



# NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

1800 Massachusetts Avenue, N.W.  
Washington, D.C. 20036/202-857-9500

PO MAIL 744 53  
9365715  
ISM= 38249

April 13, 1984

Mr. Alan Jacobs  
Director of Energy  
U.S. Agency for International Development  
SA-18  
Room 508  
Washington, D.C. 20523

Dear Alan:

Herewith I submit to AID S&T/EY NRECA's monthly activities report for the month of March, 1984, regarding Cooperative Agreement No. AID-DSAN-CA-0226-Small Decentralized Hydropower Program. A more detailed description of the program status is attached.

## Country Activities

As you have gathered from my activities reports the past several months, the Program is presently involved in a substantial level of country-specific activity. In view of the upcoming evaluation of the Program, I think it might be helpful at this point to review in greater detail the status of each country activity. I will start with activities in Asia and the South Pacific and move east to Africa and Latin America.

Nepal. The draft report of the team's recent visit is now ready. You recall that the purpose of the visit (in February) was to make a general appraisal of the government's overall small hydro program with a view to offering recommendations to correct certain deficiencies and for carrying out a subsequent level of assistance to implement those recommendations. As you know, Nepal is engaged in a major small hydropower program which has progressed quite slowly and with only limited success despite considerable outside funding support (AID, OPEC, Asian Development Bank, etc.). While various technical issues were identified by the team for which solutions may be available, the underlying obstacle is clearly a lack of institutional and individual technical capacity within the government to carry out this activity. Clearly, small hydro is an essential ingredient in Nepal's overall energy strategy; no one disputes that. Moreover, the efforts of private groups outside the government with the technology have been extremely successful. We believe we have proposed a very sound approach, combining limited but well-targeted technical assistance with training and institution-building support to address the government's present needs. Undoubtedly the key to successful follow-up with our initial work will be the strong support of the Mission, and the willingness of the government to learn from, and take advantage of, the superb expertise of these other private resources within the country. I think there is good reason to be optimistic in both accounts. We hope to meet with you in the next day or two to discuss the draft report.



Indonesia. Here too, we have initiated a potentially substantial program effort to help the government address institutional difficulties which have heretofore prevented a very promising program from making much headway. The country is simply loaded with indigenous energy resources including hydropower, but curiously little has been done to develop national policies to conserve oil, on the one hand, or develop renewables, on the other. The GOI is keenly aware of the need to conserve its foreign exchange-generating petroleum reserves, which serve as the primary source of revenues to fund the national capital budget. Hydropower resources clearly offer an immediate and significant means of reducing the enormous domestic consumption of this precious national resource. Again, many outside sources of funding have come forward to support small hydro development, but little has been done to organize the government to move forward. Last fall we fielded an institutional advisor at our suggestion to probe reasons why progress has been poor. This effort was paid from NRECA funds in keeping with the terms of the Cooperative Agreement which require "in-kind" NRECA contributions to the SDH Program. His report, which has been sent to AID/Jakarta for comments, includes a number of good suggestions, two of which, we understand, have already been instituted by the GOI: (1) to raise domestic prices for petroleum products, and (2) to place planning responsibility for small hydro development under a single agency (the PLN). We will be discussing with the Mission and the GOI further steps which the report proposes, including assistance to initiate a small hydro program in Sumatra, which has been designated by the GOI as AID's area for small hydro. Incidentally, with Eric's approval last week we have agreed to the Mission's proposal to fund travel costs for John Rumondor of the PLN to come to the U.S. for a training course (the Mission will pay the bulk of the cost; the travel cost should not exceed \$3,000). Rumondor has been designated as the top man in the PLN for small hydro. We believe his trip will give us timely opportunity to discuss in more detail the report's findings and recommendations, and next steps.

