

PD-ABT-226

Volunteers for Energy Efficiency in India

First Progress Report

December 2000

**Cooperative Agreement
No. 386-G-00-99-00086**

Submitted by:

**The NRECA International Foundation
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Arlington, Virginia 22203**

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to:

**U.S. Agency for International Development
New Delhi, India**

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Volunteers for Energy Efficiency in India

Program Purpose and Objectives

The Volunteers for Energy Efficiency in India program ("Program") is aimed at promoting energy efficiency improvements in India's electrification programs with a goal of increasing India's capacity to improve economic development conditions through environmentally sustainable energy supply, distribution and use. The program funds the participation of NRECA volunteers in technical assistance and training activities working directly with Indian electric utility and other rural energy agency counterparts.

Measurable impacts of the Program activities include reduced energy losses in Indian electric distribution systems, increased development of renewable energy resources for rural energy supply, and resulting contributions to greenhouse gas mitigation.

Progress Toward Achieving Program Objectives

During the initial year of the Program, NRECA established the operating framework including the procedure and forms for executing volunteership project agreements, and initiated contacts with several prospective counterpart agencies. A local coordinator was recruited who is based in Haryana. NRECA's team in Dhaka, Bangladesh, assisted in the Program preparation activities and serves in a liaison role for the home office, which administers the Program.

A formal work plan was presented to USAID at the end of November 1999. Subsequently, a program announcement was developed for the purpose of raising interest in participating in the program as well as for soliciting volunteers (Attachment 1). NRECA also publicized the program in its quarterly international newsletter (Attachment 2). This was part of a recruiting campaign that was successful in identifying a number of interested candidates. Discussions were initiated with officials in West Bengal to develop an initial activity, and a visit was made by the local coordinator to discuss the program with USAID/Delhi.

Whereas, at the outset of the Program, NRECA and USAID envisioned utilizing the volunteers in a role of project initiators with Indian utilities, NRECA modified its strategy to use the Program primarily as part of the implementation

of identified projects. This approach was, in fact, suggested in NRECA's 1999 proposal to USAID, at the time NRECA expected to be implementing a technical assistance and training project with the Haryana State Electricity Board.¹ NRECA then initiated contact with several other Indian agencies with the idea of developing technical assistance programs and agreements which could utilize the assistance of volunteers, as part of program implementation.

The first of these, after the unproductive attempt in Haryana, was with the newly established West Bengal Rural Energy Development Corporation (WBREDC). This project has the characteristics of a highly replicable model with wide potential application in other parts of the country. NRECA has continued to initiate contacts with other potential counterparts with the plan of using the WBREDC initiative as a model for similar activities. With delays in arranging the funding for the WBREDC program, however, there has been an extended delay in getting the Program underway.

Currently, NRECA expects to be in a position to use a series of volunteerships in implementing the WBREDC activity, and has been able to establish several other contacts as candidate counterparts for subsequent projects.

Planned Activities

NRECA has initiated formal contact with potential counterparts in five states: Haryana, Karnataka, Maharashtra, Orissa, and West Bengal. NRECA's local representative, Mr. Bahri, will participate in most of the scheduled activities.

WBREDC pilot electric distribution loss reduction project

The first volunteer activity will be carried out with the WREDC in January 2000 based on a Memorandum of Understanding that was executed between NRECA and WBREDC in 1999 to begin laying plans for a pilot project that will help WBREDC to implement its mandate. In April 2000 we executed a related agreement with WBREDC for the volunteer project (Attachment 3 – Scope of Work). Two volunteers were selected and approved by WBREDC to assist in carrying out data collection in Jalpaiguri District, where the team will focus on load requirements and related rural electric investment. They will also evaluate a typical 11 KV feeder for sources of energy losses. These data will be used by WBREDC and NRECA in planning the overall design of a model rural electric distribution system. In particular, the team will focus on design, construction,

¹ The HSEB project was to be a \$1.2 million consultancy under World Bank funding to help HSEB in engineering and construction supervision relating to its major T&D investment prior to HSEB's privatization. Disputes arose in the bidding of this project and after more than a year of delay, the project did not go forward.

and operational patterns in the distribution utility that are responsible for avoidable energy losses.

Subsequent volunteer activities are anticipated for West Bengal, including follow-up assistance relating to the NRECA/WBREDC general agreement activities, and other activities involving other counterparts in the State. Subject to having more time to schedule subsequent activities, these could be scheduled in March-April for subsequent implementation in May-June.

