and regulations on matters affecting electric cooperatives. Also, its franchising powers were delegated to the national electrification administration. At the same time NAVAU was empowered to fix the tariffs for the electric rates of the electric cooperatives.

The current status of rural electric coops is that there are 1,455 cities and municipalities around the franchise area of the electric cooperatives and out of these 1,455, all of them have been energized with the 119 cooperatives now operating in our country. There are 36,080 villages being served by our cooperatives and out of these 36,000, 30,782 have been energized or with an energization of 85%. The potential household connection of the cooperatives of our country amounts to 13,000,635 and out of which 5,914,000 have been energized by the electric cooperatives, giving a 70% energization rate.

⁵ Burt Bosick is general manager of RE cooperatives from the northernmost portion of the country.

As additional highlights there are 119 electric cooperatives now working in our country. The total connection is 5,914,374. The gross revenue of the electric cooperatives in our country runs to 37 billion 773 million. In terms of kilowatts sold. In terms of kilowatts per hour sold by the electrical cooperatives, for the year ending in December 2002, they sold 7,813-gigowatts/ hour. The total peak load of the electrical cooperatives in our country is 2,000 megawatts. There are 23,396 employees working in the 119 electrical cooperatives and the total lines constructed by these, amounts to 213,913 circuit kilometers. The average revenue per electric cooperative amounts to 317,422,000. The cost per kilometer of lines amounts to 350,000 Pesos, an average cost to provide connection for one-member consumer amounts to 314,000. The average systems rate in our country 4.83 pesos roughly about \$0.09 U.S. cents. Collection efficiency is 95%. Average consumers per electric cooperative are about 49,700.

The highest electrical cooperative that has the highest connection is no other Batanga electric cooperative with 154,610 and the smallest is only 736 consumers. Average consumer per circuit is 28 consumers. The average systems loss for electrification in the country is about 15% and the load factor is 52%.

What are the challenges that are now confronting our electric cooperatives? 1) The compliance of the electric cooperative. On June 26, 2001, there was a law enacted, which we call the Republic Act. 9136 known as ENPIRA. ENPIRA stands for energy and power, whereby all the utilities in our country have to comply with certain provisions of the law particularly geared towards attaining efficiency, reliability and at the same time affordable cost for the electrical cooperative and for the consumers. Complying with the grid and distribution of the loan will entail a huge investment on the part of the electric cooperatives and this is the present problem that they are confronting, especially the small cooperatives. In order to meet the 60% compliance of the grid and distribution code, it will cost us around 200 million Pesos. That is the main problem that the electric cooperatives have right now.

Rural Electrification Financing Corporation in the Philippines
Kent Wick⁶, Country Director, The Philippines

⁶ Kent is a Minnesota native and a graduate from the University of Minnesota. He earned his CPA certificate in 1971 and has worked in rural electric management for over 30 years. Of his 27 years in rural electric management in the states, he has been general manager of distribution coops and CEO of a major G&T cooperative for 17 of those years. In 1997, Mr. Wick joined NRECA International in Bangladesh as the alternative chief of party, management advisor, and advisor for distributed generation. This past April, he moved to the Philippines as country director for NRECA there, heading up a team providing assistance for the establishment of a new rural electric coop financing corporation patterned after the CFC in the U.S.

In order for me to describe what we are doing in the Philippines, I would like to give a little bit of background on things occurring in the United States in the late 1960s, which is the starting point for our work in the Philippines. As was stated previously, the rural electrification program in the United States started in 1935. It was fine until the late 1960s, when REA was not able to provide all of the funding for the rural electric coops. Several different avenues of supplemental financing were looked at, and, eventually, the National Rural Utilities Cooperative Finance Corporation, CFC, was created. They had to use the open market to secure funding for rural electric cooperatives. In order to do that, the rural electric cooperatives had to provide seed capital to CFC. I was a finance manager at that time. I remember the days when CFC was first created. Each of the utilities was obligated to put in a certain percentage as capital term certificates to get this started, with very little return. From a financial perspective, that did not seem to make sense. Many of us opposed it, because we wanted to continue to borrow money from REA at low interest rates. Eventually, we all participated, and CFC has become a \$20 billion financing institution that is recognized on Wall Street and is a major player in financing for rural electric distribution and GNTs here in the United States.

A similar pattern occurred in the Philippines. In 1973, the rural electrification program started in the Philippines with the establishment of a central organization called the National Electrification Administration, or NEA, that was similar to REA in the U.S. They also created rural electric cooperatives similar to rural electric cooperatives in the United States. A major difference is that in the U.S. cooperatives are formed and incorporated in each state as a separate incorporated organization. REA in the U.S. provides loans and very tight controls over the rural electric cooperatives, and they do it very effectively.

In the Philippines and Bangladesh, a similar pattern evolved, with a strong central organization and individual coops functioning as decentralized operational units. The difference between the Philippines and Bangladesh is that the rural electric cooperatives are registered or certified by the central organization. The central organization then provides a much stronger central control. Today, there are 119 rural electrics in the Philippines serving 5.6 million households. There are still 3 million to be served.