Ponape. You may be aware the Congress has been pushing for action to increase the energy self-sufficiency and efficiency of the U.S. Trust Territories in the Pacific and Caribbean. DOE carried out a major Territorial Energy Assessment two years ago, which was followed by a congressionally-sponsored seminar last summer to review its findings and recommend action. NRECA was invited to participate (Jack Vanderryn also participated, for S&T). We made a number of general suggestions dealing with opportunities for decentralized development, including the consideration of consumer-managed rural energy systems, possibly along the lines of cooperative or similar organizations. Earlier this year we received a letter from the Energy Planner of Ponape (part of the Federated States of Micronesia) requesting assistance in the development of small, isolated sites on the island. We have spoken with several people in Washington about this, including staffers in the House authorizing committee, the FSM Representative, and at DOI. The latter has offered to fund the travel and per diem for an NRECA team to go out there and see what might be done. We're proposing to send a couple of staffers for a few weeks for that purpose. Our congressional contacts believe that a specific appropriation to implement a program is quite possible. This could serve as a useful model for similar development in other Pacific islands, including Fiji, the Solomon Islands, and Western Samoa, where AID/Suva has a direct interest in small hydro potential.

Madagascar. Also last fall, we provided a small hydro engineer, Pete Smith, at the request of the U.S. Embassy in Antananarivo, to present a paper on small hydro at a U.S. sponsored conference on renewable energy. While there, he had a chance to assess the potential for a small hydro program in Madagascar and wrote a letter recommending a particular approach to developing sites, including implementing a demonstration project. REDSO/EA and the U.S. Ambassador have favorably embraced this idea, noting that "Madagascar may possess the largest SDH potential of any E/SA country," and have requested a team visit by the SDH Program to assist in developing a small hydro component of a larger AID energy project in Madagascar. We should meet soon to go over a scope of work and the timing for this effort.

Zimbabwe. The AID Mission is quite enthusiastic about small hydro in Zimbabwe, and has indicated its intention to request an SDH team to provide assistance to the GOZ in organizing for a major program. You recall that Bard Jackson stopped in Zimbabwe at the request of the Mission during a trip to Africa last fall and laid the groundwork for a country survey of SDH potential. We recently received word from the Mission that the request has been postponed pending the reorganization of the GOZ ministry responsible for small hydro.

Togo. Last fall the Mission made a request for additional SDH assistance to follow-up on the recommendations of a 1981 team visit to make a general appraisal of small hydro potential in Togo. Based on a more detailed economic analysis of two sites we prepared at the request of REDSO/WA last spring, the Mission informed us that the GOT has since made a policy decision to pursue the diversification of its electrical energy supply system. We have proposed to send a team to prepare a more detailed energy plan for grid-connected small hydro and work closely with the appropriate GOT agencies to organize for project site assessment, design and subsequent implementation. The Mission has just cabled its approval of our approach and is in the process of making preparations for the team visit. Incidentally, the African Development Bank (BAD) has informed the GOT that it would be interested in financing small hydro in Togo, and so we will of course consult with the BAD in carrying out this effort.

Congo. Some months ago, the Congolese government approached NRECA for assistance in developing a decentralized rural electrification program based on small diesel stations and--where appropriate--small hydros. We submitted a proposal, including a major financing package by the Eximbank, which apparently is quite close to being approved by the GOC. This, of course, is something NRECA is pursuing outside the SDH cooperative agreement, but it has the strong backing of AID/Kinshasa and U.S. Ambassador Brown in Brazzaville. I just note that this is one of several instances where the cooperative agreement has succeeded in its original objective to strengthen NRECA's capacity to provide small hydro assistance to LDC's (independent of AID).

Sierra Leone. Some time ago we prepared a brief report on the potential of small hydro in Sierra Leone on the basis of a visit by one of the staff to Freetown. The report noted considerable physical potential, but found that several problems stood in the way of extensive development, primarily the lack of financing and the absence of significant loads near sites which had been studied. We have recently received a letter from the

AID Mission offering to pay the travel cost of an individual to return to Sierra Leone for the purpose of exploring the matter further. We believe that the key issue will be to integrate small hydro with other rural development activities for which small hydro could provide the best energy alternative. This trip might be scheduled as part of another future trip to West Africa by an SDH Program staffer.