Haryana Biomass Generation Project

A volunteer is scheduled to travel to Tohana in the State of Haryana. The project counterpart is Nuchem, Ltd., a manufacturer of several types of products, primarily fiberboard. Nuchem also operates as an independent power producer and sells surplus power from its biomass generation plant in Tohana to the Haryana state utility system, HVPN. Over the years, the PPA between Nuchem and the SEB has not been satisfactory to Nuchem, who are interested in looking at an alternative marketing approach.

Nuchem is undertaking a feasibility study to expand the Tohana fiberboard facility and is considering expanding the power generating plant from 4 MW to as much as 14 MW. NRECA has proposed to Nuchem to consider developing an electric cooperative near his plant in Tohana as an alternative customer for its power sales. The scope of activity is to evaluate the concept of a cooperative at a pre-feasibility level. NRECA will also be looking at Nuchem's power plant expansion plan from a technical design standpoint. The volunteer will be an electric co-op specialist with a technical background and will be accompanied by an NRECA representative for at least a portion of the visit. The visit is scheduled to take place over a 10-day period in February or March. A copy of the counterpart agreement is provided as Attachment 4.

Electric cooperative loss control – Mula Pravara, Maharashtra

NRECA helped set up a group of electric cooperatives in India as a pilot program for USAID starting in the 1960s and, more recently, have begun to address the continuing problems of low efficiency and poor overall operating performance in their distribution systems. NRECA is interested in developing a plan with the electric cooperatives of India for assistance in identifying and correcting system energy losses, along with commercial losses, leading to an effort to develop a self-financing program for driving energy efficiency related investments by the cooperatives.

NRECA may be able to address this program under a planned climate change initiative, which would provide expertise, equipment and materials, capital, etc. to support the implementation of the operating agreements. As an initial step in this process, NRECA plans to field a volunteer to conduct an

evaluation of an electric co-op in Maharashtra State to determine the general operating condition, as well as their readiness and interest for participating in this kind of program. Follow-up technical assistance and training needs will also be identified. The volunteer is scheduled to make this visit in early April.

Future Activities

Orissa. NRECA is proposing a reconnaissance visit to Orissa under the sponsorship of Bombay Suburban Electricity Supply (BSES). BSES bought into the privatization of the Orissa SEB and has held discussions with NRECA regarding improvements in its rural electric distribution holdings. The purpose of the volunteership is to evaluate the current BSES approach to reducing losses in its rural distribution system, and the potential for a follow-on assistance arrangement to develop a more aggressive program.

Karnataka. NRECA has also made initial contacts with the State Electricity Board in Karnataka about sending a volunteer to help to assess and define the State's plans for rural electrification development under its privatization plan. Similar contact has been made with a smaller distribution utility. NRECA is making plans for volunteers to visit Karnataka.

Follow-up in WBREDC and Nuchem. NRECA anticipates the use of additional volunteers in West Bengal and Haryana (Nuchem) for continued development of those projects, and also potentially with the cooperative project in Maharashtra, subject to the amount of time remaining in the grant period.

Administrative Issues

As noted, the Program has suffered from delays for several reasons. As a result, expenditures as of November 30, 2000 totaled just \$39,548.68 as against a budgeted amount of roughly \$95,000 through this date.

Four volunteers are currently planned for the first four months of 2001. NRECA anticipates that approximately \$65,000 of the grant amount would be expended leaving roughly \$55,000 unspent by the time of the scheduled cooperative agreement end date (April 30, 2001). Other projects may also be implementable within that timeframe, so the draw-down by the end of April could be somewhat higher. A budget summary is provided as an annex. With the expected visits to Karnataka and Orissa, plus follow-up in West Bengal, Maharashtra, and/or Haryana, it is probable that most if not all of the remaining funds could be expended within a relatively short time.

Alternatively, NRECA proposes that the scope of the project be modified to permit the use of the funds that are not committed to the currently-planned volunteer activities (WBREDC, Nuchem, and Mula-Prevara), or approximately

\$55,000, to focus a more concentrated effort on the Nuchem biomass project. As defined in Attachment 4, one of the purposes of the volunteer effort scheduled for February is to develop a program for a follow-up feasibility study on the local cooperative concept. The cost of this study is expected to be on the order of \$50,000 and it could be implemented in a short period of time. NRECA can provide a detailed scope of work for this option by the time that the volunteer completes his work at Nuchem.