Historically, the Federal Government, through NEA, provided all funding until about 1995. Those sources came from USAID, World Bank, Asian Development Bank, and other sources. In 1995, the sources of funds to NEA continued at the same pace; however, the demand for funding exceeded the pace of funding. NEA is providing about the equivalent of 100 million U.S. dollars for rural electrification. The needs today are from \$150 to \$200 million, so there is roughly \$50 million that is not being met by the central government.

The utilities are still providing service to new areas and providing expanded service intensification and so forth, but sub-transmission is a new

responsibility for the utilities. 33-KV -- 69-KV lines are going to be much more difficult.

When the electric power industry reform act of 2001 was enacted, a greater financial impact on utilities in the Philippines was indicated. For utilities that meet certain qualifications, which, hopefully, are most of them, the government is going to forgive their loans. The purpose of that is to help the utilities reduce the rates to the consumers, which is a major step. The steps that affect the financing is going to require competition. They have to become more efficient, and other entities can eventually move into those areas if they are not competitive.

With demand outstripping supply, construction is being deferred. Where there is construction, it is being funded with internally generated funds; but it is not keeping up with demand.

NRECA, CFC, and IFC worked jointly with the rural electric cooperatives in the Philippines starting about three years ago. In 2000, a feasibility study was completed. This feasibility study showed that there should be an entity created by the rural electric cooperatives and free of government funding. The sources of funding should come from the cooperatives as seed money, similar to CFC, but this should be leveraged with funding from other sources. In working closely with the Filipinos, the Asian Development Bank, the IFC, and the Development Bank for the Philippines must establish strong international standards using CFC in the U.S. as a guide.

For the past three years, NRECA has been working in the Philippines to develop this entity. We have been working very closely with IFC, ADB, the Development Bank of the Philippines, and CFC. Teamwork is holding this whole thing together. ADB said that they "do not want to participate if CFC and NRECA are not actively involved," and we, in turn, are participating because IFC and ADB are involved. With the participation of IFC, ADB, and Development Bank of the Philippines, the seed money that the cooperatives provide will be leveraged approximately five or six to one. So, for every peso or dollar that is given by the cooperative, they will be able to borrow five or six of those pesos or dollars.

The study also indicated that there was a strong support amongst the Philippine cooperatives to fund the entity. The decision was made that this should be a stock corporation. It is going to be a private corporation owned at least 51 percent by the electric cooperatives. The other owners will be ADB, IFC, NRECA, Development Bank of the Philippines, and other major investors. It is not a cooperative like CFC. CFC is a cooperative owned by the cooperatives. The feasibility study indicated that the best way to raise the funding and handle this most efficiently was through a stock corporation.

The Rural Electrification Finance Corporation, or REFC was incorporated and registered with the Philippines Securities and Exchange Commission in August of 2001. The goals are to provide rural electrification, develop, and foster the electric cooperatives.

The organization was incorporated in 2001. Early in 2002, they started hiring their first employees, and during the year, they received 50 million pesos of funding from the electric cooperatives. They granted loans for 31 million pesos, of which about 15 million was actually paid out. So the organization has started, but it is just in its infancy. There has not yet been any infusion of capital from IFC, ADB, NRECA, or any other sources.

To secure a loan, the electric cooperatives must prove viability. Out of 119 rural electric cooperatives in the Philippines, initially we have identified perhaps 25 or 30 that might qualify to borrow from REFC. For 90 or so other cooperatives, government is still providing funding. That funding is primarily for what we call "missionary electricity" and is available to the less viable electric cooperatives. In the middle, are another 30 or so cooperatives that are being missed by REFC and missed by the government. The World Bank is working with the Development Bank of the Philippines to pick up that middle group.

REFC, because it is obtaining funds from the private sector or the quasi-private sector through ADB and IFC, also has to prove viability. It has to pay the going rate to IFC and ADB, and they have to collect the proper funds. There can be virtually no loan losses. REFC, by its policies, will determine if a cooperative is viable. In order to be viable, a cooperative must show that it can pay its major bills on time. It has to show that for the preceding year it has paid all the power bills on time and that it has paid its debt to the NEA on time. If it cannot show that, then it will not become borrowers of REFC initially. Coops can borrow over time as they gain this credibility. The cooperatives also have to show a times*-interest-earned ratio or a debt-service coverage -- times*-interest-earned ratio of 1.5 or higher, or debt service coverage of 1.2 or higher. They also have to comply with what we call "collateral sharing." Any bank or finance institution that provides funds to a company would like to have a first mortgage on all assets.

In the U.S., the first mortgage was with REA. When a rural electric cooperative borrowed money, REA had a first mortgage on everything, tangible and intangible, future and past. They owned everything. In the Philippines, NEA owns everything. They have a first mortgage on everything. In the U.S., CFC and the REA work out collateral sharing where CFC shares in the first lien on all assets with REA. We are working on that same concept in the Philippines. There will be strings attached to that, and so the electric cooperative is going to have to abide by the collateral sharing rules, which are still being developed. REFC will also implement other rules. They must maintain viability to continue borrowing.