Guinea. We had a favorable response from the AID Mission to Bard Jackson's report proposing the development of several small hydro plants to serve the agriculturally active Forest Region instead of a much larger, single hydropower plant as proposed by the Energy Ministry. As you know, we believe that the capacity of the single plant far exceeds likely demand for electricity in the area. The project as proposed will probably suffer from a dismally low plant factor, hence our suggestion to consider smaller, more economical units on a decentralized basis. The Mission's message indicates that there are those within the GOG who agree with us, but that the Ministry seems to be calling the shots. Now, with the recent coup, things appear to be even more unsettled. So, while the Mission appears interested, we will have to wait until things sort out a bit more.

Costa Rica. We have received from the Mission a formal request to follow-up on Paul Clark's visit to Costa Rica last December with a team sometime this spring/summer to take a closer look at small hydro, per Paul's report. We are being asked to look at the general potential and to specifically consider approaches whereby a national small hydro program could help mitigate the enormous foreign exchange drain associated with Costa Rica's large hydropower program. A key issue here will be the potential for local manufacture of equipment. We are beginning preparations for fielding a team and would like your input based on your recent visit to San Jose.

Panama. We have been in touch with the Mission on a pending request to address a couple of issues. First, we have been asked to perform an evaluation of AID's renewable energy project and, in particular, its small hydro component. Unit costs for the first two projects were way out of line, and the Mission wants us to work with IRHE to see what can be done to bring them down. Related to this concern is an expressed interest by IRHE and the Mission to look into local equipment manufacture prospects as one way of reducing project costs over the long-run. Finally, IRHE appears to be serious about developing rural electric cooperatives to help implement and manage future projects, including one presently underway. We suspect that the centralized management approach used by IRHE to date is one of the main causes of the high cost. We are expecting a cable from the Mission shortly making this request.

Dominican Republic. The Mission has asked NRECA to submit a brief proposal to evaluate the small hydro component of the Mission's large energy project. You recall that we had heard, through Harza, that the project was experiencing difficulties, now a year old. We understand that others were selected to do the evaluation, which is scheduled to begin around May 1.

Guatemala. In response to your letter of last January 30 to the Mission regarding the new SDH Program directions, a request has been made to look seriously at small hydro as a national energy supply strategy. Guatemala is fully aware of its enormous

hydro potential and is evidently quite interested in pursuing small hydro. The Mission noted that the GOG has very little capacity to undertake a program so this would be a key aspect of any assistance we provide. The Mission also indicated that it sees the possibility of integrating SDH with some of its on-going rural development projects.

### Training and Workshops

As you know, we wrapped up our series of introductory workshops with the East Africa workshop last June in Swaziland. The proceedings for that event are nearing completion. This isn't to say that we won't consider holding other workshops in the future. To the contrary, the two African workshops set the framework for training activities in more hands-on, practical format. We believe it is time to build on those successful experiences with more intensive training sessions in targeted areas to address specific problems and issues.

Our first effort will occur in Asia later this year with a 2-week course on hydrologic assessment for engineers and planners from Indonesia, Philippines, Thailand, and Malaysia. Each of these countries has initiated small hydro development, and all four have had considerable difficulty with hydrology. In short, there is very little good data, requiring great expense and effort to make accurate estimates of run-off and streamflow. We suspect that their designs have in at least some cases suffered from poor hydrologic forecasts. This was a big topic at our workshop in Bangkok three years ago, and is clearly a continuing problem. Undoubtedly many other countries would benefit from similar instruction--I note that AID in Pakistan has asked to be included in the ASEAN course. We'll be developing this, and other key topical courses, as we move into this new training phase. We already have learned that the ASEAN group is anxious for training in design considerations, for example.

### Publications

The up-dated edition of the Directory of Manufacturers of Small Hydropower Equipment is now back from the printers. I have attached a copy. This has been a very popular publication over the years, and we have a number of requests for the new edition, including a number of AID Missions.

You will note that several of the Missions responding to your general mailing of January 30 on the SDH Program have mentioned particular interest in the two major publications we are presently working on: the Micro-hydro Sourcebook and the SDH Economics Handbook. We are making every effort to complete these by the end of the year, but with the heavy load of field activities over the next several months, this may prove difficult. I will keep you informed on their progress.