If USAID agrees to this option, or alternatively agrees to NRECA's scheduling and implementing additional volunteer assignments in the month or two beyond the current expiration date of April 30, an extension of the expiration date would be necessary. NRECA therefore requests an extension of the grant period of as long as possible up to six months' duration. Any length of extension would be helpful.

Attachments

- 1. Program Description/Announcement**
- 2. NRECA Newsletter Article on India Volunteers Program**
- 3. NRECA/WBREDC Volunteers Memorandum of Understanding**
- 4. NRECA/Nuchem Memorandum of Understanding**
- 5. Budget Summary**

ATTACHMENT 1.

Program Description/Announcement

VOLUNTEERS for ENERGY EFFICIENCY in INDIA

Program Description

The Volunteers for Energy Efficiency in India is a tri-party program designed to focus on loss control in State Electric Boards and electric cooperative distribution systems, and on demand-side efficiency improvements in the areas of load management and energy conservation. Program participants include:

- U. S. Agency for International Development - Funding of volunteer international travel and program management;
- NRECA International Foundation – Locating and providing qualified volunteers;
- Host SEB or electric cooperative in India - Identify areas of work and providing all “in-country” services at their own cost, including local transportation, lodging, food, and technical support as required.

A key purpose of the program is to improve electric energy distribution efficiency as part of USAID’s sustainable energy development focus. Volunteers will identify and transfer new distribution technology and practices to increase system efficiency of host utilities rural electrification systems. Distribution improvements will key on metering, billing and collections, distribution system monitoring, analysis and planning to identify and reduce energy loss from overloading, voltage drop, low power factors, etc. In load management volunteers might work directly with user communities, especially with irrigators and rural industries. Volunteers will typically work at the host utility for two to three weeks.

The NRECA International Foundation is a subsidiary of NRECA International, Ltd. It has carried out many assignments over more than twenty years through Volunteers in Overseas Assistance (VOCA). Because of the organization’s experience, and due to its close tie to over 1,000 rural electric systems in the United States, it has a large roster of volunteers. Examples of volunteer experience available include:

- Technical and non-technical line loss analysis
- Engineering design and standards
- Demand side management programs
- Electrical construction and maintenance procedures
- Substation maintenance
- All utility management and operational fields
- Training – technical and management
- Billing, metering, and collection

NRECA has identified Mr. J. K. Bahri from Panchkula as its India Program Coordinator. Mr. Bahri shall coordinate communications, work flow, and participate on site as needed for

identification of work, monitoring of volunteer progress, and follow-up. He shall be supported by Mr. Kent Wick in Dhaka, Bangladesh.

- Contact numbers for Mr. Bahri: Phone – 172-565-212, Fax – 172-549-054.
- Contact numbers for Mr. Wick: Phone – 88-02-881-2746, Fax 88-02-882-4163, e-mail nreca3@citechco.net

Implementation Procedures:

1. Host utility in collaboration with NRECA shall identify the initial scope of work and specific work location. Host utility shall provide NRECA a written request for volunteers, brief scope of work, and the location(s). The NRECA India Field Coordinator shall assist the host utility as needed;
2. NRECA to secure and identify qualified volunteer(s). Host utility shall review volunteer qualifications and advise NRECA of acceptance (or rejection);
3. Host Utility to provide NRECA additional detailed information of tasks to be performed;
4. NRECA in collaboration with host utility will prepare a final Work Plan using the detailed information provided by the host utility. Work Plan will be forwarded by NRECA to USAID for comment;
5. Host Utility and NRECA Foundation to sign a brief agreement identifying the responsibilities of each party;
6. Volunteer(s) proceed to host utility to conduct work according to the Work Plan. Volunteer(s) work shall be closely monitored by the India Field Coordinator;
7. Shortly after completion of the volunteer(s) work, NRECA shall provide a report of work accomplished and findings/recommendations to the host utility and to USAID;

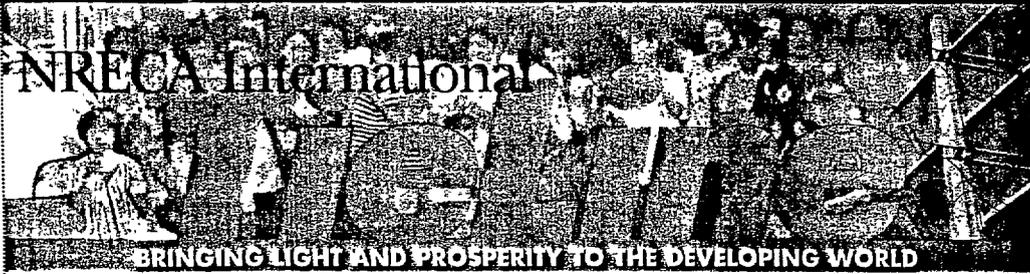
The Volunteers for Energy Efficiency in India is a program with many advantages and little cost to host utilities. Participation in the program usually involves only minimal paper work with NRECA, and no government approvals either from USAID or with the India or State governments. Participation is strictly voluntary, and requires no follow-up reporting or commitments from the host utilities. NRECA volunteers will provide professional advice backed by years of experience. NRECA International (including the Foundation) will be available before and after Volunteer work for additional consultation and assistance.