The next step is to show that each project meets certain standards. REFC is going to provide funding for projects that will enhance revenue, decrease system losses, and improve reliability. REFC will provide funding for upgrading and rehabilitation of distribution but not, at this time, for generation or bulk transmission. It also will not supply funding for electricity into new areas. We have to get this organization off the ground and prove its feasibility. Over time, we hope that it can loosen up a little bit and expand its loans to other areas. In the beginning, it has to be very restrictive.

Fund disbursements will be staged. As I indicated, out of a 50 million peso investment into REFC, about 32 million have been loaned out, of which 12 to 15 million have actually obligayed. We are using what we call "staged disbursements," this means that as funds are extended, REFC will advance the funding.

Collateral sharing of the first mortgage right is important, but there is a caveat to that. We are not sure really what it means. If a utility does not pay their bill, NEA can step in and take over the utility. We do not have that right. We do not have a franchise to take over any utilities. We are not exactly sure what rights we have. In our collateral sharing agreement with NEA, we will emphasize that we can work through them. From legal perspective, however, REFC will not be able to step in and take over a utility, and from a social point of view, we are certainly not going to disconnect a substation and leave 10,000 people without power. So, we are not sure exactly what collateral we have. We are working closely with IFC, ADB, and other banks, because they are asking the same questions.

This corporation absolutely requires close cooperation with the providers of funds to REFC, the ADB, and IFC. We are looking for a major bank in the Philippines to participate, which is difficult, because commercial banks are very conservative. They do not want to provide equity or loans to an entity that is not established. If banks do take risks, they want a good return on their investment. We are brand new, and we do not want to pay very much interest on anything. We are working with a couple of banks there, and, hopefully, will get their participation. There is some pressure on them from multilateral agencies to give us loans, because everybody wants this corporation to succeed.

A chief executive officer and a chief financial officer are critical. The first couple of months at REFC, we had some difficulty, because the proper personnel were not hired. Personnel are very important.

Obviously, we must also comply with local regulations. The Securities and Exchange Commission had a rule that almost prohibited REFC from ever acting, because its funds are re-loaned to its owners. There was a prohibition against a certain percentage doing of re-loans. We worked with the Philippine Securities and Exchange Commission to have the rule interpreted and modified.

Legal assistance is expensive but necessary. In a new entity, stockholders are reluctant to pay for legal assistance, because it is an expensive component. Yet, to set up an organization, one must have qualified legal assistance. We had discussions about the difficulties in collecting funding from the rural electric cooperatives to pay for the proper legal assistance.

Funds coming in have to be balanced with funds going out. If we are going to be paying 10 or 11 percent for funds brought in, we have to make sure that those funds are channeled out immediately or risk bankruptcy.

We have to develop an accounting and reporting system. A new finance corporation for rural electric utilities has never been created outside of the U.S. This is new territory, and, therefore, we must develop an accounting system that is small but expandable. We also need a loan-tracking system so that we have properly supervised credit.

REA, in the U.S., established very good material and construction standards. When CFC came into existence, they simply adopted those standards and said, "To borrow from CFC, borrowers must comply with REA standards." In the Philippines, that is not the case. NEA has some standards, but they are not being rigidly enforced. REFC will have to review those standards, and it will have to rigidly enforce them. We will need field personnel for that part of the supervised credit, to monitor the construction, and to make sure the construction is done to the standard. We will try to help utilities in the Philippines upgrade their standards so that they can operate more competitively.

Next, we must build credibility with investors and borrowers. 50 million pesos were invested initially into REFC. No further investments have been made. The reason is that, just like with CFC, everybody is taking a wait-and-see attitude. They want to see that certain steps are taken. The first few months were rather slow. We are starting to pick up the pace, and the pieces are going to come together. The policy developing, hiring the right people, and showing to the IFC, ADB, and NRECA that REFC is an organization in which to invest, all need to be done.

NRECA will be an investor. NRECA obtained funding from the U.S. Department of Agriculture's surplus commodity program. NRECA sold surplus commodities in the Philippines. Part of the funding then goes to pay for providing assistance to REFC, and part of that funding will be invested in REFC. The other investors are the electric cooperatives. They are not going to invest until they start seeing more movement.

We have to negotiate investment agreements. To do so, we need to develop a portfolio of loan-able projects. Even though we do not have funding,

we want the pre-qualified cooperatives to submit loan requests so that we can give them loans as soon as we receive funding.

We need to proceed with controlled growth, develop proper loan procedures, balance the capital funds with loans, strengthen our supervised credit functions, and insist on strong internal controls, efficiency, and impeccable honesty. Some of the Asian countries have a problem with corruption, so we have to try to keep this loan process very clean.

NRECA will build up the REFC abilities, and we will eventually become unnecessary. NRECA has a consulting services agreement with REFC. IFC and ADB have insisted that we participate in REFC. We provide services to strengthen their ability to operate independently. People ask Myk and I how long we will be there. We do not know. It could be two years, or it could be much longer than that. Our goal is to work ourselves out of a job.

That is an overview. This organization has never been attempted outside of the U.S. We have some difficulties, but IFC and ADB are very upbeat about it. They recognize that what we are doing there can be replicated in other countries. NRECA has a terrific opportunity to make this work.