Another very popular series of publications has been the case studies on the successful experience with small hydro in Nepal and Pakistan. These describe two unique approaches to very low-cost, decentralized project development, and include a lot of useful data and information. We would like to propose to prepare a third case study on successful small project in Africa. As with the other case studies, this project involved community participation of villagers, a concept which has attracted a great deal of

interest in Africa. Representatives at both the Abidjan and Mbabane workshops were very keen on the idea, including attendees from the African Development Bank. Unfortunately there has been very little experience in Africa with this approach, and almost nothing which has been documented. Walt Lawrence, who assisted in designing project in question (Karawa in the Zaire) is planning to attend the commissioning ceremony at the Karawa plant this spring. He would also present a paper on grid-connection of small hydro at the annual conference of the Union of Producers, Conveyors, and Distributors of Electrical Energy in Africa (UPDEA) in Togo. We suggest taking advantage of this trip by asking Walt to collect the information for a full case study. The cost to the Program would be under \$10,000. We have cabled AID/Kinshasa requesting their concurrence and co-funding.

### Networking and Private Sector Activities

Key networking activities and contacts with other international technical resource/donor organizations and offices included the following:

- o Gustavo Calderon and Kenneth Cole, Inter-American Development Bank (IDB). Discussed a general strategy to develop micro-hydropower projects in connection with rural electric cooperatives in a number of IDB-member countries. This approach, which would be funded under the IDB's Small Projects Unit, would involve initially, Panama, Bolivia, and Chile. We had earlier received a request from the latter for assistance in developing micro-hydropower projects, so this may prove to be an excellent vehicle to provide this assistance. We are in general agreement with the IDB to coordinate anything which develops from this with on-going efforts in the target regions of Panama and Bolivia.
- o Enrique Barraza, Corporacion de Fomento de la Produccion (Chile). CORFO is undertaking a major small hydro program with the IDB's assistance. They are seeking NRECA assistance with a parallel program in micro-hydropower. We will be working through the IDB to provide this assistance.
- o Kana Mutombo, Union of Producers, Conveyors, and Distributors of Electrical Energy in Africa (UPDEA). Accepted his invitation to attend annual UPDEA conference in Togo in June to present paper on grid interconnection guidelines for small hydro plants. Many UPDEA members are very interested in developing decentralized hydro to feed national power networks, but few have any experience with this. Our contribution could provide significant impetus to this movement.

In the area of private sector networking and contacts, we have been in close touch with a number of U.S. firms as we updated the Directory of Manufacturers of Small Hydropower Equipment. We also have continued to work with several of these in preparing studies of local manufacture prospects in several countries, including the Philippines, Indonesia, Costa Rica, and Panama.

### Other Activities

Per your request, we have been helping Eric, as needed, to prepare for the upcoming evaluation of the SDH Program. We understand from Eric that there may be

Mr. Alan Jacobs  
April 13, 1984  
Page 7

flexibility on the timing of the evaluation, and may not need to precede the commitment of FY84 funds. While we will be ready whenever it is necessary, there are distinct advantages from our point of view to delaying the evaluation until later this year. We presently have scheduled seven field visits during the period April-August. While the bulk of the team's members will come from the private sector, SDH staffers will be involved in most of these visits. This will make it difficult to have us all available during this period for the evaluation. Moreover, since the establishment of the new Program objectives and directions last fall, and before the recent flurry of requests and activity, we would have very few field assignments on which to base an evaluation. This coming fall would be a better time. It therefore may be beneficial from the standpoint of the evaluation itself to provide a more extensive record against which the objectives could be judged. Please let me know how we can be of further help to you in the meantime.

Paul Clark has been spending afternoons over at S&T/EY per your request for about three weeks now. We hope this has been helpful to you, it certainly has been a great boon to us to have more regular contact with your office.

This has been a summary of our program activities for the month of March 1984. You will receive the next status report in the first week of May.