To participate in the Volunteer program or if you have any questions, please contact either Mr. Bahri or Mr. Wick at the numbers listed above.

NRECA looks forward to working with you.

ATTACHMENT 2.

NRECA Newsletter Article on India Volunteers Program



NRECA

A Touchstone Energy® Cooperative 

A New Look and Name For Our Newsletter

Notice anything different about us? Well, we've consolidated our various international newsletters and re-vamped them to bring you our first issue of "NRECA International TieLine." In it, you'll find distinct sections with stories relating to both Foundation activities and International Limited projects.

"NRECA International TieLine" will be published four times a year, bringing you news of what the NRECA International Programs

Division (IPD) is doing for the community, the projects in which we're involved, and how your efforts and assistance are helping to improve the world.

We chose the name "TieLine" to represent the tie between the U.S. and developing world cooperatives, and also the communication tie that this new paper is meant to provide. The name "tie line" comes from a utility term for a power line built expressly to "tie" two separate electric systems together. We think the

name fits well and hope you do too.

Keep a lookout for the new sections we'll be introducing in upcoming issues. We'll have a variety of stories about the co-ops and the volunteers working with both the Foundation and International Limited.

Any questions, comments or suggestions? Please e-mail us at InternationalPrograms@nreca.org. We hope that you like the new design and would love to get feedback from you! □

Inside TieLine

- **International Foundation**
See the positive impact of donations from U.S. cooperatives on overseas communities.
- **International Volunteers**
Volunteer activity from Asia to the South Pacific. Learn how a simple past-time improved the lives of women in the Philippines.
- **NRECA International, Ltd. Overseas Report**
Sun and fun in the Caribbean—and lots of post-hurricane reconstruction.
- **IPD Overview**
Our many thanks to all the U.S. cooperatives that have contributed to the NRECA International Foundation during 1999.

International Foundation

The Focus Is On You At the NRECA International Foundation

By James Willis

During the coming months, we will be making a concerted effort to update you and other members of the U.S. electric cooperatives on the programs and activities taking place in the NRECA International Programs Division. We will be focusing on you with information

about what we are doing and will try to answer specific questions that you may have about development issues and the impact of the electric cooperatives on them. The focus will be on providing detailed information of international development activities as a whole and what part you can play. We will be looking to strengthen the bond between the NRECA members and

their international cooperative counterparts, and working to increase the knowledge of our young people about the world outside the U.S. We will be working with USAID to help build stronger relationships between U.S. electric cooperatives and those in developing countries, to focus attention on the impact of energy efficiency and rainforest preservation and the important role that you play.

Aside from updating you on what we are doing, IPD will be looking for volunteers for activities, both in the U.S. and abroad. We're looking for people who want to make a real impact on the lives of others less fortunate that need assistance. The idea is to solicit an increasing number of volunteers to assist in reaching more people that desperately need our help. USAID is an active partner in our efforts and sees NRECA

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NRECA International Foundation Volunteers Assist India Utilities

By James Willis

The NRECA International Foundation, with support from USAID, is providing volunteer technical experts to utilities in India to help improve their energy efficiency. The program is focusing on energy line losses, improving existing renewable energy resources, and searching for new areas where renewable energy can be utilized.

Each volunteer will make two visits to the assigned work site. The first will be to evaluate the existing situation, make recommendations, and implement the initial corrective actions. The second visit will be to assess the impact of the project and to modify the program if needed and leave behind a working energy efficiency improvement program.

We expect each visit to take about two to three weeks. The follow-up visit will take place at least six months later. We are currently looking for volunteers for the program.

If you are interested in this program, you can learn more about it by contacting the NRECA International Foundation.

James M. Willis
Director of Utility Services
Phone: 703-907-5669
e-mail: jim.willis@nreca.org

or
Ingrid Roldan
Program Coordinator
Phone: 703-907-5629
e-mail: ingrid.roldan@nreca.org

Foundation:
Fax: 703-907-5532 e-mail:
InternationalPrograms@nreca.org □



The Development Education Grant is a USAID sponsored program funded directly by the Development Education Program, Office of Private and Voluntary Cooperation, Bureau for Humanitarian Response, U.S. Agency for International Development.

The views expressed herein are those of the authors and do not necessarily reflect those of USAID or its agencies.

NRECA International

TieLine

National Rural Electric
Cooperative Association

4301 Wilson Boulevard
IPD9-202
Arlington, VA 22203-1860
March, 2000

BEST AVAILABLE COPY

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ATTACHMENT 3.

NRECA/WBREDC Volunteers Memorandum of Understanding

FINAL SCOPE OF WORK

To the Memorandum of Understanding (MOU)

for the

VOLUNTEERS for ENERGY EFFICIENCY in INDIA PROGRAM

between

NRECA International Foundation (NRECA)

and

West Bengal Rural Energy Development Corporation (WBREDC)

Dated 7 April, 2000

(This Final Scope of Work supersedes and replaces Attachment – I, Preliminary Scope of Work dated 7 April, 2000 to the above document)

Assignment Location: West Bengal, India

Schedule: Up to three consecutive weeks during the months of January and/or February, 2001

Host Utility: West Bengal Rural Energy Development Corporation (WBREDC)

Scope of Work:

NRECA International Foundation (NRECA) shall provide two Specialists as project volunteers in the initial development and implementation of an energy efficiency program for West Bengal (WBREDC) as provided for in the basic MOU dated 7 April, 2000.

Program will include two Tasks.

Task One: Review of WBREDC field survey procedures (extensive physical site and load survey of selected Blocks to identify existing and potential future electrical distribution facilities) to assist WBREDC in two sub-tasks.

- Identify and provide computer generated output formats for the selected survey contractors to record their findings;
- Review input parameters and modify if necessary and as appropriate to allow the survey outputs to better assist WBREDC in its ability to carry out its goals (i.e. to identify future improvements and new construction, and to provide an initial basis for proper system operations), and for NRECA to perform Task 5 of the Rural Electrification Study.

It is anticipated Task One will require about one week of effort by both Specialists.

Task Two: Assess electric utility operations in specific 11kV and low tension feeders, assess existing energy efficiencies on those feeders, and make recommendations for improvements therein. Specialists will prepare a brief energy loss reduction program for the specific 11 kV and low tension feeders, for use by WBREDC.

It is anticipated, Task 2 will require approximately two weeks of effort by both Specialists.

Supporting Representatives

Specialists will be supported and directed by both local and US domestic NRECA staff.

NRECA in India

- ❖ Mr. J K Bahri, NRECA India Representative - local coordinator.
- ❖ Mr. Kent Wick, NRECA Program Field Specialist - in country oversight.

NRECA in USA

- ❖ Ingrid Roldan, NRECA Program Coordinator - program coordination.

❖ James Willis, NRECA Director, Int'l utility SCVS - program management

Host Utility (WBREDC)

❖ Mr. M K Chatterjee, WBREDC Program Manager and Project Coordinator

The team will meet with Messieurs Bahri and Wick in Calcutta. Mr. Wick will provide an orientation and overview of the project as well as details of the activities and tasks to be undertaken. Mr. Bahri will introduce the team to the appropriate local administration and dignitaries as needed and will be responsible for the day to day logistics of the project team.

After initial meetings in Calcutta with Messieurs Bahri, Wick and WBREDC officials, the Specialists shall coordinate and work directly with WBREDC assigned personnel. Messieurs Bahri and Wick will remain on site only long enough to assure the work is adequately defined and proceeding as planned.

SPECIFIC TASKS & ACTIVITIES

Overview:

Meet with the officials of WBREDC to discuss needs, plans and objectives of the organisations as these relate to both Tasks in this program. Gain a feel for respective viewpoints and hope for this program.

Task One:

Identify and provide computer generated output formats for the selected survey contractors to record their findings. Specific activities include:

- Obtain an understanding from WBREDC officials of their goals and expectations from the field survey.
- Review the WBREDC Tender offering for conducting the Survey associated with Task 4 of the Rural Electrification Study. In that Tender, review Scope of Work.
- Work closely with WBREDC and NRECA to identify purposes for which the output will be used, designing computer generated output forms to best capture and retrieve the required information. Output formats must incorporate simple computer programs that might be used by all potential successful survey contractors. WBREDC will use the output to identify future improvements and new construction, and as an initial basis for proper system operations. NRECA will use the output as part of Task 5 of the Rural Electrification Study;

Review input parameters and modify if necessary and as appropriate to allow the survey outputs to better assist WBREDC in its ability to carry out its goals (i.e. to identify future improvements and new construction, and to provide an initial basis for proper system operations), and for NRECA to perform Task 5 of the Rural Electrification Study.