Sincerely,



David R. Zoellner  
Manager  
Small Decentralized Hydropower Program

DRZ:jc

Enclosures

cc: Eric Peterson  
Samuel Bunker  
Robert Kabar  
Jack Vanderryn  
David Rhoad

### Routine contacts during the month of March

- o Harza Engineering, Inc., USAID contractor for Dominican Republic project--sent various SDH publications in response to a request for assistance.
- o Scott Hudson, Cherryland Cooperative (Michigan)--had Peace Corps experience in Nepal some time ago, saw article written by A. Inversin in Overseas Report, and wanted to see how he or coop could get involved.
- o Wes Combs, Institute for Animal and Agricultural Sciences, Nepal--wanted background information on NRECA SDH Program with a couple of proceedings. He will be only staff member staying with IAAS and is interested in going through with micro-hydro plant for one of their campuses.
- o Ed Kramer, Himal Hydro, Nepal--sent copy of Sourcebook for comments, as he is thinking of a similar effort.
- o Rajbhandari, Senior Engineer, SECID, Nepal--was interested in getting any info on small hydropower since he has been involved in such efforts.
- o Ben Weije, DCS, Butwal, Nepal--sent copy of Nepal case study; he is involved in storage cooker work.
- o Francisco J. Gutierrez Atencio, Argentina--answered letter forward to us by A. Jacobs.
- o Rob Lichtman, Massachusetts--consultant who has worked with UN, etc., interested in work in Nepal; sent him Nepal issues paper and SDH material.
- o Arun Kuman, Roorkee, India--sent information on intake design to assist with their hydro projects.
- o Robert Jugie, Sarawak, Malaysia--responded to request for assistance in micro-hydropower project; sent case studies and Directory of manufacturers of small hydropower equipment.
- o Robert Smith, Training Specialist, International Fertilizer Development Corporation (IDFC)--responded to letter received by E. Graham, discussed knowledge of fertilizer projects and sent Program Status.
- o Kevin Shea, Swift Run Company, Boston--gave information on working overseas.
- o Bob Archer, USAID/LAC/DR--responded to request for candidates for evaluation team.
- o Paul Cadario--sent copy of Guinea: Proposal to renovate the Macenta mini-hydro site.
- o Myron Golden, USAID/Lome/Togo--sent copies of Togo: An assessment of decentralized hydropower potential.
- o Ursula Weimper, World Bank--sent copy of Togo: An assessment of decentralized hydropower potential.

- o Laurence Bond, USAID/Abidjan/Ivory Coast--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Edmond Leo, United Nations Renewable Energy Unit--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Mark Ward, USAID/AFR/TR/SDP--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Shasi Desai, African Development Bank--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Clarence Kooi, Palo Alto, California--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Paul Kirshen, Concord, Massachusetts--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Walter Lawrence, Alexandria, Virginia--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Tobie Lanou, Alexandria, Virginia--sent copy of Togo: An assessment of decentralized hydropower potential.
- o Ron Greenberg, USAID/ASIA/TR/EFE--sent information on SDH and IPD.
- o Christopher D. Turner, Earth Studies Program, Appalachian State University--sent 50 copies of Directory of Manufacturers of Small Hydropower Equipment.
- o Keith Power, North American Turbine Company, Inc.--sent copy of Directory of Manufacturers of Small Hydropower Equipment.
- o Mark P. Youngstrom, Wright Engineering, Ltd.--sent copy of Directory of Manufacturers of Small Hydropower Equipment.
- o Robert Abbot, San Francisco, California--sent copy of Directory of Manufacturers of Small Hydropower Equipment.
- o Douglas S. Lewis, West Des Moines, Iowa--sent information on volunteer organizations.
- o Institute of Development Studies, University of Sussex, England--sent copy of "Nepal: Private Sector Approach to Implementing Micro-Hydropower Schemes, A Case Study."
- o Jordan College, Energy Institute--sent copy of "Pakistan: Villager-Implemented Micro-Hydropower Schemes, A Case Study."
- o Copies of the Directory of Manufacturers of Small Hydropower Equipment were sent to all companies listed in the directory.
- o Zenaida Santos, National Electrification Administration, Philippines--sent copy of Directory of Manufacturers of Small Hydropower Equipment.
- o Chartdanai Chartpolrak, National Energy Administration, Thailand--sent copy of Directory of Manufacturers of Small Hydropower Equipment.

- o Hoesni Nasaruddin, National Electricity Board, Malaysia--sent copy of Directory of Manufacturers of Small Hydropower Equipment.
- o Hartoyo Notodipuro, Director, PLN, Indonesia--sent copy of Directory of Manufacturers of Small Hydropower Equipment.