Task Two:

Assess electric utility operations in specific 11 kV and low tension feeders. Assess existing energy efficiencies on those feeders and make recommendations for improvements therein. Work with WBREDC to formulate an overall program plan and implementation schedule;

- Specific location of work is expected to be selected 11 kV feeders emanating from the Purba Durgapur sub station located about forty (40) kilometers south east of Calcutta, as well as

one or two low tension systems identified by WBREDC on one or more feeders. This may change upon mutual verbal or written agreement between WBREDC and Masseur Bahri or Wick;

- Assess the need for and impact of differing energy saving activities of local households, businesses, and industries on the selected feeders. Make an initial determination of appropriate demand side management remedies;
- Evaluate losses on the selected feeders and make preliminary assumptions as to types of losses (technical / non-technical) and cause of losses. Assess the ability of WBREDC to address these losses;
- Develop a brief findings report of the evaluation of the existing system, problems identified and remedies recommended;
- Assist in development of an action plan to address the problems and prepare a material list for work to be done on the selected 11 kV and 400 volt systems;
- Develop a preliminary list of energy efficiency needs and corresponding appropriate remedies, and provide a cursory cost / benefit analysis;

Accepted for West Bengal Energy Development Corporation:

Signature: _____

Date: _____

Name (Print) _____

Accepted for NRECA International Foundation:

Signature: _____

Date: _____

Name: (Print): _____

ATTACHMENT 4.

NRECA/Nuchem Memorandum of Understanding

A Memorandum of Understanding (MOU)
for the
VOLUNTEERS for ENERGY EFFICIENCY in INDIA PROGRAM

Between
The NRECA International Foundation
4301 Wilson Boulevard, Arlington, Virginia, USA

and

NUCHEM LIMITED

located at

Faridabad, Haryana State, India

The NRECA International Foundation (referred to hereinafter as **NRECA**),
and NUCHEM LIMITED (referred to hereinafter as the **NUCHEM**), agree to participate in a
volunteer technical assistance program aimed at the improving the economic and energy
efficiency of NUCHEM's electrical facility.

Intent of MOU

The intent of this Memorandum is to develop a working-relationship framework for the technical assistance to be provided to NUCHEM by NRECA. The specific requirements of the technical assistance (TA) are detailed in the attached *Scope-of-Work* (Attachment I).

PERIOD OF AGREEMENT

Effective date of this Agreement shall be the last date to be executed as indicated on the Signature portion of this Agreement and shall extend for a period not to exceed 360 days from the effective date of the MOU unless extended in writing by both parties.

FUNDING AND PAYMENTS

- A. NRECA shall pay any salary and fringe benefits due each Volunteer herein identified, and will provide the necessary International travel to/from NUCHEM's headquarters in India for each Volunteer.
- B. NUCHEM shall provide or compensate the Volunteer for all cost relating to: local transportation to/and from its headquarters and the worksite(s); food and lodging for the Volunteer during the assignment period (while at NUCHEM or work site); and requisite technical support from its employees or consultants or materials needed and as detailed in the Scope of Work (SOW).

VOLUNTEERS

NRECA shall provide the Volunteer(s) needed to successfully accomplish the tasks identified in the attached SOW. NRECA will provide NUCHEM with the names and resumes of the candidate volunteers and NUCHEM shall have the right to accept or reject each Volunteer recommended by NRECA, prior to international travel to India. The inability of NRECA to obtain the services of the qualified Volunteers during any given period or for due cause, shall not be justification for default of this Agreement. It is expected that each Volunteer, while on assignment shall be present at the NUCHEM/work-site for a period of two to four weeks. The actual on-site time period and the specific assignment shall be determined by NRECA, unless such Volunteer services are terminated early by mutual agreement of NRECA and NUCHEM.

TECHNICAL ASSISTANCE TO BE PROVIDED BY NRECA

NRECA shall provide the Volunteers needed to accomplish tasks and objectives shown in the attached SOW. Though NRECA and NUCHEM have jointly identified the tasks for the SOW, it is recognized that the Scope-of-Work is only a guideline and that the work accomplished by the Volunteer may deviate significantly from the activities spelled out in the SOW.

NRECA will undertake to provide highly qualified Volunteer(s) with the necessary skills and experience to successfully accomplish the program objectives. However, no warranties or guarantees, either written or implied, are provided by NRECA for the consultant services provided, advice given, or corrective actions implemented by the Volunteers.

DUTIES AND RESPONSIBILITIES OF THE HOST UTILITY

NUCHEM shall meet the Volunteer at a predetermined in-country disembarkation point and return the same to a predetermined embarkation point at the end of the assignment period or at some other mutually agreed time. NUCHEM will be responsible for the security and well being of the Volunteer during the time period from disembarkation and embarkation. NUCHEM shall provide the Volunteer with safe, comfortable lodging; meals, refreshments, and potable water, as well as other reasonable incidentals needed.

NUCHEM will provide any local personnel or technical specialist and all tools and materials indicated as its responsibility in the SOW.

INDEMNIFICATION

By mutual agreement NRECA and NUCHEM shall indemnify each other for, and to hold harmless from, all damages, judgements, verdicts, and settlements at law or in equity resulting from the negligence of the indemnifying party and arising out of or in connection with work to be performed under this MOU Agreement.

EARLY TERMINATION

- A. Either party may terminate the services of a Volunteer at any time by giving the other party at least seven (7) days advance notice in writing.

- B. Either party may terminate this Agreement at any time, giving the other party at least thirty (30) days advance written notice of such termination.
- C. Early termination pursuant to paragraphs 7. A. and 7. B. need not be for cause. Upon early termination, each party shall bear its own costs for such early termination and shall also be obligated to pay all its costs as identified in this Agreement up to the specified date of termination.

SUPERVISION AND COORDINATION

NRECA shall provide adequate and reasonable supervision of each Volunteer, but it is understood that continuous on-site supervision by NRECA will not be required. NRECA will provide the program administrator and an in-country project coordinator to work with NUCHEM and the Volunteer(s) assigned.

NUCHEM shall provide a program manager to coordinate the associated Volunteer activities and contacts with NRECA, plus assign a project coordinator to work with each Volunteer assigned to the utility.

NRECA and NUCHEM may, at their sole option, change the individuals named in this paragraph by giving the other party such notice in writing and providing the names of the new individuals.

- A. NRECA Program Administrator: James Willis :
- B. NRECA Project Coordinator: Paul Clark :
- C. NUCHEM Program Manager: _____ :

REPORTS

NRECA shall provide a Report to NUCHEM shortly after completion of the SOW by the Volunteer(s). If the SOW includes work of several Volunteers, such Report shall be provided at the end of the complete work. Such report shall document the work accomplished by the Volunteer(s) and shall include any recommendations of the Volunteers and/or NRECA. NRECA shall use due diligence to provide an accurate and professional Report, however shall not be held liable for errors or mis-statements contained therein.

CONFIDENTIALITY

It is understood that all information gathered under this Agreement and all reports and recommendations made pursuant to the scope of work of the Agreement shall be treated as confidential and shall not be copied and distributed, without the written approval of NRECA. No part of the above listed documents may be made available to any person or party other than NRECA, NUCHEM, or any agency for which they have been specifically prepared, except as otherwise expressly provided.

INDEPENDENT CONTRACTOR

NRECA and NUCHEM agree that NRECA and its Volunteers are working on an independent contractor basis in the performance of the duties under this Agreement and that no employer-employee relation is hereby created between NRECA and NUCHEM.

ENTIRE AGREEMENT

This Memorandum-of-Understanding constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements, written or oral, between the parties hereto. No change, modification, addition, or termination of this Agreement or any part hereof shall be valid unless in writing and signed by the parties hereto.

GOVERNING LAW

This agreement shall be governed by and construed in accordance with the laws of the State of Virginia, USA or the applicable International Business Laws having precedence.

IN WITNESS WHEREOF, the Parties have executed and delivered this Agreement as of the date indicated below.

For and on behalf of NRECA International Foundation

WITNESS: _____

By: _____

Title: _____

Date: _____

For and on behalf of NUCHEM LIMITED

WITNESS: _____

By: _____

Title: _____

Date: _____

Attachment I

SCOPE-OF-WORK

Nuchem, located in Tohana, Haryana State, India, is a fiberboard manufacturer that currently generates 4 MW of power using biomass waste and sells its excess electricity output to the State-owned electric power utility, HVPN. Nuchem is planning a major expansion of its fiberboard factory, and as part of this expansion, is considering an investment to more than triple the capacity of its power generation plant. A number of issues need to be addressed in considering the power expansion scheme, including technical issues relating to sizing, fuel supply and design, and also the market. In particular, Nuchem should consider alternative approaches to selling the power.

NRECA International, Ltd. proposes to conduct a preliminary study of the feasibility of a new power marketing approach for Nuchem's excess electricity supply. NRECA's concept is to arrange for the direct sale of electricity by Nuchem to a newly-formed electric consumer cooperative. The basic assumption underlying this initiative is that Nuchem's propensity to invest in additional power capacity is currently inhibited by a lack of confidence in the purchaser, the State electric utility corporation. A second assumption is that electricity consumers in Nuchem's vicinity desire a more reliable power supply arrangement. The envisioned approach has several levels of potential benefit:

- Nuchem's commercial risk may be mitigated, increasing its willingness to invest.
- Efficiencies of the "distributed power" option (expanding the power generating capacity through smaller increments, located closer to the sources of demand) could be achieved, i.e. efficiencies obtained in bypassing voltage step-up/step-down and other technical losses in central grid supply and transmission over long distances.
- Nearby industries and other local power consumers may obtain more reliable electricity service under a more confident and responsive relationship with Nuchem as the principal power supplier.
- Government may gain an innovative economic model for solving a fundamental rural electricity supply and distribution problem in Haryana and elsewhere in India (low collections by the power distributor → financial insolvency → reduced ability to pay power purchase contracts with private power vendors → low power vendor confidence → insufficient investment in power → lower power grid supply reliability → reduced customer satisfaction → reduced willingness to pay → low collections).

The purpose of this analysis is to determine if there exists a sufficient level of feasibility to allow a complete evaluation and business plan for this concept. The following aspects of the proposed project will be considered in the first-stage study at an initial level of appraisal:

1. Evaluate opportunity for "local" sale of the Nuchem power output

- Identify a potential market – tour Nuchem plant vicinity.
- Interview a representative group of business and community leaders in the target area(s).
- Obtain information on customer power demand, current attitudes regarding current electricity service.

2. Investigate the legal/policy/regulatory conditions and options

- Consult with HVPN and other electric power policy and regulatory authorities in Haryana on existing laws and restrictions relating to the proposed scheme.
- Consult with central government authorities on same.
- Obtain information on laws pertaining to electric cooperatives.

3. Appraise transmission/distribution system

- Obtain and review system maps, plant records, operating records, financial records, etc. from local HVPN office.
- Obtain information on tariffs, billing and collection rates, etc.
- Observe conditions of local distribution system: substations, distribution lines, service drops, etc.

4. Estimate power capacity

- Visit Nuchem power generating facility and evaluate current plant performance.
- Discuss with Nuchem officials the plant expansion plan, including feedstock supply issues, costs, etc.
- Estimate a realistic maximum power output.
- Evaluate energy and capacity service and reliability issues from the buyers' side, and contracting remedies and methods to assure reliable baseload power supply to the envisioned consumer cooperative.

5. Outline business/contracting model

- Consult with Nuchem on current experience with HSEB power sales contract, and on the general concept for modified power marketing/sales strategy.
- Identify "hurdle" thresholds and critical issues and risks.
- Outline a more detailed framework including roles and responsibilities.
- Identify potential feasibility study team personnel.

6. Prepare full feasibility study terms of reference

This proposal to investigate the concept of an electric consumers' cooperative is predicated on the assumption that Nuchem and all potential stakeholders, particularly Haryana state government authorities, are interested in promoting this innovative concept, and are motivated to find a workable framework in a spirit of cooperation and flexibility. This could entail policy and regulatory actions to allow the formation of a new type of electric cooperative and any licensing that would be necessary, to develop appropriate power sales contracts, to educate local electricity consumers, to facilitate mobilization of any needed financing or other resources, and to allow the transfer of HVPN distribution rights and assets.

NRECA initiated this process with a brief visit to Tohana in April 2000 by Paul Clark to review the project concept with key players and initiate plans for follow-up. Under this Scope of Work, NRECA will field a two-person team to carry out the study for a period of approximately ten days. NUCHEM will make its staff available to the NRECA team to arrange meetings including the plant operator/engineer, if possible a lawyer or other expert on pertinent laws and policies, driver, etc., and will furnish data as requested, and make all necessary logistical arrangements. NRECA will present a report within one month of the team's departure from Haryana.